CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
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DOCKET
01-EP-7C
DATE OCT 14 2009
RECD OCT 14 2009

**DATE:** October 14, 2009

**TO:** Interested Parties

**FROM:** Matt Trask, Amendment Project Manager

**SUBJECT: Hanford Energy Park Peaker (HEPP) Project (01-EP-7C) Staff Analysis of Proposed Modifications to the California Energy Commission's Final Decision Approving the HEPP**

On October 1, 2008, GWF Energy, LLC, filed a petition with the California Energy Commission to amend the Energy Commission Decision for the Hanford Energy Park Peaker (HEPP) Project. Staff prepared an analysis of this proposed change, and a copy is enclosed for your information and review.

The HEPP project is a 95 MW simple-cycle peaking power plant located in the City of Hanford in Kings County. The project was certified by the Energy Commission on April 26, 2001, and began commercial operation on September 21, 2001. The proposed modifications would allow GWF to convert the facility from single-cycle to combined-cycle operations by adding two Once-Through Steam Generators, an air-cooled condenser and a steam turbine, which would increase overall generating capacity of the facility to 120 MW without increasing fuel use.

Energy Commission staff reviewed the petition and assessed the impacts of this proposal on environmental quality, public health and safety, and proposes revisions to existing conditions of certification for Air Quality, Biological Resources, Cultural Resources, Facility Design, Geology and Paleontology, Socioeconomic Resources, Soil and Water Resources, Transmission System Engineering, and Visual Resources. It is staff's opinion that, with the implementation of revised conditions, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The amendment petition and staff's analysis has been posted on the Energy Commission's webpage at:

http://www.energy.ca.gov/sitingcases/hanford_amendment/documents/index.html

The Energy Commission's Order (if approved) will also be posted on the webpage. Energy Commission staff intends to recommend approval of the petition at the December 16, 2009, Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below prior to October 22, 2009.

Matt Trask, Amendment Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

Comments may be submitted by fax to (916) 654-3882, or by e-mail to mtrask@energy.state.ca.us. If you have any questions, please contact me at (916) 651-2935.

For further information on how to participate in this proceeding, please contact the Energy Commission Public Adviser's Office, at (916) 654-4489, or toll free in California at (800) 822-6228, or by e-mail at publicadviser@energy.state.ca.us. News media inquiries should be directed to the Energy Commission Media Office at (916) 654-4989, or by e-mail at mediaoffice@energy.state.ca.us.

Enclosure

Staff Assessment

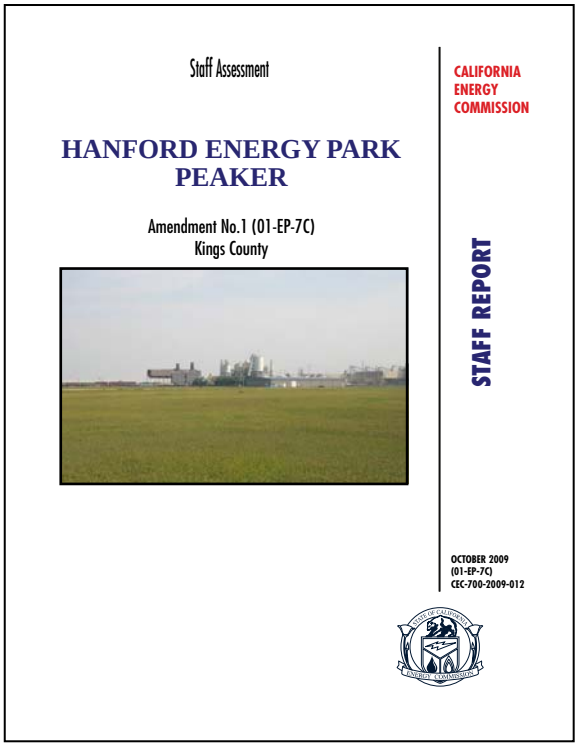
# HANFORD ENERGY PARK PEAKER

Amendment No.1 (01-EP-7C)
Kings County

CALIFORNIA ENERGY COMMISSION

STAFF REPORT

OCTOBER 2009
(01-EP-7C)
CEC-700-2009-012-REV1




# CALIFORNIA ENERGY COMMISSION

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# HANFORD ENERGY PARK PEAKER PROJECT (01-EP-7C)
# STAFF ANALYSIS
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# EXECUTIVE SUMMARY

Matt Trask, Amendment Project Manager

## INTRODUCTION

On October 1, 2008, the California Energy Commission (Energy Commission) received a petition from GWF Energy, LLC (GWF) to amend the Energy Commission Decision for the Hanford Energy Park Peaker (HEPP) Project (01-EP-7C).

The purpose of the Energy Commission's amendment review process in this Staff Assessment (SA) is to assess the direct, indirect and cumulative impacts of the amendment on the environment, public health and safety, and the electric transmission system. The SA presents the conclusions, recommendations, and proposed conditions of certification that staff believes are necessary to mitigate or avoid potential significant adverse environmental impacts and to satisfy laws, ordinances, regulations and standards (LORS) that have changed since the original project was certified.

The review process includes an evaluation of the consistency of the proposed changes with the Energy Commission's Decision and with current applicable LORS (Title 20, Calif. Code of Regulations, section 1769).

This SA contains the Energy Commission staff's evaluation of the following technical areas: air quality; biological resources; cultural resources; land use; noise and vibration; public health; socioeconomic resources; soil and water resources; traffic and transportation; transmission line safety and nuisance; visual resources; waste management; facility design; geology and paleontology; power plant efficiency; power plant reliability; and transmission system engineering.

## PROJECT LOCATION AND DESCRIPTION

The 95-megawatt HEPP project was certified by the Energy Commission on April 26, 2001, and began operations on September 21, 2001. The facility is located on approximately 5 acres in an industrial area in the City of Hanford in Kings County. The HEPP was certified under the Energy Commission's Emergency Peaker Program during the power crisis of 2001. It consists of two aero-derivative General Electric LM6000 combustion turbine-generator sets operating in simple-cycle mode. It presently uses up to 150 acre-feet per year (afy) of groundwater from a well located on GWF's adjacent petroleum coke-fueled cogeneration plant (Hanford LP, LLC) for plant cooling and other uses.

GWF requests to convert the HEPP to the GWF Hanford Combined-Cycle Power Plant (GWF Hanford) by adding two Once-Through Steam Generators (OTSGs) to recover heat from the exhaust of the existing turbines and create steam to power a new 25 MW steam turbine generator. The OTSGs differ from more common heat-recovery steam generators (HRSGs) found at combined-cycle plants in that the OTSGs are constructed to withstand operation of the plant in simple-cycle operations for extended periods, providing considerable flexibility in how GWF would operate the plant and its ability to deliver power to the grid.

To avoid the need for extensive new water use at the converted plant, GWF proposes to install a 74-foot tall, 240-foot long, 42-foot wide air-cooled condenser to convert steam exiting the steam turbine back into liquid to be pumped back into the OTSGs. The combined-cycle plant would also utilize a wet-surface air cooler (WSAC) for lube-oil cooling, which uses a spray of water onto the surface of the heat exchanger when air temperatures are above 98 degrees. GWF proposes to increase present water use at the plant by approximately 5 percent in order to supply makeup water for the OTSGs and WSAC.

GWF also intends to demolish and remove the two existing oxidation catalyst and selective catalytic reduction (SCR) systems, including the existing catalyst housing and 85-foot stacks, and add a new oxidation catalyst system within each OTSG. The new system would control carbon monoxide (CO) emissions to outlet concentration of less than 3 parts per million volume dry (ppmvd) at 15 percent oxygen (O2) and volatile organic compounds (VOC) emissions to outlet concentration of less than 2 ppmvd at 15 percent O2 during simple-cycle and combined-cycle operation. The new SCR system within each OTSG would reuse the existing aqueous ammonia storage system to control oxides of nitrogen (NOx) emissions to less than 2 ppmvd at 15 percent O2 during combined-cycle operation.

These proposed modifications would require changes to the site layout concerning location of the new and existing structures, such as relocation of the present stormwater retention basin, but not to the fenced area of the project site. In addition, GWF requests to add a temporary area for construction worker parking and secondary laydown. The additional 5 acres, located adjacent to the present HEPP site on GWF land used for the same purpose during construction of the existing plant, will allow for a more efficient use of the project site during construction and safer, more cost-effective construction staging.

A more complete description of the project, including maps of the project site and vicinity, is contained in the **Project Description** section of this SA. (**See PROJECT DESCRIPTION Figure 1 & 2**).

## NECESSITY FOR THE PROPOSED MODIFICATIONS

The project owner requested the proposed modifications in order to increase the efficiency and operational flexibility of the plant, and therefore be better able to provide the power and ancillary services being solicited by area utilities. If approved and constructed, the modified plant would be able to operate both in simple-cycle and combined-cycle modes, and in combined-cycle mode would be able to produce an additional 25 MW of power, without any increase in fuel use. The project is located such that it can deliver power into the Southern California electricity market, and help relieve congestion on the major interties connecting Northern and Southern California.

## PROJECT FUNDING AND OWNERSHIP

GWF Hanford, LLC, a subsidiary of GWF Energy, LLC (GWF), would be the sole project owner of the GWF Hanford facility. GWF is currently negotiating a power purchase

agreement for the modified facility with an area utility, but has not yet finalized the agreement.

## SUMMARY OF STAFF ANALYSIS

The **EXECUTIVE SUMMARY Table 1** below shows all the technical areas contained in the SA and also indicates where staff has recommended changes to the existing HEPP license and conditions of certifications. Staff believes that by requiring the proposed changes to the existing conditions below, the potential impacts of the proposed conversion to combined-cycle operations would be reduced to less than significant levels. The details of the proposed condition changes can be found under their appropriate technical headings in this SA.

**EXECUTIVE SUMMARY Table 1**
**Summary of Technical Sections Conditions of Certification**

| Technical Area | Changes to Conditions of Certification | Technical Area | Changes to Conditions of Certification |
|---|---|---|---|
| Biological Resources | Yes | Air Quality/Greenhouse Gas | Yes |
| Cultural Resources | Yes | Facility Design | Yes |
| Noise and Vibration | Yes | Geology and Paleontology | Yes |
| Socioeconomic Resources | Yes | Power Plant Efficiency | No |
| Soil and Water Resources | Yes | Power Plant Reliability | No |
| Transmission Line Safety and Nuisance | No | Transmission System Engineering | Yes |
| Visual Resources | Yes | Public Health | No |

Energy Commission technical staff reviewed the petition to amend for potential environmental impacts and consistency with applicable laws, ordinances, regulations and standards (LORS). Where applicable, staff referred to previous environmental assessments in the attached analyses of GWF's amendment petition. Staff determined that the technical areas of hazardous materials management, power plant efficiency and reliability, public health, socioeconomics, transmission line safety and nuisance, and worker safety and fire protection were not affected by the proposed changes, and no revisions or new conditions of certification are needed to ensure the project remains in compliance with all applicable LORS. Staff also determined no additional analysis was needed for the areas of Hazardous Materials Management and Worker Safety and Fire Protection, and therefore those sections are not included in this SA.

Staff determined that the following technical or environmental areas would be affected by the proposed project change to combined-cycle operations and has proposed new and revised conditions of certification in order to assure compliance with LORS and/or to reduce potential environmental impacts to a less than significant level.

- **Air Quality**: Changes to air quality conditions of certification relate largely to the changes in the conditions imposed in the San Joaquin Valley Air Pollution Control District's Air Permit for the facility, as well as updating air quality standards and the best management practices employed to reduce project impacts.

- **Biological Resources**: Staff recommends elimination of seven Biological Resources Conditions of Certification and changes to five other Conditions originally contained in the Decision to reflect the proposed minor project changes and remain relevant to the proposed GWF Hanford project.

- **Cultural Resources:** The changes to Cultural Resources Conditions of Certification were made to more appropriately provide for the discovery of as yet unknown buried archaeological deposits, reflecting changing standards and practices now recommended by staff compared to when the project's license was originally issued, and to assure the proposed project's compliance with all applicable LORS.

- **Facility Design:** The Facility Design Conditions of Certification were modified to include several additional components that would be installed as a result of the changed design of the project, such as the steam turbine and its step-up transformer, and to note an update to the applicable Building Codes since the project was originally licensed.

- **Geology, Mineral Resources and Paleontology:** As with Cultural Resources, Conditions of Certification related to Geology, Mineral Resources and Paleontology were modified to ensure protection of any paleontological resources that might be encountered during construction, reflecting changing standards and practices now recommended by staff compared to when the project's license was originally issued, and to assure the proposed project's compliance with all applicable LORS.

- **Land Use:** Staff's new proposed Condition of Certification **LAND-4** requires that the project conform to the revised Kings Industrial Park Performance and Development Standards (updated in 2007), and includes a provision calling for review and comment by the City of Hanford.

- **Noise:** One Noise-related Condition of Certification was revised to more accurately reflect the appropriate conditions for verifying project noise levels by specifying the power level at which the monitoring should be done.

- **Soil & Water Resources:** The Soil & Water Resources Conditions of Certification were modified to reflect the changes in water use and the impact mitigation for the project, which consists of groundwater banking in the local area.

- **Traffic and Transportation:** The Traffic and Transportation Conditions of Certification were modified to reflect the changes in Levels of Service (LOS) for several roads in the area, and requiring additional restrictions to use of those roads during congested periods.

- **Transmission System Engineering:** The TSE Conditions of Certification were revised to reflect the changed design of the project, and to ensure proper interconnection and synchronization of the steam turbine generator.

- **Visual Resources:** Staff has proposed Visual Resources Condition of Certification **VIS-7** to screen the construction laydown and parking area to be located north of the current boundary of the HEPP site, and Condition of Certification **VIS-8** to mitigate impacts of project construction.

- **Waste Management:** Staff has proposed changes to Condition of Certification **WASTE-1** to ensure the project owner maintains compliance with California Code of Regulations Title 22, Section 66262.12 for identification of U.S. EPA hazardous waste generators; and has proposed changing Condition of Certification **WASTE-2**, deletion of **WASTE-3**, and the addition of **WASTE-5** to ensure that if potentially hazardous conditions are encountered, Energy Commission staff would be notified and the appropriate mitigation would be implemented.

## STAFF RECOMMENDATIONS AND CONCLUSIONS

Staff concludes that the following required findings mandated by Title 20, section 1769(a)(3) of the California Code of Regulations can be made and will recommend approval of the petition to the Energy Commission:

A. There will be no new or additional unmitigated significant environmental impacts associated with the proposed changes,

B. The facility will remain in compliance with all applicable laws, ordinances, regulations and standards,

C. The change will be beneficial to the project owner by increasing operational efficiencies and enhancing the project's economics. Moreover, the change will be beneficial to the State of California by increasing power in an area of need (Southern California).

There has been a substantial change in circumstances since the Energy Commission certification justifying the change. The combined-cycle will provide superior fuel economy and environmental performance compared to the present simple-cycle configuration.

# INTRODUCTION

Matt Trask

## PURPOSE OF THIS REPORT

The Staff Assessment (SA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the GWF Energy's LLC's October 2008 Petition to Amend the Energy Commission's license for the Hanford Energy Park Peaker (HEPP) Project (01-EP-7C). This SA is a staff document. It is neither a Committee document, nor a draft decision.

The SA describes the following:

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

The technical area analyses contained in this SA are based upon information from: 1) the Energy Commission Decision; 2) Petition to Amend; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed changes and additions to the 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 staff's method of ensuring post-certification compliance with adopted requirements.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulation section 1701 et seq.(specifically section 1769 pertaining to amendments), and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).

Section 1769(a)(3) authorizes the Energy Commission's approval of the amendment petition if it can make the following findings:

(A) The findings specified in section 1755 (c) [whether all significant environmental impacts can be mitigated or avoided], and (d) [if all significant impacts cannot

be avoided, overriding considerations justify approving the amendment], if applicable;

(B) That the project would remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;

(C) The change will be beneficial to the public, project owner, or intervenors; and

(D) There has been a substantial change in circumstances since the Energy Commission certification justifying the change or that the change is based on information that was not available to the parties prior to Energy Commission certification.

The SA contains an Executive Summary, Introduction, Project Description, and the environmental, engineering, and public health and safety analysis of the proposed amendment. The technical areas included in the SA are: air quality (including greenhouse gas analysis); biological resources; cultural resources; land use; noise and vibration; socioeconomic resources; soil and water resources; traffic and transportation; transmission line safety and nuisance; waste management; facility design; geology and paleontology; power plant efficiency; power plant reliability; and transmission system engineering.

Each of the technical area assessments includes a discussion of:

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

Staff has added new conditions of certification and in some cases modified or deleted some of the existing conditions of certification contained in the Energy Commission Decision for the HEPP. Implementing the modified and existing conditions, along with the mitigation measures proposed by the project owner, will ensure that the proposed relocation and other site changes would result in no significant environmental impacts. Where conditions of certification have changed from the original Energy Commission Decision staff displays the revised information in <u>underline</u> (new text) and ~~strikeout~~ (deleted text).

## ENERGY COMMISSION AMENDMENT PROCESS

The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, §25500). The Energy Commission must review Petitions to Amend to

assess potential environmental and public health and safety impacts, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws and standards (Pub. Resources Code, §25523 (d)).

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

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Staff is required to coordinate with other agencies to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of CEQA. The Energy Commission's site certification and amendment program has been certified by the Resources Agency as CEQA-equivalent (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission acts in the role of the CEQA lead agency and is subject to all other applicable portions of CEQA.

Staff uses the SA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. If controversy or disagreement over the SA arises after it is published, staff may conduct one or more workshops to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshop(s) and written comments, staff will refine their analyses, correct any errors, and finalize conditions of certification to reflect areas where staff has reached agreement with the parties. These refined analyses, along with responses to written comments on the SA, will be published in an errata.

The Siting Committee has oversight over compliance issues for the Energy Commission and has elected to oversee the HEPP amendment petition. If significant controversy or disagreement among parties arise following publication of this SA, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties at one or more Committee hearings, thereby creating a hearing record on which a decision on the amendment can be based. The hearing before the Committee would also allow all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies. If no significant controversy nor disagreement among parties arise following publication of the SA, the Siting Committee may choose to not hold hearings on the petition, in which case parties would still be able to address their concerns at the Business Meeting at which the Energy Commission is scheduled to rule upon the petition.

Following any hearings, the Siting Committee's recommendation to the full Energy Commission on whether or not to approve the proposed amendment may be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated to receive written public comments. At the

conclusion of the comment period, the Committee may prepare a revised PMPD. If there is a revised PMPD, it will be circulated for a comment period to be determined by the Committee. At the close of that comment period, the PMPD would be submitted to the full Energy Commission for a decision.

The Energy Commission staff has made a substantial effort to notify interested parties, encourage public participation and notify property owners within 1000 feet of the HEPP project and 500 feet of the transmission line. Energy Commission staff mailed Notices of Receipt on October 16, 2008, to interested parties, local libraries, responsible and trustee agencies and to property owners within 1000 feet of the HEPP project and 500 feet of the transmission line. Staff also contacted applicable local, regional, state and federal agencies to encourage participation in the amendment process.

## AGENCY COORDINATION

As noted above, the Energy Commission approval 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 LORS that may be applicable to proposed projects or would have had permitting authority except for the Energy Commission's exclusive jurisdiction to permit thermal power plant 50 megawatts or larger. These agencies include the City of Hanford, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, California Department of Fish and Game, California Air Resources Board, Department of Toxic Substances Control, the Regional Water Quality Control Board, and the San Joaquin Valley Air Pollution Control District.

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# PROJECT DESCRIPTION

Testimony of Matt Trask

## INTRODUCTION

On October 1, 2008, the California Energy Commission (Energy Commission) received a petition from GWF Energy, LLC (GWF) to amend the Energy Commission Decision for the Hanford Energy Park Peaker Plant. The 95-megawatt project was certified by the Energy Commission under its Emergency Peaker program on April 26, 2001, and began operations on September 21, 2001. The facility is located on approximately 5 acres in an industrial area in the City of Hanford in Kings County. If approved by the Energy Commission, construction of the modified facility is expected to commence approximately three months after the Energy Commission rules on the petition to amend, which could be as early as first quarter of 2010.

The petition contains several modifications, the most notable being the installation of an air-cooled condenser, a steam-turbine generator, and two Once-Through Steam Generators. All of the proposed modifications are described below.

## PROJECT LOCATION

Following the completion of the certification process in April 2001, the project owner was granted permission by the Energy Commission to construct the HEPP in the City of Hanford's Kings Industrial Park at the southwest corner of the intersection of Idaho Avenue and Power Way, directly across Idaho Avenue from the former Pirelli Tire manufacturing facility. The facility is located adjacent to GWF's existing Hanford, LP, cogeneration plant, which is fueled by petroleum coke. See **PROJECT DESCRIPTION Figures 1 and 2** for the local setting of this proposed location.

## PROJECT FACILITIES

GWF requests to convert the HEPP to the GWF Hanford Combined-Cycle Power Plant (GWF Hanford) by adding two Once-Through Steam Generators (OTSGs) to recover heat from the exhaust of the existing turbines and create steam to power a new 25 MW steam turbine generator. The OTSGs differ from more common heat-recovery steam generators (HRSGs) found at combined-cycle plants in that the OTSGs are constructed to withstand operation of the plant in simple-cycle operations for extended periods, providing considerable flexibility in how GWF would operate the plant and its ability to deliver power to the grid.

To avoid the need for extensive new water use at the converted plant, GWF proposes to install a 74-foot tall, 240-foot long, 42-foot wide air-cooled condenser to convert steam exiting the steam turbine back into liquid to be pumped back into the OTSGs. The combined-cycle plant would also utilize a wet-surface air cooler (WSAC) for lube-oil cooling, which uses a spray of water onto the surface of the heat exchanger when air temperatures are above 98 degrees.

GWF proposes to increase present water use at the plant by approximately 5 percent in order to supply makeup water for the OTSGs and WSAC. These proposed

modifications would require changes to the site layout concerning location of the new and existing structures, such as relocation of the present stormwater retention basin, but not to the fenced area of the project site.

In addition, GWF requests to add a temporary area for construction worker parking and secondary laydown. The additional 5 acres, located adjacent to the present HEPP site on GWF land used for the same purpose during construction of the existing plant, would allow for a more efficient use of the project site during construction and safer, more cost-effective construction staging.

Key features of GWF's proposal for the new combined-cycle plant include:

- Addition of two new OTSGs, each receiving the exhaust from one of the existing combustion turbine generators (CTGs). The OTSGs would be vertical flow boilers with rectangular stacks that would be 91 feet, 6 inches tall by 13 feet wide by 8.9 feet long.
- Addition of a new 25 MW (net) condensing steam turbine generator (STG) with an associated lube oil cooler.
- Addition of a new 74-foot tall by 240-foot long by 42-foot wide air cooled condenser (ACC) for system heat rejection.
- On-site modifications to the water piping, fire protection, and the storm water drainage collection systems.
- Utilization of existing, previously permitted auxiliary boiler at the adjacent GWF cogeneration plant and addition of steam piping to the new facilities to provide steam turbine seals and air cooled condenser evacuation during OTSG start-up.
- Addition of a new water treatment skid for boiler makeup water.
- Modification of the wastewater treatment system to optimize water supply requirements and minimize off-site wastewater disposal.
- Increase in water consumption of approximately 8 acre-feet per year (AFY) for OTSG feedwater makeup and the lube oil cooler makeup, but no change to the water supply or service connection.
- Addition of a generator step-up transformer and circuit breaker into the existing on-site 115 kilovolt (kV) switchyard to transmit the STG power output to the PG&E grid.
- No change to existing off-site transmission lines.
- No change to existing site access.

## AIR QUALITY EMISSIONS

The original air quality and public health analysis was based on 8,000 hours per year of steady state operations, while the analysis of the petition to amend includes those hours plus up to 541 hours of start-up and shutdown operations per year. However, annual emissions limits and San Joaquin Valley Air Pollution Control District-required emission reduction credit quantities (offsets) are unchanged from those in the original project

license. The project will use the Best Available Control Technology (BACT) to control NOx, VOCs, sulfur dioxide ($SO_2$ ), and PM10)/2.5 emissions.

The project would involve demolition and removal of the two existing oxidation catalyst and selective catalytic reduction (SCR) systems, including the existing catalyst housing and 85-foot stacks, and addition of a new oxidation catalyst system within each OTSG. The new system would control carbon monoxide (CO) emissions to outlet concentration of less than 3 parts per million volume dry (ppmvd) at 15 percent oxygen (O2) and volatile organic compounds (VOC) emissions to outlet concentration of less than 2 ppmvd at 15 percent O2 during simple-cycle and combined-cycle operation. Addition of a new SCR system within each OTSG, reusing the existing aqueous ammonia storage system, would control oxides of nitrogen (NOx) emissions to less than 2 ppmvd at 15 percent O2 during combined-cycle operation.

## WATER SUPPLY AND WASTE WATER TREATMENT

The modified project would utilize the existing storm water retention basin for storm water management. The basin would be expanded by approximately 1,200 cubic yards by expanding the basin approximately 20 ft to the west, within the existing fenceline. Excess cut from expansion of the retention basin would be retained on-site and incorporated into the final facility grading.

Water required for domestic uses and fire fighting would also be provided by the City through a new connection from the southern boundary of the project site to the existing 12-inch potable water line that runs along Enterprise Avenue. The quantities of water used would remain nearly the same as under the original design.

## CONSTRUCTION AND OPERATION

GWF proposes construction to begin on the project in the first quarter of 2011 and take approximately 15 months. Commercial operation of GWF Hanford is expected to begin by the spring of 2012. The construction work force necessary for the project is expected to peak at 154 workers in months 7 through 12. Once the new project is on line, the operational staff required is expected to increase by about 14 employees. The capital cost of the project is expected to be approximately $90 million.

## FACILITY CLOSURE

The planned life of the GWF Hanford facility is 30 years or longer. Whenever the facility is closed, either temporally or permanently, the closure procedures would follow the described plan provided in the Energy Commission Decision and any additional LORS in effect at that time.

## REFERENCES

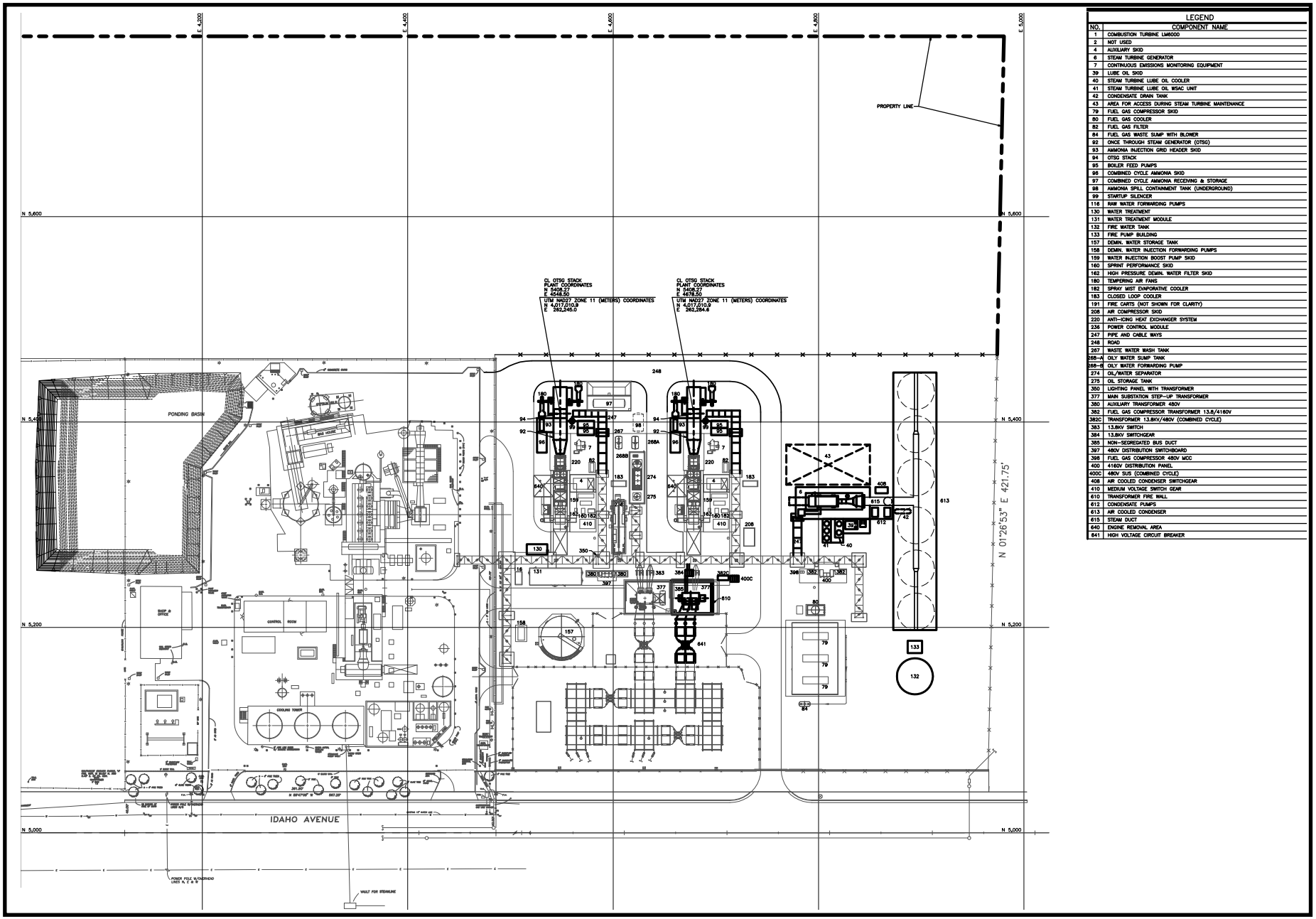
California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

# PROJECT DESCRIPTION - FIGURE 1

Hanford Amendment Project - General Arrangement



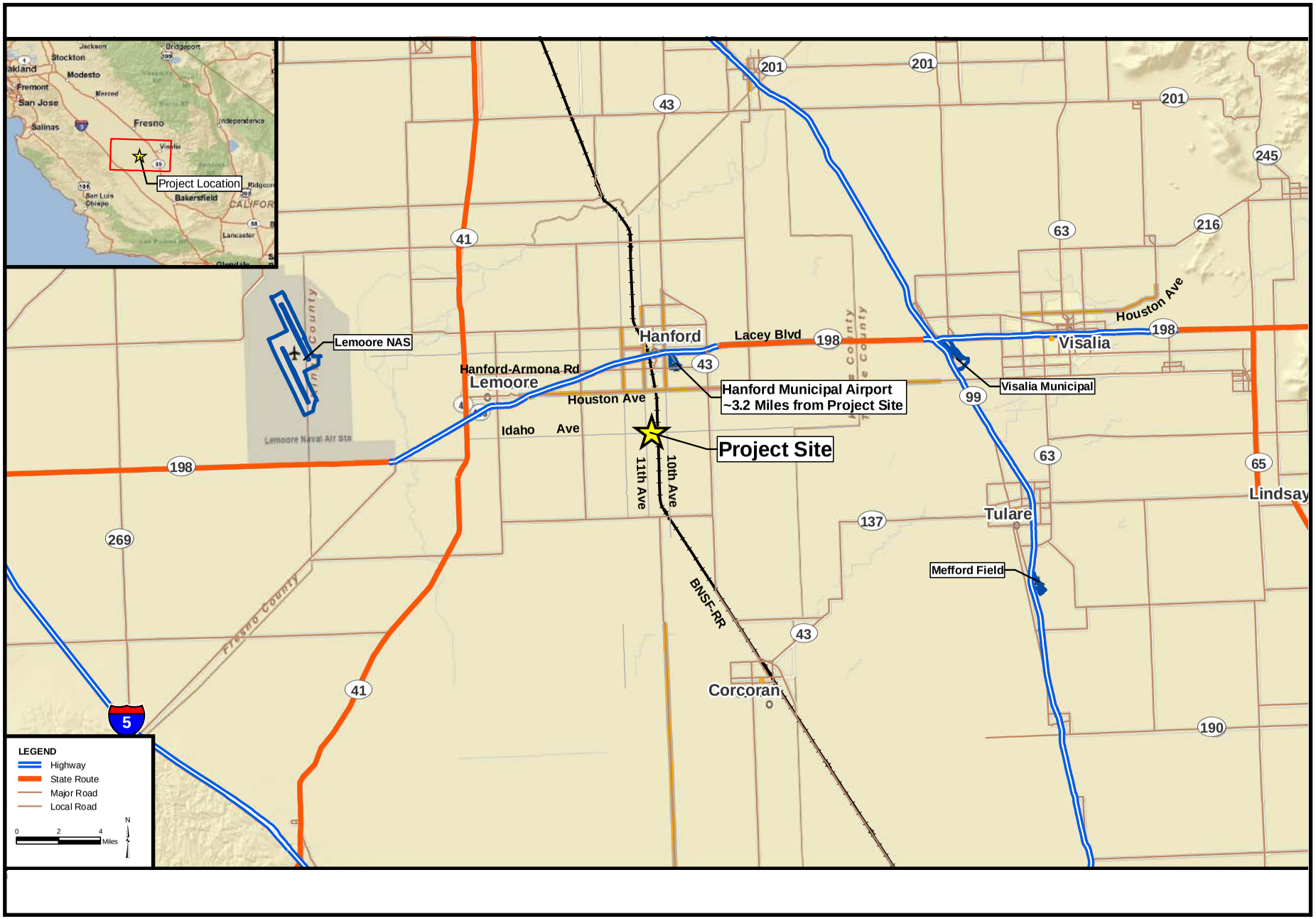

| LEGEND | |
|---|---|
| NO. | COMPONENT NAME |
| 1 | COMBUSTION TURBINE LM6000 |
| 2 | NOT USED |
| 4 | AUXILIARY SKID |
| 6 | STEAM TURBINE GENERATOR |
| 7 | CONTINUOUS EMISSIONS MONITORING EQUIPMENT |
| 39 | LUBE OIL SKID |
| 40 | STEAM TURBINE LUBE OIL COOLER |
| 41 | STEAM TURBINE LUBE OIL WSAC UNIT |
| 42 | CONDENSATE DRAIN TANK |
| 43 | AREA FOR ACCESS DURING STEAM TURBINE MAINTENANCE |
| 79 | FUEL GAS COMPRESSOR SKID |
| 80 | FUEL GAS COOLER |
| 82 | FUEL GAS FILTER |
| 84 | FUEL GAS WASTE SUMP WITH BLOWER |
| 92 | ONCE THROUGH STEAM GENERATOR (OTSG) |
| 93 | AMMONIA INJECTION GRID HEADER SKID |
| 94 | OTSG STACK |
| 95 | BOILER FEED PUMPS |
| 96 | COMBINED CYCLE AMMONIA SKID |
| 97 | COMBINED CYCLE AMMONIA RECEIVING & STORAGE |
| 98 | AMMONIA SPILL CONTAINMENT TANK (UNDERGROUND) |
| 99 | STARTUP SILENCER |
| 116 | RAW WATER FORWARDING PUMPS |
| 130 | WATER TREATMENT |
| 131 | WATER TREATMENT MODULE |
| 132 | FIRE WATER TANK |
| 133 | FIRE PUMP BUILDING |
| 157 | DEMIN. WATER STORAGE TANK |
| 158 | DEMIN. WATER INJECTION FORWARDING PUMPS |
| 159 | WATER INJECTION BOOST PUMP SKID |
| 160 | SPRINT PERFORMANCE SKID |
| 162 | HIGH PRESSURE DEMIN. WATER FILTER SKID |
| 180 | TEMPERING AIR FANS |
| 182 | SPRAY MIST EVAPORATIVE COOLER |
| 183 | CLOSED LOOP COOLER |
| 191 | FIRE CARTS (NOT SHOWN FOR CLARITY) |
| 208 | AIR COMPRESSOR SKID |
| 220 | ANTI-ICING HEAT EXCHANGER SYSTEM |
| 236 | POWER CONTROL MODULE |
| 247 | PIPE AND CABLE WAYS |
| 248 | ROAD |
| 267 | WASTE WATER WASH TANK |
| 268-A | OILY WATER SUMP TANK |
| 268-B | OILY WATER FORWARDING PUMP |
| 274 | OIL/WATER SEPARATOR |
| 275 | OIL STORAGE TANK |
| 350 | LIGHTING PANEL WITH TRANSFORMER |
| 377 | MAIN SUBSTATION STEP-UP TRANSFORMER |
| 380 | AUXILIARY TRANSFORMER 480V |
| 382 | FUEL GAS COMPRESSOR TRANSFORMER 13.8/4160V |
| 382C | TRANSFORMER 13.8KV/480V (COMBINED CYCLE) |
| 383 | 13.8KV SWITCH |
| 384 | 13.8KV SWITCHGEAR |
| 385 | NON-SEGREGATED BUS DUCT |
| 397 | 480V DISTRIBUTION SWITCHBOARD |
| 398 | FUEL GAS COMPRESSOR 480V MCC |
| 400 | 4160V DISTRIBUTION PANEL |
| 400C | 480V SUS (COMBINED CYCLE) |
| 408 | AIR COOLED CONDENSER SWITCHGEAR |
| 410 | MEDIUM VOLTAGE SWITCH GEAR |
| 610 | TRANSFORMER FIRE WALL |
| 612 | CONDENSATE PUMPS |
| 613 | AIR COOLED CONDENSER |
| 615 | STEAM DUCT |
| 640 | ENGINE REMOVAL AREA |
| 641 | HIGH VOLTAGE CIRCUIT BREAKER |

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

SOURCE: Hanford Amendment #1

**PROJECT DESCRIPTION - FIGURE 2**

Hanford Amendment Project - Regional Setting






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

SOURCE: Hanford Amendment #1

# ENVIRONMENTAL ANALYSIS

# AIR QUALITY
**Testimony of William Walters**

## INTRODUCTION

GWF proposes to modify the existing Hanford Energy Peaker Plant (HEPP) to create a dual-function power plant. The modification of the facility to the GWF Hanford Combined-Cycle Power Plant (GWF Hanford) would enable the plant to operate both in simple-cycle mode and combined-cycle mode. The existing selective catalytic reduction (SCR) equipment would be replaced with a “once through steam generator (OTSG)” unit that contains a new SCR system, capable of efficiently controlling NOx emissions under both of the operating modes. A single steam turbine generator (STG) unit would be added to generate electricity from the steam coming from the OTSG. The STG would increase nominal generating capacity by 25 MW and the total nominal net generating capacity when operating in combined-cycle mode would increase to 120 MW. The generating capacity when operating in simple-cycle mode (95 MW net) would not be significantly altered by the requested modification.

The setting, project emissions, and project impacts are fully updated by this analysis and the Conditions of Certification (COCs) have been revised. All of the District conditions have been revisited by the San Joaquin Valley Air Pollution Control District (SJVAPCD or District), and all of the District Revised Preliminary Determination of Compliance conditions including the additions and revisions required by the District are provided in this analysis. District conditions have been renumbered in some instances. The construction emission mitigation staff COCs have been updated to current staff recommended measures.

Emissions from simple-cycle operation without steam generation would remain the same with exception of reduction in nitrogen oxides (NOx) and carbon monoxide (CO) emissions that are due to the integration of the new SCR and CO oxidation catalyst control systems. CO emissions would be reduced from 6 ppmvd to 3 ppmvd at 15 percent oxygen ($O_2$), and NOx emissions would be reduced from 3.7 ppmvd to 2.5 ppmvd at 15 percent $O_2$. The concentration of ammonia used in the SCR process would be limited to 10 ppmvd or less at 15 percent $O_2$.

In the combined-cycle mode, NOx emissions would be reduced to 2 ppmvd at 15 percent $O_2$ by a combination of water injection into the CTG combustor and the SCR system. The concentration of ammonia used in the SCR process would be limited to 5 ppmvd or less at 15 percent $O_2$. No supplementary firing of natural gas in the CTGs would be needed during the combined-cycle operation.

Under both simple- and combined-cycle operations the CO emissions and volatile organic compound (VOC) emissions from the CTG would be controlled by the oxidation catalyst to 3 ppmvd or less and 2 ppmvd or less at 15 percent $O_2$, respectively.

The proposed modifications would involve substantial changes to almost every aspect of the original air quality analysis because of the substantial changes to the gas turbine operation and newly proposed auxiliary equipment. The new auxiliary equipment with

air pollutant emissions include a Wet Surface Air Condenser (WSAC) used for auxiliary cooling and a 460 horsepower firewater pump engine.

To address the significant proposed changes to the facility, SJVAPCD conducted an evaluation for proposed GWF Hanford. The SJVAPCD commenced review of the proposed amendment in December 2008, and issued a Preliminary Determination of Compliance on March 17, 2009 (SJVAPCD 2009a) and then issued a revised PDOC on July 23, 2009 (SJVAPCD 2009b). After a 30-day public comment period, a Final Determination of Compliance will be issued by SJVAPCD. If the Final Determination of Compliance involves revised permit conditions, Energy Commission staff would provide an addendum to this analysis that provides those revisions.

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

At the time of certification, LORS applicable to Air Quality were identified in the Staff Assessment for the project. These LORS would continue to apply to the amended project with the following revisions:

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

| Applicable Law | Description |
|---|---|
| **Federal** | |
| 40 Code of Federal Regulations (CFR) 52 | Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to SJVAPCD.<br>Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for attainment pollutants. A major source for a combined-cycle combustion turbine is defined as any one pollutant exceeding 100 tons per year. Since the emissions from GWF Hanford would not exceed 100 tons per year, PSD does not apply. |
| 40 CFR 60 Subpart IIII | Regulates emissions and provides other operating and recordkeeping requirements for 2009 model year and later emergency firewater pump stationary compression ignition internal combustion engine with an engine power ratings between 130≤KW≤560 (175≤HP≤750). Enforcement delegated to SJVAPCD. |
| 40 CFR 60 Subpart KKKK | New Source Performance Standard for gas turbines: 15 parts per million (ppm) NOx at 15 percent $O_2$ and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT will be more restrictive. Enforcement delegated to SJVAPCD. |
| 40 CFR Part 70 | Title V: Federal permit. Title V permit application is required within one year of start of operation. Permitting and enforcement delegated to SJVAPCD. |
| 40 CFR Part 72 | Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement delegated to SJVAPCD. |
| **State** | |
| Health and Safety Code (HSC) Section 40910-40930 | Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans. |
| HSC Section 41700 | Restricts emissions that would cause nuisance or injury. |
| California Code of Regulations (CCR) Section 93115 | Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements. |

| Local – San Joaquin Valley Air Pollution Control District (SJVAPCD) Rules and Regulations | |
|---|---|
| Regulation I – General Provisions | This regulation sets forth requirements and standards for stack monitoring, source sampling, and breakdown events. |
| Regulation II – Permits | This regulation 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, Title V Permits, and the Acid Rain Program.<br><br>Regulation II Rule 2201 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 progress in attainment of the national ambient air quality standards and that future economic growth in the San Joaquin Valley is not unnecessarily restricted. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements.<br><br>Regulation II, Rule 2520 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.<br><br>Regulation II, Rule 2540 incorporates the requirements for the Acid Rain Program, including the requirement for a subject facility to obtain emission allowances for SOx emissions as well as fuel sampling and/or continuous monitoring to determine SOx, NOx, and carbon dioxide ($CO_2$) emissions from the facility. |
| Regulation IV – Prohibitions | This regulation sets forth the restrictions for visible emissions, odor nuisance, various air emissions, and fuel contaminants.<br><br>Regulation IV incorporates provisions of 40 CFR Part 60, Chapter I, and is applicable to all new, modified, or reconstructed sources of air pollution. Sections of this regulation apply to stationary gas turbines (40 CFR Part 60 Subpart KKKK) and to firewater pump engines. These subparts establish limits of $NO_2$ and $SO_2$ emissions from the facility as well as monitoring and test method requirements. Sections of this regulation also apply to firewater pump engines (40 CFR Part 60 Subpart IIII).<br><br>This regulation also specifies additional performance standards for stationary gas turbines. |
| Regulation V – Procedures before the Hearing Board | Establishes the procedures for reporting emergencies and emergency variances. |
| Regulation VIII – Fugitive PM10 Prohibitions | This regulation sets forth the requirements and performance standards for the control of emissions from fugitive dust causing activities. |

# SETTING

## AIR QUALITY STANDARDS AND ATTAINMENT STATUS

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The state and federal air quality standards are listed in **AIR QUALITY Table 2**. The averaging times for the various air quality standards, the times over which they are

measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air ($mg/m^3$ or $\mu g/m^3$, respectively).

**AIR QUALITY Table 2**
**Federal and State Ambient Air Quality Standards**

| Pollutant | Averaging Time | Federal Standard | California Standard |
|---|---|---|---|
| Ozone ($O_3$) | 8 Hour | 0.075 ppm (147 $\mu g/m^3$) | 0.070 ppm (137 $\mu g/m^3$) |
| | 1 Hour | -- | 0.09 ppm (180 $\mu g/m^3$) |
| Carbon Monoxide (CO) | 8 Hour | 9 ppm (10 $\mu g/m^3$) | 9.0 ppm (10 $\mu g/m^3$) |
| | 1 Hour | 35 ppm (40 $\mu g/m^3$) | 20 ppm (23 $\mu g/m^3$) |
| Nitrogen Dioxide ($NO_2$) | Annual Arithmetic Mean | 0.053 ppm (100 $\mu g/m^3$) | 0.03 ppm (57 $\mu g/m^3$) |
| | 1 Hour | -- | 0.18 ppm (339 $\mu g/m^3$) |
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | 0.030 ppm (80 $\mu g/m^3$) | -- |
| | 24 Hour | 0.14 ppm (365 $\mu g/m^3$) | 0.04 ppm (105 $\mu g/m^3$) |
| | 3 Hour | 0.5 ppm (1300 $\mu g/m^3$) | -- |
| | 1 Hour | -- | 0.25 ppm (655 $\mu g/m^3$) |
| Respirable Particulate Matter (PM10) | Annual Arithmetic Mean | -- | 20 $\mu g/m^3$ |
| | 24 Hour | 150 $\mu g/m^3$ | 50 $\mu g/m^3$ |
| Fine Particulate Matter (PM2.5) | Annual Arithmetic Mean | 15 $\mu g/m^3$ | 12 $\mu g/m^3$ |
| | 24 Hour | 35 $\mu g/m^3$ | -- |
| Sulfates ($SO_4$) | 24 Hour | -- | 25 $\mu g/m^3$ |
| Lead | 30 Day Average | -- | 1.5 $\mu g/m^3$ |
| | Calendar Quarter | 1.5 $\mu g/m^3$ | -- |
| Hydrogen Sulfide ($H_2S$) | 1 Hour | -- | 0.03ppm (42 $\mu g/m^3$) |
| Vinyl Chloride (Chloroethene) | 24 Hour | -- | 0.03ppm (42 $\mu g/m^3$) |
| 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 2009a.

The project site is located in the south of the City of Hanford in Kings County. The project site is located within the San Joaquin Valley Air Basin (SVJAB) under the jurisdiction of San Joaquin Valley Air Pollution Control District. The SVJAB is designated as non-attainment for the federal and state ozone and PM2.5 standards, and the state PM10 standard. This area is designated as attainment for the federal PM10 standard and the federal and state CO, NOx, and SOx standards. **AIR QUALITY Table 3** summarizes the area's attainment status for various applicable state and federal standards. The ambient air quality standards that staff uses as a basis for determining project significance are health-based standards. They are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality such as the aged, people with existing illnesses, and infants and children, while providing a margin of safety.

**AIR QUALITY Table 3**
**Federal and State Attainment Status for San Joaquin Valley Air Basin**

| Pollutant | Federal Classification | State Classification |
|---|---|---|
| Ozone | Extreme Nonattainment | Severe Nonattainment |
| PM10 | Attainment | Nonattainment |
| PM2.5 | Nonattainment | Nonattainment |
| $NO_2$ | Attainment[a] | Attainment |
| CO | Attainment[a] | Attainment |
| $SO_2$ | Attainment[a] | Attainment |

Sources: U.S.EPA 2009. ARB 2009b
Note(s): [a] Attainment = attainment or unclassified

## CRITERIA POLLUTANT AIR QUALITY DATA

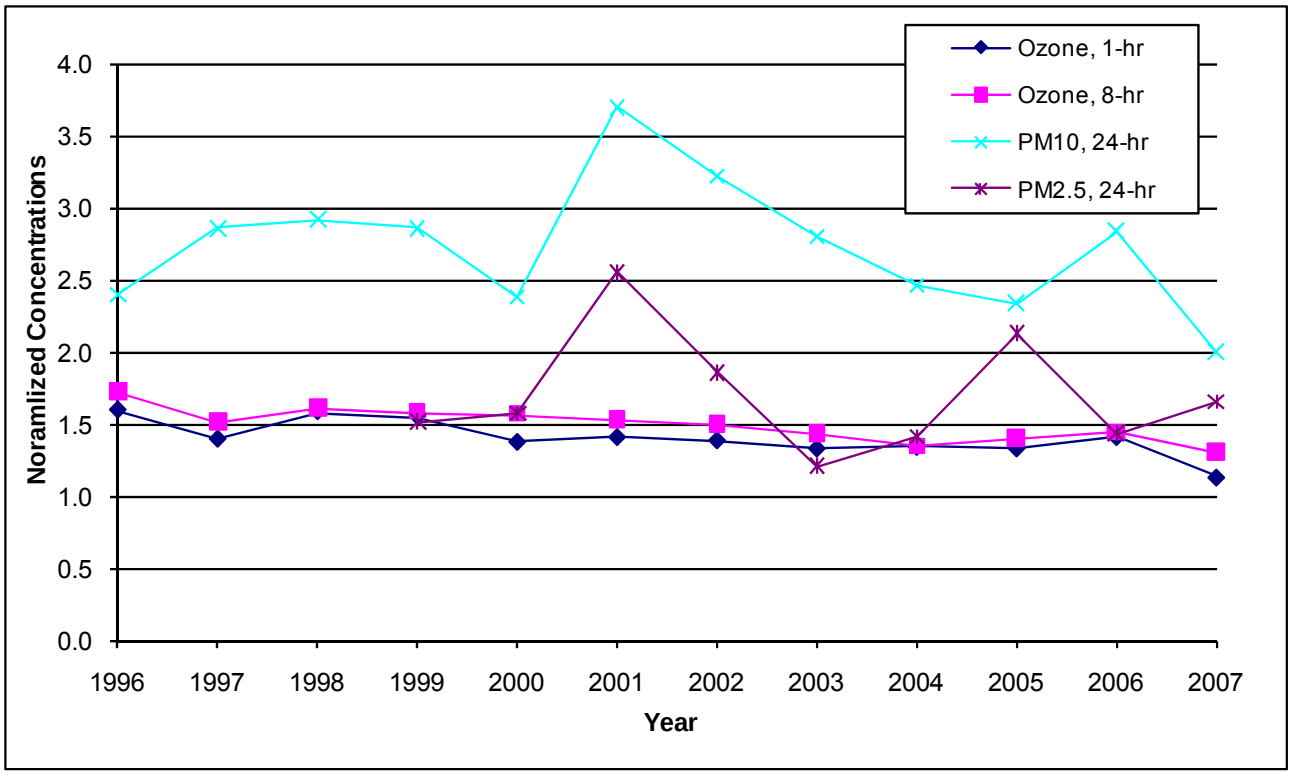
Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, $NO_2$, and $SO_2$ for the years between 2002 through 2007 at the most representative monitoring stations for each pollutant are compared to the most restrictive applicable standards in **AIR QUALITY Table 4** and the 1-hour and 8-hour ozone, and 24-hour PM10 data for the years 1996 through 2007 are shown in **AIR QUALITY Figure 1**. The closest monitoring stations from the site are the Hanford-South Irwin Street monitoring station, 3 miles north of the project site, the Corcoran-Patterson Avenue monitoring station, 12 miles southeast of the project site, and the Fresno-First Street and Drummond Street monitoring stations, approximately 30 miles north of the project site. All ozone, PM10 and $NO_2$ data presented are collected from the Hanford-South Irwin monitoring station. All PM2.5 data are from Corcoran-Patterson Avenue monitoring station, and all CO data are from Fresno-Drummond Street monitoring station. A complete history of $SO_2$ concentration is not available; however, $SO_2$ is not expected to be a critical pollutant in this study since this area has been designated as attainment for $SO_2$ and the project does not emit $SO_2$ in high concentrations. The 2007 $SO_2$ concentration data is collected from the Fresno First Street monitoring station.

**AIR QUALITY Table 4**
**Criteria Pollutant Summary**
**Maximum Ambient Concentrations (ppm or μg/m$^3$)**

| Pollutant | Averaging Period | Units | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Limiting AAQS |
|---|---|---|---|---|---|---|---|---|---|
| Ozone | 1 hour | ppm | 0.125 | 0.120 | 0.121 | 0.120 | 0.127 | 0.102 | 0.09 |
| Ozone | 8 hours | ppm | 0.105 | 0.100 | 0.094 | 0.098 | 0.101 | 0.091 | 0.07 |
| PM10 [a] | 24 hours | μg/m$^3$ | 161 | 140 | 123 | 117 | 142 | 100 | 50 |
| PM10 | Annual | μg/m$^3$ | 54.8 | 47.5 | 43.6 | 41 | 46.8 | 44.4 | 20 |
| PM2.5 [a] | 24 hours | μg/m$^3$ | 65.1 | 42.2 | 49.4 | 74.5 | 50.1 | 57.9 | 35 |
| PM2.5 | Annual | μg/m$^3$ | 21.5[b] | 16.2 | 17.4[b] | 17.5 | 16.9[b] | 21.2 | 12 |
| $NO_2$ | 1 hour | ppm | 0.067 | 0.076 | 0.069 | 0.072 | 0.073 | 0.058 | 0.18 |
| $NO_2$ | Annual | ppm | 0.014 | 0.013 | 0.012 | 0.012 | 0.012 | 0.011 | 0.03 |
| CO | 1 hour | ppm | 5.2 | 3.6 | 3.5 | 2.8 | 4.0 | 4.4 | 20 |
| CO | 8 hours | ppm | 3.54 | 2.56 | 2.73 | 2.33 | 3.31 | 2.37 | 9.0 |
| $SO_2$ | 1 hour | ppm | -- | -- | -- | -- | -- | 0.13 | 0.25 |
| $SO_2$ | 24 hours | ppm | -- | -- | -- | -- | -- | 0.031 | 0.04 |
| $SO_2$ | Annual | ppm | -- | -- | -- | -- | -- | 0.007 | 0.03 |

Sources: ARB 2009c, ARB 2008
Notes:
[a] Exceptional PM concentration events, such as those caused by wind storms may be included in the data presented.
[b] State arithmetic mean is not available. Instead, national annual average PM2.5 data are used.

**AIR QUALITY Figure 1**
**1996-2007 Historical Ozone and PM Air Quality Data**
**Hanford-S Irwin Monitoring Station, Kings County**




Sources: ARB 2009c, ARB 2008
Note: The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 1-hour ozone concentration in 1998 is 0.143 ppm/0.09 ppm standard = 1.6.

## 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 nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOC]) in the presence of sunlight to form ozone.

As **AIR QUALITY Table 4** and **AIR QUALITY Figure 1** indicate, the 1-hour and 8-hour ozone concentrations measured in Kings County have been slowly decreasing over time. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during May through September.

## Nitrogen Dioxide

The entire air basin is classified as attainment for the state and federal $NO_2$ standards. Approximately 90 percent of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is $NO_2$. NO is oxidized in the atmosphere to $NO_2$, but some level of photochemical activity is needed for this conversion. The highest concentrations of $NO_2$ typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking significant photochemical activity (sun light), $NO_2$ levels are relatively low. In the summer the conversion rates of NO to $NO_2$

are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of $NO_2$. The $NO_2$ concentrations in the project area are well below the state and federal ambient air quality standards.

## Carbon Monoxide

The area is classified as attainment for the state 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground. The project area has a lack of significant mobile source emissions and has CO ambient concentrations that are well below the state and federal ambient air quality standards.

## Particulate Matter (PM10) and Fine Particulate Matter (PM2.5)

Particulate Matter (PM10 and PM2.5) can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Respirable particulate matter, or PM10, is derived from a combination of sources including fugitive dust and combustion particulate and secondary particulate formation. Fine particulate matter, or PM2.5, is derived mainly from either the combustion of materials, or from precursor gases (SOx, NOx, and VOC) through complex reactions in the atmosphere. PM2.5 consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The area is non-attainment for the state and federal PM2.5 standards and state PM10 standards. As shown in **AIR QUALITY Figure 1**, PM10 and PM2.5 concentrations were much higher than the state 24-hour PM10 standard in the recent 12-year history.

## Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal $SO_2$ standards. Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. The project area's $SO_2$ concentrations are below the state and federal ambient air quality standards.

## Summary

In summary, staff recommends the background ambient air concentrations in **AIR QUALITY Table 5** for use in the modeling and impacts analysis. The maximum criteria pollutant concentrations from the past three years of available data collected at the most representative monitoring stations are used to determine the recommended background values.

**AIR QUALITY Table 5**
**Staff Recommended Background Concentrations (µg/m$^3$)**

| Pollutant | Averaging Period | Recommended Background | Limiting Standard | Percent of Standard |
|---|---|---|---|---|
| $NO_2$ | 1 hour | 137.5 | 339 | 41% |
| | Annual | 22.8 | 57 | 40% |
| PM10 | 24 hour | 142 | 50 | 284% |
| | Annual | 46.8 | 20 | 234% |
| PM2.5 | 24 hour | 74.5 | 35 | 213% |
| | Annual | 21.2 | 12 | 177% |
| CO | 1 hour | 5,060 | 23,000 | 22% |
| | 8 hour | 3,678 | 10,000 | 37% |
| $SO_2$ | 1 hour | 340.6 | 655 | 52% |
| | 3 hour | 195.0 | 1,300 | 15% |
| | 24 hour | 81.4 | 105 | 78% |
| | Annual | 18.7 | 80 | 23% |

Sources: ARB 2009c, GWF Energy 2008a, ARB 2008, and Energy Commission Staff Analysis

The background concentrations for PM10 and PM2.5 are at or above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all well below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **AIR QUALITY Table 5**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.).

## PROJECT DESCRIPTION CHANGES

## EQUIPMENT DESCRIPTION CHANGES

Electricity would be produced by the two existing CTGs and the single, new STG. The followings are the major components of the new amended generating system (GWF Energy 2008a).

- Combustion Turbine Generator (CTG): This equipment is unchanged from the HEPP Final Decision (CEC, 2001a) and consists of two natural gas-fired General Electric LM6000 CTGs equipped with water injection and evaporative inlet air coolers.
- Once Through Steam Generator (OTSG): The OTSGs would recover heat from the exhaust gases of the CTGs to convert de-mineralized feed-water, into high pressure steam. There would be one OTSG per existing CTG. Each OTSG would be a continuous tube heat exchanger in which preheating, evaporation, and superheating of the feed water would take place consecutively. Each OTSG would be equipped with Selective Catalyst Reduction (SCR) and oxidation catalyst equipment.
- Steam Turbine Generator (STG): Steam generated in the OTSGs would be routed to a new two-pressure STG. The steam turbine would extract the thermal energy

from the pressurized steam and convert it to mechanical work. The generator, coupled to the steam turbine, would convert the mechanical work into electricity.

- Air Cooled Condenser (ACC): The project would add one new ACC with sufficient surface area to reject heat from the steam cycle to the atmosphere. The ACC would be elevated and supported by a steel structure to ensure adequate air flow.
- Wet surface air cooler (WSAC): A 305 gallon per minute (GPM) wet surface air cooler (WSAC) would be used to reject heat from a fin-fan heat exchanger in the auxiliary cooling water system. The auxiliary cooling water system is provided for the STG lube oil cooler, STG generator cooler, STG hydraulic control system, OTSG feed pump lube oil, and seal water coolers.
- 460 hp Firewater Pump Engine: A 460 hp Cummins model CFP15E-F10 Tier 3 certified diesel-fired emergency internal combustion engine is proposed to power a new firewater pump for the site.

## EMISSION CONTROLS

The turbines would be equipped with water-injected low NOx combustors and a post-combustion SCR system. The combination of these two features would reduce NOx emissions to 2.5 ppmvd at 15 percent $O_2$ in the simple-cycle mode, and 2.0 ppmvd at 15 percent $O_2$ in combined-cycle mode.

Additionally an oxidation catalyst system would be used to reduce CO and VOC emissions from the turbines to 3 ppmvd and 2 ppmvd (corrected to 15 percent $O_2$) respectively when operating in either simple-cycle or combined-cycle mode. Particulate matter and $SO_2$ emissions would be controlled by exclusively firing pipeline quality natural gas using inlet air filtration and mist eliminator filters on lubricating oil vents.

The WSAC would employ a mist eliminator that would reduce mist, and reduce associated PM emissions, to no more than 0.005 percent of the water spray flow.

The emergency fire pump would be a Tier III engine, which would use diesel fuel with no more than 15 ppm by weight fuel sulfur.

To ensure that the systems perform correctly, continuous emissions monitors (CEMs) would be installed on the turbine OTSG stacks prior to release to the atmosphere. The CEM systems would be used to sample, analyze, and record fuel gas flow rate, exhaust gas flow rate, NOx and CO concentration levels, and percentage of $O_2$ in the stack exhaust gas. An existing SCR inlet NOx analyzer would be used to calculate ammonia slip. This system would generate emission data reports in accordance with permit requirements and would send alarm signals to the plant control room when emission levels approach or exceed pre-selected limits.

## AMENDED PROJECT EMISSIONS AND IMPACTS

### Construction Activities

Construction of the project would includes the demolition of the two existing oxidation catalyst and SCR systems, demolition of the associated exhaust stacks, and installation of the two new OTSGs, the new 25 MW steam condensing turbine generator, the new

ACC and other associated auxiliary equipment. The total duration for the demolition and construction would be approximately 15 months. Construction schedule is based on 12 hours of equipment operation per day and 26 working days per month. 4.7 acres of the existing GWF-owned 10-acre parcel would be temporarily disturbed for construction laydown and parking.

The existing Hanford Energy Peaker Plant (HEPP) already has natural gas and water pipelines and transmission infrastructure in place; therefore no modifications to the offsite linear facilities are required.

In the emissions estimates shown in **AIR QUALITY Table 6**, it was conservatively assumed that the construction equipment would operate 12 hours per day, 26 days per month. The maximum annual construction emissions represent the 12-month period out of the 15-month construction schedule with the highest emissions. The 12-month period with the highest predicted emissions is the period from month 2 through month 13. Total construction emissions during 15 months are presented in **AIR QUALITY Table 7**.

No maximum daily offsite emission rate was provided by the project owner; therefore, staff has estimated the maximum daily emissions based on maximum monthly emissions and the days per month schedule assumption.

**AIR QUALITY Table 6**
**Maximum Daily, Monthly, and Annual Construction Emissions**

| **Maximum Daily Emissions (lbs/day)** | | | | | | |
|---|---|---|---|---|---|---|
| | NOx | CO | VOC | SOx | PM10 | PM2.5 |
| Onsite Construction Equipment | 104.90 | 57.80 | 16.80 | 0.11 | 7.06 | 6.29 |
| Onsite Motor Vehicle | 0.05 | 0.30 | 0.03 | 0.00 | 0.00 | 0.00 |
| Fugitive Dust | -- | -- | -- | -- | 14.70 | 1.69 |
| Onsite Total | 104.95 | 58.10 | 16.83 | 0.11 | 21.76 | 7.98 |
| Offsite Total | 2.95 | 10.88 | 0.41 | 0.02 | 0.09 | 0.03 |
| Total | 107.90 | 68.98 | 17.24 | 0.13 | 21.85 | 8.01 |
| **Maximum Monthly Emissions (lbs/month)** | | | | | | |
| | NOx | CO | VOC | SOx | PM10 | PM2.5 |
| Onsite Construction Equipment | 2,727.00 | 1,502.00 | 437.00 | 2.90 | 190.00 | 1,521.00 |
| Onsite Motor Vehicle | 1.38 | 7.9 | 0.74 | 0.02 | 0.13 | 1.41 |
| Fugitive Dust | -- | -- | -- | -- | 5,022.00 | 566.00 |
| Onsite Total | 2,728.38 | 1,509.90 | 437.74 | 2.92 | 5,212.13 | 2,088.41 |
| Offsite Total | 76.74 | 283.00 | 10.54 | 0.45 | 31.09 | 8.96 |
| Total | 2,805.12 | 1,792.9 | 448.28 | 3.37 | 5,243.22 | 2,097.37 |
| **Maximum Annual Emissions (ton/year)** | | | | | | |
| | NOx | CO | VOC | SOx | PM10 | PM2.5 |
| Onsite Construction Equipment | 11.07 | 6.19 | 1.85 | 0.01 | 0.79 | 0.70 |
| Onsite Motor Vehicle | 0.01 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fugitive Dust | -- | -- | -- | -- | 2.14 | 0.24 |
| Onsite Total | 11.08 | 6.23 | 1.85 | 0.01 | 2.93 | 0.94 |
| Offsite Total | 0.28 | 1.13 | 0.04 | 0.00 | 0.01 | 0.00 |
| Total | 11.36 | 7.36 | 1.89 | 0.01 | 2.94 | 0.94 |

Source: GWF Energy 2008a

**AIR QUALITY Table 7**
**Total Construction Emissions (tons)**

| | NOx | CO | VOC | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Onsite Total | 11.3 | 6.3 | 1.9 | 0.012 | 2.9 | 0.9 |
| Offsite Total | 1.5 | 0.55 | 0.077 | 0.0018 | 0.76 | 0.0996 |
| Total | 12.8 | 6.9 | 2.0 | 0.014 | 3.7 | 1.0 |

Source: GWF Energy 2009a

The original Staff Assessment found that mitigation measures would be necessary to avoid the potentially significant impacts of particulate matter and ozone concentrations during construction, and various Conditions of Certification (COCs) were identified and adopted. This conclusion remains applicable for this amendment, and staff recommends COCs, updated to current staff recommendations, to mitigate both fugitive dust and equipment exhaust emissions during construction.

## Commissioning Activities and Emissions

The total duration of the commissioning phase for the proposed project is expected to be 65 days. Commissioning activities are conducted to test and tune the CTG performance and ensure emission limits will be met. The commissioning emissions are reduced to the extent feasible by limiting equipment operation during commissioning consistent with the equipment manufacturers' recommended intervals. **AIR QUALITY Table 8** and **9** summarize the commissioning NOx and CO emissions for four testing scenarios that were included in the modeling analysis, which were the four worst-case emission event scenarios out of the 16 different testing scenarios provided by the project owner (GWF Energy 2008a, Attachment C2, Table C2.1). The commissioning event scenario data provided by the project owner consider three different turbine load rates, 45 percent, 50 percent and 100 percent; and provide the peak hourly and total commissioning NOx and CO emissions for each of the sixteen event scenarios.

**AIR QUALITY Table 8**
**Turbine Commissioning Emissions**

| Scenarios | Turbines/ Modeling Load | Emission Rates per Turbine (lb/hr) | |
|---|---|---|---|
| | | NOx | CO |
| Steam Blows | 1 or 2 / 45% | 52.0 | 20.9 |
| Steam Blows | Both / 45% | 39.0 | 18.2 |
| Verify STG on Turning Gear; Establish Vacuum in ACC Exit Bypass Blowdown to ACC (combined blows) commence tuning on ACC Controls; Finalize Bypass Valve Tuning | 1 or 2 /50% | 44.8 | 40.5 |
| Verify STG on Turning Gear; Establish Vacuum in ACC Exit Bypass Blowdown to ACC (combined blows) commence tuning on ACC Controls; Finalize Bypass Valve Tuning | Both / 100% | 44.8 | 40.5 |

Source: GWF Energy 2008a

**AIR QUALITY Table 9**
**Turbine Commissioning Emissions**

| | NOx | CO |
|---|---|---|
| Maximum Hourly (lbs/hr per turbine) | 52.0 | 40.5 |
| Total Commissioning Period (tons, both turbines) | 8.3 | 6.3 |

Source: GWF Energy 2008a

## Operational Phase and Emissions

GWF Hanford would consist of two existing General Electric (GE) LM6000 PC Sprint CTGs, two new OTSGs used to generate steam, a new 25 MW (net) STG, a new ACC, and a 305 gallon per minute (GPM) WSAC. GWF Hanford would also include a new 460 hp diesel fired water pump engine.

Normal operating emission estimates for simple-cycle and combined-cycle operation modes are presented in **AIR QUALITY Table 10**. Start-up and shutdown emission estimates shown in **AIR QUALITY Table 11** are based on vendor data and engineering estimates. Each turbine starts up in the simple-cycle mode. If the turbine transitions to combined-cycle operation, then the turbine would subsequently start up in the combined-cycle mode, resulting in emissions that are the sum of the simple-cycle and combined-cycle start-up emissions. A shutdown event would occur in the same sequenced manner depending on the operating mode.

**AIR QUALITY Table 10**
**Maximum Full Load Normal Operating Emission Rates per Turbine**

| | NOx | CO [a] | VOC [a] | $SO_2$ | PM10/PM2.5 |
|---|---|---|---|---|---|
| Simple-cycle | 4.2 | 3.1 | 1.2 | 0.31 | 2.2 |
| Combined-cycle | 3.4 | 3.1 | 1.2 | 0.31 | 2.2 |

Source: GWF Energy 2008a
Note: [a] The average annual emission rate for CO and VOC, for the determination of annual emissions, is estimated to be 1.8 and 0.5 lb/hour, respectively.

**AIR QUALITY Table 11**
**Start-up/Shutdown Emission Rates**

| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
|---|---|---|---|---|---|
| **Simple-cycle** | | | | | |
| Startup (lbs/event)[a] | 7.7 | 7.7 | 0.7 | 0.1 | 0.1 |
| Shutdown (lbs/event)[b] | 7.7 | 7.7 | 0.7 | 0.1 | 0.2 |
| **Combined-cycle** | | | | | |
| Startup (lbs/event)[c] | 6.1 | 3.0 | 0.5 | 0.3 | 2.2 |
| Shutdown (lbs/event)[d] | 2.1 | 1.0 | 0.2 | 0.1 | 0.8 |

Source: GWF Energy 2008a
Notes:
[a] Simple-cycle startup is based on a 10-minute start cycle.
[b] Simple-cycle shutdown is based on a 10-minute stop cycle.
[c] Combined-cycle startup is based on a 60-minute start cycle.
[d] Combined-cycle shutdown is based on a 20-minute stop cycle.

**AIR QUALITY Table 12** presents the worst case hourly emissions rates per turbine. The emissions estimates are based on a startup event, 40 minutes of normal operation and a shutdown event in the simple-cycle mode for NOx, CO, and VOC. The emissions estimates for $SO_2$ and PM10/PM2.5 are based on 60 minutes of normal operation. Since emission rates during the simple-cycle mode are always higher than during the combined-cycle mode, the maximum hourly emissions would occur during the simple-cycle operation.

**AIR QUALITY Table 12**
**Maximum Hourly Emission Rates per Turbine**

| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
|---|---|---|---|---|---|
| Simple-cycle | 18.2 | 17.5 | 2.2 | 0.31 | 2.2 |

Source: GWF 2008a

When operating in simple-cycle mode, GWF Hanford would retain the current level of normal emission rates and emission concentrations with exception of CO and VOCs emissions. The new emission concentration limits for CO and VOCs would be 3 ppmvd, and 2 ppmvd respectively each at 15 percent $O_2$. Maximum simple-cycle daily turbine emissions are based on two simple-cycle start-up and shutdown events per turbine. Normal operation duration for maximum simple-cycle emissions is estimated to be 23.3 hours with 100 percent load rate at 15°F. Maximum daily emissions for combined-cycle mode are based on two combined-cycle start-up and shutdown events, with 20.7 hours of normal operation at 100 percent load at 15°F.

The hourly diesel fired emergency firewater pump emissions are estimated based on 60 minutes of continuous operation. The daily emission rates are based on non-emergency use of one hour per day. Maximum WSAC emissions are estimated from the maximum cooling water total dissolved solids (TDS). For the hourly emissions, TDS concentration is assumed to be 1,100 ppm, 5 cycles of concentration, and a design cooling water recirculation rate of 305 gallons per minute with a 0.005 percent efficient drift eliminator. The WSAC emissions are based on continuous maximum operation for hourly and daily emissions. The project owner's maximum operating hourly and daily emission estimates under simple-cycle and combined-cycle operation are provided in **AIR QUALITY Table 13** and **14**, respectively.

**AIR QUALITY Table 13**
**GWF Hanford Facility Maximum Simple-cycle Emissions**

| **Maximum Hourly Emissions, lbs/hr (excluding start-ups and shutdowns)** | | | | | |
|---|---|---|---|---|---|
| Equipment Item | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
| Turbine (Both Turbines) | 8.5 | 6.2 | 2.4 | 0.62 | 4.4 |
| WSAC | -- | -- | -- | -- | 0.0084 |
| Emergency Fire Pump | 2.7 | 0.68 | 0.09 | 0.005 | 0.08 |
| Total Project (lbs/hr) | 11.20 | 6.88 | 2.49 | 0.63 | 4.49 |
| **Maximum Daily Emissions, lbs/day (including 2 start-ups and 2 shutdowns)** | | | | | |
| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
| Turbine (Both Turbines) | 260 | 206 | 62 | 15 | 104 |
| WSAC | -- | -- | -- | -- | 0.2 |
| Emergency Fire Pump | 2.7 | 0.68 | 0.09 | 0.005 | 0.08 |
| Total Project (lbs/day) | 262.70 | 206.68 | 62.09 | 15.01 | 104.28 |

Source: GWF Energy 2008a

**AIR QUALITY Table 14**
**GWF Hanford Facility Maximum Combined-cycle Emissions**

| **Maximum Hourly Emissions, lbs/hr (excluding start-ups and shutdowns)** | | | | | |
|---|---|---|---|---|---|
| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
| Turbine (Both Turbines) | 6.8 | 6.2 | 2.4 | 0.62 | 4.4 |
| WSAC | -- | -- | -- | -- | 0.0084 |
| Emergency Fire Pump | 2.7 | 0.68 | 0.09 | 0.005 | 0.08 |
| Total Project (lbs/hr) | 9.5 | 6.88 | 2.49 | 0.63 | 4.49 |
| **Maximum Daily Emissions, lbs/day (including 2 start-ups and 2 shutdowns)** | | | | | |
| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
| Turbine (Both Turbines) | 236 | 200 | 60 | 15 | 106 |
| WSAC | -- | -- | -- | -- | 0.2 |
| Emergency Fire Pump | 2.7 | 0.68 | 0.09 | 0.005 | 0.08 |
| Total Project (lbs/day) | 238.7 | 200.68 | 60.09 | 15.01 | 106.28 |

Source: GWF Energy 2008a

The basis for maximum annual emissions is 1,350 hours of normal operation in the simple-cycle mode at 63°F, 6,650 hours of combined-cycle normal operation at 63°F, and 325 start-ups and shutdowns. Annual $SO_2$ emissions are based on an expected annual fuel sulfur level of 0.24 grains per 100 standard cubic feet of natural gas. The firewater pump engine annual emissions are based on 100 hours per year of operation. Annual WSAC emissions are based on use of water sprays for 850 hours per year. The project owner's maximum annual operating emission estimates are provided in **AIR QUALITY Table 15**.

**AIR QUALITY Table 15**
**GWF Hanford Facility Maximum Annual Emissions**

| Maximum Annual Emissions, tons/year | | | | | |
|---|---|---|---|---|---|
| | NOx | CO | VOC | $SO_2$ | PM10/PM2.5 |
| Turbine (Both Turbines) | 36.00 | 20.71 | 4.68 | 2.65 | 18.66 |
| WSAC | -- | -- | -- | -- | 0.00 |
| Emergency Fire Pump | 0.14 | 0.04 | 0.00 | 0.00 | 0.00 |
| Total Project (tons/year) | 36.13 | 20.74 | 4.69 | 2.65 | 18.67 |

Source: GWF Energy 2008a; SJVAPCD 2009a

The power generation equipment related to the original Hanford project was found to cause potentially significant air quality impacts by emitting PM10 and precursors to PM10, PM2.5, and ozone. The original initial study and Energy Commission decision found that the project owner could fully mitigate these impacts by offsetting the project emissions (CEC 2001b, CEC 2001c). This amendment would not change the basic mitigation strategy (GWF Energy 2009a); however, because it would change the power generation equipment and revise the short- and long-term annual permitted emission rates, the analysis of operational impacts has been revisited.

## AMENDED PROJECT IMPACTS

## DISPERSION MODELING APPROACH

In the analysis of the initial HEP SPPE project and HEPP emergency power plant project, the U.S.EPA Industrial Source Complex Short-Term (ISCST3) air dispersion model was used to estimate the impacts of the project's criteria pollutants emissions. For the proposed amendment, the impact analysis is prepared using the U.S.EPA-approved AERMOD model, which is now U.S.EPA's guideline model, and meteorological data approved by the SJVAPCD[1]. Additionally, the project owner obtained hourly ozone ambient data from the Hanford-South Irwin monitoring station for 2004 that was used in a more refined $NO_2$ impact modeling analysis using the Ozone Limiting Method (OLM) option that is available with AERMOD.

The background concentrations used in the dispersion modeling analysis were chosen from the highest ambient concentrations from the most recent 3 years of data (see **AIR QUALITY Table 4** and **5**). The impacts from the amended GWF Hanford project were added to the background concentrations for the evaluation of impacts on ambient air quality as shown in **AIR QUALITY Tables 16, 18, 19** and **26**.

[1] Meteorological data for 2004 collected from the Hanford monitoring station and processed by SJVAPCD.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

### Analysis of Construction Phase Impacts

For the construction impacts analysis, the emissions were divided into onsite exhaust impacts and fugitive dust impacts. Onsite exhaust emissions were modeled as four separate point sources within the construction zone. PM10 emissions from fugitive dust were modeled as an area source with a release height of 2 meters. The modeling results shown in **AIR QUALITY Table 16** indicate that maximum construction impacts would not exceed the most stringent $SO_2$, CO, and annual $NO_2$ standards. However, PM10/PM2.5 and 1-hour $NO_2$ modeled impacts combined with the background concentration would be potentially significant due to the potentially significant increase to existing PM10/PM2.5 exceedances and the creation of new $NO_2$ exceedances.

**AIR QUALITY Table 16**
**Maximum Project Construction Impacts**

| Pollutant | Averaging Period | Impacts (µg/m$^3$) | Background (µg/m$^3$) | Total Impact (µg/m$^3$) | Standard (µg/m$^3$) | Percent of Standard |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 277 | 137.5 | 414.5 | 339 | 122% |
| | Annual | 30.9 | 22.8 | 53.7 | 57 | 94% |
| CO | 1-hour | 371 | 5,060 | 5,431 | 23,000 | 24% |
| | 8-hour | 99.5 | 3,678 | 3,778 | 10,000 | 38% |
| $SO_2$ | 1-hour | 0.69 | 340.6 | 341.3 | 665 | 51% |
| | 3-hour | 0.33 | 195.0 | 195.3 | 1,300 | 15% |
| | 24-hour | 0.11 | 81.4 | 81.5 | 105 | 78% |
| | Annual | 0.033 | 18.7 | 18.7 | 80 | 23% |
| PM10 | 24-hour | 60 | 142 | 202 | 50 | 404% |
| | Annual | 22 | 46.8 | 68.8 | 20 | 344% |
| PM2.5 | 24-hour | 9.0 | 74.5 | 83.5 | 35 | 239% |
| | Annual | 3.2 | 21.2 | 24.4 | 12 | 203% |

Source: GWF Energy 2008a

Staff would like to note that the 1-hour $NO_2$ and 24-hour PM10 maximum predicted concentrations from the construction activities are approximately 50 percent of the previous impacts estimated in the 2000 HEP SPPE application and subsequent HEPP Emergency Permit License application. The worst-case 1-hour $NO_2$ impact is decreased from 575 µg/m$^3$ to 277 µg/m$^3$ for the proposed amendment. The maximum predicted 24-hour PM10 impact is decreased from 143 µg/m$^3$ in the 2000 HEP SPPE application to 60 µg/m$^3$ for the proposed amendment.

The project owner has noted that the modeling method they used was conservative for several reasons and that they do not believe the construction would cause a violation of the State 1-hr standard. The OLM method used for 1-hour $NO_2$ determination does not account for ozone reactant or kinetic limitations in the near-field conversion of NO to $NO_2$ that are likely to reduce the amount of $NO_2$ that can be formed from NOx emissions in near-field where the model predicts high concentrations. Staff completed a separate modeling analysis to determine the worst case 1-hr NOx impacts. Staff's modeling analysis uses both the hourly background ozone data to determine conservative impacts from the construction impacts and adds them to the corresponding actual hourly background $NO_2$ concentrations from the Hanford monitoring station to determine a worst-case hourly concentration. This analysis is still conservative as it assumes complete conversion of all of the NO to $NO_2$ based on complete reaction with the

ambient ozone concentration in the very short-time frame that the emission plume reaches the fence line. The results of this analysis are provided in **AIR QUALITY Table 17**.

**AIR QUALITY Table 17**
**Maximum Project Construction 1-hr $NO_2$ Impact**

| Pollutant | Averaging Period | Impacts ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | Standard ($\mu g/m^3$) | Percent of Standard |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 272.8 | 52.7 | 325.5 | 339 | 96% |

Source: Staff Analysis

As shown in **AIR QUALITY Table 17** the expected worst-case construction related 1-hour $NO_2$ impact was found to be just below the California AAQS. The maximum impact was determined to occur approximately 25 meters east of the site fence line.

The project area is designated nonattainment area for PM10/2.5, and the selected background concentrations exceed the current PM10/2.5 standards. In order to minimize the constructional impacts of PM10/2.5 and $NO_2$, best available control measures would be used throughout the 15-month construction period.

## Construction Mitigation

### *Project Owner's Proposed Mitigation*

The project owner proposes the following measures to control fugitive dust emissions during construction of the project:

- Identification of the employee parking areas and surfacing of the parking areas;
- Use of water or chemical dust suppressants on unpaved roads and disturbed areas;
- Stabilization of storage piles and disturbed areas;
- Covering or maintaining freeboard on haul vehicles;
- Use of gravel in high traffic areas;
- Use of paved access aprons;
- Use of posted speed limit signs;
- Use of wheel washing areas prior to large trucks leaving the project site;

### *Staff Proposed Mitigation*

Staff agrees with the project owner's proposed mitigation measures. However, because of the predicted potentially significant contribution to both the short- and long-term PM10 and PM2.5 exceedances, staff believes additional construction mitigation measures are necessary.

Staff recommends construction PM10 and NOx emission mitigation measures as articulated in Conditions of Certification **AQ-SC1** through **AQ-SC5** that include modified versions of similar conditions proposed by the project owner in the amendment petition. In particular, slight modifications to the fugitive dust controls are necessary to control the higher fugitive dust emission potential for this type of project, and modifications to the off-road equipment mitigation measure are needed to update it to current staff

standards and in consideration of the high unmitigated emission potential from the construction of this project.

Staff recommends **AQ-SC1** to require the project owner to have an on-site construction mitigation manager who would 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**. Recommended Condition of Certification **AQ-SC3** formalizes the fugitive dust control requirements. Recommended Condition of Certification **AQ-SC4** would limit the potential offsite impacts from visible dust emissions, to respond to situations when the control measures required by **AQ-SC3** are not working effectively to control fugitive dust from leaving the construction site area.

Staff recommends Condition of Certification **AQ-SC5** to mitigate the PM and NOx emissions from the large diesel-fueled construction equipment. Implementation of this mitigation measure would provide additional primary and secondary PM mitigation to supplement the recommended fugitive dust mitigation measures. This condition requires the use of U.S.EPA/ARB Tier 2 engine compliant equipment for equipment over 100 horsepower where available, a good faith effort to find and use available U.S.EPA/ARB Tier 3 engine compliant equipment over 100 horsepower, and also includes equipment idle time restrictions and engine maintenance provisions. The Tier 2 standards include engine emission standards for NOx plus non-methane hydrocarbons, CO, and PM emissions; while the Tier 3 standards further reduce the NOx plus non-methane hydrocarbons emissions. The Tier 2 and Tier 3 standards became effective for engine/equipment model years 2001 to 2003 and models years 2006 to 2007, respectively, for engines between 100 and 750 horsepower.

## Analysis of Commissioning Phase Impacts

The project owner estimated commissioning impacts based on the maximum emission rates for each operating load and turbine configuration. The annual commissioning impacts are not provided since commissioning activities are only expected to last for 65 days. The project owner did not include the diesel-fueled engines and WSAC emissions as part of the turbine commissioning impacts analysis. Maximum impacts for $SO_2$, PM10 and PM2.5 are expected to be equal to or less than normal operational impacts due to reduced loads and fuel inputs during the commission period. The modeled commissioning impacts for $NO_2$ and CO in **AIR QUALITY Table 18** show that the total impacts would be well below the ambient air quality standards, therefore, impacts from commissioning would be less than significant.

**AIR QUALITY Table 18**
**Maximum Project Commissioning Impacts**

| Pollutant | Averaging Period | Impacts ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | Standard ($\mu g/m^3$) | Percent of Standard |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 56.3 | 137.5 | 193.8 | 339 | 57% |
| CO | 1-hour | 50.9 | 5,060 | 5,111 | 23,000 | 22% |
| | 8-hour | 32.0 | 3,678 | 3,710 | 10,000 | 37% |

Source: GWF Energy 2008a

## Analysis of Operating Phase Impacts

In order to evaluate the maximum operating impacts, a modeling analysis was conducted at base and 60 percent loads at the design-high (115°F), low (15°F), and weighted annual average ambient temperature (63°F). The emission rates provided in **AIR QUALITY Tables 13** through **15** were used in operational modeling analysis.

**AIR QUALITY Table 19**
**Maximum Project Operating Impacts**

| Pollutant | Averaging Period | Impacts ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | Standard ($\mu g/m^3$) | Percent of Standard |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 192 | 137.5 | 329.5 | 339 | 97% |
| | Annual | 0.82 | 22.8 | 23.62 | 57 | 41% |
| CO | 1-hour | 75 | 5,060 | 5,135 | 23,000 | 22% |
| | 8-hour | 42 | 3,678 | 3,720 | 10,000 | 37% |
| $SO_2$ | 1-hour | 0.58 | 340.6 | 341.2 | 665 | 51% |
| | 3-hour | 0.47 | 195.0 | 195.5 | 1,300 | 15% |
| | 24-hour | 0.24 | 81.4 | 81.6 | 105 | 78% |
| | Annual | 0.057 | 18.7 | 18.8 | 80 | 23% |
| PM10 | 24-hour | 3.5 | 142 | 145.5 | 50 | 291% |
| | Annual | 0.38 | 46.8 | 47.2 | 20 | 236% |
| PM2.5 | 24-hour | 3.5 | 74.5 | 78.0 | 35 | 223% |
| | Annual | 0.38 | 21.2 | 21.6 | 12 | 180% |

Source: GWF Energy 2008a

The $NO_2$, $SO_2$, and CO concentrations combined with the background concentrations do not exceed the most stringent standards. However, the $NO_2$ and VOC emissions of unmitigated could contribute to exceed ozone exceedances. The selected PM10 and PM2.5 background concentrations exceed the standard without adding the operational impacts. Therefore, PM10/2.5 emissions, if unmitigated, would further contribute to existing exceedances and would be potentially significant. GWF Hanford is proposing to fully offset all project emissions.

## 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 GWF Hanford project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively 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, and 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 significantly increased 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 San Joaquin Valley has been the subject of an extensive secondary particulate formation study, the California Regional Particulate Air Quality Study, which has determined that the San Joaquin Valley is ammonia rich. Therefore, the ammonia emissions from the GWF Hanford project are not expected to lead to substantial further formation of ammonium nitrate or sulfate. While there will certainly be some conversion from the ammonia emitted from the GWF Hanford project, 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 GWF Hanford project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region.

The project owner is proposing to fully 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 when operating in combined-cycle mode and 10 ppm when operating in simple-cycle mode. NOx, VOC, $SO_2$, and PM10 are proposed to be offset by the project owner at a greater than 1:1 ratio. With the proposed emission offsets, it is staff’s belief that the project would not cause significant secondary pollutant impacts.

## Operations Mitigation

### *Project Owner’s Proposed Mitigation*

#### Emission Controls

As discussed in the air quality section of the amendment petition (GWF Energy 2008a), the project owner proposes the following emission controls on the stationary equipment associated with operation of GWF Hanford:

#### Turbines

The project owner’s proposed Best Available Control Technology (BACT) for the two 95MW turbines would include water injected low NOx combustors, selective catalytic reduction (SCR) (for NOx), an oxidation catalyst and good combustion practices (for CO), and operate exclusively on pipeline quality natural gas (for VOC, PM and SOx) to

limit emission levels. The amendment petition (GWF Energy 2008a) and PDOC conditions (SJVAPCD 2009a) provide the following BACT emission limits, each for the two CTGs:

NOx: 2.5 ppmvd at 15 percent $O_2$ in simple-cycle mode, 2.0 ppmvd at 15 percent $O_2$ in combined-cycle mode, or 4.2 lbs/hour for simple-cycle mode and 3.4 lbs/hour for combined-cycle mode (1-hour average)

CO: 3.0 ppmvd at 15 percent $O_2$, 3.1 lbs/hour for both modes (3-hour average)

VOC: 2.0 ppmvd at 15 percent $O_2$, 1.2 lbs/hour for both modes (3-hour average)

PM10/PM2.5: 2.20 lbs/hour

$SO_2$: 0.31 lbs/hour, based on natural gas sulfur content of 0.24 gr/100 scf.

$NH_3$: 10.0 ppmvd (6.2 lbs/hour) in simple-cycle mode and 5.0 ppmvd (3.1 lbs/hour) at 15 percent $O_2$ in combined-cycle mode. (24-hour rolling average)

**Wet Surface Air Cooler (WSAC)**

Drift rate, percent of recirculation rate: 0.005 percent, using a mist eliminator

PM10: 0.0084 lbs/hour

**Emergency Engine**

The proposed emergency fire pump engine would be a Tier III engine, equipped with positive crankcase ventilation, 90 percent efficient crankcase emission control device, turbocharger, intercooler/aftercooler, and automatic air/fuel ratio or $O_2$ controller.

NOx: 2.66 grams/BHP-hour, 2.698 lbs/hour

CO: 0.671 grams/BHP-hour, 0.68 lbs/hour

VOC: 0.086 grams/BHP-hour, 0.09 lbs/hour

PM10: 0.078 grams/BHP-hour, 0.079 lbs/hour

$SO_2$: 0.0048 lbs/hour

**Emission Offsets**

The HEPP when initially permitted was required to fully offset it's emissions, without use of the District offset thresholds, due to the fact that it was considered together as a single stationary source with the existing Hanford petroleum coke fired cogeneration facility (Hanford LP), which had already consumed the District's offset thresholds for NOx, VOC, PM10 and $SO_2$.

The project emissions change is calculated as the difference between the proposed post-project potential to emit and the current permitted emissions level, since the original HEPP was fully offset. All criteria pollutants emissions would be decreased, resulting in a reduction of all pollutants permitted emissions as shown in **AIR QUALITY Table 20**. Therefore, additional offset mitigation would not be required as a result of operation of the amended GWF Hanford Combined-Cycle Power Plant.

**AIR QUALITY Table 20**
**GWF Hanford Mitigation Summary (lbs)**

| | NOx | CO | VOC | $SO_2$ | PM10/2.5 |
|---|---|---|---|---|---|
| Post Project Potential to Emit | 72,266 | 41,478 | 9,375 | 5,299 | 37,333 |
| Current Permitted Emissions Level (2 Turbines) | 104,628 | 103,894 | 19,528 | 5,420 | 50,352 |
| Project Emissions Change | -32,495 | -63,494 | -10,164 | -111 | -12,923 |

Source: GWF Energy 2008a, SJVAPCD 2009a

**AIR QUALITY Tables 21** through **24** show HEPP's currently permitted emissions levels and offsets. For all pollutants, GWF has surrendered more than enough emission reduction credit to meet District offset requirements for all nonattainment pollutants and their precursors. As shown in **AIR QUALITY Table 14**, the project emissions would be reduced with the proposed amendment, therefore the GWF project would be offset fully with a greater than 1:1 offset ratio for all nonattainment pollutants and their precursors.

**AIR QUALITY Table 21**
**NOx Offsets Surrendered for GWF Hanford**

| Offset Source Location | Credit Number | Total Q1 (lb) | Total Q2 (lb) | Total Q3 (lb) | Total Q4 (lb) |
|---|---|---|---|---|---|
| 29400 Whitesbridge Rd., Mendota | C-278-2 | 19,218 | 41,221 | 63,223 | 41,221 |
| Elk Hills Sec.:35 Township: 30S Range:23 E | S-1615-2 | 39,452 | 39,890 | 40,329 | 40,329 |
| Total ERC Holdings | | 58,670 | 81,111 | 103,552 | 81,550 |
| HEPP Currently Permitted NOx emissions | | 25,772 | 26,542 | 26,542 | 25,772 |
| Total Required @ 1.5:1 | | 38,658 | 39,813 | 39,813 | 38,658 |
| ERC's remaining on Certificate | C-278-2 | 0 | 1,408 | 23,410 | 2,563 |
| ERC's remaining on Certificate | S-1615-2 | 20,012 | 39,890 | 40,329 | 40,329 |
| Final Surplus | | 20,012 | 41,298 | 63,739 | 42,892 |

Sources: GWF Energy 2009a; GWF Energy 2009b

As **AIR QUALITY Table 21** shows, the total amount of surrendered NOx ERCs (156,942 lbs) meets the District's offset requirements based on the revised potential to emit of 72,266 lbs/year (offset ratio is 2.17:1).

**AIR QUALITY Table 22**
**VOC Offsets Surrendered for GWF Hanford**

| Offset Source Location | Credit Number [a] | Total Q1 (lb) | Total Q2 (lb) | Total Q3 (lb) | Total Q4 (lb) |
|---|---|---|---|---|---|
| 20807 Stockdale HWY, Bakersfield | S-1567-1 | 10,000 | 10,000 | 10,000 | 10,000 |
| Total ERC Holdings | | | | | |
| HEPP Currently Permitted VOC emissions | | 4,848 | 4,916 | 4,916 | 4,848 |
| Total Required @ 1.5:1 | | 7,272 | 7,374 | 7,272 | 7,374 |
| ERC's remaining on Certificate | S-1673-1 | 2,728 | 2,626 | 2,626 | 2,728 |
| Final Surplus | | | | | |

Sources: GWF Energy 2009a; GWF Energy 2009b
Note: [a] Certificate renumbered by District after partial submittal

As **AIR QUALITY Table 22** shows, the total amount of surrendered VOC ERCs (29,292 lbs) ) meets the District's offset requirements based on the revised potential to emit of 9,375 lbs/year (offset ratio is 3.12:1).

**AIR QUALITY Table 23**
**PM10 Offsets Surrendered for GWF Hanford**

| Offset Source Location | Credit Number [b] | Total Q1 (lb) | Total Q2 (lb) | Total Q3 (lb) | Total Q4 (lb) |
|---|---|---|---|---|---|
| 525 W. Third St., Hanford | C-415-5 | 30,461 | 23,378 | 17,662 | 30,095 |
| 525 W. Third St., Hanford | C-414-5 | 23,108 | 13,700 | 14,900 | 16,579 |
| Total ERC Holdings | | 53,569 | 37,078 | 32,562 | 46,674 |
| HEPP Currently Permitted PM10 emissions | | 12,436 | 12,740 | 12,740 | 12,436 |
| Total Required @ 1.9:1 [a] | | 23,628.4 | 24,206 | 24,206 | 23,628.4 |
| ERC's remaining on Certificate | C-442-5 | 6,823.6 | 0.0 | 0.0 | 6,466.6 |
| ERC's remaining on Certificate | C-445-5 | 23,108 | 12,842.0 | 8,356.0 | 16,579.0 |
| Final Surplus | | 29,931.6 | 12,842.0 | 8,356.0 | 23,045.6 |

Sources: GWF Energy 2009a; GWF Energy 2009b
Notes:
[a] Distance Ratio 1.5 plus Interpollutant Ratio 1.4 = 1.9 total offset ratio based on former District methodology.
[b] Certificate renumbered by District after partial submittal

When the project was originally permitted the District's $SO_2$ for PM10 offset ratio was 1.4:1, and the current $SO_2$ for PM10 offset ratio for Kings County is 1.0:1. Therefore, if this facility were to be permitted today the District's interpollutant offset ratio and total offset ratio would be substantially reduced from what was required when it was originally permitted. As **AIR QUALITY Table 23** shows, the total amount of surrendered $SO_2$ for PM10 ERCs (95,669 lbs) meets the District's offset requirements based on the revised potential to emit of 37,333 lbs/year (total SOx for PM10 offset ratio of 2.56:1 and total interpollutant SOx for PM10 offset ratio of 1.71:1).

**AIR QUALITY Table 24**
**$SO_2$ Offsets Available for GWF Hanford**

| Offset Source Location | Credit Number | Total Q1 (lb) | Total Q2 (lb) | Total Q3 (lb) | Total Q4 (lb) |
|---|---|---|---|---|---|
| 525 W. Third St., Hanford | C-445-5 | 23,108 | 12,872 | 8,356 | 16,579 |
| HEPP Currently Permitted $SO_2$ emissions | | 1,338 | 1,372 | 1,372 | 1,338 |
| Total Required @ 1.5:1 | | 2,007 | 2,058 | 2,058 | 2,007 |
| ERC's remaining on Certificate | C-445-5 | 21,101 | 10,814 | 6,298 | 14,572 |
| Final Surplus | | 21,101 | 10,814 | 6,298 | 14,572 |

Sources: GWF Energy 2009a; GWF Energy 2009b

As **AIR QUALITY Table 24** shows, the total amount of surrendered $SO_2$ ERCs (8,130 lbs) meets the District's offset requirements based on the revised potential to emit of 5,299 lbs/year (offset ratio is 1.53:1).

## Summary of Staff Changes to Mitigation

Staff recommends Condition of Certification **AQ-SC6** for compliance demonstration of the mist eliminator control technology and requirement to estimate the PM10/PM2.5 emissions for the WSAC that is not included in the District PDOC. Staff also recommends Condition of Certification **AQ-SC7**, which would require the project owner to provide quarterly operational reports that demonstrate compliance with all of the staff and District operating conditions.

## CUMULATIVE IMPACTS

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

This 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 discussion in this analysis is concerned with cumulative impacts. The "Criteria Pollutant Air Quality Data" section above describes the air quality background in the San Joaquin Valley Air Basin, including a discussion of historic ambient levels for each of the significant criteria pollutants. The "Analysis if Construction Activities Impacts" section discusses the project's contribution to the local existing background caused by project construction. The "Analysis of Operation Phase Impact" section discusses the project's contribution to the local existing background caused by project operation. This Cumulative Impacts section includes three 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; and,
- a discussion of greenhouse gas emissions and global climate change impacts (provided in **Air Quality Appendix AIR-1**).

### Summary of Projections

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

### Ozone

- The **2004 Extreme Ozone Attainment Demonstration Plan** illustrates how the SJVAPCD would attain the federal 1-hour ozone standard that was revoked in 2005. The U.S.EPA proposed approval of the SJVAPCD 2004 Ozone Plan on

October 16, 2008 (73 FR 61381). This plan shows how the area would achieve the revoked 1-hour ozone standard in 2010, and it includes elements that are the foundation for later ozone plans.

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

The GWF Hanford project is subject to the current SJVAPCD rules and regulations that specify performance standards, offset requirements, and emission control requirements for stationary sources. The regulations also include requirements for obtaining Authority to Construct (ATC) permits and subsequent operating permits. These regulations apply to GWF Hanford and all other projects with emission sources. In general, triennial updates of the attainment plans ensure that population, employment, and transportation trends in the region are taken into account, and compliance with SJVAPCD rules and regulations ensures consistency with the regional air quality management plans.

## Particulate Matter

- The **2007 PM10 Maintenance Plan** illustrates how the SJVAPCD intends to continue the efforts of the 2003 PM10 Plan and 2006 PM10 Plan that implemented aggressive PM10 controls in the region, including Reasonably Available Control Measures (RACM) for large existing sources of PM10 and fugitive dust. The 2007 PM10 Maintenance Plan includes a request for reclassification to "attainment" for the federal PM10 standard, and it provides for continued attainment for 10 years from the designation. In November 2008, the U.S.EPA redesignated the SJVAPCD to attainment for the federal PM10 standard (73 FR 66759, November 12, 2008).

- The **2008 PM2.5 Plan** was adopted by the SJVAPCD Governing Board on April 30, 2008, and it includes measures for attaining the 1997 and 2006 federal PM2.5 standards. The 2008 PM2.5 Plan shows that emission reductions of NOx, directly emitted PM2.5, and $SO_2$ are needed to demonstrate attainment of the PM2.5 NAAQS in the San Joaquin Valley (p. 6-1 of plan).

Energy Commission staff is concerned that projects within the SJVAB could interfere with the attainment effort of the 2008 PM2.5 Plan when they rely on SOx emission reduction credits to mitigate PM2.5 emissions without an adequate interpollutant trading ratio. The "reasonable further progress" calculations in the 2008 PM2.5 Plan shows that about 10 times more tons of direct PM2.5 need to be reduced than $SO_2$ (Table 8-2 of 2008 PM2.5 Plan). The 2014 Receptor Modeling Documentation supporting the 2008 PM2.5 Plan indicates that reducing SOx would not be as effective as reducing direct PM2.5 or NOx. Interpollutant trading is allowed with "the appropriate scientific demonstration of an adequate trading ratio" (Rule 2201, Section 4.13), and the SJVAPCD 2007 PM10 Maintenance Plan (see Appendix E of the Maintenance Plan)

indicates that the minimum ratio would be one-to-one with higher interpollutant ratios if appropriate under Rule 2201. The project owner originally complied with a SOx-for-PM interpollutant offset ratio of 1.4 to 1 when offsetting the HEPP, while the current minimum interpollutant ratio for the project area would be 1.0 to 1. The proposed GWF Hanford would decrease the potential to emit for PM10 and PM2.5, which would increase the applied SOx-for-PM10 interpollutant ratio to 1.71:1. Additionally, unlike other current siting projects, GWF Hanford would use SOx ERCs from a relatively nearby reduction source in Hanford. Therefore, staff believes that the proposed project would comply with the particulate matter plans by meeting its permit requirements and complying with the existing applicable rules and regulations.

### Carbon Monoxide

The **Carbon Monoxide Maintenance Plan** applies to 10 separate urbanized areas including the Fresno urbanized area. The project site itself is approximately 30 miles south of the Fresno urbanized area; therefore, the plan does not strictly apply to the project area. The project's construction and operation were not found to cause any new exceedances of the CO AAQS. The project's generated traffic would be insignificant in comparison with the existing Hanford area traffic and the project's primary emission sources normally emit CO concentrations out of the stack that are below the ambient air quality standards. Therefore, the project would not adversely affect the Carbon Monoxide Maintenance Plan.

## Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling the project 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 , referred to as the "background". The staff undertakes the following steps to identify appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Energy Commission staff (or the project owner) works with the air district to identify all projects within 6 miles of the project site that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO. 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 project owner) 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 from 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 then 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 2 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 GWF Hanford project if the high impact area is the result of high fence line concentrations from another stationary source and GWF Hanford 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, which completes the modeling portion of the cumulative assessment. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the project owner must submit a modeling protocol, based on information 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 project owner 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 project owner to complete. There are several reasons for this; modeling analyses take time to perform and require significant expertise, the project owner has already performed a modeling analysis of the project alone, and the project owner 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 project owner (see Mitigation section).

The project owner obtained an extensive list of nearby 67 stationary source facilities with a total of 125 permitting projects from the SJVAPCD. After removing projects that were outside of the six mile radius, or VOC emission-only sources (such as gas stations) a total 23 facilities were left on the cumulative projects list (GWF Energy 2009a) and are shown in **AIR QUALITY Table 25**. Of these remaining stationary sources:

- One facility was shutdown, cancelling the permit requests;
- Seven facilities did not have emission increases associated with their permit requests;
- 14 facilities had emission increases of less than 5 tons/year of any criteria pollutant; and
- The remaining facility of the 23 total facilities had emission increases of all criteria pollutants, other than CO, of less than 5 tons/year.

Staff does not believe modeling cumulative CO impacts to be necessary due to their being no potential for such a cumulative analysis to show exceedances of the standard due to the low ambient concentrations of CO and low GWF Hanford project CO impacts. Therefore staff has excluded all of these sources from the cumulative modeling analysis.

**AIR QUALITY Table 25**
**SJVAPCD Sources within a 6-mile radius**

| Facility | Description | Emissions |
|---|---|---|
| Cargill Inc/Nutrena Feed | Increase throughput, op unit 2 and op unit 3 | Increase ≤ 0.2 tons-PM10/year |
| Cargill Inc/Nutrena Feed | Modify premix room op unit 14 | No emissions increase |
| Central Valley Cabinet Mfg. | Evaluate new dust collector | Increase ≤ 0.5 tons-PM10/year |
| Del Monte Corporation | Modify unit 2 with a Temporary Replacement Emissions Unit | Increase ≤ 0.7 tons/year for: NOx, CO, PM10 and SOx |
| Pyramid Systems, Inc | Replace baghouse (2209 cfm to 28000 cfm) | Increase ≤ 3.9 tons-PM10/year |
| Mineral king Minerals | Pellet milling fertilizer production | Increase ≤ 0.4 tons-PM10/year |
| Intergrated Grain and Milling | Increase process rate on units 2 and 7 | Increase ≤ 2.5 tons-PM10/year |
| City of Hanford, Wastewater | Remove permit conditions from waste gas flare and two boilers | No emissions increase |
| Verdegaal Bros Inc | Installation of sulfur pellet receiving and load out operation | Increase ≤ 0.4 tons-PM10/year |
| Verdegaal Bros Inc | Install dry fertilizer bulk blender | Increase ≤ 0.6 tons-PM10/year |
| Central Valley Meat Co | Install new 21.0 MMBtu/hr boiler | Increase ≤ 1.0 tons/year for: NOx, PM10 and SOx; Increase ≤ 6.8 tons/year of CO |
| International Paper | Modification of units 1-2, 2-2, and 11-2 to increase waste paper throughput | Information received by District indicates facility has been shutdown, project to be cancelled |
| City of Hanford | 364 BHP diesel internal combustion engine (ICE) | Increase ≤ 0.1 tons/year for: NOx, CO, PM10 and SOx |
| City of Hanford | ICE emergency standby unit | Increase ≤ 0.1 tons/year for NOx, CO, PM10 and SOx |
| Penny Newman Milling | Increase receiving operations | Increase ≤ 0.04 tons-PM10/year |
| Carl's Jr. #227 | Increase charboiler throughput | Increase ≤ 0.2 tons-PM10/year |
| Kent Avenue Dairy | Application for diesel engine | Increase < 0.2 tons/year for: NOx, CO, PM10 and SOx |
| Turner Ranch Dairy | In-house Power Take-Off (PTO) ag ICE | No emissions increase |
| Turner Ranch Dairy | Emergency DICE | No emissions increase |
| Danell Bros. Dairy | Application for 3 diesel pump engines | No emissions increase |
| Manuel Monteiro | 755 hp Cummins engine | Increase < 0.4 tons/year for NOx, CO, PM10 and SOx |
| Valley View Farms | Application for engines | No emissions increase |
| Yokum Dairy | 300 hp Cummins diesel engine | No emissions increase |

Source: GWF Energy 2009a

The cumulative modeling analysis was limited to modeling the adjacent existing GWF Hanford LP facility, to determine if the combined localized impacts of GWF Hanford and the Hanford LP facility could cause significant impacts. The Hanford LP sources include the fluidized bed combustor, the low-pressure evaporator (auxiliary boiler), and the emergency diesel generator. The Hanford LP cooling tower was not included in the

cumulative modeling analysis by the project owner and has been evaluated separately by staff.

The results of this cumulative modeling effort are provided in **AIR QUALITY Table 26** and indicate that GWF Hanford, along with the Hanford LP, would contribute to existing violations of the PM10 and PM2.5 ambient air quality standards. The results also show that GWF Hanford will not contribute to new AAQS violations for any of the other pollutants modeled.

**AIR QUALITY Table 26**
**Cumulative Impacts Modeling Results (ug/m3)**

| Pollutant | Averaging Period | Impacts ($\mu g/m^3$) | Background ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | Standard ($\mu g/m^3$) | Percent of Standard |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 197 | 137.5 | 334.5 | 339 | 99% |
| | Annual | 2.0 | 22.8 | 24.8 | 57 | 44% |
| CO | 1-hour | 354 | 5,060 | 5414 | 23,000 | 22% |
| | 8-hour | 137 | 3,678 | 3815 | 10,000 | 38% |
| $SO_2$ | 1-hour | 17 | 340.6 | 357.6 | 665 | 54% |
| | 3-hour | 10 | 195.0 | 205 | 1,300 | 16% |
| | 24-hour | 4.9 | 81.4 | 86.3 | 105 | 82% |
| | Annual | 1.3 | 18.7 | 20 | 80 | 25% |
| PM10 | 24-hour | 3.5 | 142 | 145.5 | 50 | 291% |
| | Annual | 0.38 | 46.8 | 47.2 | 20 | 236% |
| PM2.5 | 24-hour | 3.5 | 74.5 | 78 | 35 | 223% |
| | Annual | 0.38 | 21.2 | 21.6 | 12 | 180% |

Source: GWF Energy 2009a

The PM10/PM2.5 24-hour and annual impacts from the Hanford LP cooling tower, estimated by staff through a review of the HEPP modeling results, would be approximately 9.3 and 0.78 $\mu g/m^3$, respectively. The maximum impacts from the Hanford LP cooling tower occur in a completely different location than the maximum impacts for the proposed GWF Hanford project, and so should not create significant overlap or increase of current Hanford LP worst case PM10/PM2.5 impacts.

The GWF Hanford project has provided emission reduction credits for PM10 and particulate precursor pollutants (NOx, SOx and VOC); these offsets would be in amounts much greater than a 1:1 ratio of maximum permitted emissions. Therefore, the direct particulate matter (PM10 and PM2.5) and secondary particular matter cumulative impacts after mitigation are considered to be less than significant.

## COMPLIANCE WITH LORS

The San Joaquin Valley Air Pollution Control District issued a Preliminary Determination of Compliance (PDOC) for the GWF Hanford project on March 17, 2009 (SJVAPCD 2009a) and a Revised Preliminary Determination of Compliance (RPDOC) on July 23, 2009 (SJVAPCD 2009b). The revised PDOC incorporated U.S. EPA comments on the PDOC and incorporated a change in the permitting of the adjacent existing GWF Hanford LP facility to reduce total site permitted CO emissions that eliminates the need for U.S. EPA PSD permitting for this amendment. Compliance with all District Rules and Regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification. Staff will provide an

addendum to this assessment to incorporate any revisions to the conditions or findings in the District's FDOC.

## FEDERAL

The District is responsible for issuing the Federal New Source Review (NSR) permit. This project will not require a PSD permit from U.S.EPA prior to initiating construction.

## STATE

The project owner will demonstrate that the project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance (FDOC) and the Energy Commission's affirmative finding for the amended project.

## LOCAL

The District has issued a PDOC (SJVAPCD 2009a) stating 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 GWF Hanford project. Best Available Control Technology would be implemented, and emission reduction credits (ERCs), proposed by the Project owner and approved and certified by the District, would fully mitigate project nonattainment pollutant (including precursors) emissions so they would be consistent with the strategies and future emissions anticipated under the Districts air quality attainment and maintenance plans.

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the project owner for the GWF Hanford project, the District will prepare and present to the Energy Commission a Determination of Compliance (DOC), consisting of both a PDOC and, after a public comment period, an FDOC. The PDOC was published on March 17, 2009, a revised PDOC was issued on July 23, 2009, and the FDOC will be published sometime in August or September 2009. The DOC 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

### Rule 1080 – Stack Monitoring

This rule grants the Air Pollution Control Officer the authority to request the installation and use of continuous emissions monitors (CEMs), and specifies performance standards for the equipment and administrative requirements for record keeping, reporting, and notification. The PDOC includes conditions to assure compliance with this rule. Compliance is expected.

### Rule 1081 – Source Sampling

This rule requires adequate and safe facilities for use in sampling to determine compliance with emission limits, and specifies methods and procedures for source testing and sample collection. The PDOC includes conditions to assure compliance with this rule. Compliance is expected.

### Rule 1100 – Equipment Breakdown

This rule defines a breakdown condition, the procedures to follow if one occurs, and the requirements for corrective action, issuance of an emergency variance, and reporting. This rule is applied to the owner of any source operation with air pollution control equipment, or related operating equipment that controls air emissions, or continuous monitoring equipment. The PDOC includes conditions to assure compliance with this rule. Compliance is expected.

## Regulation II - Permits

### Rule 2010 – Permits Required

This rule requires any person who is building, altering, replacing or operating any source that emits, may emit air contaminants, or may reduce emissions, to first obtain authorization from the District in the form of an Authority to Construct or a Permit to Operate. Obtaining the DOC will assure compliance with this rule.

### Rule 2201 – New and Modified Stationary Source Review Rule

The main function of the District's New Source Review Rule is to allow for the issuance of Authorities to Construct, Permits to Operate, the application of Best Available Control Technology (BACT) to new or modified permit source and to require the new permit source to secure emission offsets.

#### *Section 4.1 – Best Available Control Technology*

Best Available Control Technology (BACT) is defined as the most stringent emission limitation or control technique of the following: a) achieved in practice for a category and class of source; b) contained in any State Implementation Plan and that have been approved by the U.S.EPA for a category and class of source; c) contained in an applicable federal New Source Performance Standard; or d) any other emission limitation or control technique that the District's Air Pollution Control Officer (APCO) finds is technologically feasible and is cost effective. BACT is required for any new or modified emission unit that results in an emissions increase of 2.0 lb/day. However, Section 4.2.1 states that BACT is not required for CO emissions from any new or modified emissions unit if those sources emit less than 200,000 lb/year of CO. In the case of GWF Hanford, BACT applies for NOx, VOC, CO, $SO_2$, and PM10 emissions from the natural gas turbines. The District has concluded that the project meets BACT requirements for the gas turbine and firewater pump engine (SJVAPCD 2009a). Compliance is expected.

#### *Section 4.5 through 4.13 – Emission Offset Requirements*

Section 4.5 specifies that emissions offsets for new or modified sources are required when their emissions are equal to or exceed the following levels:

Oxides of Nitrogen, NOx – 20,000 lbs/year;
Volatile Organic Compounds, VOC – 20,000 lbs/year;
Carbon Monoxide, CO – 200,000 lbs/year;
PM10 – 29,200 lbs/year;
Sulfur Oxides, SOx – 54,750 lbs/year.

The GWF Hanford is considered part of the same site as the Hanford LP facility, which had already exceeded these offset thresholds. So, first the HEPP and now the

requested amended GWF Hanford project must offset all of its permitted NOx, VOC, PM10 and SOx emissions.

Section 4.6 specifies that emissions offsets are not required for increases of CO in attainment areas if the project owner demonstrates that the emissions increase will not cause or contribute to a violation of the ambient air quality standards, and that those emissions are consistent with Reasonable Further Progress. The District has evaluated the project's CO emissions and has concluded that they are consistent with Reasonable Further Progress and do not require offsets.

Section 4.8 specifies that the emission offsets provided shall be adjusted according to the distance of the offset from the project proposed site. The ratios are:

- Internal or on-site source – 1 to 1;
- Within 15 miles of the source – 1.2 to 1 (non-major source), or 1.3 to 1 (major source); and
- 15 miles or more from the source – 1.5 to 1.

Section 4.13.1 specifies that major sources (defined as those sources that emit greater than 25 tons of NOx and VOC, 100 tons CO, or 70 tons of PM10 and SOx) that are shut down and thus generate an ERC may not be used as an offset for a new major source unless those ERCs are included in an U.S.EPA-approved attainment plan.

Section 4.13.3 allows for the use of interpollutant offsets (including PM10 precursors for PM10) on a case-by-case basis, provided that the project owner demonstrates that the emissions increase will not cause a violation of any ambient air quality standard. The ratio for interpollutant trading shall be based on an air quality analysis and shall be equal to or greater than the minimum offsetting requirement (the distance ratios) of this rule (Section 4.8).

Section 4.13.4 requires Actual Emissions Reductions (AER) used as offsets to have occurred during the same calendar quarter as the emissions increases being offset. Exceptions to this rule (4.13.6 through 4.13.9) allow PM emission reductions that occurred from October through March to offset PM emissions occurring anytime during the year, for NOx and VOC emission reductions that occurred from April through November to offset NOx and VOC emissions occurring anytime during the year, and for CO emission reductions that occurred from November through February to offset CO emissions occurring anytime during the year.

The Districts has evaluated the offset need and the previous ERC submittal for the HEPP. The District has found that the ERC previously submitted will comply with these regulations (SJVAPCD 2009a). Compliance with this rule is expected.

### *Section 4.14 – Ambient Air Quality Standards*

Section 4.14.1 requires that a new source not cause, or make worse, the violation of an ambient air quality standard as demonstrated through analysis with air dispersion models. The District completed the required modeling analysis and found that the project would comply with this regulation as the emissions would not cause new violations for the attainment pollutants and would not cause a significant increase in

PM10 levels. The Districts PM10 modeling determined the following comparison with U.S.EPA PM10 significance levels:

| Pollutant | Significance Level | Facility Impact |
|---|---|---|
| PM10 24-hour | 5 $\mu g/m^3$ | 3.19 $\mu g/m^3$ |
| PM10 Annual | 1 $\mu g/m^3$ | 0.71 $\mu g/m^3$ |

Staff also reviewed the project owner's modeling analysis that indicates no new exceedances of ambient air quality standards. Compliance with this rule is expected.

***Section 4.15 – Additional Requirements for new Major Sources and Federal Major Modifications***

Section 4.15.2 requires that the owner of a proposed new major source or federal major modification demonstrate to the satisfaction of the District that all major stationary sources subject to emission limitations that are owned or operated by the project owner or any entity controlling or under common control with the project owner in California, are in compliance or on a schedule for compliance with all applicable emission limitations and standards. The project owner's compliance demonstration has been accepted by the District and is included in the District's PDOC.

***Section 5.0 – Administrative Requirements***

Section 5.8 applies to all power plants proposed to be constructed within the SJVAPCD, where an AFC or a Notice of Intention has been submitted to the CEC. It describes the actions to be taken by SJVAPCD to provide information to CEC and ARB to ensure that District's rules and regulations will be satisfied. After the Application has been submitted to CEC and other responsible agencies, including SJVAPCD, the APCO is required to conduct a Determination of Compliance review, identical to that which would be performed if an Application for an Authority to Construct had been received for the power plant. If the AFC does not meet the requirements of this regulation, then the APCO is required to inform the CEC within 20 calendar days following receipt of the AFC, including specifying what additional information is required. In such an instance, the AFC is considered to be incomplete and returned to the Project owner for resubmittal. The GWF Hanford project is a petition for project amendment rather than an AFC for a new or amended project; however, the District is treating the project as if it were a full AFC project. With the submittal of the FDOC compliance is assumed.

**Rule 2520 – Federally Mandated Operating Permits**

Rule 2520 requires that a project owner file a Title V Operating Permit from the U.S.EPA with the District within 12 months of commencing operation. A project is subject to this requirement if any of the following apply: the project is a major stationary source (under PSD definitions), it has the potential to emit greater than 100 tons per year of a criteria pollutant, any equipment permitted is subject to New Source Performance Standards, the project is subject to Title IV Acid Rain program, or the owner is required to obtain a PSD Permit from the U.S.EPA. The Title V Permit application requires that the owner submit information on the operation of the air polluting equipment, the emission controls, the quantities of emissions, the monitoring of the equipment as well as other information requirements. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

### Rule 2540 – Acid Rain Program

A project greater than 25 megawatts (MW) and installed after November 15, 1990, must submit an acid rain program permit application to the District. The acid rain requirements will become part of the Title V Operating Permit (Rule 2520). Monitoring of the NOx and SOx emissions and a relatively small quantity of SOx allowances (from a national SOx allowance bank) will be required as well as the use of a NOx CEM. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

## Regulation IV - Prohibitions

### Rule 4001 – New Source Performance Standards

Rule 4001 specifies that a project must meet the requirements of the Federal New Source Performance Standards (NSPS), according to Title 40, Code of Federal Regulations, Part 60, Chapter 1. Subpart KKKK, that overrides subpart GG, which pertain to Stationary Gas Turbines, requires that a project meet specific NOx and $SO_2$ standards, meet continuous emission monitoring system requirements, meet various emission and fuel reporting requirements, and meet specified NOx and SOx performance testing requirements. The District has carefully evaluated this rule in the PDOC (SJVAPCD 2009a) and the PDOC includes conditions to assure compliance with this rule. Compliance is expected.

Subpart IIII applies to the new firewater pump engine. The District has evaluated this request and has determined that the proposed Tier 3 engine will meet the emission requirements of this regulation and the District has proposed conditions that will ensure compliance with the record keeping and maintenance provision of this regulation.

### Rule 4002 – National Emission Standards for Hazardous Air Pollutants

Rule 4002 incorporates the National Emission Standards for Hazardous Air Pollutants (HAPs) from Part 61 and Part 63, Chapter I, Subchapter C, Title 40 CFR and applies to major sources of HAPs. The facility is not forecast as a major HAPs source. Compliance is expected.

### Rule 4101 – Visible Emissions

Rule 4101 prohibits visible air emissions, other than water vapor, of more than No. 1 on the Ringelmann chart (20 percent opacity) for more than three minutes in any one-hour. Considering the control equipment (SCR/CO catalyst) on the turbines no visible emissions are expected during normal operation of the facility. The PDOC includes conditions to assure compliance with this rule. Compliance is expected.

### Rule 4102 – Nuisance

Rule 4102 prohibits any emissions “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 person or public or which cause or have a natural tendency to cause injury or damage to business or property.” The types of emission sources at the facility are not expected to cause the potential for nuisance. The PDOC includes a condition to assure compliance with this rule. Compliance is expected.

### Rule 4201 – Particulate Matter Concentration

Rule 4201 limits particulates emissions from any source that emits or may emit dust, fumes, or total suspended particulate matter to less than 0.1 grain per dry standard cubic foot (gr/dscf) of gas calculated to 12 percent of carbon dioxide. The particulate matter grain loading expected for the proposed facility equipment are less than this standard. The PDOC includes a condition to assure compliance with this rule. Compliance is expected.

### Rule 4202 – Particulate Matter Emission Rate

This rule limits particulate matter emissions for any source operation that emits or may emit particulate matter emissions by establishing allowable emission rates. Calculation methods for determining the emission rate based on process weight are specified. Gaseous and liquid fuels are exempt, so the gas turbines are exempt from this rule.

### Rule 4301 – Fuel Burning Equipment

Rule 4301 provides limits on the concentration of combustion contaminants and specifies maximum emission rates for NOx, $SO_2$, and combustion contaminant emissions (particulates) for any fuel burning equipment, except for air pollution control equipment, which is exempt. The specified limits are 140 lbs/hour of NOx (calculated as $NO_2$), 200 lbs/hour of $SO_2$, 0.1 gr/dscf of gas calculated to 12 percent of carbon dioxide, and 10 lbs/hour of combustion contaminants. The gas turbines do not meet the definition of fuel burning equipment as stated in this rule and are therefore exempt. The use of California diesel fuel will ensure compliance for the firewater pump engine.

### Rule 4302 – Internal Combustion Engines – Phase 2

Rule 4302 provides monitoring and record keeping requirements for standby emergency engines. The District has provided conditions for the firewater pump engine to ensure compliance with this rule.

### Rule 4703 – Stationary Gas Turbines

This rule limits NOx and CO emissions from stationary gas turbines. Establishes requirements for testing, monitoring, and record keeping for NOx and CO emissions from new or modified stationary gas turbines with a designed power of 0.3 MW or higher and/or a maximum heat input rating of more than 3,000,000 Btu per hour. The use of BACT will ensure that the emission requirements of this rule are met. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

### Rule 4801 – Sulfur Compounds

This rule limits the emissions of sulfur compounds to no greater than 0.2 percent by volume calculated as $SO_2$ on a dry basis averaged over 15 consecutive minutes. The use of pipeline quality natural gas and California diesel fuel will assure compliance with this rule. Compliance is expected.

## Regulation VIII - Fugitive PM10 Prohibitions

### Rule 8011 – General Requirements

Rule 8011 specifies the types of chemical stabilizing agents and dust suppressant materials that can (and cannot) be used to minimize fugitive dust from anthropogenic (man-made) sources. The rule also specifies test methods for determining compliance with visible dust emission (VDE) standards, stabilized surface conditions, soil moisture

content, silt content for bulk materials, silt content for unpaved roads and unpaved vehicle/ equipment traffic areas, and threshold friction velocity (TFV). Records shall be maintained only for those days that a control measure was implemented, and kept for one year following project completion to demonstrate compliance. An owner subject to Rule 2520 (Federally Mandated Operating Permits) shall keep such records for five years. A fugitive dust management plan for unpaved roads and unpaved vehicle/ equipment traffic areas is discussed as an alternative for Rule 8061 and Rule 8071. The PDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

**Rule 8021 – Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities**

This rule requires fugitive dust emissions throughout construction activities (from pre-activity to active operations and during periods of inactivity) to comply with the conditions of a stabilized surface area and to not exceed an opacity limit of 20 percent, by means of water application, chemical dust suppressants, or constructing and maintaining wind barriers. A Dust Control Plan is also required and shall be submitted to the APCO at least 30 days prior to the start of any construction activities on any site that will include 10 acres or more of disturbed surface area for residential developments, 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. The PDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

**Rule 8031 – Bulk Materials**

Rule 8031 limits the fugitive dust emissions from the outdoor handling, storage and transport of bulk materials. It requires that fugitive dust emissions comply with the conditions of a stabilized unpaved road surface and not exceed an opacity limit of 20 percent. It specifies that bulk materials be transported using wetting agents, with appropriate freeboard space in the vehicles, or be covered. It also requires that stored materials be covered or stabilized. The PDOC includes conditions to assure compliance with all Regulation VIII rules. Compliance is expected.

**Rule 8041 – Carryout and Trackout**

This rule limits carryout and trackout during construction, demolition, excavation, extraction, and other earthmoving activities (Rule 8021), from bulk materials handling (Rule 8031), from paved and unpaved roads (Rule 8061), and from unpaved vehicle and equipment traffic areas (Rule 8071) where carryout has occurred or may occur. It specifies acceptable (and unacceptable) methods for cleanup of carryout and trackout. The PDOC includes conditions to assure compliance with all Regulation VIII rules. Compliance is expected.

**Rule 8051 – Open Areas**

Rule 8051 requires any open area of 0.5 acres or more within urban areas, or three acres or more within rural areas, and contains at least 1,000 square feet of disturbed surface area to comply with the conditions of a stabilized unpaved road surface and to not exceed an opacity limit of 20 percent, by means of water application, chemical dust suppressants, paving, applying and maintaining gravel, or planting vegetation. The PDOC includes conditions to assure compliance with all Regulation VIII rules. Compliance is expected.

### Rule 8061 – Paved and Unpaved Roads

Rule 8061 specifies the width of paved shoulders on paved roads and guidelines for medians. It requires gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants on unpaved roadways to prevent exceeding an opacity limit of 20 percent. Exemptions to this rule include "any unpaved road segment with less than 26 annual average daily vehicle trips (AADT)." The PDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

### Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas

This rule intends to limit fugitive dust from any unpaved vehicle and equipment traffic area by using gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants to prevent exceeding an opacity limit of 20 percent. Exemptions to this rule include "unpaved vehicle and equipment traffic areas with less than 50 Average Annual Daily Trips (AADT)." The PDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

## CONCLUSIONS

The requested changes in project design and related construction would conform with applicable Federal, State, and SJVAPCD air quality laws, ordinances, regulations, and standards, and the amended project would not cause significant air quality impacts, provided that the recommended staff Conditions of Certification (COCs) and District COCs are included as provided below.

After review of the RPDOC, including public comments, the SJVAPCD may revise the conditions in the Final Determination of Compliance. If necessary, a revision to this analysis would be prepared that provides any additional changes to the COCs.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff recommends the following conditions of certification to address the potential impacts associated with the construction and operation of the GWF Hanford. These conditions include the SJVAPCD proposed conditions from the PDOC, with appropriate staff proposed verification language for each condition, as well as Energy Commission staff proposed conditions. The revisions and additions to the currently approved conditions are shown in underline and strikeout.

Revisions to the conditions provided in the District's FDOC, which should be published sometime in August or September 2009, will be incorporated in the Energy Commission's Staff Assessment Addendum.

Due to the significant revisions in the District conditions for this facility and staff's compilation of certain conditions, **AIR QUALITY Table 27** has been prepared to show which conditions remain, altered or unaltered, from the original list of District conditions, which conditions are new, and how staff's numbering of the conditions relates to the District's list of conditions.

**AIR QUALITY Table 27**
**SJVAPCD Permit Conditions with Corresponding Energy Commission Conditions of Certification**

| Original SJVAPCD HEPP Conditions | Current SJVAPCD Conditions | Revised Conditions of Certification |
|---|---|---|
| **Turbines** | | |
| | 1 | AQ-1 |
| | 2 | AQ-2 |
| | 3 | AQ-3 |
| 2 | 4 | AQ-4 |
| | 5 | AQ-5 |
| | 6 | AQ-6 |
| | 7 | AQ-7 |
| | 8 | AQ-8 |
| | 9 | AQ-9 |
| | 10 | AQ-10 |
| | 11 | AQ-11 |
| | 12 | AQ-12 |
| | 13 | AQ-13 |
| | 14 | AQ-14 |
| | 15 | AQ-15 |
| | 16 | AQ-16 |
| | 17 | AQ-17 |
| | 18 | AQ-18 |
| 5 | 19 | AQ-19 |
| | 20 | AQ-20 |
| | 21 | AQ-21 |
| 6 | 22 | AQ-22 |
| 7 | 23 | AQ-23 |
| 9 | 24 | AQ-24 |
| 8 | 25 | AQ-25 |
| 10 | 26 | AQ-26 |
| 15 | 27 | AQ-27 |
| 16 | 28 | AQ-28 |
| 20 | 29 | AQ-29 |
| + | 30 | AQ-30 |
| 16 | 31 | AQ-31 |
| | 32 | AQ-32 |
| | 33 | AQ-33 |
| | 34 | AQ-34 |
| | 35 | AQ-35 |
| 18 | 36 | AQ-36 |
| | 37 | AQ-37 |
| | 38 | AQ-38 |
| | 39 | AQ-39 |
| 21 | 40 | AQ-40 |
| | 41 | AQ-41 |

| Original SJVAPCD HEPP Conditions | Current SJVAPCD Conditions | Revised Conditions of Certification |
|---|---|---|
| | 42 | AQ-42 |
| | 43 | AQ-43 |
| 17 | 44 | AQ-44 |
| | 45 | AQ-45 |
| | 46 | AQ-46 |
| 22 | 47 | AQ-47 |
| | 48 | AQ-48 |
| 22 | 49 | AQ-49 |
| | 50 | AQ-50 |
| 24 | 51 | AQ-51 |
| | 52 | AQ-52 |
| 14 | 53 | AQ-53 |
| 23 | 54 | AQ-54 |
| 11 | 55 | AQ-55 |
| | 56 | AQ-56 |
| 13 | 57 | AQ-57 |
| | 58 | AQ-58 |
| | 59 | AQ-59 |
| | 60 | AQ-60 |
| 29 | 61 | AQ-61 |
| 30 | 62 | AQ-62 |
| | 63 | AQ-63 |
| | 64 | AQ-64 |
| | 65 | AQ-65 |
| | 66 | AQ-66 |
| | 67 | AQ-67 |
| | 68 | AQ-68 |
| | 69 | AQ-69 |
| 31 | 70 | AQ-70 |
| | 71 | AQ-71 |
| | 72 | AQ-72 |
| | 73 | AQ-73 |
| 26 | 74 | AQ-74 |
| 27 | 75 | AQ-75 |
| 32 | 76 | AQ-76 |
| | 77 to 92 | AQ-77 |
| | 93 | AQ-78 |
| | 94 | AQ-79 |
| | 95 | AQ-80 |
| | 96 | AQ-81 |
| | 97 | AQ-82 |
| | 98 | AQ-83 |
| | 99 | AQ-84 |
| | 100 | AQ-85 |
| | 101 | AQ-86 |

| Original SJVAPCD HEPP Conditions | Current SJVAPCD Conditions | Revised Conditions of Certification |
|---|---|---|
| | 102 | AQ-87 |
| 1 | Deleted | -- |
| 3 | Deleted | -- |
| 4 | Deleted | -- |
| 12 | Deleted | -- |
| 19 | Deleted | -- |
| 25 | Deleted | -- |
| 28 | Deleted | -- |
| 33 | Deleted | -- |
| 34 | Deleted | -- |
| **Emergency IC Engine** | | |
| | 1 | AQ-88 |
| | 2 | AQ-89 |
| | 3 | AQ-90 |
| | 4 | AQ-91 |
| | 5 | AQ-92 |
| | 6 | AQ-93 |
| | 7 | AQ-94 |
| | 8 | AQ-95 |
| | 9 | AQ-96 |
| | 10 | AQ-97 |
| | 11 | AQ-98 |
| | 12 | AQ-99 |
| | 13 | AQ-100 |
| | 14 | AQ-101 |
| | 15 | AQ-102 |
| | 16 | AQ-103 |
| | 17 | AQ-104 |
| | 18 | AQ-105 |
| | 19 | AQ-106 |
| | 20 | AQ-107 |
| | 21 | AQ-108 |

## STAFF CONDITIONS AND VERIFICATIONS

## Original Conditions of Certification

~~**AQ-SC1** Prior to the commencement of project construction, the project owner shall prepare a Construction Fugitive Dust Mitigation Plan that will specifically indentify fugitive dust mitigation measures that will be employed for the construction of the project and related facilities.~~

- ~~Measures that should be addressed include the following:~~
- ~~The identification of the employee parking area(s) and surface of the parking area(s);~~
- ~~The frequency of watering of unpaved roads and disturbed areas;~~

- ~~The application of chemical dust suppressants;~~
- ~~The stabilization of storage piles and disturbed areas;~~
- ~~The use of gravel access aprons;~~
- ~~The use of posted speed limit signs;~~
- ~~The use of wheel washing areas prior to large trucks leaving the project site;~~
- ~~The methods that will be used to clean tracker-out mud and dirt from the project site onto public roads; and~~
- ~~For any transportation of borrowed fill material, the use of covers on vehicles, wetting of the material, and insuring appropriate freeboard of material in the vehicles.~~

~~**Verification:** The project owner shall submit to the CPM a letter attesting to compliance with the above and shall report any violations to the CPM.~~

~~**AQ-SC2** The project owner shall comply with the terms and conditions of the Authority to Construct and the Permit to Operate issued by San Joaquin Valley Unified Air Pollution Control District.~~

~~**Verification:** In the event that the air district finds the project to be out of compliance with the terms and conditions of the Authority to Construct, the project owner shall notify the CPM of the violation, and the measures taken to return to compliance, within five (5) days.~~

~~**AQ-SC3** The project owner shall operate the project in compliance with all Best Available Control Technology (BACT) standards imposed by the Air District in its Authority to Construct. Failure to meet these standards will result in a finding that the project owner is out of compliance with the certification.~~

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

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

**AQ-SC2** Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide 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.

1. All unpaved roads and disturbed areas in the project and laydown 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.

2. No vehicle shall exceed 10 miles per hour on unpaved areas within the project and laydown construction sites.

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

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

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

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

7. 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.

8. 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.

9. 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.

10. At least the first 500 feet of any public roadway exiting the construction site shall be swept visually clean, using wet sweepers or air filtered dry vacuum sweepers, 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.

11. 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.

12. 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.

13. 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.

14. Disturbed areas shall be re-vegetated as soon as practical.

The fugitive dust requirements listed in this condition may be replaced with as stringent or more stringent methods as required by SJVAPCD Regulation VIII.

**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 shut-down 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.

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

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

3. ~~A good faith effort shall be made to find and use~~For off-road construction diesel equipment that has a rating of 100 hp to 750 hp a good faith effort shall be made to find and use equipment that meets the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines as specified in Title 13, California Code of Regulations section 2423(b)(1). This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms.

4. All construction diesel engines that have a rating of 50 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). The following exceptions for specific construction equipment items may be made on a case-by-case basis.

   (A) Tier 1 equipment will be allowed on a case-by-case basis only when the project owner has documented that no Tier 2 equipment is available for a particular equipment type that must be used to complete the project's construction. This shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms.

   (B) The construction equipment item is intended to be on site for five days or less.

(C) Equipment owned by specialty subcontractors may be granted an exemption, for single equipment items on a case-by-case basis, if it can be demonstrated that extreme financial hardship would occur if the specialty subcontractor had to rent replacement equipment, or if it can be demonstrated that a specialized equipment item is not available by rental.

5. 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.

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

7. 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 at the project owner's discretion.

~~**AQ-SC6** The wet surface air cooler shall have a mist eliminator with a manufacturer guaranteed mist reduction rate of 0.005 percent or less of the water recirculation rate.~~

~~**Verification:** Verification: The project owner shall provide the CPM a copy of the manufacturer guarantee for the mist eliminator 30 days prior to installation of the wet surface air cooler.~~

**AQ-SC6** The wet surface air cooler shall have a mist eliminator with a manufacturer guaranteed mist reduction rate of 0.005 percent or less of the water recirculation rate.

The wet surface air cooler spray water shall be tested for total dissolved solids and that data shall be used to determine and report the particulate matter emissions from the wet surface air cooler. The wet surface air cooler spray water shall be tested at least once annually during the anticipated summer operation peak period (July through September).

The wet surface air coolers annual particulate (PM10/PM2.5) emissions shall be limited to 8 lbs/year. The project owner shall estimate annual particulate emissions from the wet surface air cooler using the water quality testing data and estimated spray water use. Compliance with the wet surface air cooler PM10 emission limit shall be demonstrated as follows:

PM10 = cooling water recirculation * total dissolved solids concentration in the blowdown water * design drift rate.

**Verification:** The project owner shall provide the CPM a copy of the manufacturer guarantee for the mist eliminator 30 days prior to installation of the wet surface air cooler. The project owner shall provide the water quality test results and the wet surface air cooler particulate (PM10/PM2.5) emissions estimates to the CPM as part of the fourth quarter's Quarterly Operational Report (**AQ-7**).

~~**AQ-SC7** The wet surface air cooler spray water shall be tested for total dissolved solids and that data shall be used to determine and report the particulate matter emissions from the wet surface air cooler. The wet surface air cooler spray water shall be tested at least once annually during the anticipated summer operation peak period (July through September).~~

~~Verification: The project owner shall provide the water quality test results and the wet surface air cooler particulate (PM10/PM2.5) emissions estimates to the CPM as part of the fourth quarter's quarterly operational report (**AQ-SC9**).~~

~~**AQ-SC8** The wet surface air coolers daily PM10 emissions shall be limited to 18.82 lb/day in total for all eight cooling tower cells. The cooling towers shall be equipped with a drift eliminator to control the drift fraction to 0.0005 percent of the circulating water flow. The project owner shall estimate daily PM10 emissions from the cooling towers using the water quality testing data or continuous monitoring data and daily circulating water flow data collected on a quarterly basis. Compliance with the cooling tower PM10 emission limit shall be demonstrated as follows:~~

~~PM10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.~~

~~Verification: The project owner shall submit to the CPM daily cooling tower PM10 emission estimates in the Quarterly Operation Report (**AQ-SC9**).~~

**AQ-SC7** The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter, that include operational and emissions information as necessary to demonstrate compliance with the Conditions of Certification 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 PRELIMINARY DETERMINATION OF COMPLIANCE CONDITIONS (SJVAPCD 2009a)

*EQUIPMENT DESCRIPTION, UNIT C-4140-1-5:*

Modification of 47.5 MW nominally rated simple-cycle peak-demand power generating system #1 consisting of a general electric model LM6000 natural gas-fired combustion turbine generator with water spray premised combustion systems, served by a selective catalytic reduction (SCR) system with ammonia injection and an oxidation catalyst: convert the existing power generating system to a simple-cycle or combined-cycle configuration by (1) removing the existing oxidation catalyst, SCR system and 85' exhaust stack; (2) installing a new once through heat recovery steam generator; (3) installing a new oxidation catalyst, SCR system and 91.5' tall exhaust stack; and (4)

installing a 25 mw nominally rated condensing steam turbine generator and its associated lube oil cooler (share with c-4140-2).

*EQUIPMENT DESCRIPTION, UNIT C-4140-2-5:*
Modification of 47.5 MW nominally rated simple-cycle peak-demand power generating system #2 consisting of a general electric model LM6000 natural gas-fired combustion turbine generator with water spray premised combustion systems, served by a selective catalytic reduction (SCR) system with ammonia injection and an oxidation catalyst: convert the existing power generating system to a simple-cycle or combined-cycle configuration by (1) removing the existing oxidation catalyst, SCR system and 85' exhaust stack; (2) installing a new once through heat recovery steam generator; (3) installing a new oxidation catalyst, SCR system and 91.5' tall exhaust stack; and (4) installing a 25 MW nominally rated condensing steam turbine generator and its associated lube oil cooler (share with c-4140-1).

**AQ-1** This Determination of Compliance serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]

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

**AQ-2** Prior to operating with modifications authorized by this Determination of Compliance, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

**Verification:** The project owner shall submit to the CPM copies of the Title V operating permit application within five working days of its submittal by the project owner to the District.

**AQ-3** To the extent this Determination of Compliance serves as an Authority to Construct, said Authority to Construct shall not become effective until the California Energy Commission approves the Petition to Amend the project's existing license. [California Environmental Quality Act and District Rule 2201, 5.8.8]

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

**AQ-4** The project owner shall not begin actual onsite construction of the equipment authorized by this Determination of Compliance until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA).

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

**AQ-5** Authority to Construct (ATC) C-603-1-8 shall be implemented concurrently, or prior to the modification and startup of the equipment authorized by this Determination of Compliance. [District Rule 2201]

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

**AQ-6** District facilities C-603 and C-4140 are the same stationary source for District permitting purposes. [District Rule 2201]

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

**AQ-7** The owner/operator of GWF Hanford shall minimize the emissions from the gas turbine to the maximum extent possible during the commissioning period. Conditions **AQ-8** through **AQ-18** shall apply only during the commissioning period as defined below. Unless otherwise indicated, Conditions **AQ-19** through **AQ-87** shall apply after the commissioning period has ended. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the monthly commissioning status report by the 10th of each month and the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-8** Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the GWF Hanford construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems. [District Rule 2201]

**Verification:** The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-9** Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when a gas turbine is first fired, whichever occurs first. The commissioning period shall terminate when the plant has completed initial performance testing and is available for commercial operation. [District Rule 2201]

**Verification:** The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-10** At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the combustors of this unit shall be tuned to minimize emissions. [District Rule 2201]

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

**AQ-11** At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the Selective Catalytic Reduction (SCR) system and the oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]

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

**AQ-12** Coincident with the end of the commission period and the steady-state operation of the SCR system and the oxidation catalyst, $NO_X$ and CO emissions from this unit shall comply with the steady state limits specified in condition **AQ-28** or **AQ-32**. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG CEMs operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-13** The project owner shall submit a plan to the District at least four weeks prior to the first firing of this unit, describing the procedures to be followed during the commissioning period. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the combustors, the installation and operation of the SCR systems and the oxidation catalyst, the installation, calibration, and testing of the $NO_X$ and CO continuous emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system or oxidation catalyst. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM for review and the District for approval the commissioning plan at least four weeks prior to the first firing of turbines. The project owner shall notify the CPM and District no later than 30 days prior to the proposed start date of commissioning and expected duration.

**AQ-14** Emission rates from this CTG, during the commissioning period, shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 52.00 lb/hr; CO – 40.50 lb/hr; VOC (as methane) – 1.20 lb/hr; PM10 – 2.20 lb/hr; or $SO_X$ (as $SO_2$) – 0.31 lb/hr. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG CEMs operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-15** During the initial commissioning activities, the project owner shall demonstrate compliance with the $NO_X$ emission limits specified in **AQ-14** through the use of a properly operated and maintained continuous emissions monitor located within the inlet section of the steam generator unit. Upon completion of the initial commission activities and with the installation of the SCR system and oxidation catalyst, the project owner shall demonstrate compliance with the NOx and CO emission limits specified in **AQ-14** through the use of a properly operated and maintained continuous emission monitors and recorders as specified in **AQ-55** and **AQ-57**. The monitored parameters for this unit shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation). [District Rule 2201]

**Verification:** The project owner shall provide the source test data and CPM CEMs data demonstrating compliance with this condition as part of the monthly commissioning status report (**AQ-7**).

**AQ-16** During the initial commission activities, the inlet NOx continuous emission monitor specified in this permit shall be installed, calibrated, and operational prior to the first re-firing of this unit. Upon completion of the initial commission activities and the installation of the SCR system and oxidation catalyst, the exhaust stack NOx and CO continuous emissions monitor specified within this permit shall be installed, calibrated, and operational prior to the first re-firing of this unit. After first re-firing, the detection range of the each continuous emissions monitor shall be adjusted as necessary to accurately measure the resulting range of $NO_X$ and/or CO emission concentrations. [District Rule 2201]

**Verification:** The project owner shall provide a protocol for the installation, calibration, and testing for the SCR system continuous monitors at least 60 days prior to SCR system use. The project owner shall submit to the CPM and District the SCR system operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports **(AQ-SC7)**.

**AQ-17** The total number of firing hours of this unit without abatement of emissions by the SCR system and the oxidation catalyst shall not exceed 430 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and the oxidation catalyst in place. Upon completion of these activities, the project owner shall provide written notice to the District and the unused balance of the 430 firing hours without abatement shall expire. [District Rule 2201]

**Verification:** A log of the dates, times, and cumulative unit operating hours when fuel is being combusted during the commissioning period shall be maintained by the project owner. The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with the requirements listed in this condition. The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-18** The total mass emissions of $NO_X$, CO, VOC, PM10, and $SO_X$ that are emitted during the commissioning period shall accrue towards the consecutive 12 month emission limits specified in **AQ-41**. [District Rule 2201]

**Verification:** The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date. The project owner shall submit the total mass emissions of NOx, CO, VOC, PM10, and SOx in the 12th month commissioning status report in compliance with this condition.

**AQ-19** A s~~S~~elective catalytic reduction (SCR) system and oxidation catalyst shall serve this ~~the~~ gas turbine engine. Exhaust ducting may~~shall~~ be equipped (if required)

with a fresh air inlet ~~and~~ blower to be used to lower the exhaust temperature prior to inlet of the SCR system catalyst. The project owner ~~Permittee~~ shall submit SCR and oxidation catalyst design details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM for review and District for approval final selection, design parameters and details of the SCR and oxidation.

**AQ-20** Project owner shall submit continuous emission monitor design, installation, and operational details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM for review and the District for approval CEM specification, installation details and operating plan at least 30 days prior to the commencement of construction.

**AQ-21** When operating in simple-cycle mode and when operating in combined-cycle mode, the project owner shall submit to the District information correlating the $NO_X$ control system operating parameters to the associated measured $NO_X$ output. The information must be sufficient to allow the District to determine compliance with the $NO_X$ emission limits of this permit when no continuous emission monitoring data for $NO_X$ is available or when the continuous emission monitoring system is not operating properly. [District Rule 4703]

**Verification:** The project owner/operator shall provide the District with documentation correlating NOx control system operating parameters to the associated measured NOx output. Information must be sufficient to allow NOx emissions to be calculated during times when the CEMS is not functioning properly.

**AQ-22** All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]

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

**AQ-23** No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

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

**AQ-24** No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20 percent opacity. [District Rule 4101]

**Verification:** The project owner shall submit to the CPM the CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-25** Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

**Verification:** The project owner shall submit to the CPM the CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-26** ~~Gas turbine engine shall be equipped with an air inlet cooler/filter and lube oil vent coalesce.~~ Combustion turbine generator (CTG) and electrical generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5 percent or greater, except for up to three minutes in any hour. [District Rules 2201 and 4101]

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

**AQ-27** ~~Gas turbine engine shall be fired exclusively on natural gas~~ This CTG shall be fired exclusively on PUC-regulated natural gas with a sulfur content of no greater than ~~0.25~~ 0.24 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]

**Verification:** The project owner shall submit the quarterly fuel sulfur content values in the Quarterly Operation Reports (**AQ-SC7**) and make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-28** ~~Emissions rates from gas turbine engine, excluding startup and shutdown, shall not exceed any of the following: PM10: 3.03 lb/hr, SOx (as $SO_2$): 0.33 lb/hr, NOx (as $NO_2$): 3.7 ppmvd @ 15 percent $O_2$ and 6.3 lb/hr, VOC (as methane): 2.0 ppmvd @ 15 percent $O_2$ and 1.19 lb/hr, CO: 6.0 ppmvd @15 percent $O_2$ and 6.2 lb/hr, or ammonia ($NH_3$): 10 ppmvd @ 15 percent $O_2$.~~ When operating in simple-cycle mode, the steady state emission rates from this CTG, except during startup and shutdown periods, shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 4.24 lb/hr and 2.5 ppmvd @ 15 percent $O_2$; CO – 3.10 lb/hr and 3.0 ppmvd @ 15 percent $O_2$; VOC (as methane) – 1.20 lb/hr and 2.0 ppmvd @ 15 percent $O_2$; PM10 – 2.20 lb/hr; or $SO_X$ (as $SO_2$) – 0.31 lb/hr. $NO_X$ (as $NO_2$) emission rates are one hour rolling averages. All other emission rates are three hour rolling averages. [District Rules 2201, 4001 and 4703 and 40 CFR 60.4320(a) & (b)]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-29** ~~During startup or shutdown of any gas turbine engine, combined emissions from the two gas turbine engines (C-603-11 and '-12) shall not exceed the following: NOx – 15.4 lb and CO – 15.4 lb in any one hour. [California Environmental Quality Act]~~ When operating in simple-cycle mode, during start-up, CTG exhaust emission rates shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 7.70 lb/event; CO – 7.70 lb/event; VOC (as methane) – 0.70 lb/event; PM10 – 0.13 lb/event; or $SO_X$ (as $SO_2$) – 0.054 lb/event. [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-30** ~~During startup or shutdown of any gas turbine engine, combined emissions from the two gas turbine engines (C-603-11 and ‘-12) shall not exceed the following: NOx – 15.4 lb and CO – 15.4 lb in any one hour. [California Environmental Quality Act]~~ When operating in simple-cycle mode, during shutdown, CTG exhaust emission rates shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 7.70 lb/event; CO – 7.70 lb/event; VOC (as methane) – 0.70 lb/event; PM10 – 0.20 lb/event; or $SO_X$ (as $SO_2$) – 0.054 lb/event. [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-31** ~~Emissions rates from gas turbine engine, excluding startup and shutdown, shall not exceed any of the following: PM10: 3.03 lb/hr, SOx (as $SO_2$): 0.33 lb/hr, NOx (as $NO_2$): 3.7 ppmvd @ 15 percent $O_2$ and 6.3 lb/hr, VOC (as methane): 2.0 ppmvd @ 15 percent $O_2$ and 1.19 lb/hr, CO: 6.0 ppmvd @15 percent $O_2$ and 6.2 lb/hr, or ammonia ($NH_3$): 10 ppmvd @ 15 percent $O_2$.~~ When operating in simple-cycle mode, the ammonia ($NH_3$) emissions shall not exceed either of the following limits: 6.20 lb/hr or 10 ppmvd @ 15 percent $O_2$ over a 24 hour rolling average. [District Rules 2201 and 4102]

**Verification:** The project owner shall provide the estimated daily ammonia concentration and daily ammonia emissions based on the procedures given in this condition and provide the annual source test data to demonstrate compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**), where the source test data is due in the quarter after the source test report is completed.

**AQ-32** When operating in combined-cycle mode, emission rates from this CTG, except during startup and shutdown periods, shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 3.40 lb/hr and 2.0 ppmvd @ 15 percent $O_2$; CO – 3.10 lb/hr and 3.0 ppmvd @ 15 percent $O_2$; VOC (as methane) – 1.20 lb/hr and 2.0 ppmvd @ 15 percent $O_2$; PM10 – 2.20 lb/hr; or $SO_X$ (as $SO_2$) – 0.31 lb/hr. $NO_X$ (as $NO_2$) emission rates are one hour rolling averages. All other emission rates are three hour rolling averages. [District Rules 2201 and 4703 and 40 CFR 60.4320(a) & (b)]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-33** When operating in combined-cycle mode, during start-up, CTG exhaust emission rates shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 6.10 lb/event; CO – 3.00 lb/event; VOC (as methane) – 0.50 lb/event; PM10 – 2.20 lb/event; or $SO_X$ (as $SO_2$) – 0.31 lb/event. [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-34** When operating in combined-cycle mode, during shutdown, CTG exhaust emission rates shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 2.08

lb/event; CO – 1.00 lb/event; VOC (as methane) – 0.20 lb/event; PM10 – 0.73 lb/event; or $SO_X$ (as $SO_2$) – 0.10 lb/event. [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-35** When operating in combined-cycle mode, the ammonia ($NH_3$) emissions shall not exceed either of the following limits: 3.10 lb/hr or 5 ppmvd @ 15 percent $O_2$ over a 24 hour rolling average. [District Rules 2201 and 4102]

**Verification:** The project owner shall provide the estimated daily ammonia concentration and daily ammonia emissions based on the procedures given in this condition and provide the annual source test data to demonstrate compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**), where the source test data is due in the quarter after the source test report is completed.

**AQ-36** A simple-cycle s~~S~~tartup ~~is~~ shall be defined as the period ~~beginning with turbine initial firing until the unit meets the lb/hr and ppmvd emission limits in condition #13.~~ of time during which a unit is brought from a shutdown status until the unit meets the steady state simple-cycle lb/hr and ppmvd emission limits specified within this permit. A combined-cycle startup period shall be defined as the period of time beginning with the gas turbine operating in simple-cycle mode and the initial start sequence of the heat recovery steam generator until the unit meets the steady state combined-cycle lb/hr and ppmvd emission limits specified within this permit. A combined-cycle shutdown shall be defined as the period of time during which the initial shutdown sequence is given for the heat recovery steam generator until the unit meets the steady state simple-cycle lb/hr and ppmvd emission limits specified within this permit. A simple-cycle shutdown shall be defined as the period of time during which a unit is taken from an operational to a non-operational status as the fuel supply to the unit is completely turned off. ~~Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown of gas turbine engine shall not exceed a time period of one hour each per occurrence.~~ [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM and District the CTG startup and shutdown operating data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports (**AQ-SC9**).

**AQ-37** The duration of each startup or shut down time shall not exceed two hours. Startup and shutdown emissions shall be counted toward all applicable emission limits. [District Rules 2201 and 4703]

**Verification:** The project owner shall submit to the CPM and District the CTG startup and shutdown operating data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports (**AQ-SC7**).

**AQ-38** The emission control systems shall be in operation and emissions shall be minimized insofar as technologically feasible during startup and shutdown. [District Rule 4703]

**Verification:** The project owner shall submit to the CPM and District the CTG startup and shutdown operating data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports (**AQ-SC7**).

**AQ-39** During all types of operation, including startup and shutdown periods, ammonia injection in to the SCR system shall occur once the minimum temperature at the catalyst face has been reached to ensure NOx emission reductions can occur with a reasonable level of ammonia slip. The minimum catalyst face temperature shall be determined during the final design phase of this project and shall be submitted to the District at least 30 days prior to commencement of construction. [District Rule 2201]

**Verification:** The project owner shall submit the minimum catalyst face temperature determination to the District for approval and CPM for review at least 30 days prior to commencement of construction. The project owner shall maintain the operational ammonia injection records to demonstrate compliance with this condition and shall make those records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-40** Maximum daily emissions from ~~gas turbine engine~~ the CTG shall not exceed any of the following limits: NOx (as $NO_2$) – 129.7 lb/day; CO – 103.1 lb/day; VOC – 30.8 lb/day; PM10 – 52.1 lb/day; or SOx (as $SO_2$) – 7.5 lb/day. ~~PM10 – 72.8 lb/day; SOx (as $SO_2$) – 7.8 lb/day; NOx (as $NO_2$) – 151.5 lb/day; VOC – 28.7 lb/day; and CO – 150.3 lb/day.~~ [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-41** Annual emissions from this CTG, calculated on a 12- month rolling basis, shall not exceed any of the following limits: $NO_X$ (as $NO_2$) – 35,998 lb/year; CO – 20,705 lb/year; VOC – 4,683 lb/year; PM10 – 18,659 lb/year; or $SO_X$ (as $SO_2$) – 2,649 lb/year. Compliance with the annual NOx and CO emission limits shall be demonstrated using CEM data and the annual VOC, PM10 and SOx emission limits shall be demonstrated using the most recent source test results. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-42** Each one hour period shall commence on the hour. Each one hour period in a three hour rolling average will commence on the hour. The three hour average will be compiled from the three most recent one hour periods. Each one hour period in a twenty-four hour average for ammonia slip will commence on the hour. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-43** Daily emissions will be compiled for a 24-hour period starting and ending at 12-midnight. Each month in the 12 consecutive month rolling average emissions shall commence at the beginning of the first day of the month. The 12 consecutive month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the 12 most recent calendar months. [District Rule 2201]

**Verification:** The project owner shall submit to the CPM the source test data and CTG operating data demonstrating compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-44** Compliance with the ammonia emission limits shall be demonstrated ~~by using~~ utilizing one of the following ~~calculation~~ procedures: ~~ammonia slip ppmv @ 15 percent $O_2$ = ((a-bxc/1,000,000)) x 1,000,000/b)~~ 1) calculate the daily ammonia emissions using the following equation: (ppmvd @ 15 percent $O_2$) = ((a - (b x c/1,000,000)) x (1,000,000 / b)) x d, where a = ammonia injection rate (lb/hr) / (17 lb/lb mol), b = dry exhaust flow rate (lb/hr) / (29 lb/lb mol), c = change in measured NOx concentration ppmvd @ 15 percent $O_2$ across the catalyst, and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip; 2.) Utilize another District-approved calculation method using measured surrogate parameters to determine the daily ammonia emissions in ppmvd @ 15 percent $O_2$. If this option is chosen, the project owner shall submit a detailed calculation protocol for District approval at least 60 days prior to commencement of operation; 3.) Alternatively, the project owner may utilize a continuous in-stack ammonia monitor to verify compliance with the ammonia emissions limit. If this option is chosen, the project owner shall submit a monitoring plan for District approval at least 60 days prior to commencement of operation. [District Rules 2201 and 4102]

**Verification:** The project owner shall provide the estimated daily ammonia concentration and daily ammonia emissions based on the procedures given in this condition and provide the annual source test data to demonstrate compliance with this condition as part of the Quarterly Operation Reports (**AQ-SC7**), where the source test data is due in the quarter after the source test report is completed.

**AQ-45** When operating in simple-cycle mode and when operating in combined-cycle mode, source testing to measure startup and shutdown $NO_X$, CO, and VOC mass emission rates shall be conducted for one of the gas turbines (C-4140-1 or C-4140-2) within 60 days after the end of the commissioning period. ~~and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup and shutdown source testing in accordance with 40 CFR 60, Appendix F (Relative Accuracy Audit). If CEM data is not certifiable to determine compliance with $NO_X$ and CO startup and shutdown emission limits, then source testing to measure startup and shutdown $NO_X$ and CO mass emission rates shall be conducted at least once every 12 months. If an annual startup and shutdown NOx and CO relative accuracy audit demonstrates that the CEM data is certifiable, the startup and shutdown NOx and CO testing frequency shall return to the once every seven years schedule.~~ [District Rules 1081 and 2201]

**Verification:** The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

**AQ-46** Source testing to measure startup and shutdown NOx, CO, and VOC mass emission rates shall be conducted for one of the gas turbines (C-4140-1 or C-4140-2) at least once every seven years. CEM relative accuracy shall be determined during startup and shutdown source testing in accordance with 40 CFR 60, Appendix F (Relative Accuracy Audit). If CEM data is not certifiable to determine compliance with $NO_X$ and CO startup and shutdown emission limits, then source testing to measure startup and shutdown $NO_X$ and CO mass emission rates shall be conducted at least once every 12 months. If an annual startup and shutdown NOx and CO relative accuracy audit demonstrates that the CEM data is certifiable, the startup and shutdown NOx and CO testing frequency shall return to the once every seven years schedule. [District Rules 1081 and 2201]

**Verification:** The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

**AQ-47** When operating in simple-cycle mode, initial source testing to determine compliance with the steady state NOx, CO, VOC and $NH_3$ emission rates (lb/hr and ppmvd @ 15 percent $O_2$) and PM10 emission rate (lb/hr) shall be conducted within 60 days after the end of the commissioning period. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

**Verification:** The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

**AQ-48** ~~Compliance testing to demonstrate compliance with the PM10, NOx (as $NO_2$), VOC, CO, and ammonia emission limits, and fuel gas sulfur content shall be conducted within 60 days if initial operation and at least once every twelve months thereafter.~~ When operating in combined-cycle mode, initial source testing to determine compliance with the steady state $NO_X$, CO, VOC and $NH_3$ emission rates (lb/hr and ppmvd @ 15 percent $O_2$) and PM10 emission rate (lb/hr) shall be conducted within 60 days after the end of the commissioning period. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

**Verification:** The results and field data collected during source tests required by this condition shall be submitted to the CPM for review and the District for approval within 60 days of testing.

**AQ-49** ~~Compliance testing to demonstrate compliance with the PM10, NOx (as $NO_2$), VOC, CO, and ammonia emission limits, and fuel gas sulfur content shall be conducted within 60 days if initial operation and at least once every twelve months thereafter~~. Source testing to determine compliance with the steady state $NO_X$, CO, VOC and $NH_3$ emission rates (lb/hr and ppmvd @ 15 percent $O_2$) and PM10 emission rate (lb/hr) shall be conducted at least once every 12 months. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

**Verification:** The project owner will submit source test reports to the CPM for review and the District for approval within 60 days of the completion of those tests.

**AQ-50** Testing to demonstrate compliance with the fuel sulfur content limit shall be conducted weekly. Once eight consecutive weekly tests show compliance, the fuel sulfur content testing frequency may be reduced to once every calendar quarter. If a quarterly test shows a violation of the sulfur content limit, then the weekly testing shall resume and continue until eight consecutive tests show compliance. Once compliance is shown on eight consecutive weekly tests, then testing may return to quarterly. [District Rule 2201 and 40 CFR 60.4360, 60.4365(a) and 60.4370(c)]

**Verification:** The project owner shall submit the quarterly fuel sulfur content values in the in the Quarterly Operation Reports (**AQ-SC7**) and shall document all emissions standard violation in each Quarterly Operation Report. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-51** The following test methods shall be used: ~~PM10: EPA method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA method 10 or 10B, $O_2$: EPA Method 3, 3A, or 20, VOC: EPA method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246.~~ $NO_X$ - EPA Method 7E, ~~or~~ 20, or ARB Method 100 (ppmv basis), or EPA Method 19 (lb/MMBtu basis); CO - EPA Method 10, ~~or~~ 10B, or ARB Method 100; VOC - EPA Method 18 or 25; PM10 - EPA Method 5 and ~~/~~202 (front half and back half) or 201 and 202a; ammonia - BAAQMD ST-1B; and $O_2$ - EPA Method 3, 3A, or 20, or ARB Method 100. NOx testing shall also be conducted in accordance with the requirements of 40 CFR 60.4400(a)(2), (3), and (b). EPA approved alternative test methods, as approved by the District, may also be used to address the source testing requirements of this permit. [District Rules 1081, and 4703 and 40 CFR 60.4400(1)(i) and 40 CFR 60.4400(a)(2), (3), and (b)]

**Verification:** The project owner shall submit to the CPM for review and the District for approval the initial source test protocol in compliance with requirements of this condition at least 60 days prior to the initial source test.

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

**Verification:** The project owner shall submit the quarterly fuel sulfur content values in the Quarterly Operation Reports (**AQ-SC7**) and make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-53** The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable $NO_X$, CO, and $O_2$ analyzer during District inspections. The sampling ports shall be located in accordance with the ARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

**Verification:** The project owner shall submit to the CPM for review and District for approval a stack test port plan and stack specification at least 60 days before the installation of the stack ports.

**AQ-54** ~~Compliance demonstration (source testing~~)Source testing shall be ~~by~~ District witnessed, or authorized~~,~~ and samples shall be collected by a California Air Resources Board ~~collection by ARB~~ certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081 and 40 CFR 60.4375(b)]

**Verification:** The project owner shall submit to the CPM for review and the District for approval the initial source test protocol and plan at least 15 days prior to the initial source test. The project owner shall notify the CPM and District no later than 30 days prior to the proposed source test date and time. The project owner will submit source test reports to the CPM for review and the District for approval within 60 days of the completion of those tests.

**AQ-55** ~~Gas turbine engine~~The CTG shall be equipped with a continuous monitoring system to measure and record fuel consumption. [District Rules 2201~~, 4001,~~ and 4703]

**Verification:** The project owner shall submit to the CPM the natural gas usage data from the fuel flow meters as part of the Quarterly Operation Report (**AQ-SC7**).

**AQ-56** The SCR system shall be equipped with a continuous temperature monitoring system to measure and record the temperature at the catalyst face. [District Rule 2201]

**Verification:** The project owner shall maintain the temperature data at the catalyst face and shall make those records available for review by representatives of the District, ARB, and the Energy Commission.

**AQ-57** ~~Gas turbine engine shall be equipped with continuous emission monitor for NOx (before and after SCR system), CO, and $O_2$. Continuous emission monitor shall meet the requirements of 40 CFR parts 60 and 75 and shall be capable of monitoring emissions during startups and shutdowns as well as normal operating conditions. [District Rules 2201, 4001, and 4706]~~ The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas $NO_X$, CO and $O_2$ concentrations. Continuous emissions monitor(s) shall be capable of monitor emissions during all types of operation, including during startups and shutdowns periods, provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080 and 4703 and 40 CFR 60.4335(b)(1)]

**Verification:** The project owner shall provide a protocol for the installation, calibration, and testing for the CEMS at least 60 days prior to the operation of CEMS. CEMS data summaries shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-58** The project owner or operator shall develop and keep on site a quality assurance plan for the NOx CEMS. [40 CFR 4345(e)]

**Verification:** The project owner shall make the quality assurance plan for the NOx CEMS available for inspection by representatives of the District, ARB and the Energy Commission.

**AQ-59** The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period or shall meet equivalent specifications established by mutual agreement of the District, the ARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]

**Verification:** CEMS data summaries in compliance with this condition shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-60** The $NO_X$, CO and $O_2$ CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 2,3 and 4 (PS 2, 3 and 4), or 40 CFR 75, Appendix A, or shall meet equivalent specifications established by mutual agreement of the District, the ARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]

**Verification:** The project owner shall provide a protocol for the installation, calibration, and testing for the CEMS at least 60 days prior to the operation of CEMS. CEMS data summaries shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-61** Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and ~~total accuracy testing is performed~~ compliance source testing are both performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]

**Verification:** The project owner will submit all RATA reports to the CPM for review and the District for approval within 60 days of the completion of the test.

**AQ-62** The owner/operator shall perform a relative accuracy test audit (RATA) for the $NO_X$, CO and $O_2$ CEMS as specified by 40 CFR Part 60, Appendix F, 5.11, or 40 CFR 75, Appendix B, at least once every four calendar quarters. The project owner~~permittee~~ shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. ~~or 40 CFR 75, Appendix B.~~ If the RATA test is conducted as specified in 40 CFR Part 75 Appendix B, the RATA shall be conducted on a lb/MMBtu basis. [District Rule 1080 and 40 CFR 60.4345(a)]

**Verification:** The project owner will submit all RATA reports to the CPM for review and the District for approval within 60 days of the completion of the test.

**AQ-63** Results of the CEM system shall be averaged over a one hour period for $NO_X$ emissions and a three hour period for CO emissions using consecutive 15-minute sampling periods in accordance with all applicable requirements of CFR 60.13. [District Rule 4703 and 40 CFR 60.4350(a)]

**Verification:** CEMS data summaries in compliance with this condition shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-64** When operating in simple-cycle mode, excess emissions shall be defined as any operating hour in which the 1-hour rolling average $NO_X$ concentration exceeds an applicable emissions limit. When operating in combined-cycle mode, excess NOx emission shall be defined as any 30 day operating period in which the 30 day rolling average NOx concentration exceeds an applicable emissions limit. A period of monitor downtime shall be any unit operating hour in which sufficient data are not obtained to validate the hour for either $NO_X$ or $O_2$ (or both). [40CFR 60.4350(g), 40 CFR 60.4350(h) and 40 CFR 60.4380(b)(1)]

**Verification:** CEMS data summaries in compliance with this condition shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

~~**AQ-58** Results of continuous emissions monitoring shall be reduced according to the procedures established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]~~

~~CEMS data summaries in compliance with this condition shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC9**).~~

**AQ-65** For the purpose of determining excess NOx emission, for each unit operating hour in which a valid hourly average is obtained, the data acquisition system and handling system must calculate and record the hourly NOx emission rate in units of ppm, using the appropriate equation from Method 19 of 40 CFR 60, Appendix 1A. For any hour in which the hourly $O_2$ concentration exceeds 19.0 percent $O_2$, a diluents cap value of 19.0 percent $O_2$ may be used in the emission calculations. [40 CFR 60.4350(b) and 60.4350(f)]

**Verification:** The project owner shall make the records required under this condition available for inspection by representatives of the District, ARB and the Energy Commission.

**AQ-66** Excess SOx emissions is each unit operating hour including in the period beginning on the data and hour of any sample for which the fuel sulfur content exceeds the applicable limits listed in this permit and ending on the data and hour that a subsequent sample is taken that demonstrates compliance with the sulfur limit. Monitoring downtimes for SOx begins when a sample is not taken by its due date. A period of monitor downtime for SOx also begins on the date and hour of a required sample, if invalid results are obtained. A period of SOx monitoring downtime ends on the data and hour of the next valid sample. [40 CFR 60.4385(a) and (c)]

**Verification:** The project owner shall make the records required under this condition available for inspection by representatives of the District, ARB and the Energy Commission.

**AQ-67** The facility shall install and maintain equipment, facilities, and systems compatible with the District's CEM data polling software system and shall make CEM data available to the District's automated polling system on a daily basis. [District Rule 1080]

**Verification:** The project owner shall make the records required under this condition available for inspection by representatives of the District, ARB and the Energy Commission.

**AQ-68** Upon notice by the District that the facility's CEM system is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEM data is sent to the District by a District-approved alternative method. [District Rule 1080]

**Verification:** The project owner shall provide the non-polled CEM system data using a District approved alternative method and shall make that data available for inspection by representatives of the ARB and the Energy Commission.

**AQ-69** The owner or operator shall, upon written notice from the APCO, provide a summary of the data obtained from the CEM systems. This summary shall be in the form and the manner prescribed by the APCO. [District Rule 1080]

**Verification:** The project owner shall make the records required under this condition available for inspection by representatives of the District, ARB and the Energy Commission.

**AQ-70** ~~The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including:~~ The owner or operator shall submit a written report of CEM operations for each calendar quarter to the APCO. The report is due on the 30th day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NOx emissions, nature and the cause of excess (if known), corrective actions taken and preventive measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period used to determine compliance with an emission standard; applicable time and date of each period during which the CEM was inoperative (monitor downtime), (except for zero and span checks), and the nature of system repairs and adjustments; and A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

**Verification:** CEMS data summaries in compliance with this condition shall be submitted to the CPM as part of the Quarterly Operation Reports (**AQ-SC7**).

**AQ-71** APCO or an authorized representative shall be allowed to inspect, as determined to be necessary, the required monitoring devices to ensure that such devices are functioning properly. [District Rule 1080]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, California Air Resources Board (ARB) and the Energy Commission.

**AQ-72** Project owner shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100, 6.1]

**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 Report (**AQ-SC7**).

**AQ-73** The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations. [District Rule 1100, 7.0]

**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 Report (**AQ-SC7**).

**AQ-74** The project owner ~~permittee~~ shall maintain the following records: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 1080, 2201 and 4703 and 40 CFR 60.8(d)]

**Verification:** The operating log or data acquisition and handling system (DAHS) operating records will be provided as part of the Quarterly Operation Report (**AQ-SC7**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-75** The project owner ~~permittee~~ shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling 12 month period), continuous emission monitor measurements, calculated ammonia slip, calculated $NO_X$ and CO mass emission rates (lb/hr, lb/qtr and lb/12 month rolling period), and VOC, PM10 and SOx mass emission rates (lb/12 month rolling period. [District Rules 2201 and 4703]

**Verification:** The operating log or data acquisition and handling system (DAHS) operating records will be provided as part of the Quarterly Operation Report (**AQ-SC7**). The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-76** ~~All records required to be maintained by this permit shall be maintained for a period of two years~~All records shall be maintained and retained on-site for a period of at least five years and shall be made ~~readily~~available for District inspection upon request. [District Rules 1070, 2201 and 4703]

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

**AQ-77** The project owner shall comply with the following Acid Rain regulation requirements:

a. The owners and operators of each affected source and each affected unit at the source shall: (i) Operate the unit in compliance with a complete Acid Rain permit application or a superseding Acid Rain permit issued by the permitting authority; and (ii) Have an Acid Rain permit. [40 CFR 72]

b. The owners and operators and, to the extent applicable, designated representative of each affected source and each affected unit at the source shall comply with the monitoring requirements as provided in 40 CFR part 75. [40 CFR 75]

c. The emissions measurements recorded and reported in accordance with 40 CFR part 75 shall be used to determine compliance by the unit with the Acid Rain emissions limitations and emissions reduction requirements for sulfur dioxide and nitrogen oxides under the Acid Rain Program. [40 CFR 75]

d. The owners and operators of each source and each affected unit at the source shall: (i) Hold allowances, as of the allowance transfer deadline, in the unit's compliance subaccount (after deductions under 40 CFR 73.34(c)) not less than the total annual emissions of sulfur dioxide for the previous calendar year from the unit; and (ii) Comply with the applicable Acid Rain emissions limitations for sulfur dioxide. [40 CFR 73]

e. Each ton of sulfur dioxide emitted in excess of the Acid Rain emissions limitations for sulfur dioxide shall constitute a separate violation of the Act. [40 CFR 77]

f. An affected unit shall be subject to the sulfur dioxide requirements starting on the later of January 1, 2000, or the deadline for monitoring certification under 40 CFR part 75, an affected unit under 40 CFR 72.6(a)(3) that is not a substitution or compensating unit. [40 CFR 72 and 40 CFR 75]

g. Allowances shall be held in, deducted from, or transferred among Allowance Tracking System accounts in accordance with the Acid Rain Program. [40 CFR 72]

h. An allowance shall not be deducted in order to comply with the requirements under 40 CFR part 73, prior to the calendar year for which the allowance was allocated. [40 CFR 73]

i. An allowance allocated by the Administrator under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the Acid Rain permit application, the Acid Rain permit, or the written exemption under 40 CFR 72.7 and 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization. [40 CFR 72]

j. An allowance allocated by the Administrator under the Acid Rain Program does not constitute a property right. [40 CFR 72]

k. The owners and operators of each affected unit at the source shall comply with the applicable Acid Rain emissions limitation for nitrogen oxides. [40 CFR 72]

l. The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR part 77. [40 CFR 77]

m. The owners and operators of an affected unit that has excess emissions in any calendar year shall: (i) Pay without demand the penalty required, and pay up on demand the interest on that penalty; and (ii) Comply with the terms of an approved offset plan, as required by 40 CFR part 77. [40 CFR 77]

n. The owners and operators of the each affected unit at the source shall keep on site the following documents for a period of five years from the date the document is created. This period may be extended for cause, at any time prior to the end of five years, in writing by the Administrator or permitting authority: (i) The certificate of representation for the designated representative for the source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR 72.24; provided that the certificate and documents shall be retained on site beyond such five-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative. [40 CFR 72]

o. The owners and operators of each affected unit at the source shall keep on site each of the following documents for a period of five years from the date the document is created. (i) This period may be extended for cause, at any time prior to the end of five years, in writing by the Administrator or permitting authority; (ii) All emissions monitoring information, in accordance with 40 CFR part 75; (iii) Copies of all reports, compliance certifications and other submissions and all records made or required under the Acid Rain Program; (iv) Copies of all documents used to complete an Acid Rain permit application and any other submission that demonstrates compliance with the requirements of the Acid Rain Program. [40 CFR 75]

p. The designated representative of an affected source and each affected unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR 75 Subpart I. [40 CFR 75]

**Verification:** The project owner shall submit to the CPM and District the CTG annual operating data and NOx emissions limitation information demonstrating compliance with all applicable provisions of 40 CFR 72 as part of the Quarterly Operation Reports (**AQ-SC7**). The project owner shall maintain the documents in accordance with 40 CFR 72.24 on site and made available to district personnel upon request. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

**AQ-78** Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-79** An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

**Verification:** The project owner shall provide a Dust Control Plan to the APCO at least 60 days prior to the start of any construction activity required in this condition.

**AQ-80** An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 (8/19/04) or Rule 8011(8/19/04). [District Rules 8011 and 8021]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-81** Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-82** Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-83** Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20 percent opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-84** Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust

stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20 percent opacity. [District Rules 8011 and 8071]

**Verification:** The project owner/operator shall make the site available for inspection by representatives of the District, ARB and the Energy Commission to determine if adequate measures to control fugitive dust emissions are in place.

**AQ-85** On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, project owner shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20 percent opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rules 8011 and 8071]

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

**AQ-86** Whenever any portion of the site becomes inactive, the project owner shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

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

**AQ-87** Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

**Verification:** The project owner shall make the records required under this condition available for inspection by representatives of the District, ARB and the Energy Commission.

*EQUIPMENT DESCRIPTION, UNIT C-4140-3-0:*
460 BHP Cummins Model CFP15E-F10 Tier 3 Certified Diesel-Fired Emergency Internal Combustion (IC) Engine Powering a Firewater Pump

**AQ-88** This Determination of Compliance serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]

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

**AQ-89** Prior to operating with modifications authorized by this Determination of Compliance, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

**Verification:** The project owner shall submit to the CPM copies of the Title V operating permit application to modify within five working days of its submittal by the project owner to the District.

**AQ-90** To the extent this Determination of Compliance serves as an Authority to Construct, said Authority to Construct shall not become effective until the California Energy Commission approves the Petition to Amend the project's existing license. [California Environmental Quality Act and District Rule 2201, 5.8.8]

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

**AQ-91** The project owner shall not begin actual onsite construction of the equipment authorized by this Determination of Compliance until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA).

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

**AQ-92** Authority to Construct (ATC) C-603-1-8 shall be implemented concurrently, or prior to the modification and startup of the equipment authorized by this Determination of Compliance. [District Rule 2201]

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

**AQ-93** District facilities C-603 and C-4140 are the same stationary source for District permitting purposes. [District Rule 2201]

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

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

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

**AQ-95** No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20 percent opacity. [District Rule 4101]

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

**AQ-96** Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

**Verification:** The project owner shall make the engine use and maintenance records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-97** Emissions from this IC engine shall not exceed any of the following limits: 2.66 g-$NO_X$/bhp-hr, 0.671 g-CO/bhp-hr, or 0.086 g-VOC/bhp-hr. [District Rule 2201, 40 CFR 60.4205(c) and 13 CCR 2423 and 17 CCR 93115]

**Verification:** The project owner shall make the engine use and maintenance records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-98** Emissions from this IC engine shall not exceed 0.078 g-PM10/bhp-hr based on U.S.EPA certification using ISO 8178 test procedure. [District Rules 2201, 40 CFR 60.4205(c) and 4102 and 13 CCR 2423 and 17 CCR 93115]

**Verification:** The project owner shall make the engine use and maintenance records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-99** Only ARB certified diesel fuel containing not more than 0.0015 percent sulfur by weight is to be used. [District Rules 2201 and 4801, 40 CFR 60.4207 and 17 CCR 93115]

**Verification:** The project owner shall maintain delivered diesel fuel sulfur content records and make those records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-100** This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702 and 40 CFR 60.4209(a)]

**Verification:** The project owner shall make the site available for inspection by representatives of the District, ARB, and the Energy Commission. The project owner shall submit elapsed time in hours in the Quarterly Operation Report (**AQ-SC7).**

**AQ-101** This engine shall be equipped with either a positive crankcase ventilation (PCV) system which recirculates crankcase emissions into the air intake system for combustion, or a crankcase emissions control device of at least 90 percent control efficiency. [District Rule 2201]

**Verification:** The engine shall be equipped with a positive crankcase ventilation (PCV) system or a crankcase emissions control device of at least 90 percent control efficiency.

**AQ-102** The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap, roof overhang, or any other obstruction. [District Rule 4102]

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

**AQ-103** This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [40 CFR 60.4211(a)]

**Verification:** The project owner shall make the engine use and maintenance records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-104** During periods of operation for maintenance, testing, and required regulatory purposes, the project owner shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [40CFR 60.4211(a)]

**Verification:** The project owner shall make the engine use and maintenance records available for inspection by representatives of the District, ARB, and the Energy Commission.

**AQ-105** This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. For testing purposes, the engine shall only be operated the number of hours necessary to comply with the testing requirements of the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems", 1998 edition. Total hours of operation for all maintenance, testing, and required regulatory purposes shall not exceed 100 hours per calendar year. [District Rule 4702, 40 CFR 60.4211 (e) and 17 CCR 93115]

**Verification:** The project owner shall submit to the CPM and District the emergency engine operating data demonstrating compliance with this condition as part of the fourth quarter's Quarterly Operation Reports (**AQ-SC7**).

**AQ-106** An emergency situation is an unscheduled event caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the project owner. [District Rule 4702]

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

**AQ-107** The project owner shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, and the purpose of the operation (for example: load testing, weekly testing, emergency fire fighting, etc.). For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702, 40 CFR 60.4214 (b) and 17 CCR 93115]

**Verification:** The project owner shall make the records required under the condition available for inspection by representatives of the District, ARB and the Energy Commission. The project owner shall submit the records required under this condition in the Quarterly Operation Report (**AQ-SC7**).

**AQ-108** All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115]

**Verification:** The project owner shall maintain all the records on site and made available to district personnel upon request. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

## ACRONYMS

| | |
|---|---|
| AADT | Annual Average Daily Trips |
| AAQS | Ambient Air Quality Standard |
| ACC | Air Cooled Condenser |
| AERMOD | ARMS/EPA Regulatory Model |
| AER | Actual Emission Reduction |
| AFC | Application for Certification |
| APCD | Air Pollution Control District (SJVAPCD) |
| APCO | Air Pollution Control Officer |
| AQCMM | Air Quality Construction Mitigation Manager |
| AQCMP | Air Quality Construction Mitigation Plan |
| AQMP | Air Quality Management Plan |
| ARB | California Air Resources Board |
| ATC | Authority to Construct |
| BACM | Best Available Control Measures |
| BACT | Best Available Control Technology |
| bhp | brake horsepower |
| Btu | British thermal unit |
| CCR | California Code of Regulation |
| CEC | California Energy Commission (or Energy Commission) |
| CEMS | Continuous Emission Monitoring System |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| COC | Conditions of Certification |
| CPM | (CEC) Compliance Project Manager |
| CTG | Combustion Turbine Generator |
| dscf | Dry Standard Cubic Feet |
| EIR | Environmental Impact Report |
| EMFAC | Emission Factors |
| ERC | Emission Reduction Credit |
| FDOC | Final Determination Of Compliance |
| GE | General Electric |
| GPM | Gallon per minute |
| gr | Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound) |
| GWF Hanford | GWF Hanford Combined-cycle Power Plant |
| HAP | Hazardous Air Pollutants |
| HEP | Hanford Energy Park |
| HEPP | Hanford Energy Peaker Plant |
| $H_2S$ | Hydrogen Sulfide |

| | |
|---|---|
| hp | Horsepower |
| HSC | Health and Safety Code |
| ICE | Internal Combustion Engine |
| ISC | Industrial Source Complex |
| ISCST3 | Industrial Source Complex Short Term, version 3 |
| kW | Kilowatts (1,000 watts) |
| lbs | Pounds |
| LORS | Laws, Ordinances, Regulations and Standards |
| MCR | Monthly Compliance Report |
| µg | Microgram |
| $\mu g/m^3$ | Microgram per cubic meter |
| $mg/m^3$ | Milligrams per cubic meter |
| MMBtu | Million British Thermal units |
| MW | Megawatts (1,000,000 Watts) |
| NAAQS | National Ambient Air Quality Standard |
| $NH_3$ | Ammonia |
| NO | Nitric Oxide |
| $NO_2$ | Nitrogen Dioxide |
| $NO_3$ | Nitrates |
| NOx | Oxides of Nitrogen or Nitrogen Oxides |
| NSPS | New Source Performance Standard |
| NSR | New Source Review |
| $O_2$ | Oxygen |
| $O_3$ | Ozone |
| OLM | Ozone Limiting Method |
| OTSG | Once Through Steam Generator |
| PDOC | Preliminary Determination Of Compliance |
| PM | Particulate Matter |
| PM10 | Particulate Matter less than 10 microns in diameter |
| PM2.5 | Particulate Matter 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 |
| PTO | Permit to Operate |
| ROG | Reactive Organic Gas |
| RPDOC | Revised Preliminary Determination of Compliance |
| scf | Standard Cubic Feet |
| SCR | Selective Catalytic Reduction |
| SIP | State Implementation Plan |

| | |
|---|---|
| SJVAPCD | San Joaquin Valley Air Pollution Control District |
| $SO_2$ | Sulfur Dioxide |
| $SO_3$ | Sulfate |
| SOx | Oxides of Sulfur |
| SPPE | Small Power Plant Exemption |
| STG | Steam Turbine Generator |
| TDS | Total Dissolved Solid |
| TFV | Thresholds Friction Velocity |
| TPA | Transportation Planning Agencies |
| tpy | Tons per year |
| U.S.EPA | United States Environmental Protection Agency |
| VDE | Visible Dust Emission |
| VOC | Volatile Organic Compounds |
| WSAC | Wet Surface Air Cooler |

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# AIR QUALITY APPENDIX AIR-1

**Greenhouse Gas Emissions**

Testimony of William Walters, P.E. and Matthew Layton, P.E.

## SUMMARY OF CONCLUSIONS

The GWF Hanford Combined Cycle Power Plant Project (GWF Hanford) is a proposed addition to the state's electricity system that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. GWF Hanford would modify the existing Hanford Energy Park Peaker (HEPP) project to create a dual-function natural gas-fired power plant capable of operating either in a simple-cycle mode, as it does today, or as a more-efficient, dispatchable combined cycle power plant. Its addition to the system would displace other less efficient generation and facilitate the integration of renewable resources. Because the project's emissions per megawatt-hour (MWh) would be lower than those of other power plants that the project would displace, the addition of GWF Hanford would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG[2] emissions and GHG emission rate average.

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

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

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

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

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

- GWF Hanford would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the Greater Fresno Area.
- GWF Hanford would facilitate to some degree the replacement of out-of-state coal electricity generation that must be phased out in conformance with the State's new Emission Performance Standard.
- GWF Hanford could facilitate to some extent the replacement of generation provided by aging power plants that use once-through cooling.

The ability and magnitude to which GWF Hanford would fulfill these roles are uncertain given that the project would be permitted to operate as a base load facility with an overall annual capacity factor of nearly 98 percent (GWF 2008a) but as of yet, does not have a power purchase contract that would specify how and when it would operate to achieve such a capacity factor. The energy displaced by the GWF Hanford project would result in a reduction in GHG emissions from the electricity system, and the project would serve a role in optimizing the system by providing reliability to a major local reliability area, the Greater Fresno Area. The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a net reduction in GHG emissions from power plants, would not worsen, but would improve, current conditions, and thus would not result in impacts that are cumulatively significant.

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

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

## INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but are discussed in the context of cumulative impacts. The state has demonstrated its intent to address global climate change though research, adaptation,[3] and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

**GREENHOUSE GAS Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable Law | Description |
|---|---|
| **State** | |
| California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.) | This act requires the California Air Resources Board (ARB) to enact standards that will reduce GHG emissions to 1990 levels. Electricity production facilities will be regulated by the ARB. |
| California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq. | These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.) |
| Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009 | The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tons carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lb $CO_2$/MWh) |

## GLOBAL CLIMATE CHANGE AND CALIFORNIA

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

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gases or global climate change[4] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006 California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[5] To achieve this, ARB has a mandate to define the 1990 emissions levels and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market

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

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

mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011, and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities over 1 megawatt (MW) capacity, and the due date for initial reports by existing facilities this first year was June 1, 2009.

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

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

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33 percent Renewables Portfolio Standard.

SB 1368,[6] also enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Greenhouse Gas Emission Performance Standard of 0.500 metric tons $CO_2$ per megawatt-hour[7] (1,100 pounds $CO_2$/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five

[6] Public Utilities Code § 8340 et seq.

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

years or more, including contracts with power plants located outside of California.[8] If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60 percent. As a project applying for the flexibility to operate in base load scenarios, if GWF Hanford enters into a contract to sell base load electricity, GWF Hanford would have to meet the SB 1368 EPS.

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

## ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver the adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation unavoidably curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[9] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

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

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

The Energy Commission staff-sponsored report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-

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

[9] See page CEC 2009b, page 95.

fueled. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable. Solid fueled projects are also generally base load, not dispatchable, and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

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

## CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of a variety of equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of GWF Hanford would involve 15 months of activity. The project owner provided a GHG emission estimate for the entirety of the construction phase. The GHG emissions estimate, presented below in **GREENHOUSE GAS Table 2**, includes the total emissions for the 15 months of construction activity in terms of $CO_2$-equivalent.

**GREENHOUSE GAS Table 2**
**GWF Hanford, Estimated Potential Construction Greenhouse Gas Emissions**

| Construction Source | Construction-Phase GHG Emissions (MTCO2E) [a] |
|---|---|
| Onsite off-road equipment | 1,551 |
| Onsite on-road vehicle | 7 |
| **Onsite Total** | **1,558** |
| Offsite on-road vehicles | 482 |
| **Construction Total** | **2,040** |

Source: GWF 2009a.
Notes:
a. One metric ton (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

## OPERATIONS

The proposed GWF Hanford would operate as both simple-cycle and combined-cycle power plant up to nearly 98 percent capacity annually. The two General Electric LM6000 gas turbines are fired with natural gas. The project would increase the thermal

efficiency of the existing simple-cycle plant without sacrificing flexibility because the new steam turbine generator (STG) would use thermal energy that the existing pair of combustion turbine generators (CTGs) presently release to the atmosphere. Simple-cycle mode startups are based on the CTGs achieving a 10-minute cycle, and starting the STG in combined-cycle mode would take 60 minutes. This power plant configuration would be capable of achieving startups of less than 2 hours under all conditions (GWF 2008a).

The primary sources of GHG would be the existing, modified natural gas fired combustion turbines. There will also be a small amount of GHG emissions from the diesel fuel consumed in the new emergency fire pump engine, and sulfur hexafluoride emissions from electrical component equipment. This project would not increase employee vehicle trips to the Hanford facility as no additional employees, from the number of employees required to operate the existing adjacent Hanford cogeneration plant, would be needed to operate GWF Hanford.

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

**GREENHOUSE GAS Table 3**
**GWF Hanford, Estimated Potential Greenhouse Gas (GHG) Emissions**

| **Emissions Source** | **Operational GHG Emissions (MTCO2E/yr)** [a] |
|---|---|
| Stationary Gas Turbines with Combined-Cycle Modification (CTG/STG) | 423,305 |
| Emergency Fire Pump | 11 |
| Sulfur Hexafluoride (SF6) Leakage | 16 |
| **Total Project GHG Emissions (MTCO2E/yr)** | **423,332** |
| Estimated Annual Energy Output (MWh/yr) [b] | 988,470 |
| **Estimated Annualized GHG Performance** (MTCO2/MWh) | **0.43** |
| **Estimated Annualized GHG Performance** (MTCO2E/MWh) | **0.43** |

Sources: GWF 2008a, CH2MHill 2009; including methane ($CH_4$) and nitrous oxide ($N_2O$); independent Energy Commission staff analysis for estimated energy output.
Notes:
a. One metric ton (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. Annualized basis uses the project owner's assumed maximum operating basis of 1,458 hours per year in simple-cycle mode and 7,083 hours in combined-cycle mode, including startups and shutdowns.

The proposed project would be permitted, on an annual basis, to emit over 423,000 metric tons of $CO_2$-equivalent per year if operated at its maximum permitted level. The new GWF Hanford combined cycle plant would be more efficient than the existing HEPP that it would replace, which has a GHG performance of around 0.50 MTCO2/MWh. The proposed GWF Hanford project in a combined-cycle mode for

much of the year would emit at 0.43 MTCO2/MWh, which would easily meet the limits of SB 1368 and the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh. However, if the use of combined-cycle mode is less than expected, then the project's annual average efficiency would decrease, which would cause the actual GHG emissions to increase slightly per MWh. The annual $CO_2$ performance of GWF Hanford would be highly dependent on the number of hours operating in combined-cycle mode, which would be dependent on power purchase contract terms that are not known at this time. The $CO_2$ emissions performance for the plant would be around 0.50 MTCO2/MWh for simple-cycle mode, and 0.41 MTCO2/MWh in combined-cycle mode.

The proposed project would increase the available energy and capacity to the electricity system currently provided by the existing HEPP. The Greater Fresno Area would benefit from the incremental increase in energy and capacity provided by GWF Hanford. GWF Hanford would be likely to provide local reliability support, could facilitate the retirement of other less-efficient power plants, and would contribute capacity towards a projected 113 MW deficiency by 2013 in the Herndon sub-area.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

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

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

## CONSTRUCTION IMPACTS

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

diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment.

## DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

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

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

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

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

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

### The Role of GWF Hanford in Local Generation Displacement

The proposed GWF Hanford project would have a net heat rate between 7,750 Btu/kWh[10] in combined-cycle mode and 9,400 Btu/kWh, which is the existing heat rate of HEPP, depending on the frequency of combined-cycle operation. The heat rate, energy output and GHG emissions of local generation resources near the HEPP are listed in **GREENHOUSE GAS Table 4**. Compared to most other new and existing units in the Greater Fresno Area, including the existing HEPP, GWF Hanford would be more efficient, and emit fewer GHG emissions during any hour of operation. Local generating units with the best (lowest) heat rate or lowest GHG performance factor generally

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

operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2008 from the local units. However, dispatch order can change, or deviate from economic or efficiency dispatch, in any one year or due to other concerns such as permit limits, contractual obligations, droughts, heat waves, local reliability needs or emergencies. These deviations, however, are likely to occur infrequently.

Because GWF Hanford is inside the Greater Fresno Area Local Capacity Area, it would be able to provide capacity during most system operating conditions.

**GREENHOUSE GAS Table 4**
**Greater Fresno Area, Local Generation Heat Rates and 2008 Energy Outputs**

| Plant Name | Heat Rate (Btu/kWh) [a] | 2008 Energy Output (GWh) | GHG Performance (MTCO2/MWh) |
|---|---|---|---|
| La Paloma Generating | 7,172 | 6,185.2 | 0.380 |
| Pastoria Energy Facility L.L.C. | 7,032 | 4,900.9 | 0.373 |
| Sunrise Power | 7,266 | 3,604.9 | 0.385 |
| Elk Hills Power, LLC | 7,048 | 3,551.9 | 0.374 |
| KRCD Malaga Peaking Plant | 9,957 | 151.0 | 0.528 |
| Henrietta Peaker | 10,351 | 48.1 | 0.549 |
| CalPeak Power – Panoche | 10,376 | 7.0 | 0.550 |
| Wellhead Power Gates, LLC [b] | 12,305 | 4.6 | 0.652 |
| Wellhead Power Panoche, LLC | 13,716 | 2.7 | 0.727 |
| MMC Mid-Sun, LLC | 12,738 | 1.4 | 0.675 |
| Fresno Cogen Partners, LP PKR | 16,898 | 0.8 | 0.896 |
| Existing Hanford Energy Park Peaker (HEPP) | 9,396 | 45.9 | 0.498 |
| Proposed GWF Hanford (at permitted limit) | 8,039 | 988 (max est.) | 0.43 |

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); with independent Energy Commission staff analysis for GWF Hanford on annualized basis of 1,458 hours per year in simple-cycle mode and 7,083 hours in combined cycle mode, including startups and shutdowns.
Notes:
a. Based on the Higher Heating Value or HHV of the fuel.

## The Role of GWF Hanford in the Integration of Renewable Energy

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

GWF Hanford would provide flexible, dispatchable and fast ramping[11] power that would not obstruct penetration of renewable energy. In general, combustion turbines can ramp up quickly, but output of a large-scale combined cycle facility can be limited by the steam turbine to about 15 MW per minute.[12]

GWF Hanford would also provide fast starting[13] capabilities by continuing the existing capability of HEPP to operate in a simple-cycle mode. The existing CTGs would continue to have the ability of achieving a 10-minute startup cycle, and the proposed once-through steam generator and the STG would add generation capable of starting in 60 minutes. Intermittent renewable sources of energy would be accommodated by GWF Hanford varying its energy output as needed to integrate the renewable sources, which enables GWF Hanford to play a role in most system operating scenarios.[14]

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

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast.[15] If, for example, forecasted retail sales in 2020 were lowered by 10,000 GWh due to the success of increased energy efficiency expenditures, non-renewable energy needs fall by an additional 8,000 to 6,700 GWh/year, depending on whether 20 percent or 33 percent RPS is assumed, respectively.

## The Role of GWF Hanford in Retirements/Replacements

GWF Hanford would be capable of annually providing 988 GWh of natural gas-fired generation to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting generation, such as coal-

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

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

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

[14] It is important to note that renewable generation is just one source of intermittency, or variability, that fast ramping plants can and do accommodate for in the California electric system, such as inaccurate load and weather forecasts, and unscheduled generation outages.

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

fired, generation, as well as generation that relies on water for once-through cooling, and aging power plants in general (CEC 2007). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

**GREENHOUSE GAS Table 5**
**Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020**

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

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

## Replacement of High GHG-emitting Generation

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

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[16], all the coal contracts (including those in **GREENHOUSE GAS Table 6**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are approximately 500 MW of in-state coal and petroleum coke-fired capacity that may not be able to contract with California utilities due to the SB 1368

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

Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. New generation resources generally will emit significantly less GHG than the coal and petroleum coke-fired generation, which average about 1.0 MTCO2/MWh, or two times more than a natural gas-fired combined-cycle project like GWF Hanford, resulting in a significant net reduction in GHG emissions from the California electricity sector.

**GREENHOUSE GAS Table 6**
**Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020**

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

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

## Retirement of Generation Using Once-Through Cooling

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

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in

local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **GREENHOUSE GAS Table 7** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

**GREENHOUSE GAS Table 7**
**Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]**

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

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.
b. Units are aging but are not OTC.
c. The Los Angeles Department of Water and Power (LADWP) reported a 2007 aggregate energy number of 4,003 GWh for all the Haynes units. Staff allocated the energy between the units based on Haynes' current and historical output allocations in the LADWP fillings for 2009 IEPR.

New generation resources that can either provide local support or energy will emit significantly less GHGs than aging OTC plants whose generation they should partially

displace. Existing aging and OTC natural gas generation average 0.6 to 0.7 MTCO2/MWh, which is less efficient than a new natural gas-fired combined-cycle project like GWF Hanford. When a project can provide energy and capacity, depending on its location, it can provide a significant net reduction in GHG emissions from the California electricity sector. A project located in a coastal load pocket, like the Greater Bay Area Local Capacity Area, would more likely provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants to a degree that the GWF Hanford project could not.

## CUMULATIVE IMPACTS

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

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

## COMPLIANCE WITH LORS

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

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

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at

this time, but compliance would be mandatory. The ARB's mandatory GHG emissions reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. The GWF Hanford project would not be subject to the SB 1368 Emission Performance Standard if it continues to operate as a peaker and does not exceed a 60 percent capacity factor. However, because the project would be permitted to operate as a base load facility exceeding a 60 percent capacity factor, it must be and would be capable of complying with the EPS in SB 1368, as long as it operates some reasonable fraction of the time in combined-cycle mode.

## NOTEWORTHY PUBLIC BENEFITS

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

- GWF Hanford would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- GWF Hanford would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the Greater Fresno Area.
- GWF Hanford would facilitate to some degree the replacement of out-of-state coal electricity generation that must be phased out in conformance with the State's new Emission Performance Standard.
- GWF Hanford could facilitate to some extent the replacement of generation provided by aging power plants that use once-through cooling.

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

The energy displaced by the GWF Hanford project would result in a reduction in GHG emissions from the electricity system. In other system roles, as described in **GREENHOUSE GAS Table 8**, GWF Hanford would minimize its GHG impacts by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

**GREENHOUSE GAS Table 8**
**GWF Hanford, Summary of Role in Providing Energy and Capacity Resources**

| Services Provided by Generating Resources | Discussion, GWF Hanford |
|---|---|
| Integration of Renewable Energy | • Would provide fast startup capability (within 2 hours).<br>• Would provide rapid ramping capability.<br>• Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable. |
| Local Generation Displacement | • Would be able to satisfy/partially satisfy local capacity area (LCA) resource requirements.<br>• Would provide voltage support.<br>• *Would not* provide black start capability. |
| Ancillary Services, Grid System, and Emergency Support | • Would provide fast startup capability (within 2 hours).<br>• *Would not* have low minimum load levels.<br>• Would provide rapid ramping capability.<br>• Would have ability to provide regulation and reserves.<br>• *Would not* provide black start capability. |
| General Energy Support | • Would provide general energy support.<br>• Could facilitate some retirements and replacements<br>• Would provide cost-competitive energy.<br>• Would be able to help a load-serving entity (LSE) meet resource adequacy (RA) requirements. |

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

## CONCLUSIONS

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

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state’s power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. GWF Hanford would also provide other potential GHG benefits by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

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

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

The GWF Hanford project would not be subject to the Emission Performance Standard of SB 1368 if it continues to operate as a peaker and does not exceed a 60 percent capacity factor. The project could meet the EPS, if it exceeds a 60 percent capacity factor as long as it operates some reasonable fraction of the time in combined-cycle mode.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

No Conditions of Certification related to Greenhouse Gas emissions are proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, section 95100 et. seq.) and/or future GHG regulations formulated by the ARB, such as limits set by GHG emissions cap and trade markets.

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# BIOLOGICAL RESOURCES

**Testimony of Joy Nishida**

## INTRODUCTION

This analysis addresses project changes that could potentially affect biological resources in the project area. This analysis examines only those aspects of the Hanford Energy Park Peaker (HEPP) project that would change because of the proposed amendment seeking to convert to the GWF Hanford Combined-Cycle Power Plant, and that affect staff's testimony for Biological Resources as contained in the Energy Commission Decision dated April 11, 2001 (CEC 2001a). The significant project change that could affect biological resources would be the temporary impacts associated with the proposed construction laydown and parking area.

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

There are no new or changed biological resource laws, ordinances, regulations, and standards (LORS) that would be applicable to the amended project as proposed.

## ANALYSIS

This analysis is based, in part, on information provided in the HEPP Small Power Plant Exemption application (GWF Power Systems Company, Inc., 2000), GWF Hanford amendment (GWF Energy, LLC., 2008), the Initial Study for the Hanford Energy Park Application for a Small Power Plant Exemption, Docket No. 00-SPPE-1 (CEC, 2001b), staff site visit conducted on October 22, 2008, and discussions with the U. S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG).

## SETTING

In support of the proposed amendment, CH2M HILL biologists Gary Santolo and Virginia Dains surveyed the proposed project site and the parking/construction laydown area on April 26, 2007. The permanent impacts of the proposed project will be located entirely within the fenced boundary of the existing HEPP. The project site is devoid of natural vegetation; the HEPP site is graded and covered with concrete foundations, facility components, crushed rock, and a paved plant access road. There are no wetlands on-site; however, a storm water retention basin within the existing HEPP site supports a collection of common wetland plant species dominated by rabbit's foot (*Polypogon monspeliensis*).

The temporary impacts from the construction laydown and parking area will be located along the northern perimeter of the site, extending outside of the existing site by approximately 200 feet into an adjacent fallow agricultural field. Approximately 60 percent of the eastern portion of this area was previously graded, graveled, and used for construction laydown and parking for the construction of HEPP. The parking and laydown area supports only weedy annuals such as rip-gut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), and Russian-thistle (*Salsola tragus*).

During the staff site visit on October 22, 2008, the eastern portion of the proposed laydown and parking area closest to the railroad tracks was used to store railroad track segments and broken concrete.

## SPECIAL-STATUS SPECIES

Consultants to the applicant conducted reconnaissance-level wildlife and floristic surveys of the project site and a habitat suitability assessment for special-status species within a one-mile radius of the HEPP on April 26, 2007. California Natural Diversity Database (CNDDB) (CDFG, 2008a) and California Native Plant Society special-status species database (CNPS, 2008) searches were also conducted. **BIOLOGICAL RESOURCES Table 1** identifies special-status species that have the potential to be present within the vicinity of the project area.

**BIOLOGICAL RESOURCES Table 1**
**Special-Status Species Identified as Potentially Occurring in the Vicinity of the GWF Hanford Site**

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| **Plants** | | | |
| brittlescale (*Atriplex depressa*) | CNPS 1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools with alkaline clay soils | Not present; no appropriate habitat |
| Earlimart orache (*Atriplex erecticaulis*) | CNPS 1B.2 | Valley and foothill grassland | Not present; no appropriate habitat |
| subtle orache (*Atriplex subtilis*) | CNPS 1B.2 | Valley and foothill grassland | Not present; no appropriate habitat |
| California jewelflower (*Caulanthus californicus*) | FE/SE | Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland with sandy soils | Not present; no appropriate habitat |
| slough thistle (*Cirsium crassicaule*) | CNPS 1B.1 | Chenopod scrub, marshes, swamps, and slow moving sloughs, riparian scrub | Not present; no appropriate habitat |
| recurved larkspur (*Delphinium recuvatum*) | CNPS 1B.2 | Chenopod scrub, cismontane woodland, valley and foothill grassland with alkaline soils | Not present; no appropriate habitat |
| Panoche pepper-grass (*Lepidium jaredii* ssp. *album*) | CNPS 1B.2 | Alluvial fans and washes in valley and foothill grassland | Not present; no appropriate habitat |
| **Invertebrates** | | | |
| longhorn fairy shrimp (*Branchinecta longiantenna*) | FE/-- | Inhabits clear to turbid grass-bottomed vernal pools in grasslands and clear-water pools in sandstone depressions. | Not present; no appropriate habitat |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| | | Occupied habitats range from 1 meter in diameter in sandstone habitats to 62 meters in diameter in grassland pools. Pools must stay inundated a minimum of 23 days for the species to reach maturity. | |
| vernal pool fairy shrimp (*Branchinecta lynchi*) | FT/-- | Inhabits ephemeral pools (vernal pools) in grassland or basalt flow depressions. Pools typically have grass or mud bottoms. Also occurs in other wetlands with habitat characteristics similar to those of vernal pools, including alkaline rain-pools, rock outcrop pools, and some constructed sites. Occupied habitats range from 0.56-m² puddles to pools exceeding 10 hectares. Pools must stay inundated long enough (3 weeks under optimal conditions) for the species to complete its life cycle, but species does not use riverine, marine, or other permanent waters. | Not present; no appropriate habitat |
| vernal pool tadpole shrimp (*Lepidurus packardi*) | FE/-- | Found in grass-bottomed swales on old alluvial soils underlain by hardpan; and in mud-bottomed pools with highly turbid water. Occupied habitats range in size from 5 m² to 36 hectares. Pools must dry out and reinundate for cysts to hatch. Adult populations generally persist until the habitat dries up. | Not present; no appropriate habitat |
| San Joaquin tiger beetle (*Cicindela tranquebarica* ssp. unnamed) | --/-- | Alkali and clay flats, sand dunes, sand bars, beaches, and sandy soils | Not present; no appropriate habitat |
| valley elderberry longhorn beetle (*Desmocerus californicus* ssp. *dimorphus*) | FT/-- | Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant. | Not present; no appropriate habitat |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| **Fish** | | | |
| delta smelt (*Hypomesus transpacificus*) | FT/-- | Along the freshwater edge of the mixing zone (saltwater-freshwater interface) where salinity is ca. 2 parts per thousand (ppt). Shortly before spawning, adults migrate upstream from the brackish-water habitat of the mixing zone and disperse widely into river channels and tidally influenced backwater sloughs. They spawn in shallow, fresh or slightly brackish water upstream of the mixing zone. | Not present; no appropriate habitat |
| **Amphibians and Reptiles** | | | |
| western pond turtle (*Actinemys* [*Clemmys*] *marmorata*) | --/SSC | Aquatic habitats such as ponds, marshes, or streams with rocky or muddy bottoms and vegetation for cover and food. | Not present; no appropriate habitat |
| California tiger salamander (*Ambystoma californiense*) | FT/-- | Restricted to grasslands and low foothill regions that provide breeding habitat, including temporary ponds or pools, slower portions of streams, and some permanent waters. Unlikely to use permanent waters unless fish predators are absent. Requires dry-season refugia such as ground squirrel burrows within 1 mile of breeding sites. | Not present; no appropriate habitat |
| blunt-nosed leopard lizard (*Gambelia sila*) | FE/SE, SFP | Found in undeveloped areas. Inhabits sparsely vegetated plains, alkali flats, grasslands, low foothills, canyon floors, and large washes; typically uses areas with sandy soils and scattered vegetation and absent from thickly vegetated habitats. In the San Joaquin Valley, species is usually found in nonnative grassland, valley sink scrub, valley needlegrass grassland, alkali playa, and valley saltbush scrub habitats. Uses ground squirrel and kangaroo rat burrows for shelter and thermoregulation. | Not present; no appropriate habitat |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| California red-legged frog (*Rana aurora draytonii*) | FT/-- | Permanent and semi-permanent aquatic habitats such as creeks and cold water ponds with emergent and subemergent vegetation. May estivate in rodent burrows or cracks during dry periods. | Not present; no appropriate habitat |
| western spadefoot (*Spea* [*Scaphiopus*] *hammondii)* | --/SSC | Shallow streams with riffles and seasonal wetlands such as vernal pools in annual grasslands and oak woodlands. | Not present; no appropriate habitat |
| giant garter snake (*Thamnophis gigas*) | FT/ST | Sloughs, canals, low gradient streams, and freshwater marsh habitat where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grass banks and emergent vegetation for basking and areas of high ground protection from flooding during winter. | Not present; no appropriate habitat |
| **Birds** | | | |
| tricolored blackbird (*Agelaius tricolor*) | --/SSC | Nests in dense colonies in emergent marsh vegetation such as tules and cattails, or upland sites with blackberries, thistles, nettles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony. | Not present; no appropriate habitat |
| Western burrowing owl (*Athene cunicularia*) | --/SSC | Requires habitat with three key attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles. Occupies grasslands, deserts, sagebrush, scrub, agricultural areas including pastures and untilled margins of cropland, earthen levees and berms, coastal uplands, and urban vacant lots as well as the margins of airports, golf courses, and roads. Relies on burrows excavated by fossorial mammals such as ground squirrels, badgers, skunks, and coyotes for nesting and cover. Can also use | Not present; appropriate habitat available, but no burrows found |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| | | cavities in rock outcrops and artificial habitat such as concrete, asphalt, and piles of rubble for nesting sites. | |
| Swainson's hawk (*Buteo swainsoni*) | --/ST | Primarily consumes insects and small rodents, foraging in large, open plains and grasslands. Hay, grain, and most row crops also provide suitable foraging habitat during at least part of the breeding season. Usually nests in large trees, preferring native species. Most nest sites are found in riparian habitats, but species may also use mature roadside trees in some urban areas, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses. | None seen; potential foraging habitat, but no appropriate nesting habitat; closest nesting occurrence 6 miles east of project area |
| western snowy plover (inland population) (*Charadrius alexandrines*) | --/-- | Barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds, and riverine sand bars; also along sewage, salt-evaporation, and agricultural wastewater ponds. | Not present; no appropriate habitat |
| Loggerhead shrike (*Lanius ludovicianus*) | --/SSC | Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. | None seen; potential habitat present |
| Black-crowned night heron (*Nycticorax nycticorax*) | --/-- | Various wetland habitats, including salt, brackish, and freshwater marshes, swamps, streams, lakes, and agricultural fields. | Not present; no appropriate habitat |
| **Mammals** | | | |
| Fresno kangaroo rat (*Dipodomys nitratoides exilis*) | FE/SE | Occupies grassland and alkaline scrub communities on the floor of the San Joaquin Valley. | Not present; no appropriate habitat |
| Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) | FE/SE | Occupies arid-land communities on alluvial fans and saline floodplain soils; occurs in higher densities where shrub cover is sparse to moderate. Burrow systems are most often located in open areas; commonly found in slightly elevated mounds, road | Not present; closest occurrence 5 miles south of project area; appropriate habitat available, but |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| | | berms, canal embankments, railroad beds, and at bases of shrubs and fences where windblown soils accumulate. For permanent occupancy, species requires terrain not subject to flooding. Soils with finer texture and higher salinity are more commonly associated with higher-density populations than are less saline soils. | no burrows found |
| Hoary bat (*Lasiurus cinereus*) | --/-- | Prefers open habitats or habitat mosaics with access to trees for cover and open areas of habitat for feeding. Roosts in dense foliage of medium to large trees. Preferred sites are hidden from above, with few branches below, and have ground cover of low reflectivity. Females and young tend to roost at higher sites in trees. | Not present; closest occurrence 3.8 miles north of project area; no appropriate habitat |
| Tulare grasshopper mouse (*Onychomys torridus tularensis*) | --/SSC | Inhabit arid shrubland communities in hot, arid grassland and shrubland. Habitats include alkali sink, mesquite associations on the Valley floor, saltbush scrub, Upper Sonoran subshrub scrub, and in rare instances, blue oak woodland at 450 meters (1,476 feet). | Not present; no appropriate habitat |
| San Joaquin pocket mouse (*Perognathus inornatus inornatus*) | --/SSC | Inhabit annual grassland, saltbush scrub, and oak savannah habitats, generally on friable soils. | Not present; no appropriate habitat |
| American badger (*Taxidea taxus*) | --/SSC | Requires sufficient food, friable soils, and relatively uncultivated ground; preferred habitats include grassland, savannas, and mountain meadows near timberline. | Not present; no appropriate habitat |
| San Joaquin kit fox (*Vulpes macrotis mutica*) | FE/ST | Because agriculture has replaced much of the Central Valley's native habitat, species appears to have adapted to marginal areas such as grazed, non-irrigated grasslands, peripheral lands | Not present; closest occurrence 1.6 miles south of project area; |

| Common Name (Scientific Name) | Status* | Habitat Type | Potential to Occur |
|---|---|---|---|
| | | adjacent to tilled and fallow fields, irrigated row crops, orchards, vineyards, and petroleum development and urban areas. Usually prefers areas with loose-textured soils suitable for den excavation, but is found on virtually every soil type. Where soils make digging difficult, may enlarge or modify burrows built by other animals, particularly California ground squirrels. May also use structures such as culverts, abandoned pipes, and well casing as den sites. | appropriate habitat available, but no burrows found |

* Status legend:
CNPS 1B.1 = plants endemic to California that are seriously endangered throughout their range
CNPS 1B.2 = plants that are fairly endangered in California and elsewhere
FE = federally endangered
FT = federally threatened
SE = state endangered
ST = state threatened
SSC = state species of special concern
SFP = state fully protected animal
-- = no special-status (species for which dashes are shown for both federal and state status are included by CNDDB because of declining trends)
Sources: CDFG 2008a, CNPS 2008

Special-status plant and wildlife species were not observed on or adjacent to the project area during biological surveys. Although not observed in the project area, several special-status wildlife species, including burrowing owl and San Joaquin kit fox, are known to use disturbed areas in the region and thus have suitable habitat near the GWF Hanford site. Potential foraging habitat also exists for loggerhead shrike at the HEPP site, and for Swainson's hawk on the adjacent fallow farmland.

Special-status plant species are not expected to occur in the project area. The CNDDB and CNPS database searches identified seven plant species that are known to occur in the general vicinity. However, there are no recorded occurrences of special-status plant species within three miles of the project area. These species were determined to have little or no potential to occur on site due to the high level of disturbance and the resulting lack of suitable environmental conditions to support them.

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

### IMPACTS

The only potential impacts that could affect biological resources would be the temporary impacts associated with the proposed construction and laydown area.

## Mitigation and Compensation

In connection with the development of the HEPP in 2001, the applicant received incidental take authority from the USFWS and acquired 10 acres of habitat conservation credits from the Kern Water Bank Authority (Kern Water Bank, 2008) to mitigate the original HEPP project's habitat loss impacts. The 10 credit acres were based on 6 acres of permanent disturbance and 20 acres of temporary disturbance for the HEPP project with the compensation ratios of 1:1 (1 x 6 acres = 6 acres) for permanent disturbance, and 0.2:1 (0.2 x 20 acres = 4 acres) for temporary disturbance. When constructed, the HEPP permanently disturbed only 4.7 acres, so the applicant acquired 1.3 acres (6 acres – 4.7 acres = 1.3 acres) of "surplus" conservation credits.

The permanent disturbance for the proposed GWF Hanford project will be fully contained within the existing 4.7 acre HEPP site. Therefore, there will be no additional permanent habitat disturbance, and no additional compensation acreage for permanent disturbance will be required. The only disturbance for the GWF Hanford project is 5.3 acres of temporary disturbance for the construction laydown and parking area, which will be fenced during construction. Using the current compensation ratio of 0.3:1, the compensation acreage required for the new temporary laydown and parking area would be 1.6 acres (0.3 x 5.3 acres = 1.6 acres).

Since the new project site does not represent any new sensitive species habitat or permanent impact, the USFWS approved the 1.3 acres of "surplus" conservation credits from the HEPP project to compensate for the temporary impacts of the GWF Hanford project. Therefore, the applicant would not be required to get a Biological Opinion from the USFWS and would not have to provide any additional habitat compensation (USFWS, 2008). The Energy Commission staff and CDFG (CDFG, 2008b) agree with this recommendation; therefore, Biological Resources Condition of Certification **BIO-12** requiring habitat compensation is satisfied by the purchase of the excess habitat conservation credits from the Kern Water Mitigation Bank for the HEPP project in 2001.

Based on the results of the April 26, 2007, field survey conducted by the applicant's consultants (GWF Energy LLC, 2008), and a site visit by Energy Commission staff on October 22, 2008, significant construction-related impacts to biological resources are not expected to occur. Any construction-related impacts not addressed when the original project was certified will be minimal and can be dealt with effectively through measures provided in the existing Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), which is required by Biological Resources Condition of Certification **BIO-11** developed for the HEPP. In the event that a special-status species is encountered, the BRMIMP implements avoidance strategies and mitigation measures for each sensitive biological resource.

For the proposed amendment, specific items related to Biological Resources Conditions of Certification are modified to be consistent with the changes that would result from adoption of the proposed amendment.

## CONCLUSIONS AND RECOMMENDATIONS

There would be no unmitigated impacts to biological resources because of the proposed project changes to amend the license for the HEPP, so the GWF Hanford facility can be

constructed. The project would conform to all applicable laws, ordinances, regulations, and standards (LORS) for biological resources. The new project changes, as proposed, would not have a significant effect on sensitive species or their habitat near the project providing that the proposed Biological Resources Conditions of Certification below are adopted. Staff recommends elimination of seven Biological Resources Conditions of Certification and changes to five other Conditions originally contained in the Decision. The Conditions of Certification have been updated to reflect the proposed minor project changes and remain relevant to the proposed GWF Hanford project.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

The changes incorporated into the remaining Biological Resources Conditions of Certification **BIO-7** and **BIO-9** through **BIO-12** will not place any additional burden on the project owner than what was originally approved for the HEPP Small Power Plant Exemption. The changes to the Conditions of Certification for the proposed GWF Hanford project are as follows:

- Conditions of Certification **BIO-1** through **BIO-3** in the Staff Assessment were eliminated and incorporated into Condition of Certification **BIO-10** to reflect the original intent of Conditions **BIO-1** through **BIO-3**.
- Condition of Certification **BIO-4** in the Staff Assessment was eliminated and incorporated into Condition of Certification **BIO-11**, the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP).
- Condition of Certification **BIO-5** in the Staff Assessment was eliminated and incorporated into Conditions of Certification **BIO-9** and **BIO-10**. **BIO-5** described the qualifications of a Designated Biologist, which is the purpose of **BIO-9**. **BIO-5** also described the duties of a Designated Biologist, which is the purpose of **BIO-10**.
- Condition of Certification **BIO-6** in the Staff Assessment has been eliminated as staff believes this Condition was initially proposed in error and considers this condition to be unnecessary. The Verification for **BIO-6** was not relevant to the Condition and has been incorporated into the Verification for **BIO-10**.
- Biological Resources Table 1 is an update of Table 8.2-1 from the original HEPP project SPPE application. Biological Resources Table 1 reflects recent CNDDB (2008) and CNPS (2008) database searches, which have been updated with additional special-status species added since 2000. The proposed modification of Condition of Certification **BIO-7** reflects the change in the updated special-status species table. In addition, the correct designation for “qualified biologist” is “Designated Biologist,” which replaces the previous designation in **BIO-7** of the Staff Assessment.
- Condition of Certification **BIO-8** in the Staff Assessment was eliminated and incorporated into Condition of Certification **BIO-10**. **BIO-8** described one of the duties of a Designated Biologist, which is the purpose of **BIO-10**.
- The requirement of aerial photographs of the area proposed to be disturbed prior to and after completion of the project has been eliminated from Condition of Certification **BIO-11** in the Staff Assessment. The total disturbance acreage is anticipated to be small (approximately 5 acres), and staff feels the requirement to be excessive when a final tabulation of temporary and/or permanent acreage

impacts as revised in the Verification for Condition of Certification **BIO-12** is sufficient.

- Condition of Certification **BIO-12** in the Staff Assessment had an inaccurate habitat compensation ratio of 0.5 to 1 for temporary impacts (CEC, 2001c). A Staff Assessment Errata was published, which corrected the habitat compensation ratio for temporary impacts from 0.5 to 1 to 0.2 to 1 (CEC, 2001d). **BIO-12** reflects the correction from the Staff Assessment Errata.

Below are all Conditions of Certification pertaining to Biological Resources currently applicable to the Hanford Energy Park Peaker. Staff recommends the same Conditions of Certification apply to the GWF Hanford Combined-Cycle Power Plant, with the changes shown in the underline/strikethrough format.

~~**BIO-1** The project will avoid all impacts to legally protected species and their habitat on site, adjacent to the site and along the right of way for linear facilities.~~

~~**BIO-2** The project will avoid all impacts to designated critical habitat (wetlands, vernal pools, riparian habitat, preserves) on site or adjacent to the site.~~

~~**BIO-3** The project will avoid all impacts to locally designated sensitive species and protected areas.~~

~~**BIO-4** The project will reduce risk of large bird electrocution by electric transmission lines and any interconnection between structures, substations and transmission lines by using construction methods identified in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (APLIC 1996).~~

~~**BIO-5** The project biologist, a person knowledgeable of the local/regional biological resources, and CPM will have access to the site and linear rights-of-way at any time prior to and during construction and have the authority to halt construction in an area necessary to protect a sensitive biological resource at any time.~~

~~**BIO-6** Upon decommissioning the site, the biological resource values will be reestablished at preconstruction levels or better.~~

~~**Verification**: If the Designated Biologist halts construction, the action will be reported immediately to the CPM along with the recommended implementation actions to resolve the situation or decide that additional consultation is needed. Throughout construction, the project owner shall report on items one through six above if identified resources are found or impacted.~~

**BIO-7** **Survey:** A minimum of 5 days and no more than 30 days prior to the beginning of site mobilization, the project site, the natural gas pipeline route, and the electrical transmission line route must be surveyed by a ~~qualified~~ Designated Biologist ~~biologist~~ in accordance with US Fish and Wildlife Service (USFWS) and California Department of Fish & Game (CDFG) protocol for nesting raptors and the sensitive species listed in **BIOLOGICAL RESOURCES Table 1** of this GWF Hanford Combined-Cycle Power Plant Biological Resources Staff Analysis.

**Verification:** After the survey and prior to site mobilization, documentation of the survey method and mapped results will be submitted to the CPM.

**BIO-8** ~~All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted.~~

**BIO-9** **Designated Biologist**: Site mobilization shall not begin until a staff-approved Designated Biologist is available to be onsite.

Protocol: The Designated Biologist must meet the following minimum qualifications:

- A Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field;
- At least 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;
- At least one year of field experience with biological resources found in or near the project area; and
- An ability to demonstrate to the satisfaction of the Staff the appropriate education ~~and~~ experience, and knowledge of the local/regional biological resources for the ~~biological resources~~ tasks that must be addressed during project construction.

If staff determines the proposed Designated Biologist to be unacceptable, the project owner shall submit another individual's name and qualifications for consideration. If the approved Designated Biologist needs to be replaced, the project owner shall obtain approval of a new Designated Biologist by submitting to the CPM the name, qualifications, address, and telephone number of the proposed replacement. No disturbance will be allowed in any designated sensitive areas until the CPM approves a new Designated Biologist and the new biologist is onsite.

**Verification:** Prior to the start of any site mobilization activities the project owner shall submit to the CPM for approval, the name, qualifications, address and telephone number of the individual selected by the project owner as the Designated Biologist. If a Designated Biologist is replaced, the information on the proposed replacement, as specified in the condition, must be submitted in writing prior to the termination or release of the preceding Designated Biologist.

**BIO-10** **Designated Biologist Duties:** The CPM approved Designated Biologist shall perform the following during project construction:

- Advise the Applicant's Construction Manager on the implementation of the Biological Resources Conditions of Certification;

- Access the site and linear rights-of-way at ~~any~~ appropriate times prior to and during construction and ~~the authority to~~ halt construction ~~at any time to~~ when necessary to protect a sensitive biological resource;
- Supervise or conduct mitigation, monitoring and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as, wetlands, vernal pools, riparian habitat, and preserves, and any location where ~~special~~ special-status species or their habitat may exist onsite, adjacent to the site, and along rights-of-way for linear facilities; ~~and~~
- Thoroughly inspect all construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS and CDFG have been consulted; and
- Notify the ~~Applicants~~ project owner and the CPM of non-compliance with any Biological Resources Conditions of Certification.

**Verification:** During project construction, the Designated Biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM.

If the Designated Biologist halts construction, the action will be reported immediately to the CPM along with the recommended implementation actions to resolve the situation or decide that additional consultation is needed. Throughout construction, the Designated Biologist shall report if sensitive biological resources are found or impacted.

**BIO-11 Biological Resources Mitigation Implementation and Monitoring Plan:** The Applicant shall submit to the CPM for review and approval a copy of the final Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) and shall implement the measures identified in the plan. Any changes made to the adopted BRMIMP must be made in consultation with the CPM and USFWS.

Protocol: The final BRMIMP shall identify:

- All biological resources mitigation, monitoring, and compliance conditions included in the Energy Commission's Final Decision;
- The reduction of risk of large bird electrocution by electric transmission lines and any interconnection between structures, substations and transmission lines by implementing construction methods identified in "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (APLIC 2006);
- All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;
- All mitigation measures identified through consultation with the USFWS and CDFG;
- All required mitigation measures/avoidance strategies for each sensitive biological resource;

- Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of habitat for sensitive biological resources;
- All locations, on a map of suitable scale, of laydown areas and areas requiring temporary protection and avoidance during construction;
- ~~Aerial photographs of all areas to be disturbed during project construction activities – one set prior to site disturbance and one set after completion of mitigation measures. Include planned timing of aerial photography and a description of why times were chosen;~~
- Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
- All performance standards and remedial measures to be implemented if performance standards are not met; and
- A process for proposing plan modifications to the CPM and appropriate agencies for review and approval.

**Verification:** Prior to the start of any project-related ground disturbance activities, the project owner shall provide the CPM with the final version of the BRMIMP, and the CPM will determine the plan's acceptability. All modifications to the approved BRMIMP must be made only after consultation with the CPM, USFWS, and CDFG. The project owner shall notify the CPM before implementing any CPM approved modifications to the BRMIMP.

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

**BIO-12 Habitat Compensation:** To compensate for temporary, permanent, and incremental impacts to sensitive species habitat, the project owner will provide suitable habitat compensation funds at a ratio of 1:1 for all permanent disturbance and a ratio of 0.2:1 for all temporary disturbance to habitats at an amount of $2,375.00 per acre-credit and a $5,000.00 up front fee per transaction.

**Verification:** To account for inflation and other anticipated changes in habitat compensation costs, the project owner will consult with the Kern Water Bank (KWB) and the CPM prior to the start of any project related ground disturbance, and KWB will identify the final cost per acre and total compensation amount. Once the final compensatory mitigation amount has been determined and prior to the start of any project related ground disturbance activities, the project owner will provide a Conservation Credit Certificate to the CPM that all habitat compensation funds (including the endowment and transaction fee) have been provided to the KWB.

Within 90 days after completion of project related construction, the project owner shall provide a final tabulation of temporary and/or permanent acreage impacts. ~~aerial photographs to the CPM that were taken after construction.~~ The project owner will also

provide an analysis of the amount of any additional habitat disturbance. The CPM will notify the project owner of any additional funds required to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire additional credits if necessary.

## REFERENCES


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California Department of Fish and Game (CDFG). 2008b. Electronic e-mail communication with Justin Sloan, wildlife biologist (JSLOAN@dfg.ca.gov) re: Hanford Energy Park power plant expansion on December 17, 2008.

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Application for Small Power Plant Exemption, Docket NO. 00-SPPE-1, Kings County, published on April 11, 2001.

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California Native Plant Society (CNPS). 2008. Online inventory of rare and endangered plants V7-08d., http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi accessed on November 14, 2008.

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Kern Water Bank. 2008. Electronic e-mail communication with Cheryl Harding, administrator, (charding@kwb.org) re: Past Purchase of Mitigation Credits by GWF Energy, LLC, on November 20, 2008.

U.S. Fish and Wildlife Service (USFWS). 2008. Electronic e-mail communication and telephone conversation with Shelley Buranek, fish and wildlife biologist (Shelley_Buranek@fws.gov) re: Hanford Energy Park power plant expansion on December 12, 2008, 916-414-6517.

# CULTURAL RESOURCES

**Testimony of Beverly E. Bastian**

## INTRODUCTION

GWF Energy, LLC (GWF), requests to change the previously-approved power generation configuration for the Hanford Energy Park Peaker (HEPP) Project from simple-cycle to combined-cycle operations by adding two once-through steam generators (OTSGs), a 25-MW steam turbine, an air-cooled condenser (ACC) to allow use of dry cooling at the converted plant, and a wet-surface air cooler (WSAC) for lube-oil cooling. The proposed modifications would be restricted to the fenced area of the present project site. GWF also requests to use five acres of adjacent GWF property for temporary construction worker parking and a secondary laydown area. This additional area was used for the same purposes during construction of the original peaker plant.

Potential impacts to cultural resources from the proposed amendment are limited to those that could occur during construction-related excavations, potentially affecting unknown buried archaeological resources.

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

At the time of certification, LORS applicable to cultural resources were identified in staff's May 2001 Staff Assessment. Those LORS will continue to apply to the amended project, and no new LORS or changes to LORS pertinent to potential impacts to cultural resources caused by this project have been identified.

## ANALYSIS

For the original HEPP project, the applicant identified no cultural resources on the project site and no impacts to the three cultural resources identified within 1.0 mile of the project site and linear facility routes (GWF Hanford 2000, pp. 9, 11; GWF Hanford 2008, p. 3-39). No buried archaeological deposits discovered during HEPP construction were reported to the Energy Commission by GWF. The cultural resources conditions of certification, however, did not provide for continuous archaeological monitoring by an archaeologist. Rather, **CUL-2** gave a "cultural specialist" (qualifications not specified) access to the HEPP construction areas and additionally required that the specialist be present "during appropriate ground-disturbing activities." The latter phrase was subject to interpretation by GWF and/or by the cultural specialist, with the result that it is unclear now what activities in what areas were monitored by the cultural specialist. Clarification at this time will not be possible, because the conditions did not require the cultural specialist to keep a log, write periodic reports, or submit to the Energy Commission a final technical report on monitoring activities; and GWF has not been able to obtain any such monitoring records kept by its HEPP cultural resources consultant. Consequently, staff has concluded that the extent of archaeological monitoring of HEPP construction cannot be evidenced or reconstructed. In light of this, staff cannot properly evaluate the adequacy of the report of the absence of buried archaeological deposits, based on HEPP archaeological monitoring, because no records of the monitoring are available.

Thus, staff must assume that some potential exists for buried archaeological deposits in undisturbed parts of the HEPP site.

Additionally, the lack of archaeological monitoring records leaves uncorroborated how much of the HEPP site was previously disturbed and to what depths. Staff assumes that both the previous agricultural use of the site and the general grading and filling associated with the HEPP construction resulted in ground disturbance over the entire site to a depth of 4 feet. GWF has provided from its HEPP construction records information on maximum excavation depths reached, which ranged between 11 and 14 feet in the areas where the two combustion turbine generators were installed (GWF 2009, fig. DR5-1, section 1 and detail 3), with lesser depths reached where the demineralized water storage tank, the step-up transformers, the fuel gas supply, and the stormwater retention basin were constructed. Beyond this, GWF has indicated that no further information is available (Scholl 2009).

In light of the absence of known cultural resources on the surface of the HEPP site and the likely disturbance of the entire HEPP site to a depth of 4 feet, in its review of the present petition, staff has focused on the potential for buried archaeological deposits, primarily prehistoric in nature, in any parts of the proposed modification-construction areas that have not been previously disturbed below 4 feet in depth. The only such areas appear to be the locations of the steam turbine generator, the air-cooled condenser, and the westward expansion of the stormwater retention basin, all of which would entail excavations down to 9.5–10.0 feet below grade (GWF 2008, Fig. 2-1; GWF 2009, table DR3-1, figs. DR4-1, DR5-1). GWF maintains that encountering no archaeological deposits at depths down to 14 feet during prior HEPP construction-related excavations supports the estimation that such deposits will not be encountered during new excavations on the site (GWF 2009, p. 5). Consequently, GWF proposes no modifications to the existing Conditions of Certification. But, as explained above, staff has not been able to assess the adequacy of the archaeological monitoring that is the basis for the report of no archaeological deposits previously encountered.

For those areas not subjected to previous deep ground disturbance, staff does not agree that the excavations associated with the construction of the proposed modifications would not encounter buried archaeological deposits. Staff disagrees for three reasons:

- First, the ground underlying the project site probably consists of layers of poorly consolidated sands, gravels, silts, and clays, several hundred feet thick and dating from the Pleistocene up through the Holocene geologic epochs (GWF 2000a, pp. 4, 7), representing 500,000 to 200 years ago. This means that the upper layers of natural soils and sediments at the project site date to the period in which humans could have left remains of their activities, from 14,000 years ago to the present. Therefore, buried archaeological deposits could be present on the HEPP site at the depths to which the proposed excavations would reach in previously undisturbed areas.

- Second, the lack of surface evidence of archaeological deposits is no index of what may lie deeper down. It is a generally accepted convention among archaeologists that plowing can deposit buried archaeological materials on the surface from as deep as 3 feet down. But deeper archaeological deposits could have no surface

manifestation at all. That means that buried archaeological deposits could be present on the HEPP site below the 4-foot depth staff assumes constitutes the plow zone plus project-deposited fill at the HEPP project site.

- Third, the lack of archaeological deposits reported during the construction of the HEPP could be the result of selective archaeological monitoring. **CUL-2** allowed discretion to either or both the project owner and the cultural specialist as to when and where archaeological monitoring would occur, and at this time, no information is available on the extent of archaeological monitoring conducted during HEPP construction. So, it is possible that some of the time the recognition of encountered buried archaeological deposits could have been left to construction workers. Staff has no data on how much cultural resources recognition training the HEPP workers received, but has to assume that the workers did not become archaeological experts. Nor was it their primary job to look for archaeological deposits. This means that archaeological deposits could have been present but were not identified during prior HEPP construction.

Consequently, staff recommends that the existing HEPP Conditions of Certification be replaced with cultural resources standard Conditions of Certification **CUL-1** through **CUL-7**, which are intended to provide for the contingency of discovering archaeological resources during the construction of HEPP modifications in areas of the site where intact soils and sediments still exist below 4 feet in depth.

**CUL-1** requires a Cultural Resources Specialist (CRS) be retained and available during construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires the CRS to write and submit to the CPM a Cultural Resources Monitoring and Mitigation Plan (CRMMP). **CUL-4** requires the CRS to write and submit to the CPM a final report on all project cultural resources monitoring and mitigation activities, if any archaeological deposits are discovered. **CUL-5** requires the project owner to train workers to recognize cultural resources and instruct them to halt construction if cultural resources are discovered. **CUL-6** prescribes the monitoring, by an archaeologist and, possibly, by a Native American, intended to identify archaeological deposits buried below 4 feet in depth in the locations of the steam turbine generator, the air-cooled condenser, and the westward expansion of the stormwater retention basin. **CUL-7** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery efforts, if the discovery is evaluated as historically significant, which is defined as being eligible for listing in the California Register of Historical Resources (CRHR).

## CUMULATIVE IMPACTS

A cumulative impact under the California Environmental Quality Act (CEQA) refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. Cumulative impacts to cultural resources in the vicinity of the HEPP site could occur if any other existing or proposed projects, in conjunction with the proposed HEPP modifications, had

or would have impacts on cultural resources that, considered together, would be significant.

The Energy Commission staff's expedited review of the Emergency Peaker Application for Certification in 2001 found no known impacts on cultural resources. Other nearby past projects to which a CEQA review was applied by the appropriate lead agencies presumably complied with conditions that mitigated any impacts to cultural resources to a less-than-significant level. To determine if any proposed or foreseeable developments are being planned near the HEPP site, GWF consulted with the Hanford Community Development Department and the Kings County Planning Department and learned that none is planned within 1.0 mile (GWF 2008, p. 3-40).

Staff has identified no impacts to known cultural resources from HEPP modifications, and staff has proposed conditions of certification that would provide for the identification, evaluation, and avoidance or mitigation of impacts to previously unknown CRHR-eligible archaeological resources discovered during the construction of the project. Thus any significant impacts from the proposed HEPP modifications would be mitigated to below the level of significance.

Proponents of any future projects in the area could mitigate impacts to as-yet-undiscovered subsurface archaeological sites to less-than-significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as CRHR-eligible. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code section 5097.98.

Since the impacts from the proposed HEPP modifications would be mitigated to a less-than-significant level by the project's compliance with proposed Conditions of Certification **CUL-1** through **CUL-7**, and since similar protocols can be applied to other projects in the area, staff does not expect any incremental effects on cultural resources of the proposed HEPP modifications to be cumulatively considerable when viewed in conjunction with other projects.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has reviewed GWF's petition to modify the HEPP and has considered the potential effects of the proposed modifications on cultural resources and assessed the consistency of the proposed modifications with applicable LORS. Based on this review, staff determined that, with the implementation of Conditions of Certification **CUL-1** through **CUL-7** to appropriately provide for the discovery of as yet unknown buried archaeological deposits, the proposed amendment would have no impact on cultural resources. Additionally, GWF's compliance with staff's recommended Conditions of Certification **CUL-1** through **CUL-7** would assure the proposed project's compliance with all applicable LORS. Consequently, staff recommends the approval of the petition.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff recommends modifications to the cultural resources conditions of certification as shown below. (Strike-through text represents deleted language; underlined text represents inserted language.)

~~**CUL-1** The project certified under this emergency process shall not cause any significant impact to cultural resources on the power plant site or linear rights of way.~~

~~**CUL-2** The project has been determined to have the potential to adversely affect significant cultural resources and the project owner shall ensure the completion of the following actions/activities:~~

1. ~~Provide a cultural specialist who will have access to the site and linear rights-of-way at any time prior to and during ground disturbance.~~
2. ~~The cultural specialist will provide training to appropriate construction personnel at the site, will install avoidance measures (as necessary), and will be present during appropriate ground disturbing activities. The cultural specialist has the authority to halt construction at a location if a significant cultural resource is found. If resources are discovered and the cultural specialist is not present, the project owner will halt construction at that location and will contact the specialist immediately. The specialist will consult with the CPM and a decision will be made by the CPM within 24 hours as to how to proceed.~~
3. ~~The project owner shall allow time for the cultural specialist to recover significant resource finds, and pay all fees necessary to curate recovered significant resources.~~

**CUL-1** Prior to the start of ground disturbance (includes "preconstruction site mobilization," "construction ground disturbance," and "construction grading, boring and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternate CRSs, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to Compliance Project Manager (CPM) approval of the CRS and alternates, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission projects.

**CULTURAL RESOURCES SPECIALIST**

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

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;
2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and
3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

**CULTURAL RESOURCES MONITORS**

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or
2. an A.S. or A.A. degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

**CULTURAL RESOURCES TECHNICAL SPECIALISTS**

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

**Verification:**

1. At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.
2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner

shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that project-related ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.
4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications.
5. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.
6. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

**CUL-2** Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, Petition to Amend, and confidential cultural resources reports for the original project and the amended project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the 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 map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

**Verification:**

1. At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, Petition to Amend, and confidential cultural

resources reports for the original project and the amended project 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. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.
3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.
4. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.
5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

**CUL-3** Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) 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 CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Energy Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Energy Commission Decision are contained in Appendix A."
2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A mitigation plan shall be prepared for any CRHR-eligible (as determined by the CPM) resource, impacts to which cannot be avoided. A prescriptive treatment plan may be included in the CRMMP for limited data types.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance 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 project-related ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related effects.
7. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections, into a retrievable storage collection in a public repository or museum.
8. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.
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 ground disturbance and cannot be treated prescriptively.
10. A description of the contents and format of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

**Verification:**

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the project owner an electronic copy of the draft model CRMMP for the CRS.
2. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.
3. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

**CUL-4** The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

**Verification:**

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.
2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.
3. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's Guidelines for the Curation of Archaeological Collections, to accept the cultural materials from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.
4. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

**CUL-5** Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is

completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

**Verification:**

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.
2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.
3. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

**CUL-6** The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbance below 4 feet in depth in the locations of the steam turbine generator, the air-cooled condenser, and the westward expansion of the stormwater retention basin, to ensure there are no impacts to undiscovered resources.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of the earth-removing activities in the areas specified in the previous paragraph for as long as the activities are ongoing. Where excavation equipment is actively removing dirt and hauling the excavated material farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no further than fifty feet from the location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

**Verification:**

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.
2. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.
3. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.
4. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.
5. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.
6. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.
7. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

**CUL-7** The project owner shall grant authority to halt project-related ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting, as provided in

other conditions, shall continue during the project's ground-disturbing activities elsewhere. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.
2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.
3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.
4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

**Verification:**

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.
2. Within 48 hours of the discovery of a resource of interest to Native Americans, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.
3. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Hanford 2000—GWF Energy, LLC, "Confidential Cultural Report: GWF Hanford Energy Park Peaker (01-EP-7)," May, 2000. Submitted to Dockets (with the Petition for License Amendment for the Hanford Energy Peaker Plant), 10/2/2008.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

GWF Hanford 2009—GWF Energy, LLC, "Data Responses Set 1 (Responses to Data Requests 1 through 11), GWF Hanford Energy Park Peaker (01-EP-7[-C])," January, 2009. Submitted to Dockets, 2/16/2009.

Scholl 2009—Jennifer Scholl, Senior Project Manager, CH2MHill, e-mail to Beverly E. Bastian, regarding previously disturbed areas at the Hanford Energy Park Peaker site, 3/18/09.

# LAND USE

**Testimony of Robert Fiore**

## INTRODUCTION

The Hanford Energy Park Peaker (HEPP) Project was certified by the Energy Commission in April 2001. The project was analyzed to assess land use planning and agricultural resource impacts pursuant to the California Environmental Quality Act (CEQA), CEQA Guidelines and compliance with applicable land use planning and agricultural laws, ordinances, regulations and standards (LORS). It was determined that the original HEPP did not result in land use planning and agricultural resource impacts and was in compliance with applicable land use planning and agricultural LORS, with the effective implementation of the Conditions of Certification.

The new GWF Hanford Combined Cycle Power Plant (GWF Hanford) facilities are proposed to be contained within the current project footprint. The project's construction laydown area would be located on lands previously used for construction laydown and construction parking. With the effective implementation of the additional Condition of Certification, **LAND-4**, the proposed project does not pose additional land use planning and agricultural resources impacts and would be in compliance with land use planning LORS.

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

LORS pertinent to the proposed petition and conversion are the City of Hanford's Municipal Code, Title 17, Zoning, and the Kings Industrial Park Performance and Development Standards.

LORS contained in **LAND USE Table 1** are applicable to the proposed power plant conversion because construction parking, facilities, buildings or structures would be constructed on the project site. Such facilities, buildings or structures must comply with the City's adopted development standards. The City of Hanford's Kings Industrial Park Performance and Development Standards require that a project comply with the City's Municipal Code, Title 17, Chapter 17.60, Site Plan Review procedures.

**LAND USE Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Applicable Law | Description |
|---|---|
| **Local** | |
| City of Hanford Municipal Code, Title 17, Zoning - Chapter 17.30.030 (C)(7), Permitted Uses and Section 17.30.080(D) | Heavy Industrial District (HI) - Electrical power plants and cogeneration facilities are permitted subject to applicable site plan review and CEQA procedure and do not utilize combustion of coal, coke, or agriculture biomass for the production of heat, steam, electricity or other forms of energy. |
| City of Hanford Municipal Code, Title 17, Zoning - Chapter 17.30.050, Development Standards | Land uses in the Kings Industrial Park are subject to the Performance and Development Standards. |
| City of Hanford Municipal Code, Title 17, Zoning - Chapter 17.60, Site Plan Review | Enables the Community Development Department to determine whether a proposed development is in conformity with the intent and provisions of this chapter and to guide the building official in the issuance of building permits. |
| Kings Industrial Park Performance and Development Standards III. B. Permitted Uses, Heavy Industrial Areas, (1)(A) | Cites the City's Municipal Code, Title 17, Chapter 17.60 for site plan review procedures in processing Kings Industrial Park permitted use applications. |
| Kings Industrial Park Performance and Development Standards Sections III, B. (2) A. Permitted Uses | Requires a full description of the proposed industrial operations together with engineering, scientific or other technical evidence to meet the standards. Requires site plan review procedures of the City's Municipal Code, Title 17, Chapter 17.60. Requires certification by an individual(s) with expert knowledge, experience and proven ability in the type of operation. |
| Kings Industrial Park Performance and Development Standards Section IV, Project Review Requirements | Requires site plan review procedures of the City's Municipal Code, Title 17, Chapter 17.60. Requires certification by an individual(s) with expert knowledge, experience and proven ability in the type of operation. |
| Kings Industrial Park Performance and Development Standards Section V, Performance Standards | Establishes criteria to measure impacts related to potential industrial nuisance, operational methods to control or eliminate potential hazards and to prevent arbitrary industrial exclusion. |
| Kings Industrial Park Performance and Development Standards Section VI, Property Development Standards | Establishes lot area, lot dimensions, population density, building heights, yards, lot coverage, fences and walls, off-street parking and loading requirements, access, signs, on-site drainage and general provisions and exceptions. |

## ANALYSIS

The spatial relationship between existing and planned land uses and the proposed location of the new facilities meet the intent and purposes of the Kings Industrial Park. Figure 1-2 of the GWF Petition for License Amendment illustrates the project site and proposed new facilities. The Petition for License Amendment, Section 3.6.1, Environmental Baseline Information, states "GWF Energy LLC owns the land proposed for GWF Hanford expansion, as well as the land adjacent to the west of GWF Hanford.

GWF Hanford will be located on APN 799-000-046." It further states in Section 3.2.1, Environmental Baseline Information, "the proposed project site is located entirely within the boundary of the existing HEPP (Figure 2-1) with the exception of the construction laydown and parking area. The temporary construction parking and laydown area will be located along the northern perimeter of the site, extending outside of the existing site [footprint] by approximately 200 feet. This area was previously used for construction laydown and parking and analyzed during the [Hanford Energy Park Small Power Plant Exemption (SPPE) project] (GWF 2000) and HEPP Emergency Permit licensing processes."

The project site is located in the City of Hanford and within the City's Kings Industrial Park. Kings Industrial Park is located on 1,100 acres within the southern portion of the City of Hanford. According to the Petition to Amend, the HEPP occupies 4.7 acres of a 10-acre parcel within the Kings Industrial Park. It is east of the intersection of S. 11$^{th}$ Ave. and Idaho Ave., is rectangular in shape and is bounded by Idaho Ave. on the south and Burlington Northern Sante Fe railroad on the east. New facilities and operations are not proposed to extend beyond the current boundaries of the 10-acre parcel. The Hanford city limit is located approximately 0.25 miles west of the project site.

Zoning for the project site is Heavy Industrial District (HI), consistent with the zoning for the Kings Industrial Park (KIP). Site design performance and development standards for the KIP were established to augment the zoning within the KIP to ensure land use compatibility. The KIP Performance and Developments Standards were last revised in December 2007. The proposed conversion and new facilities must comply with the KIP Performance and Development Standards. The KIP Performance and Development Standards ensure compatibility in types of land uses and consistency of the development pattern.

Compatibility and consistency between land uses is based on several spatial characteristics, such as planned land uses, zoning, scale, intensity, nuisance effects and use type. Surrounding land uses within 1 mile of the project site are provided in the **LAND USE Table 2**. Kings Industrial Park is not completely built out but has been developed with basic public infrastructure to spur further heavy industrial development. The KIP is planned for industrial uses and the proposed project facilities are compatible with existing and proposed surrounding land uses.

**LAND USE Table 2**
**Vicinity Land Use and Zoning**

| Parcel | City's General Plan Land Use | Zoning | Existing Uses |
|---|---|---|---|
| Subject Site | Heavy Industrial | HI | power plant |
| North | Heavy Industrial | HI | vacant, prepared for industrial use |
| East | Heavy Industrial | HI | railroad, industrial |
| South | Heavy Industrial | HI | industrial |
| West | Heavy Industrial | HI | vacant, prepared for industrial use |

Existing uses within the immediate vicinity of the project include tire manufacturing and food processing. Existing uses within the KIP and proposed project facilities are typical

of large-scale industrial buildings and structures. Existing project structures and the proposed conversion facilities are in various shapes, sizes and some are fairly tall. This is consistent with the development pattern in terms of existing and planned land uses, scale, intensity and nuisance occurring within the KIP.

## ENVIRONMENTAL EFFECTS

Environmental effects of the project pertaining to land use planning and agricultural resources are negligible since the proposed conversion does not involve additional lands beyond the project's 10 acre site, and the construction laydown area is proposed for lands previously disturbed as part of the construction for the emergency peaker.

A project may also generate a potentially significant environmental impact related to land use if it would introduce an unmitigated air quality, noise, public health hazard, or water supply effect on surrounding properties. See the **Air Quality**, **Noise**, **Visual Resources, Water Quality** and **Public Health** sections of this staff analysis for further discussion of potential project impacts and mitigation.

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

Local LORS applicable to the proposed project conversion include the City of Hanford Municipal Code Title 17 (Zoning) and the Kings Industrial Park (KIP) Performance and Development Standards. Title 17 references the Kings Industrial Park for performance and development standards affecting the proposed project conversion. LORS Compliance is summarized in **LAND USE Table 3**.

The site is planned (General Plan) and zoned (Municipal Code Title 17, Zoning) for Heavy Industrial. "Electrical power plant and cogeneration facilities meeting the fuel requirements of Title 17, Section 17.30.080 (D) of the Hanford Municipal Code" is a permitted use in this zone and district. The proposed conversion would not involve use of coal, coke or agricultural biomass in compliance with Title 17, Section 17.30.080 (D).

Kings Industrial Park was established in 1975 and is regulated by the KIP Performance and Development Standards. The performance standards consist of minimizing dangerous or objectionable elements and ensuring adequate property maintenance. As stated herein, most dangerous and objectionable elements are evaluated in other technical analyses as part of this Staff Assessment. Additionally, the KIP establishes development standards related to lot area, lot dimensions, population density, building height, yards/ setbacks, lot coverage, fences and walls, off-street parking and loading, access, signs and on-site drainage.

Staff's proposed new Condition of Certification **LAND-4** requires compliance with KIP Performance and Development Standards as follows:

> **Part VI, D.**
> Provides the means to determine the maximum heights for structures in the KIP. The height of structures is determined by the distance from the front property line to structure by applying a 1:1 ratio. If the front property line to structure is 35 feet, the

maximum height of structures is 35 feet. Exceptions include: roof structures for housing of elevators, stairways, tanks, ventilating fans, or similar equipment required to operate and maintain the building, and fire or parapet walls, skylights, flagpoles, chimneys, antennas, or similar structure may be erected above the height limitation ratio provided that such structures or equipment may be safely erected and maintained and the surrounding conditions and circumstances are taken into consideration.

**Part VI, E**.
Provides building setbacks and yards criteria for the KIP. Front setbacks are based on a 1:1 ratio, front property line to structure but no less than 20 feet, while rear and side setback requirements are 20 feet. Facilities must be constructed within the setback requirements. The petitioner submitted a diagram showing the front yard setback at 10 feet and no side or rear yard setbacks. It also illustrates the location of temporary construction laydown and construction parking but is unclear as to whether these facilities extend into the side or rear yard setback as established by the KIP Performance and Development Standards. According to the project owner, the area for temporary construction parking and laydown would occupy the former Emergency Peaker construction laydown and construction parking area.

**Part VI, G.**
Provides Floor Area Ratios (FAR) criteria for the KIP. FAR is the ratio of gross building permitted on the site divided by the total net area of the site. The FAR for developments within the KIP is 50 percent.

**Part VI, H.**
Provides fence and wall criteria within the KIP. Open storage of materials is permitted only within an area surrounded and screened by a solid wall or fence not less than 6’ in height. Fences above 6’ will be engineered for wind loading. No solid fences or walls shall be permitted within the front or side yards. No solid fence and wall shall be constructed to obstruct landscaping maintained within the area of a corner lot on the street side of a diagonal line connecting points located (30) feet along the property lines as measured from the intersection of the property line at the street corner.

**Part VI, I.**
Provides off-street parking and loading criteria for the KIP. This provision requires one off-street parking space for each employee for the maximum shift and one parking space for each truck operated by the facility. All parking areas are to be graded, surfaced and drained as required by the City Engineer. All parking areas shall be marked. Part VI, L requires the project to provide off-street loading.

**Part VI, K.**
Provides criteria for signs within the KIP. Any project signs for the project must be in compliance with the required measurement computations and permitted sign criteria

**Part VI, M.**
Provides on-site drainage criteria within the KIP. Storm and drainage water must be contained on-site. The drainage retention/ detention facility must be designed according to the criteria based on the new structures proposed for the project site.

## LAND USE Table 3
## Proposed Project's Conformance With
## LORS Applicable to Land Use and Agriculture Resources

| LORS | | Consistency Determination | Basis for Consistency |
|---|---|---|---|
| **Source** | **Policy and Strategy Descriptions** | | |
| **Local** | | | |
| City of Hanford Municipal Code , Title 17, Zoning - Chapter 17.30.030 (C)(7), Permitted Uses and Section 17.30.080(D) | Zoning District is HI. Enables KIP Performance and Development Standards | YES | Power plants are permitted uses in HI zoning districts. |
| City of Hanford Municipal Code , Title 17, Zoning - Chapter 17.30.050, Development Standards | Development Standards – refers to KIP Performance and Development Standards for development criteria | YES | COC's Land-4 ensures compliance with the KIP Performance and Development Standards. |
| City of Hanford Municipal Code , Title 17, Zoning - Chapter 17.60, Site Plan Review | Refers to KIP Performance and Development Standards for site plan review | YES | COC's Land-4 ensures compliance with the KIP Performance and Development Standards. |
| Kings Industrial Park Performance and Development Standards III. B. Heavy Industrial Areas, (1)(A) | KIP Heavy Industrial Areas Purpose | YES | KIP is set aside for intense industrial uses. |
| Kings Industrial Park Performance and Development Standards Sections III, B (2) A. Permitted Uses | KIP Permitted Uses | YES | Power plants are permitted uses in the KIP. |
| Kings Industrial Park Performance and Development Standards Section IV, Project Review Requirements | KIP requires Site Plan Review and cites the Zoning Section for site plan review procedures | YES | The proposed power plant conversion is reviewed for design and development compliance by CEC staff and the CBO. |
| Kings Industrial Park Performance and Development Standards Section V, Performance Standards, C. Dangerous and Objectionable Elements | Performance Standards for Noise, Vibration, Odors, Glare, Radioactivity or Electrical Disturbance, Toxic, Flammable and Explosive Hazards, Fire System Protection, Air Pollution, Liquid and Solid Wastes and Water Quality | YES | Please refer to the applicable sections in the Staff Assessment. |
| Kings Industrial Park Performance and Development Standards Section VI, Property | KIP establishes development standards related to; lot area, lot dimensions, population density, building height, yards/ setbacks, lot coverage, fences | YES | COC's Land-4 ensures compliance with the KIP Performance and Development Standards. |

| LORS | | Consistency Determination | Basis for Consistency |
|---|---|---|---|
| Source | Policy and Strategy Descriptions | | |
| Development Standards | and walls, off-street parking and loading, access, signs and on-site drainage. | | |

## CONCLUSIONS AND RECOMMENDATIONS

The proposed amendment to the Energy Commission's certification of the Hanford Energy Peaker Plant project, with the effective implementation of staff's proposed additional conditions of certification, would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to state and local land use planning, and would not generate a significant impact under the "Land Use Planning" and "Agricultural Resources" sections in the California Environmental Quality Act (CEQA) guidelines.

The proposed conversion must conform with applicable local LORS. Applicable LORS pertinent to the proposed conversion and new facilities are the City of Hanford's Municipal Code, Title 17, Zoning, and the Kings Industrial Park Performance and Development Standards.

The proposed power plant conversion is compatible and consistent with surrounding planned land uses and built uses. Compatibility and consistency is enhanced by the City of Hanford's site plan review process and conformance to the KIP Performance and Development Standards. The City of Hanford prepared a letter dated January 9, 2009, citing the KIP Performance and Development Standards and stated, "When a Site Plan Review Application is received, it [is] reviewed by Community Development staff and distributed for review by engineering, public works department, utilities, building division, fire department, and local agencies." Except for the exclusive authority of the Energy Commission, the City would conduct a site plan review and approval process. Staff's new proposed Condition of Certification **LAND-4** requires that the project conform to the KIP Performance and Development Standards, and includes review and comment by the City of Hanford.

During the review of the Petition to Amend, no land use planning and agricultural resource impacts, pursuant to the CEQA, were identified because no lands are proposed for a different use than what is currently occupying or occurring on the project site or for any other affected lands.

The project's land use impacts to surrounding property related to; air quality, noise, public health hazard, or water supply have been evaluated in the sections referenced below. For a more detailed discussion see the **Air Quality, Noise and Vibration, Public Health** and **Soil and Water Resources** sections in this Staff Assessment.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

**LAND-4** The project owner shall comply with performance standards for the HI Zoning District set forth in the City of Hanford's Municipal Code, Title 17, Zoning, and Kings Industrial Park Performance and Development Standards.

**Verification:** The project owner shall submit a site plan to the City of Hanford for review and comment. At least 60 days prior to the start of construction, the project owner shall provide evidence of review and any comments pertaining to the site plan by the City of Hanford to the Compliance Project Manager and Chief Building Official. Such evidence shall demonstrate that the project's new facilities, structures and buildings satisfy the Kings Industrial Park Performance and Development Standards, Part VI. D. through Part VI. M.

## REFERENCES


GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

CCR 2008 - California Code of Regulations, Title 14, Chapter 3 (Guidelines for CEQA), §§15000-15387, as amended July 27, 2007

CPRC 2008 - California Public Resources Code, §§21000-21178, as amended January 1, 2008

COH 2008 - City of Hanford Municipal Code , Title 17, Zoning

COH 2007 - Kings Industrial Park Performance and Development Standards, Revised December 2007

COH 2009 - City of Hanford Letter, dated January 9, 2009

HEP 2000 – Application for Small Power Plant Exemption (SPPE) Hanford Energy Park (HEP)

GWF 2009 – Project diagrams submitted April, 2009.

# NOISE AND VIBRATION

**Testimony of Shahab Khoshmashrab**

## INTRODUCTION

GWF Energy, LLC seeks approval to convert the Hanford Energy Park Peaker (HEPP) Project to a combined cycle power plant by adding a condensing steam turbine generator, two once-through steam generators with selective catalytic reduction and carbon monoxide catalyst, an air-cooled condenser (ACC), a water treatment skid, a step-up transformer and a circuit breaker; and by modifying existing water and drainage systems.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The Energy Commission Decision included eight conditions of certification relating to Noise and Vibration, **NOISE-1** through **NOISE-8**, all relating to the City of Hanford's noise ordinance.

The City of Hanford's noise requirements applicable to the original project would continue to apply to this amendment. These requirements have not changed since the approval of the original project.

## ANALYSIS

Staff's analysis associated with the original application has not changed as a result of the proposed modification. No new sensitive noise receptors have been identified in the project area since the approval of the original project. During project operation, the existing ambient noise levels at the nearest previously-identified residential receptors would increase slightly as a result of the above modifications, but would remain in compliance with the original conditions of certification relating to Noise and Vibration and the City of Hanford's applicable noise requirements.

Construction activities would increase the existing ambient noise levels at the nearest residential receptors, but due to the temporary nature of these activities and their limitation to the daytime hours, staff considers the impacts to be less than significant.

The eight conditions of certification included in the original Decision would still apply, with one change, as shown below in the Proposed Change to Conditions of Certification section.

## CONCLUSION AND RECOMMENDATION

The proposed modification from a simple cycle peaker to a combined cycle plant will not result in significant impacts on noise and vibration. Staff recommends approval of this request and proposes the following change to one existing condition of certification.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

No mitigation measures are required for Noise and Vibration beyond the requirements of Conditions of Certification **NOISE-1** and **NOISE-8** applicable to the Hanford Energy Park Peaker project.

The ACC is expected to have six cells. Each cell would consist of a heat exchanger and an electric fan (GWF Hanford 2008a, § 2.2.6). ACC fans are typically among the major sources of noise in a power plant. Condition of Certification **NOISE-1**, Verification requires a 25-hour community noise survey to be conducted within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity (see below). In order to ensure all of the six ACC fans are in operation at the time of the survey, a minimum of 90 percent of plant output would be required. **NOISE-1** should be revised thus:

**NOISE-1** The project shall be required to comply with applicable community noise standards.

**Verification:** Within 30 days of the project first achieving a sustained output of ~~80~~90 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, utilizing the same monitoring sites employed in the pre-project ambient noise survey as a minimum. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints. If the results from the survey indicate that the project noise levels at the closest sensitive receptor are in excess of 50 dBA between the hours of 10:00 p.m. and 7:00 a.m., additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

# PUBLIC HEALTH

Prepared by: Alvin Greenberg, Ph.D.

## INTRODUCTION

The Hanford Combined-Cycle Power Plant (GWF Hanford) project proposes to add combined-cycle capabilities to the existing simple-cycled Hanford Energy Park Peaker (HEPP) Project and increase its generating capacity by a nominal 25 MW. This analysis focuses only on the proposed changes that may affect the public health assessment. These include the now-specified 541 hours per year of start up and shutdown operations and the installation of a new diesel-fueled fire pump as part of project modifications. Staff's previous analysis, conducted under the California Environmental Quality Act (CEQA)-exempt 21-day licensing process in place at the time, was necessarily brief and did not include estimates of startup and shutdown operations, as such data were not available at the time of the analysis. These changes affect the estimate of emissions of toxic air contaminants (TACs), which could potentially create a negative impact on public health, and thus require that staff conduct a revised health risk assessment (HRA). The new stacks' height (a little over 91 feet) also influences the dispersion of TACs and therefore must be included in the revised HRA.

In addition to evaluating health effects from the potential increase in TAC emissions, demolition and construction impacts are also evaluated. The proposed GWF Hanford would involve the replacement of the two existing oxidation catalyst/selective catalytic reductions (SCR) systems and associated stacks with two new once through steam generators (OTSG) with associated stacks, a new steam turbine generator, a new air cooled condenser, new auxiliary equipment, and several modifications to the water piping system (GWF 2008a, Sections ES.3 and 3.1.2.1.1). Potential risks to public health during demolition and construction may be associated with exposure to toxic substances in contaminated soil disturbed during structure removal and site preparation, as well as emissions from construction traffic and 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.

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

There are no new LORS associated with this amendment not considered in staff's original analysis of the HEPP.

## ANALYSIS

The **Public Health** section of the staff assessment discusses TACs emitted from the project that the public could be exposed to during construction and routine operation. The HRA is used to determine if people might be exposed to those types of pollutants at unhealthy levels. 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).

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. 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. Staff assesses the significance of non-cancer health effects by calculating a *hazard index*. A hazard index (HI) is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the exposure is below the safe level.

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. Staff uses a cancer risk level of 10 in 1 million, or $10 \times 10^{-6}$ as a level of significance, a level consistent with those of most state air quality management districts.

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.

## CONSTRUCTION IMPACTS

The applicant stated that construction of GWF Hanford would have similar impacts to those assessed by the Energy Commission for the HEPP. Furthermore, the applicant notes that due to the newer technology present in current construction equipment and vehicle models, emissions would be reduced compared to those assessed for the HEPP (GWF 2008a, Section 3.8.2.1). The applicant did not provide a health risk assessment for the diesel emissions from demolition and construction activities, nor did it provide diesel particulate matter (DPM) emission factors for the equipment to be used. Staff reviewed the demolition/construction criteria pollutant and particulate matter emissions modeled by the applicant (GWF 2008a, Section 3.1.2.1.1) and considered the relatively short duration of the demolition/construction phase (15 months). However, DPM emissions need to be reviewed by staff in order to evaluate public health impacts. Therefore staff requested that DPM emission factors for construction activities in pounds per day and tons per year be provided (Data Request #7) and the project owner provided these emission factors in their response (GWF 2009a).

Atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by staff. The maximum annual DPM emission rate for onsite construction equipment and vehicles was provided in Data Response #7 (GWF 2009a) as 0.79 ton/year or 1,580 lbs/yr. The Hotspots Analysis and Reporting Program (HARP) model and screening met data were used and emissions were modeled as a volume source with vertical dimension of 19.7 feet, horizontal dimension of 228 feet and release height of 8 feet. The horizontal dimension is based on the assumption made by staff that active construction at any one time will occur on

25 percent of the 4.7 acres of the existing 10 acre GWF-owned parcel that is to be used for GWF Hanford (GWF 2008; section 3.1.2.1.1). The construction phase of the project conversion is expected to last 15 months.

The maximum predicted offsite concentration of diesel particulate matter is 0.85 ug/m$^3$ (about 100 m from the fenceline) and 0.81 ug/m$^3$ at the location of the point of maximum impacts (PMI) that was determined in the applicant's modeling. In staff's analysis, cancer risk due to diesel emissions was determined using HARP and adjusted by the exposure duration of 15 months of a 70 year lifetime (15 months/840 months = 0.018). Cancer risk at the location of the maximum offsite concentration was determined to be 4.9 in a million and at the location of the PMI determined in the AFC, to be 4.6 in a million. The procedure, assumptions, and results of this analysis are presented in **PUBLIC HEALTH Table 1**.

**PUBLIC HEALTH Table 1**
**Staff's Analysis of Construction Equipment Diesel Emissions and Risks**

| | |
|---|---|
| Annual DPM emissions during construction period: | 1,580 lb/yr |
| Maximum DPM concentration predicted off-site: | 0.85 ug/m$^3$ |
| Risk at location of maximum concentration: | 4.9 in a million |
| DPM concentration at PMI identified in the AFC: | 0.81 ug/m$^3$ |
| Risk at location of PMI: | 4.6 in a million |

Potential impacts from site disturbance would be mitigated by the applicant's proposed Condition of Certification **WASTE-2,** which requires an environmental professional to be available during soil excavation and grading to ensure proper handling and disposal of any contaminated soil that may be encountered (GWF 2008a, Attachment B). See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

## OPERATION IMPACTS

The applicant's health risk assessment prepared for the GWF Hanford project includes TACs emissions associated with the 8,000 hours of operation for which HEPP was originally licensed, the 541 hours of start-up and shutdown operations associated with the GWF Hanford amendment, and the new diesel-fired fire pump. The applicant's screening analysis was performed using the California Air Resources Board/ Office of Environmental Health Hazard Assessment (ARB/OEHHA) Hotspots Analysis and Reporting Program (HARP) in conjunction with the American Meteorological Society/EPA Regulatory Model (AERMOD) air dispersion model (GWF 2008a, Section 3.8.2.2).

The applicant's screening health risk assessment resulted in a maximum acute Hazard Index (HI) of 0.5 and a maximum chronic HI of 0.05 (GWF 2008a, Sections 3.8.2.2.1 and 3.8.2.2.2). Both acute and chronic hazard indices are less than 1.0, indicating that no short- or long-term adverse health effects are expected. The total worst-case individual cancer risk calculated by the applicant at the point of maximum impact (PMI) was 0.99 in 1 million, which is below the level of significance (GWF 2008a, Section 3.8.2.2.3). These results are summarized in **PUBLIC HEALTH Table 2.**

**PUBLIC HEALTH Table 2**
**Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment**

| Type of Hazard/Risk | Hazard Index/Risk at PMI | Significance Level | Significant? |
|---|---|---|---|
| **Acute Noncancer** | 0.5 | 1.0 | No |
| **Chronic Noncancer** | 0.05 | 1.0 | No |
| **Individual Cancer** | 0.99 in a million | 10.0 in a million | No |

Source: GWF 2008a, Section 3.8.2.2

Staff conducted a quantitative evaluation of the risk assessment results presented in the petition to amend the HEPP Project license for conversion to a combined-cycle facility. Emitting units include two natural gas-fired combustion turbines/once-through steam generators (OTSGs) and a diesel fire water pump, for a total of three emitting sources evaluated at the proposed facility.

Staff's quantitative analysis of facility operations included the following:

- Stack parameters, building parameters, emission rates and locations of sources were obtained from the amendment and modeling files provided by the applicant.
- Emissions from the two combustion turbine/once-through steam generator stacks and the diesel fire water pump were included in the analysis.
- A receptor grid of -1000 to 1000 m east and -1000 to 1000 m north, at 100 m increments was used.
- Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk.

Atmospheric dispersion modeling was conducted using the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a. Screening meteorological data was used, as local meteorological data compatible for use in the HARP ISCST analysis was not provided by the applicant. The emission factors used in staff's analysis of cancer risk and hazard were obtained from the AFC and are listed in **PUBLIC HEALTH Table 3**. For cancer risk calculations using the HARP model, staff used the "Derived(Adjusted)Method" and for chronic noncancer hazard staff used the "Derived(OEHHA)Method," The location of the point of maximum impact, PMI, determined in the applicant's modeling was quantitatively evaluated in staff's analysis (70 year residential scenario). Results of staff's analysis are summarized in **PUBLIC HEALTH Table 4** and are compared to the results presented in the petition to amend for GWF Hanford. Substance-specific risks are presented in **PUBLIC HEALTH Table 5** for the Point of Maximum Impact. Staff believes that the small differences between the applicant's and staff's calculated risks ($0.99 \times 10^{-6}$ compared to $1.9 \times 10^{-6}$) and the calculated acute hazard index (0.26 compared to 0.6) are due mostly to the air dispersion model used.

## PUBLIC HEALTH Table 3
## Emission Rates Used in the Cancer Risk and Hazard Analyses Conducted by Staff

| Substance | Annual Average Emissions (lbs/year) | Maximum 1-Hour Emissions (lbs/hour) |
|---|---|---|
| **EMISSION RATES FROM OPERATION OF EACH COMBUSTION TURBINE/OTSG** | | |
| Ammonia | 5.41E+04 | 6.30E+00 |
| Acetaldehyde | 5.34E+02 | 6.25E-02 |
| Acrolein | 7.36E+01 | 8.62E-03 |
| Benzene | 5.18E+01 | 6.06E-03 |
| 1,3-Butadiene | 4.95E-01 | 5.79E-05 |
| Ethylbenzene | 6.97E+01 | 8.16E-03 |
| Formaldehyde | 3.57E+03 | 4.18E-01 |
| Hexane | 1.01E+03 | 1.18E-01 |
| Naphthalene | 6.47E+00 | 7.57E-04 |
| PAHs | 5.45E-02 | 6.39E-06 |
| Propylene | 3.00E+03 | 3.52E-01 |
| Propylene Oxide | 1.86E+02 | 2.20E-02 |
| Toluene | 2.77E+02 | 3.24E-02 |
| Xylene | 1.02E+02 | 1.19E-02 |
| **EMISSION RATES FROM OPERATION OF DIESEL FIRE PUMP** | | |
| Diesel Exhaust PM | 3.96E+00 | - |
| Acetaldehyde | - | 1.76E-02 |
| Acrolein | - | 7.63E-04 |
| Benzene | - | 4.19E-03 |
| 1,3-Butadiene | - | 4.89E-03 |
| Ethylbenzene | - | 2.45E-04 |
| Formaldehyde | - | 3.88E-02 |
| Hexane | - | 6.05E-04 |
| Naphthalene | - | 4.43E-04 |
| PAHs | - | 1.26E-03 |
| Propylene | - | 1.05E-02 |
| Toluene | - | 2.37E-03 |
| Xylene | - | 9.54E-04 |
| Chlorobenzene | - | 4.50E-06 |
| Hydrogen chloride | - | 4.19E-03 |
| Arsenic | - | 3.60E-05 |
| Cadmium | - | 3.38E-05 |
| Total Chromium | - | 2.25E-06 |
| Hex Chromium | - | 9.23E-05 |
| Copper | - | 1.87E-04 |
| Lead | - | 6.98E-05 |
| Manganese | - | 4.50E-05 |
| Mercury | - | 8.78E-05 |
| Nickel | - | 4.95E-05 |
| Selenium | - | 5.04E-04 |
| Zinc | - | 5.00E-04 |

**Note that many of these values are expressed in scientific notation. As an example, a value of 5.1e-02 means 5.1 x 10^(-02) = 5.1 x 0.01 = 0.051**

**PUBLIC HEALTH Table 4**
**Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic Hazard**

| | Staff's Analysis | | | Applicant's Analysis | | |
|---|---|---|---|---|---|---|
| | Cancer Risk (per million) | Chronic HI | Acute HI | Cancer Risk (per million) | Chronic HI | Acute HI |
| PMI | 1.9 | 0.058 | 0.60 | 0.99 | 0.043 | 0.26 |

**PUBLIC HEALTH Table 5**
**Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI)**

| Substance | CTG 1 | CTG 2 | DIESEL FIRE PUMP | TOTAL |
|---|---|---|---|---|
| Acetaldehyde | 1.05E-08 | 2.13E-08 | | 3.19E-08 |
| Benzene | 1.02E-08 | 2.07E-08 | | 3.09E-08 |
| 1,3-Butadiene | 5.87E-10 | 1.19E-09 | | 1.77E-09 |
| Ethyl Benzene | 1.20E-09 | 2.42E-09 | | 3.62E-09 |
| Formaldehyde | 1.48E-07 | 3.00E-07 | | 4.48E-07 |
| Naphthalene | 1.53E-09 | 3.10E-09 | | 4.63E-09 |
| PAHs-w/o | 2.45E-08 | 4.95E-08 | | 7.40E-08 |
| Propylene Oxide | 4.78E-09 | 9.67E-09 | | 1.45E-08 |
| DieselExhPM | | | 1.24E-06 | 1.24E-06 |
| | | | | |
| TOTAL | 2.02E-07 | 4.08E-07 | 1.24E-06 | 1.85E-06 |

## CUMULATIVE IMPACTS

The applicant contacted the Hanford Community Development Department and the Kings County Planning Department for a list of projects that may contribute to a cumulative impact. According to the applicant, both agencies identified no projects within one mile of the GWF Hanford site that fit the criteria for potential cumulative impacts (GWF 2008a, Section 3.8.2.2.4). However, the applicant did not quantitatively assess the cumulative impacts of emissions from the proposed GWF Hanford amendment combined with emissions from the adjacent GWF Hanford LP power plant. These two emission sources would be very close to each other, within a few hundred feet, which significantly increases the chances of potential cumulative impacts. Staff requested that the applicant provide a cumulative health risk assessment for the combined emissions from the project modifications and the existing Hanford LP power plant (Data Request #6). The applicant provided a cumulative HRA (mistakenly labeled Data Response #7 in GWF Energy 2009b) that assessed the emissions from the existing fluidized bed combustor and diesel-fueled emergency generator. The risk found at the PMI by the applicant is $1.9 \times 10^{-6}$, a small increase in risk over what the applicant calculated for the proposed modification alone ($0.99 \times 10^{-6}$).

The applicant did not include emissions from the existing cooling tower and instead provided water chemistry data from the groundwater which serves as the source of the cooling tower water. Staff reviewed and evaluated the need for any further assessment of cooling tower emissions and determined the following:

1. A review of past risk assessments conducted by both staff and various applicants for other power plants show that the contribution to risk and hazard due to cooling tower emissions was negligible and range from $9 \times 10^{-8}$ down to $2 \times 10^{-10}$ in cancer risk and hazard indices less than 0.03.
2. The levels of contaminants measured in the groundwater at the Hanford site were low.
3. The level of inorganic arsenic (a carcinogen and very toxic to numerous organ systems) in the groundwater has been shown in other risk assessment addressing cooling tower emissions to not pose a significant risk or hazard to nearby workers or off-site public.

Therefore, staff concluded that the exclusion of the cooling tower in this cumulative heath risk assessment was justified. Staff also accepts the results of the applicant's cumulative health risk assessment and concludes that no significant cumulative risk or hazard would be posed by the simultaneous operation of the proposed power plant and the present power plant.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the potential public health risks associated with demolition/ construction and operation of the amended GWF Hanford project and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public from the project's toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed GWF Hanford uses a conservative (health-protective) methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the GWF Hanford would not contribute significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area. Staff also concludes that construction and operation of the GWF Hanford will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **Public Health**.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

None proposed.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

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GWF Energy (GWF Energy LLC/CH2MHILL). 2009a. Data Response Set 1. January.

GWF Energy (GWF Energy LLC/CH2MHILL). 2009b. Data Response set 2. February.

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# SOCIOECONOMIC RESOURCES
**Testimony of Hedy Koczwara**

## INTRODUCTION

The proposed amendment seeks to add combined-cycle capability to the existing 95 MW Hanford Energy Park Peaker (HEPP) Project through an amendment to the original project license. This analysis is based on the changes noted in the amendment petition compared to the original license, using data presented in staff's analysis of the HEPP application and Staff Assessment, as well as on the 2001 Small Power Plant Exemption (SPPE) application submitted by the project owner and later withdrawn in order to pursue a license under the Energy Commission's Emergency Peaker Program. The proposed amendment would entail 154 peak construction workers, compared to 129 workers as was presented in the 2001 SPPE application, an increase of about 19 percent. In addition, 14 new employees would be necessary to operate and maintain the proposed GWF Hanford facility. Construction is proposed to take place over a 15-month construction period from February 2011 through April 2012.

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

**SOCIOECONOMICS Table 1**
**Laws, Ordinances, Regulations, and Standards**

| Applicable Law | Description |
|---|---|
| **FEDERAL** | |
| **Executive Order 12898 (*Federal Register*, Vol. 59, No. 32, February 11, 1994)** | 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 agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. |
| **STATE** | |
| **California Environmental Quality Act (CEQA) Title 14 of the California Code of Regulations, Chapter 3, Guidelines for Implementation of the California Environmental Quality Act,** | Socioeconomic impacts are limited to those that could be considered direct effects on the environment, such as changes to population and housing, and that are separate from strictly economic impacts, such as a loss of revenue. |
| **California Government Code, section 65040.12 (c)** | Section 65040.12 (c) defines "environmental justice" to mean "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." |

| Applicable Law | Description |
|---|---|
| **California Education Code, section 17620** | Authorizes the governing board of any school district 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** | Provides for school district levies against development projects. As amended by SB 50 (Green, Chapter 407, section 23, Statutes of 1998), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities. |

## SETTING

The HEPP is located in the southern portion of the City of Hanford in Kings County on a 4.7-acre site within the existing GWF-owned 10-acre parcel. Because workers may commute from Kings, Fresno, Tulare, and Kern Counties, the four-county area is the affected area for socioeconomics for the proposed GWF Hanford Combined Cycle Power Plant and considered by staff.

## DEMOGRAPHIC SCREENING

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project amendment site. The demographic screening process is conducted based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (Council on Environmental Quality 1998). The screening process relies on Year 2000 U.S. Census data to determine levels of minority and below-poverty-level populations.

## MINORITY POPULATIONS

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is:

- Greater than 50 percent;
- Meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis; or
- When one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50 percent.

For the GWF Hanford project, the total population within the six-mile radius of the proposed site is 46,382 persons, and the total minority population is 24,629 persons or 53.10 percent of the total population (see **SOCIOECONOMICS Figure 1**). Therefore, staff in several technical areas considered environmental justice in their environmental impact analyses. Those areas containing such analysis are identified in the **Executive Summary**.

## BELOW-POVERTY-LEVEL POPULATIONS

Staff has also identified the current below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. The below-poverty-level population within a six-mile radius of the GWF Hanford Project consists of 9,275 people or 20.84 percent of the total population in that six-mile radius.

# ANALYSIS

## 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 GWF Hanford project socioeconomic section in the Petition for License Amendment and other socioeconomic data. Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations, and its own independent analysis. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are identified in the Reliability, and Soil 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.

## ENVIRONMENTAL IMPACTS

### Population and Employment

The proposed amendment indicates that the construction workforce will peak at approximately 154 workers and once operational, the plant will require 14 additional workers. The workforce is expected to come from Kings, Fresno, Tulare, and Kern Counties, with the majority from outside of Kings County.

As is demonstrated in **SOCIOECONOMICS Table 2**, occupational employment statistics from the California Employment Development Department (EDD) show that the labor force in Kings, Kern, Tulare, and Fresno Counties for skilled occupations associated with power plant construction totaled an estimated 26,680 workers in the first

quarter of 2008 (EDD 2008a). In November 2008, the overall unemployment rate in the counties of Kings (11.4 percent), Fresno (12.1 percent), Tulare (12.5 percent), and Kern (10.4 percent) averaged 11.6 percent (EDD 2008b).

**SOCIOECONOMICS Table 2**
**Occupational Employment Statistics: Labor Force by Skill (First Quarter 2008) and GWF Hanford Workforce Required by Skill for Peak Month**

| Trade | Kings County (Hanford-Corcoran MSA) | Kern County (Bakersfield MSA) | Fresno County (Fresno MSA) | Tulare County (Visalia-Porterville MSA) | Peak Month Workforce Required by Skill |
|---|---|---|---|---|---|
| Boilermaker (SOC Code* 51-8021) | SOC code not listed | 50 | 90 | SOC code not listed | 4 |
| Carpenter (SOC Code* 47-2031) | SOC code not listed | 1,840 | 2,960 | 790 | 5 |
| Electrician (SOC Code* 47-2111) | 80 | 2,050 | 1,400 | 480 | 30 |
| Laborer (SOC Code* 47-2061) | 160 | 3,860 | 3,230 | 940 | 10 |
| Pipefitter/ Sprinklerfitter (SOC Code* 47-2152) | 70 | 1,150 | 940 | 280 | 36 |
| Painter/Insulator (SOC Code* 47-2141) | 80 | 560 | 990 | 230 | 6 |
| Bricklayer/Mason (SOC Code* 47-2021) | SOC code listed** | 160 | 310 | 50 | 2 |
| Operating Engineers (SOC Code* 47-2073) | 230 | 1,250 | 770 | 380 | 6 |
| Millwrights (SOC Code* 49-9044) | SOC code not listed | 120 | SOC code not listed | SOC code not listed | 15 |
| Ironworkers (SOC Code* 47-2221) | SOC code not listed | SOC code listed** | 70 | 30 | 15 |
| Other staff, teamsters, and indirect craft | - | - | - | - | 57 |

* Standard Occupational Classification (SOC) code for U.S. Department of Labor. Codes correlate to the craft/skill noted in this table.

** The SOC code was listed in the EDD Labor Market Information data; however, EDD stated that an estimate of employment could not be provided.

Construction is proposed to take place over a 15-month period, from February 2011 through April 2012. Although several of the occupations, such as millwrights and ironworkers, have a limited number of known estimated workers, this would not be seen as significant, as this demand would be for a relatively short period of time, and many of the skilled construction workers typically travel from job site to job site during the construction season. The applicant has not stated how many workers for each occupation would be required; however the overall peak workforce of 154 worker is relatively small. Based on the number of available workers in the four counties as listed in **SOCIOECONOMICS Table 2,** staff concurs with the applicant that an adequate supply of workers is available to construct the combined-cycle plant.

According to the Hanford Community Development Department and Kings County Planning Department, there are no proposed or foreseeable developments planned within one mile of the project site (GWF 2008). However, an expansion of the Leprino Foods Company facility, which is the largest mozzarella cheese plant in the United States, is currently underway. The facility is located approximately 8.5 miles west-northwest of the GWF Hanford site in Lemoore (Salyer 2009). Because the expansion is expected to be completed prior to construction of GWF Hanford and construction of food processing and distribution facilities require a portion of the workforce to be specialized, the number of available workers would not be adversely affected. Also underway is the construction of the New Hanford Hospital, which has added approximately 200 local jobs during its construction (Adventist Health 2009). The new hospital is expected to be completed in 2010 prior to the start of GWF Hanford project construction; consequently, the demand for labor by the two projects would not overlap.

In addition, the Henrietta Peaker Plant (01-AFC-18) is located approximately 14 miles west of the site. This plant, also owned by GWF, is also being reviewed for conversion to a combined-cycle plant by the California Energy Commission. The construction schedule for GWF Henrietta, with its expected peak workforce of 157 workers, is expected to coincide with construction of GWF Hanford. Because both projects are proposed by the same applicant and their construction timelines are similar, it is possible that a similar workforce would be employed and the construction schedules would be coordinated. Regardless, there are enough workers in the four-county area that the project modifications would not result in any problems with labor availability for other construction projects.

## Housing

The Kings County 2006 population was estimated to be approximately 149,758 with 39,128 household (CDF 2006). According to the 2006 California Department of Finance data, there were an estimated 2,314 vacant housing units with a 5.7 percent vacancy rate (CDF 2006). Even with the workforce of 154 construction workers and 14 new permanent employees, if all 168 workers were to relocate to Kings County, this would comprise only 0.4 percent of the total households and 0.1 of the estimated population base in the county.

However, most construction workers would commute daily and/or would reside in motels during the workweek and return home on weekends. In the area in and around the City of Hanford, rentals for one- and two-bedroom apartments and duplexes range from $350 to $650 per month, and houses range from $400 to $850 per month. There are also five mobile home parks, eight motels, and one inn for a total of 285 rooms in the Hanford community area. In addition, the City of Lemoore, approximately 10 miles to the west of Hanford, has four mobile home parks and three motels with a total of 203 rooms. The City of Corcoran, less than 20 miles south of Hanford, has three mobile home parks and two motels with 40 total rooms in the community area. (Kings County EDC 2006). As a result, the proposed upgrade to a combined-cycle plant would result in a minimal impact on housing supply and/or room availability.

## Fiscal and Non-Fiscal Impacts

The proposed amendment would result in an increase in the economic benefits of the project because of its contribution to local employment and taxes, in terms of local

purchases both during construction and operation. The GWF Hanford project has a projected construction cost of $90 million, of which $23.5 million would be paid out as wages and salaries, including benefits (GWF 2008).

Sales tax revenues for Kings County would increase as a result of construction and operation of the proposed project and due to increased retail sales in the area (that is, gas, food, and lodging from construction and operation worker purchases and from supplies purchased locally). Beyond just Kings County, employment of construction personnel would be beneficial to local businesses and the regional economy through increased expenditure of wages for goods and services in the four-county area.

Although most of the major equipment for the project would be purchased outside Kings County for installation at the project site, about $1.5 million worth of project construction-related materials would be purchased within Kings County (GWF 2008). Kings County's sales tax rate is 7.25 percent, thus, the GWF Hanford project would generate approximately $108,750 in sales tax revenue to the State of California. Most of this revenue ($93,750) would go to the State of California. An estimated $11,250 would be retained locally and $3,750 would be distributed to the Transportation Fund (GWF 2008).

Although 5.3 acres of temporary construction disturbance would occur outside of the existing plant fence line, all of the new permanent project components and modifications associated with the license amendment would be within the existing HEPP and Hanford LP developed footprint. Therefore, no impact mitigation fees would be required at the local level as a result of the proposed amendment (Kochar 2009).

The proposed GWF Hanford project is expected to also bring increased property tax revenue to the City of Hanford. The general tax levy for Kings County is 1.0 percent of the assessed value of the property by the California State Board of Equalization. Assuming that the assessed property tax value of the project would increase by the value of the construction costs ($90 million), the increase in property tax value is estimated to yield approximately $900,000 in local property tax revenues to the City of Hanford annually (GWF 2008). Because the property taxes are collected at the city level, their disbursement also occurs at the city level.

A summary of the data and fiscal information is included in **SOCIOECONOMICS Table 3** below.

**SOCIOECONOMICS Table 3**
**Fiscal, Non-Fiscal, and Demographic Data and Information**

| **Total Project Capital Costs** | **$90 million** |
|---|---|
| Payroll (construction)* | $23.5 million for 15 months (2008 dollars) |
| Estimate of Regionally Purchased Equipment and Materials | $1.5 million |
| Estimated Sales Tax | $108,750 (Total)<br>$93,750 (State of California)<br>$11,250 (Local)<br>$3,750 (Transportation Fund) |
| Estimated School Impact Fee | None required |
| Estimated Annual Property Taxes | $900,000 |
| Direct Employment | |
| Construction (peak) | 154 jobs |
| Operation | 14 employees |
| Secondary Employment | Not estimated |
| Direct and Secondary Income | Not estimated |
| Average Unemployment Rates (November 2008, not seasonally adjusted) | Kings County – 11.4 percent<br>Fresno County – 12.1 percent<br>Kern County – 10.4 percent<br>Tulare County – 12.5 percent |
| Percent Minority Population (6-mile radius) | 53.10 percent based on the 2000 Census. |
| Percent Poverty Population (6-mile radius) | 20.84 percent based on the 2000 Census. |

Source: GWF 2008; EED 2008b; Kochar 2009; US Census 2000.
* Operational payroll has not been estimated.

## Public Services

### Education

The project site is located within the boundaries of the Hanford Elementary School District and the Hanford Joint Union High School District. This elementary district is comprised of 11 elementary, middle and community day schools. The Hanford Joint Union High School District (HJUHSD) has two high schools, two continuation schools, and one community day school (CDOE 2009). During construction, most of the labor force would commute daily from within a two-hour drive from Kings, Kern, Fresno, and Tulare Counties. Hence, the impact on local schools would be minimal.

For operation of GWF Hanford, 14 new employees are expected to be hired. A worst-case scenario, using an average family size of three persons per household, would result in the addition of 14 school children to the Hanford Elementary School District (enrollment 5,449 children) and HJUHSD (enrollment 3,873 children). This would result in an increase of less than 1 percent using 2007–2008 enrollments for the two districts (CDOE 2009).

Education Code section 17620 states that school districts are authorized to levy a fee, charge, dedication, or other requirement for new development for the purpose of funding the construction or reconstruction of school facilities. Although 5.3 acres of temporary construction disturbance would occur outside of the existing plant fence line, all of the new permanent project components and modifications associated with the

license amendment would be within the existing HEPP and Hanford LP developed footprint. Therefore, no school fees would be required with the proposed license amendment (Kochar 2009).

## Law Enforcement

*Hanford Police Department.* The Hanford Police Department (HPD) serves the City of Hanford. Currently, the department has a staff of 71 personnel, including 49 sworn officers and 22 non-sworn personnel (HPD 2009). The HPD station closest to the proposed project site is located at 425 North Irwin Street, approximately 5.4 miles to the north of the GWF Hanford site. The average dispatch time within the city in the second half of 2008 was one minute and 51 seconds. Although the HPD does not track average arrival times, the response time to the project site for a life-or-death "priority one" emergency would likely be 5 to 7 minutes depending on officer location and availability (Lopez 2009).

*Kings County Sheriff's Department.* The Kings County Sheriff's Department (KCSD) provides law enforcement services to the county, serves as the public administrator and county coroner, and operates the county jail in Hanford. The KCSD has 249 employees (including 20 reserve officers) and 148 sworn officers (Leist 2009). The KCSD, which is based out of its Hanford headquarters at 1444 W. Lacey Boulevard approximately 5.2 miles north of the project site, has mutual-aid agreements statewide and could assist the HPD if necessary.

*California Highway Patrol, Central Division*. The California Highway Patrol (CHP), Central Division is based in Fresno, but has an area office in Hanford (1565 Glendale Avenue), approximately 5.3 miles north-northwest of the project site. The CHP Central Division has 667 Uniformed Officers and 226 Non-Uniformed Personnel (CHP 2009).

Because of the on-site security during construction and operation and other safety procedures described in the Worker Safety and Health section of the Petition for License Amendment 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 GWF Hanford project during construction and operation.

## Medical Services

The project site would be served by both the Hanford Fire Department (HFD), located at 315 North Douty Street, and the Kings County Fire Department (KCFD), which is headquartered at 280 North Campus Drive in the City of Hanford and has 10 fire stations and one supply center countywide. KCFD has 61 paid professionals and 100 volunteer firefighters (KCFD 2009). The Hanford Fire Department would be the first responder. The average response time to the project site (over 3 years) has been 6 minutes and 19 second minutes (Brotemarkle 2009). The KCFD through a mutual aid agreement would provide assistance if necessary.

American Ambulance is the sole 9-1-1 paramedic ambulance provider within Fresno and Kings Counties. The closest ambulance and staff to the site are stationed at American Ambulance's Kings County headquarters in the City of Hanford at 910 Garner Avenue (AA 2009). The project site is considered to be within a rural response zone,

and so the response time could be up to 20 minutes, however, it would likely be closer to 8 to 10 minutes to the project site (Giannone 2009).

Hanford currently has two main hospitals: Central Valley General Hospital, located at 1025 N. Douty Street with 49 acute care beds; and Adventist Health's Hanford Community Medical Center, located at 450 N. Greenfield Avenue with a 10-bed Intensive Care Unit, a 15-bed Emergency Department and a 56-bed Medical/Surgical Unit (Adventist Health 2009).

Construction of the New Hanford Hospital, a 142-bed medical center, started in September 2007 at Seventh Street and Mall Drive in Hanford (approximately 5.5 miles north of the project site). Services from Adventist Health's Hanford Community Medical Center and Central Valley General Hospital will move to the new site once it is complete (Adventist Health 2009). Construction of the New Hanford Hospital is expected to be completed in 2010 prior to the start of the proposed GWF Hanford construction, and thus it is assumed that the New Hanford Hospital would be the closest medical facility to the project site during construction and operation.

Because of the on-site security during construction and operation and other safety procedures described in the Worker Safety and Health section of the applicant's petition to amend, staff concludes that that the emergency medical services resources would be adequate to meet the needs of GWF Hanford during construction and operation.

### Parks and Recreation

According to the City of Hanford Public Works, Parks Division, the city of Hanford boasts 156.5 acres of parks, landscaped median islands, well sites and other landscaped areas (HDPW 2007). The six parks within the City of Hanford itself include: Cob Park, Civic Center Park, Hidden Valley Park, Kings County Fairgrounds, Earl Johnson Park, and Lacy Park.

Staff does not expect the construction or operation workforces to have a significant adverse impact on parks and recreation because of the number and variety of parks within the regional project area. In addition, construction workers are unlikely to bring their families to a work site, and therefore, impact existing park services.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has reviewed the amendment petition in relation to the HEPP Staff Assessment published by the Energy Commission on May 4, 2001; the Petition for License Amendment submitted by GWF on October 1, 2008; and the Final Decision adopted by the Energy Commission on April 26, 2001. The May 4, 2001, staff assessment does not include a socioeconomics discussion and, as a result, no socioeconomic LORS or conditions of certification were included in the certification process.

Staff conducted its own independent socioeconomic analysis of the Petition for License Amendment for GWF Hanford and concludes that the changes resulting from the proposed amendment would not result in a significant adverse direct or cumulative impact on schools, housing, law enforcement, emergency services, hospitals, employment, or public services and utilities, including recreational facilities.

Staff also concludes that the project would have a positive socioeconomic impact on the project area of the counties of Kings, Fresno, Tulare, and Kern, as well as to the City of Hanford in Kings County. Benefits of the project include economic benefits resulting from increased employment in the four-county area during the construction and operation of the plant. Of the $90 million projected construction cost, the applicant estimates that $23.5 million would be paid out as wages and salaries, including benefits (GWF 2008). In addition, fiscal benefits also include approximately $108,750 in sales taxes, and approximately $900,000 in annual property taxes collected by the City of Hanford and disbursed at the city level (GWF 2008).

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff has proposed no Socioeconomic Conditions of Certification.

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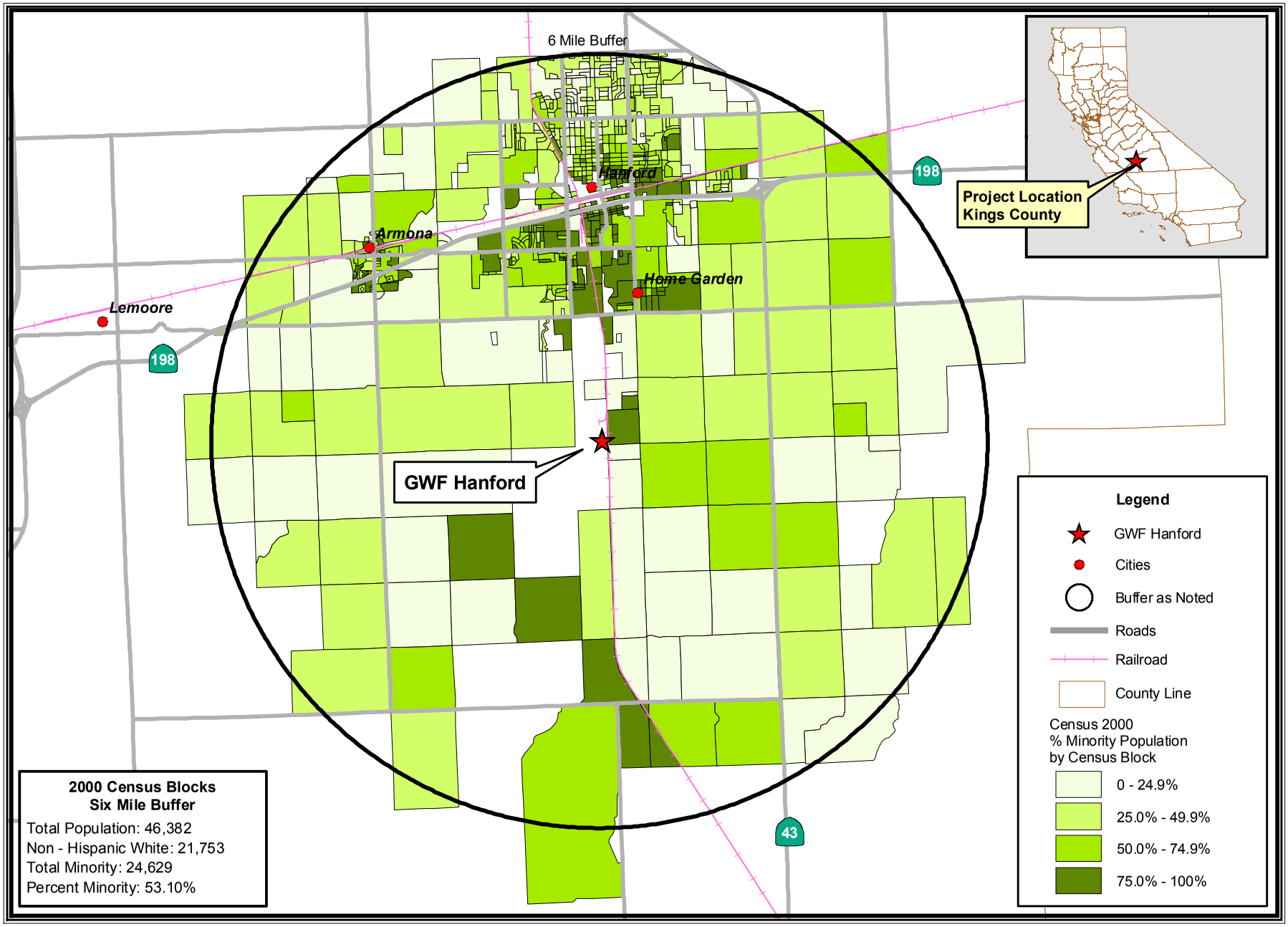
**SOCIOECONOMICS - FIGURE 1**

GWF Hanford Project - Census 2000 Minority Population by Census Block - Six Mile Buffer






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

SOURCE: California Energy Commission Statewide Power Plant Maps 2008 - Census 2000 PL 94-171 Data - Matrix PL2

# SOIL AND WATER RESOURCES

Testimony of Mark Lindley, P.E.

## INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction and/or operation of the GWF Hanford Combined Cycle Power Plant (GWF Hanford). The analysis specifically focuses on the potential for the project to cause impacts in the following areas:

- Whether the project's use of groundwater, mitigated through banking of surface water, would cause a significant, or potentially significant, adverse change in the quantity or quality of groundwater or surface water.
- Whether project construction or operation would lead to degradation of surface or groundwater quality.
- Whether construction or operation would lead to accelerated wind or water erosion and sedimentation.
- Whether the project would increase flood hazards in the vicinity of the project.
- Whether the project would comply with all applicable laws, ordinances, regulations and standards.

The existing Hanford Energy Park Peaker (HEPP) plant is permitted for maximum water use of 103 acre-feet per year (afy) primarily for evaporative cooling, combustion turbine generator (CTG) injection, $NO_x$ emission control, and power augmentation (CEC, 2001). Water is currently supplied by groundwater pumped from an existing water supply well at the facility. In 2008, HEPP used about 14.9 acre-feet over 1,087 total operating hours for both turbine generators, which was the highest annual water use on record for the project (GWF, 2009a). Groundwater use is mitigated through a banking agreement with the Kings County Water District that allows for the transfer of surface water entitlement from the Angiola Water District to the Kings County Water District to offset groundwater pumping for local agricultural uses in the vicinity of the project site. The 2001 Energy Commission Decision requires mitigation of groundwater use at a ratio of 1.76:1 (CEC, 2001).

The proposed project, GWF Hanford, includes conversion of the existing HEPP from a simple-cycle plant to combined-cycle operation by adding two Once-Through Steam Generators (OTSGs) and a 25-MW steam turbine, increasing net generation from the facility to 120 MW without increasing fuel use. GWF also proposes to install an air-cooled condenser (ACC) to allow use of dry cooling at the converted plant, as well as a wet-surface air cooler (WSAC) for lube-oil cooling. GWF proposes to increase the maximum permitted water use at the plant to 111 afy, to provide makeup water for the OTSGs and cooling water for the WSAC. This represents an increase of 96 afy as compared to the "as operated" water use for 2008.

GWF Hanford proposes to replace selective-catalytic reduction and oxidation catalyst systems at the Hanford plant with updated equipment to meet present standards. This proposed modification would require changes to the site layout concerning location of

some structures, and expansion of the stormwater retention basin, but it will not add to the fenced area of the present project site.

The primary modifications related to Soil and Water Resources that are associated with the proposed GWF Hanford amendment include:

- Increase in the permitted maximum water consumption of approximately 8 afy for the OTSG's feed water makeup and the lube oil cooler makeup;
- Addition of a new water treatment skid for boiler makeup water;
- Modification of the wastewater treatment system to optimize water supply requirements and minimize off-site wastewater disposal;
- Modifications to the storm water drainage collection systems;
- Expansion of the existing storm water retention basin for storm water management;
- Temporary disturbance associated with about 5.2 acres for construction laydown;
- Addition of an ACC for system heat rejection; and
- Use of a WSAC for steam turbine lube-oil cooling when temperatures exceed 88 °F.

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

The applicable laws, ordinances, regulations, and standards that pertain to soil and water resources are presented in the following table.

**SOIL & WATER RESOURCES Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| Federal LORS | |
|---|---|
| Clean Water Act (33 U.S.C. Section 1251 et seq.) | The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of stormwater and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. |
| Resource Conservation and Recovery Act | The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes. |
| National Resources Conservation Service (NRCS), National Engineering Handbook, Sections 2 and 3 (1983) | Sections 2 and 3 of the USDA-NRCS National Engineering Handbook (1983) provide standards for soil conservation and erosion prevention during construction activity. |
| **State LORS** | |
| 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. |

| | |
|---|---|
| The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq. | Requires the 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.<br>Requirements specifying conditions regarding the construction, operation, monitoring and closure of waste disposal sites, including injection wells and evaporation ponds for waste disposal. |
| California Water Code (CWC) Section 13550 | CWC Section 13550 requires the use of reclaimed water for industrial purposes subject to reclaimed water being available and meeting certain conditions such as the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, and the use is not detrimental to public health. |
| California Water Code (CWC) Section 13552.6 | CWC Section 13552.6 prohibits the use of domestic water for cooling towers if suitable recycled water is available. |
| Recycling Act of 1991 (Water Code § 13575 et esq.) | The Water Recycling Act of 1991 encourages the use of recycled water for certain uses and establishes standards for the development and implementation of recycled water programs. |
| California Code of Regulations, Title 22 | Title 22, Division 4, Chapter 15, requires the California Department of Public Health (DPH) to review and approve the wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of recycled water for industrial processes such as steam production and cooling water. DPH also specifies Secondary Drinking Water Standards in terms of Consumer Acceptance Contaminant Levels, including TDS ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. |
| 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 Code of Regulations, Title 23 | Title 23, Division 3, Chapter 15, requires the RWQCB to issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable. |
| The California Safe Drinking Water and Toxic Enforcement Act | This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act. |
| **Local LORS** | |
| Kings County Well Ordinance | Provides requirements for well construction for the protection of groundwater quality in the county. |
| Kings County General Plan – Resource Conservation Element | Sets forth policies that address the protection of soil and prime agricultural farmland.<br>Soil resource policies, which are intended to maintain agricultural productivity, are administered largely by the Resource Conservation District rather than by Kings County.<br>http://www.countyofkings.com/planning/Plan/GeneralPlan/05genplanresourceconsevationelement.pdf |
| City of Hanford Municipal Code Chapter 13.08 | Requires industrial discharges to the City of Hanford sewer system and waste water treatment plant meet the water quality limits set forth in the waste discharge conditions in the City of Hanford's NPDES permit.<br>http://www.ci.hanford.ca.us/Miscellaneous%20Posted%20Files/General%20Plan/Open%20Space%20Element.pdf |

| State Policies and Guidance | |
|---|---|
| State Water Resources Control Board (SWRCB) Res. 09-11 | State Water Resources Control Board Resolution 09-11 encourages and promotes recycled water to replace the use of potable water use for non-potable purposes. The policy supports the sustainable use of surface water and groundwater and encourages the use of recycled water where this water is not being put to other beneficial uses. The policy provides for a streamlined permitting process for recycled water use with local Regional Water Quality Control Boards. |
| SWRCB Resolutions 75-58 and 88-63 | The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of 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. Resolution 75-58 defines brackish waters as "all waters with a salinity range of 1,000 to 30,000 mg/l" and fresh inland waters as those "which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife". In a May 23, 2002 letter from the Chairman of the SWRCB to Energy Commission Commissioners, the principal of the policy was confirmed 'that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities'.<br><br>Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/L for it not to be considered suitable, or potentially suitable, for municipal or domestic water supply. |
| Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq) | In the 2003 IEPR, consistent with SWRCB Policy 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." Additionally, the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be "environmentally undesirable" or "economically unsound". |

# ANALYSIS

## SETTING

GWF Hanford is located on the southwest quarter of Section 13, Township 19 South, Range 21 East at about 242 feet above mean sea level (MSL). The project site is in northeastern Kings County within the City of Hanford, approximately 30 miles south of Fresno, California. The site is about 4 miles south of the center of the City of Hanford located north of Idaho Avenue, between the existing GWF HEPP to the west and the Burlington Northern & Santa Fe Railway tracks to the east.

## REGIONAL WATER RESOURCES

The GWF Hanford site is located in the south central portion of the Central Valley (or San Joaquin Valley) of California. The Central Valley is a broad, flat valley over 450 miles long and up to 100 miles wide, bounded by the Sierra Nevada range to the west, the Coast range to the east, the Tehachapi Mountains to the south, and the Klamath and Cascade ranges to the north.

The site is set on alluvial fan deposits associated with the Kings River, which is located about 9 miles north of the site. Historically, the area supported shallow, meandering sloughs and creeks draining the foothills and Sierra Nevada Mountains to the west. The major rivers that flow into the southern end of the San Joaquin Valley, including the south fork of the Kings River, Kaweah River, and Tule River, discharge to the Tulare Lake Bed, though during the growing season almost all the water in these rivers is used for irrigation, with only the tailwater flowing into the Tulare Lake Bed. The Tulare Lake Bed does not have an external drainage.

The State Water Project diverts water from the Kings River at the Pine Flat Dam east of State Route 99, upriver from the location of the river fork. The Kings River North Fork flows towards the San Joaquin River; however, the State Water Controller only directs flows to the North Fork during seasonal flood releases. The majority of flows in the Kings River are routed to the Kings River South Fork and into a series of irrigation ditches and canals for agricultural uses in the southern San Joaquin Valley. In the vicinity of the project site, the Lake Side Ditch routes irrigation water from the Kings River to agricultural users and routes stormwater to the groundwater recharge basins operated by the Kings County Water District.

Within Kings County, surface flows and groundwater provide water supply for domestic, agricultural and industrial uses. Total water use in the county is estimated to be about 1.4 million afy (GWF, 2000). About one third of the total county water supply is provided by groundwater, with the remainder from the Kings River and State Water Project (GWF SPPE, 2000).

## CLIMATE

The climate in the Hanford area is Mediterranean-subtropical and is considered warm desert, with mild winters and dry summers. Rainfall occurs primarily in the winter months between October and May, and average annual rainfall is 8.2 inches (GWF, 2000). Summers are hot and dry with average high temperatures in the mid to upper 90's in July and August. The winters tend to be foggy and cool, with average highs in the 50's and average lows in the 30's. Average pan evaporation in the Hanford area is 79 inches per year as measured at the Corcoran El Rio station (RWQCB, 2007).

## GROUNDWATER

The GWF Hanford site is located in the Tulare Lake groundwater basin, which has a surface area of approximately 525,000 acres and a storage capacity of about 1,500,000 acre-feet (GWF SPPE, 2000). Groundwater pumping in the basin is primarily for agricultural uses. Average annual groundwater pumping is about 648,000 afy, with about 24,000 afy pumped for urban and industrial uses and the remainder for agricultural uses (GWF SPPE, 2000).

The California Department of Water Resources (DWR) has determined that the Tulare Lake groundwater basin is currently experiencing critical over-draft conditions. The DWR estimates that pumping is about 229,000 afy beyond the estimated safe yield of the aquifer (GWF SPPE, 2000). To address the existing over-draft conditions, numerous irrigation districts, water agencies, and cities in the Kings River area are cooperating with State agencies including California Department of Fish & Game and DWR on groundwater management efforts. Beginning in the 1930's, irrigation districts

established percolation basins to help recharge groundwater storage. Since then, the efforts have been expanded to include up to 3,800 acres of recharge ponds with a capacity to recharge up to 87,000 afy in addition to the recharge provided by several thousand miles of unlined canals (ACWA, 2004). In the vicinity of the project site, the Kings County Water District operates the Apex Conjunctive Use Project, which uses recharge ponds to bank off-peak sources of water to be used during the dry summer months.

The aquifer system in the vicinity of the GWF Hanford site consists of an upper and lower aquifer. The Corcoran Clay layer, a 50 to 100 feet thick silty, diatomaceous clay layer with low permeability, separates the upper and lower aquifer at about 450 feet below ground surface (GWF, 2000). The upper aquifer includes interbedded sands and clays under confined to semi confined conditions. The lower aquifer also consists of interbedded sands and clays. There are up to six distinct clay beds in the region that were deposited in a lake that once occupied the San Joaquin Valley; however, the Corcoran Clay is the only significant clay bed at the GWF Hanford site.

In general, clay layers like the Cocoran Clay layer form aquitards that restrict vertical movement of groundwater. In the Tulare Lake groundwater basin, numerous wells penetrate both the upper and lower aquifers. Since these wells typically do not include a seal at the clay layer between the upper and lower aquifers, the wells provide a hydraulic connection between the two aquifers. Water level data collected in 1999 indicate that the depth to groundwater at the project site was about 80 feet below ground surface in both aquifers, indicating that the upper and lower aquifer are not confined (GWF SPPE, 2000).

## WATER RESOURCES

GWF proposes to use groundwater, supplied by an existing water supply well at the adjacent GWF Hanford LP facility, for construction and operations water supply. GWF has negotiated an agreement with the Kings County Water District to mitigate the project's proposed groundwater use. The water banking agreement allows for the transfer of surface water from the Angiola Water District to the Kings County Water District for agricultural use to offset groundwater pumping or for recharge ponds operated about 1.5 miles southwest of the project site. The 2001 Energy Commission Decision requires mitigation of groundwater use at a ratio of 1.76:1 (CEC, 2001).

### Water Supply During Construction

GWF Hanford estimates that average daily water use would be approximately 1,000 gallons per day during construction, used primarily for dust control. Maximum construction period water use is estimated to be approximately 6,000 gallons per day for flushing and commissioning of the water treatment systems and the OTSGs. Construction is expected to last about 15 months. Construction water supply would be provided by groundwater pumped from the onsite well at the adjacent Hanford LP. Wastewater generated during construction would be discharged to the Hanford LP cooling tower for recycling.

### Project Water Supply

Water use at GWF Hanford would include injection for $NO_x$ control on the existing CTGs, makeup water for evaporative cooling of CTG intake air, and power

augmentation of the CTGs. Additionally, water will be used for make up for the two OTSGs, steam turbine lubricating oil WSAC, washing the combustion turbine compressors, and miscellaneous plant uses. GWF Hanford plans to utilize groundwater pumped from the onsite well at the adjacent Hanford LP to supply all process water and service water for the plant. The City of Hanford would provide back-up water supply, as well as water for fire protection and potable uses through an existing connection (GWF, 2008).

Approximately 111 afy of water would be required for GWF Hanford process and service water requirements based on 8,000 hours of operation (GWF, 2008). This represents an 8 afy increase over the permitted maximum water use of 103 acre-feet for HEPP. In 2008, HEPP used about 14.9 acre-feet over 1,087 total operating hours for both turbine generators, which was the highest annual water use on record for the HEPP (GWF, 2009a). As compared to the "as operated" condition, GWF Hanford will require about 96 afy of additional water supply to meet process and service requirements.

Under the existing banking agreement with the Kings County Water District, GWF has banked a surplus of about 9,031 acre-feet of water purchased from the Angiola Water District (GWF, 2008) to mitigate for groundwater pumping at HEPP. At the 1.76:1 ratio required in the original 2001 Energy Commission Decision, GWF banked sufficient water to mitigate for use of 5,131 acre-feet of groundwater pumping. ~~GWF~~ reported that Hanford LP used 500 afy over the last 5 years. Water use at Hanford LP is mitigated under a separate agreement.

## Water Quality

The water quality of groundwater pumped from the onsite well at the Hanford LP has not changed appreciably from the original HEPP SPPE application (GWF, 2000). **SOIL AND WATER RESOURCES Table 2** documents the quality of water from the onsite well at the GWF Hanford LP.

**SOIL AND WATER RESOURCES Table 2**
*GWF Hanford Water Quality Parameters*
(unfiltered mg/L unless otherwise indicated)

| Constituent | Water Quality (mg/L) |
|---|---|
| Alkalinity, as calcium carbonate | 140 |
| Conductivity | 340 µmhos/cm |
| Hardness, as calcium carbonate | 5.9 |
| Total dissolved solids | 220 |
| Sulfate | 8.1 |
| Chloride | 19 |
| Silicon Dioxide | 20 |

Source: GWF, 2000.

## Water Treatment

Groundwater pumped from the onsite well at Hanford LP would be treated for use at GWF Hanford. The planned water treatment process includes a microfiltration system, a

multi-stage reverse osmosis system (RO), and an ion-exchange system. Demineralized water would be used for steam cycle makeup, gas turbine injection for NOx control, evaporative inlet cooling, WSAC makeup, and turbine wash water. Demineralized water would be stored in an existing, onsite 300,000 gallon water storage tank. Untreated groundwater would be used for other service water needs.

## Wastewater Collection, Treatment, Discharge and Disposal

Wastewater from GWF Hanford processes would be recycled through the Hanford LP cooling towers. Blowdown from the Hanford LP cooling towers and the GWF Hanford WSAC lube oil cooler would be discharged to the City of Hanford's sanitary sewer system for treatment at the Hanford Wastewater Treatment Plant under the existing Industrial Wastewater Discharge Permit issued to Hanford LP. This wastewater is discharged continuously under operational plant limits, including limits on electrical conductivity. The proposed modifications associated with GWF Hanford would not change the quality of wastewater discharged to the City of Hanford sanitary sewer system. While, the total volume discharged to the City's sanitary sewer system would increase, the discharge volume would be within current permit limits (GWF, 2008).

Sanitary wastewater from sinks, toilets, and other sanitary systems would also be collected and discharged to the City of Hanford's sanitary sewer system for treatment at the Hanford Wastewater Treatment Plant (GWF, 2008).

## Plant Drain and Oil/Water Separator

General plant drains would collect containment area washdown and discharge to sample and facility equipment drains. Water from these areas would be collected in a system of floor drains, hub drains, sumps, and piping and routed to the facility wastewater collection system (GWF, 2008).

Drains that could contain oil or grease would first be routed through an oil/water separator and then discharged to the Hanford LP cooling towers for recycle and reuse. Recovered oil would be stored in a separate tank and disposed of offsite periodically (GWF, 2008).

## Stormwater Runoff and Drainage

The overall topography in the Hanford area is relatively flat. A general gradient in the vicinity of the GWF Hanford slopes from the northeast to the southwest. Stormwater runoff in the area drains towards the Lakeside Ditch. The existing HEPP and Hanford LP sites are outside of the 100-year floodplain, and the GWF Hanford modifications would not encroach upon either the 100-year floodplain or the Lakeside Ditch.

Stormwater generated on the existing HEPP and Hanford LP site is captured in a series of storm drains and pipes and is discharged to an onsite retention basin located on the eastern side of the site. The basin is sized to contain runoff resulting from a 100-year 10-day storm based on City of Hanford Public Works Construction Standards Manual. The retention basin relies on evaporation and percolation for the removal of stormwater between storm events.

Areas within the northern and eastern portion of the existing HEPP/Hanford LP site were used for laydown during construction of the existing plant. Following construction

this area was regraded to direct runoff offsite and revegetated to protect existing soils from erosion. The GWF Hanford modifications involve expanding the current HEPP footprint and include additional impervious surface area within the eastern portion of the site, which will increase the volume of runoff generated onsite. GWF Hanford proposes to expand the existing retention basin by approximately 32,400 cubic feet or 0.74 acre-feet to accommodate the additional runoff. Soil generated by expanding the onsite retention basin would be incorporated into site grading activities.

The revegetated area in the northern portion of the site would be used for laydown for construction of GWF Hanford. Following construction, this area would be regraded to drain away from the on-site retention basin and revegetated to limit soil erosion.

## SOILS

The GWF Hanford site lies on Kings River alluvial fan deposits. These deposits consist of very deep, well-drained, saline-alkali soils. The soils at the GWF Hanford site consist primarily of Kimberlina fine sandy-loam based on information from Kings County soil survey published by the Soil Conservation Service (GWF SPPE, 2000). The permeability is moderately slow to very slow. Runoff is usually very slow and the erosion potential is slight. The soil at the site is described below in **SOIL AND WATER RESOURCES Table 3.**

The Kimberlina soil has a high concentration of salts and is alkaline. The loose nature of the soil limits its use for embankments, dikes, and levees. These soils are only fairly well suited to agriculture due to the high salt concentrations and alkaline nature.

**SOIL & WATER RESOURCES Table 3**
**Soil Types at GWF Hanford**

| | | Erosion Susceptibility | | |
|---|---|---|---|---|
| **Map Unit Number and Name** | **Soil Description** | **Water** | **Wind** | **Comments** |
| 130 Kimberlina fine sandy loam, saline-alkali | Fine sandy loam.<br>Very deep and well drained.<br>Alluvium derived from igneous and sedimentary rock | Slight | Low | Permeability: moderately slow.<br>Excavations for roads or building site pads can expose material that may be susceptible to wind and/or water erosion.<br>Disturbed area of construction sites should be revegetated or covered with synthetic matting where needed to reduce the risk of erosion.<br>Saline-alkali condition of soil causes high corrosivity to steel and concrete. Treated steel pipe and sulfate-resistant concrete should be used. |

## ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the potential direct, indirect and cumulative impacts to soil and water resources that would be caused by construction, operation

and maintenance of the project. The goal is to avoid any adverse impacts or minimize impacts so they are less than significant. Staff's analysis of potential impacts consists of a brief description of the potential effect, an analysis of the relevant project effects, and application of the threshold criteria for significance of the effects. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. When necessary, staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation measures. Mitigation is designed to reduce potentially significant project impacts to a level that is less than significant.

## METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff evaluated the significance of potential impacts to soil and water resources, including the effects of construction and operation activities, that could result in erosion of soils, the deposition of sediments into surface waters or the contamination of either groundwater or surface water. Staff also evaluated the potential for the project's proposed water use to cause a significant depletion or degradation of local and regional surface or groundwater water resources.

The significance of potential impacts to soil and water resources was determined based on:

- whether the project's use of groundwater would cause a significant, or potentially significant, adverse change in the quantity or quality of groundwater or surface water;
- whether project construction or operation will lead to degradation of surface or groundwater quality;
- whether construction or operation would lead to accelerated water erosion and sedimentation;
- whether the project would increase flood hazards in the vicinity of the project; and,
- whether the project will comply with all applicable laws, ordinances, regulations and standards including those related to water supply for power plants.

Where the potential for impacts are identified, staff has proposed mitigation measures to reduce the significance of the impact and, as appropriate, has recommended conditions of certification.

These criteria are based on the California Environmental Quality Act (CEQA) Guidelines and performance standards (CCR 2008). The threshold of significance for project impacts is based on the ability of the project to be built and operated without violating applicable erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards. The federal, state, and local LORS and policies presented in **SOIL AND WATER RESOURCES Table 1** represent the applicable standards used for the GWF Hanford analysis. These LORS support a comprehensive regulatory system, with adopted standards and established practices designed to prevent or minimize adverse impacts to soil and water resources. For those impacts that exceed standards or result in a significant adverse impact, conditions of certification

may be necessary to ensure compliance with standards or reduce the impacts to a less than significant level.

Staff's analysis, determination of potential impacts, and evaluation of appropriate mitigation measures relies on estimates and information provided by GWF regarding the construction and operation of GWF Hanford. Applicable scientific, technical, and LORS/policy-related literature and expert opinion was also consulted in the development of staff's analysis.

## DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impact and mitigation discussion is divided into impacts related to construction and to operation.

### Construction Impacts and Mitigation

Construction of the GWF Hanford would include soil excavation, grading, installation of utility connections and the use of water, primarily for dust suppression, moisture conditioning, and concrete mixing. Potential impacts to soils related to increased erosion or release of hazardous materials are possible during construction. Potential stormwater impacts could result if increases in runoff flow rate and volume discharged from the site were to increase flooding downstream. Water quality could be adversely affected by the discharge of eroded sediments from the site or hazardous materials released during construction. Project water demand could affect quantity of groundwater or surface water resources. Potential construction related impacts to soil, stormwater, and water quality or quantity are discussed below.

### Soil Erosion

Construction activities can lead to adverse impacts to soil resources, including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation. Activities that expose and disturb the ground surface leave soil particles vulnerable to detachment by wind and water. Soil erosion could result in the loss of topsoil, discharge of sediment offsite, water quality degradation, or reduced volume and infiltration capacity in the onsite retention basin.

The magnitude, extent and duration of those impacts would depend on several factors, including the proximity of the GWF Hanford site to surface receiving waters (for instance, the Lakeside Ditch), the type of soils affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity, short duration runoff events coupled with earth disturbance activities, can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. Soils at the project site are fine sandy loam with a slight water erosion potential and low wind erosion potential. Without implementation of adequate BMPs, the project earthwork and grading activities could lead to significant fugitive dust and erosion impacts. In the **Air Quality Section**, proposed conditions of certification provide mitigation that will prevent significant impacts from fugitive dust and wind borne soil erosion by requiring dust control to disturbed lands during construction. The construction activities for the GWF Hanford are expected to last about 15 months, from February 2011 through April 2012. Grading activities are expected to occur during the first six to nine months of construction, coincident with the rainy season. Grading

activities would disturb about 4.85 acres in the eastern portion of the site for construction of new equipment associated with GWF Hanford. In addition, about 5.32 acres in the northern portion of the site would be disturbed for construction laydown (GWF, 2009a).

Earthwork at GWF Hanford would include:

- removal of topsoil, vegetation, and debris;
- excavation and compaction of earth to create the plant grade for new equipment;
- excavation to expand the existing site retention basin; and
- excavation for foundations and underground systems.

Materials suitable for compaction would be stockpiled in designated locations. Materials not suitable for compaction would be stored separately and reused on site. The construction laydown and parking area may be graded and covered in gravel to facilitate construction access (GWF, 2009a).

The applicant has prepared a draft Drainage Erosion and Sediment Control Plan (DESCP) that included a list of erosion and sediment control Best Management Practices (BMPs) that would be implemented before, during, and post-construction. The applicant has proposed implementation of both source control and treatment control BMPs to limit soil erosion and the transport of eroded sediments during construction. The applicant has identified source control BMPs including soil stabilization with mulch, seeding, straw mulch, geotextiles and stabilized construction roads to stabilize disturbed soils to limit erosion. To help trap eroded sediments, the applicant identified silt fences, sand bag barriers, straw bales, and fiber rolls, as well as sediment traps as treatment control BMPs for use during construction. The applicant proposed that all BMPs be inspected before and after storm events and daily during extended storm events and that all measures be maintained in good working order (GWF, 2009a).

During construction (and operation) the applicant would need to monitor and remove trapped sediments from the onsite stormwater retention basin to maintain infiltration rates and storage volume as needed. Following construction, temporary erosion control and treatment control BMPs would be removed from the site. In addition, gravel placed on the laydown area would be removed, and the area would be seeded and mulched to re-establish vegetation.

The discussion of the proposed BMPs, including implementation and operation, were described in sufficient detail in the DESCP (GWF, 2009a). Staff believes that the draft plan is reasonable as a planning level document and that, through the proper application of the proposed BMPs, impacts to soil resources from water and wind erosion would be reduced to a level that is less than significant. Condition of Certification **SOIL & WATER-1** requires the applicant to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activities to meet the requirements of the Central Valley Regional Water Quality Control Board (RWQCB). Condition of Certification **SOIL & WATER-2** requires the applicant to prepare and implement a final DESCP for construction and operations to assure that these proposed BMPs are implemented.

## Stormwater

Potentially significant water quality impacts could occur during construction, excavation, and grading activities if contaminated soil or other hazardous materials used during construction were to contact stormwater runoff and drain off-site. Water quality could also be adversely impacted if the stormwater drainage pattern concentrates runoff in areas that are not properly protected with BMPs, causing erosion of soils and discharge of sediment into down-gradient surface waters. Flooding downstream of the project site could also increase if runoff discharged from the GWF Hanford site increases.

GWF Hanford is located on an existing industrial site within a larger industrial park south of Hanford. The area in the vicinity of project site is primarily utilized for industrial uses. The area is relatively flat, drains towards the Lakeside Ditch and is above the 100-year floodplain.

Currently, stormwater runoff on the existing HEPP and Hanford LP site is routed to the existing stormwater retention basin on the northwest corner of the improved site. The primary storm drain pipe runs along the northern fence line. The pond was designed to accommodate the flows resulting from a 10-day, 100-year storm. The runoff calculations used to support the sizing of the retention pond were based on the Rational Method as set forth in the City of Hanford Construction Standards Manual and Storm Drainage Design Criteria.

The applicant provided a grading plan and watershed delineation maps for GWF Hanford. The watershed map indicates that all areas within the permanent fence along the northern border of GWF Hanford and the Hanford LP would drain to the stormwater retention pond. Runoff from the GWF Hanford site would increase because the planned improvements include paving and construction of concrete pads expanding the plant footprint by about 1.88 acres on the 4.85-acre eastern portion (HEPP) of the project site. During construction, the stormwater pond would be expanded by approximately 32,400 cubic feet or 0.74 acre-feet to accommodate the additional runoff generated from the increase in impervious area associated with GWF Hanford (GWF, 2008). Material from expansion of the retention basin would be retained on-site and incorporated into the final grading of the site. The existing storm drain pipe along the northern fence line can accommodate the increased flows generated by the proposed GWF Hanford.

Staff reviewed the sizing calculations provided by the applicant and verified that the expanded basin had adequate capacity to contain the runoff volume produced by a 100-year 10-day storm as set forth by the City of Hanford (Hanford, 2006). Staff determined that the proposed basin could contain the 100-year 10-day runoff volume with about 1.0 feet of freeboard. Staff also reviewed the basin grading to determine if the California Stormwater Quality Association (CASQA) Water Quality Volume could drain within 3 to 5 days to limit the potential for vector control issues in the basin. Assuming a 0.15 inch/hour infiltration rate for the sandy loam soils at the site, staff estimated that the Water Quality Volume would drain from the basin within about 2.6 days.

During construction, sediment eroded from the disturbed areas on the eastern portion of the site would be trapped in the onsite retention basin. These trapped sediments can compromise the function of the retention basin in two ways. First, these sediments

would decrease the storage volume available in the basin. With limited freeboard available, if sediment deposits in the basin, the available freeboard would decrease below the 1 foot minimum requirement. Since the basin is intended to contain all runoff and has no emergency outlet, maintaining the required freeboard is necessary to limit potentially significant impacts associated with overtopping. Secondly, trapped fine sediments can clog the soil voids resulting in decreased infiltration rates and increasing drainage times. Since the basin has a drainage time that approaches the 3 to 5 day requirement to limit mosquito breeding, a significant decrease in infiltration rates could lead to mosquito breeding within the basin. To address these potential issues, staff has added a requirement to remove trapped sediment from the retention basin. Condition of Certification **SOIL & WATER-2** requires the applicant to remove accumulated sediment from the retention basin, when sediment accumulates over 0.5 feet deep in the basin to maintain storage volume and drain times. With proper maintenance of the expanded onsite retention basin, potential impacts related to downstream flooding and water quality will be less than significant.

Stormwater runoff from the laydown area is currently discharged offsite towards the City of Hanford storm drain system and ultimately discharged to the Lakeside Ditch. During construction, runoff from the laydown area will continue to be routed away from the site and will not discharge into the stormwater retention pond (GWF, 2009a). The DESCP indicated that runoff from the laydown area will be addressed under the Construction SWPPP that will identify pollution prevention controls and monitoring activities of stormwater discharges. Condition of Certification **SOIL & WATER-1** requires the applicant to prepare and implement a Construction SWPPP.

There has not been any significant soil or groundwater contamination issues identified on the GWF Hanford site. In the draft DESCP, the applicant indicated that any contaminated soils encountered during excavation will be disposed of in accordance with applicable regulations. During construction, hazardous materials including petroleum products, paints, solvents, and other chemicals will be stored in areas with secondary containment to limit the potential for spills or leaks to impact adjacent soils or stormwater (GWF, 2009a). In the event of a spill, the applicant has committed to removing any impacted soils for disposal at an approved disposal site (GWF, 2009a). Implementation of proper storage and fueling procedures as detailed in the Construction SWPPP and DESCP required in Conditions of Certification **SOIL & WATER-1** and **-2** will ensure that hazardous materials utilized during construction will not lead to significant impacts to soil and water resources.

## Water Supply

Construction water supply will be provided by groundwater pumped at the Hanford LP onsite well. The applicant estimates that an average of about 1,000 gallons per day and a maximum of about 6,000 gallons per day will be required during construction. These estimated water supply requirements are considerably less than the existing HEPP operational water use during the past two years of operation (2007 and 2008 – GWF, 2009a). Therefore, staff does not anticipate that the construction water supply will result in significant impacts to groundwater supplies or quality.

## Groundwater

The groundwater level at GWF Hanford was approximately 80 feet below ground surface in 1999 (GWF, 2000). Thus, groundwater is not expected to be encountered in excavations and significant dewatering is not anticipated due to the deep groundwater surface. During construction, the GWF Hanford site would not directly impact groundwater resources with the implementation of new Conditions of Certification **SOIL & WATER-1** and **-2**. The construction SWPPP and DESCP provide specific guidelines for protecting groundwater resources through hazardous materials handling practices.

All non-contact stormwater from the GWF Hanford site would drain into the existing/expanded retention basin, which would be designed according to Central Valley Regional Water Quality Control Board (CVRWQCB) and City of Hanford standards. The runoff in the retention basin will percolate into the ground to recharge local groundwater supplies. All contact stormwater will be collected and stored in a holding tank and eventually trucked offsite for disposal (GWF, 2008).

## Wastewater and Sanitary Waste

During the construction period, GWF states that all sanitary waste would be collected in portable toilets (no discharge) supplied by a licensed contractor for collection and disposal at an appropriate receiving facility (GWF, 2009a). Equipment wash water would also be collected and disposed of offsite; therefore, there would be no impacts from disposal of sanitary wastewater. The wastewater from hydrostatic testing would be returned to the Hanford LP cooling tower for recycle and reuse. Handling, storing and disposal of all construction wastewater shall be fully described in the construction SWPPP; required as part of Condition of Certification **SOIL & WATER-1**.

## Operation Impacts and Mitigation

Operation of the GWF Hanford could lead to potential impacts to soils, stormwater runoff, water quality, and water supply. Soils may be potentially impacted through erosion or the release of hazardous materials used in the operation of the GWF Hanford. Stormwater runoff from the GWF Hanford could result in potential impacts if increased runoff flow rates and volumes discharged from the GWF Hanford site increase downstream flooding. Water quality could be impacted by discharge of eroded sediments from the GWF Hanford or hazardous materials released during operation. Water supply for plant processes, fire protection, potable uses, and landscape irrigation could lead to potential impacts to quantity or quality of regional groundwater or surface water resources. Potential impacts to soil, stormwater, water quality, water supply, and wastewater related to the operation of the GWF Hanford, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

## Soil

The applicant has proposed seeding and/or mulch to stabilize soils and control erosion in the laydown area and at disturbed areas on the eastern portion of the site. The applicant indicates that the disturbed areas will be prepared to a depth of 3 to 4 inches through disking, harrowing, or raking. Seed will be dispersed through dry broadcasting and worked into the top soil (GWF, 2009a). The applicant has committed to obtaining 75 percent coverage on all revegetated areas, which will limit soil erosion from the laydown area and other revegetated areas during operations. Implementation of proper

revegetation and erosion control BMPs during operations as detailed in the DESCP required in Condition of Certification **SOIL & WATER-2** will reduce soil erosion related impacts to a less than significant level.

During operations, numerous hazardous materials will be stored and used onsite. The existing HEPP utilizes secondary containment for chemical and petroleum storage and use areas. These secondary containment areas are surrounded by curbs or dikes to contain chemicals in the event of a spill. Secondary containment areas are sized to contain the volume of the largest storage tank to prevent overtopping. In the draft DESCP, the applicant provided basic spill prevention and cleanup plans. Hazardous materials utilized during operations will not lead to significant impacts to soil and water resources through the proper implementation of the chemical storage BMPs and spill prevention and clean-up plans as detailed in the DESCP required in Condition of Certification **SOIL & WATER-2.**

## Stormwater

Staff examined several potential impacts related to stormwater during GWF Hanford operations. Staff verified that stormwater discharge rates from the GWF Hanford site would not exceed pre-development rates. Staff examined the applicant's proposed plans to expand the existing retention basin to determine if the basin had adequate capacity to contain the runoff generated during the design storm. Staff also reviewed the drainage time within the retention basin to confirm that operation of the basin will not lead to significant vector control impacts. In addition, staff reviewed the applicant's conceptual plans for controlling drainage to assure that appropriate BMPs are identified to avoid degradation of water quality from erosion or contact with contaminants.

Without mitigation, runoff from the GWF Hanford site would exceed pre-development runoff due to the increase of impervious area associated with the new equipment installed in the eastern portion of the site. GWF Hanford includes expanding the footprint of the developed, industrial portion of the site by about 1.88 acres. For the 100-year, 10-day design storm runoff from the site would increase by about 19,680 cubic feet or about 0.45 acre feet as compared to existing conditions with HEPP and Hanford LP. In total, the applicant estimates that the 100-year, 10-day design storm would generate about 3.30 acre-feet of runoff from the combined GWF Hanford and Hanford LP site. Staff reviewed and confirmed the applicant's estimate of runoff for the design storm (GWF, 2009b). The expanded retention basin has a capacity of about 3.31 acre-feet at a contour elevation of 221.0 feet, which provides about 1 foot of freeboard between the design storm water surface elevation and the lowest catch basin grate. Staff determined that the proposed expansion of the retention basin provides sufficient capacity to contain the design storm event and that operation of GWF Hanford will not increase stormwater runoff discharged offsite or increase any downstream flooding in the vicinity of the site.

Between storm events, runoff captured in the retention basin will percolate to the sub-surface or evaporate. Infiltration of stormwater generated at the project site within a retention basin is an ideal BMP to control runoff and protect downstream properties from flooding and water quality impacts. The proposed infiltration basin will meet the RWQCB standards related to water quality treatment and emerging standards to control hydrograph modification affects. One potential issue related to operation of the

proposed retention basin is related to drawdown time following storm events. As discussed in the Construction Stormwater impacts analysis, staff determined that the basin should drain the CASQA Water Quality Volume in about 2.6 days, which is sufficient to limit the potential for vector control issues associated with mosquito breeding in the basin.

Another potential issue associated with infiltration BMPs like the proposed retention basin is related to accumulation of toxic constituents in soils and groundwater. If the stormwater discharged to a stormwater retention/infiltration pond is impacted by toxic constituents, these constituents can accumulate in the soils in the basin and may ultimately migrate to the groundwater below the basin. Staff examined stormwater quality sample results for four samples collected in the existing HEPP retention basin in 2006 through 2008. Based on the limited sampling and analysis available, the sample results indicate that low levels of oil and grease (5 mg/l) and iron (0.24 to 1.89 mg/l) are present in stormwater discharged to the basin. These results indicate that the current stormwater quality control BMPs in place at HEPP and/or Hanford LP are not adequate to keep hydrocarbons and metals from being discharged to the stormwater retention basin. The applicant should add a vault based BMP targeting hydrocarbons and heavy metal pollutants to the existing stormdrain pipe prior to discharge to the retention basin. Staff recommends that the applicant also consider employing a similar vault based BMP at the stormdrain outlet from the Hanford LP site.

The applicant also noted GWF Hanford is exempt from the Industrial Activities Storm Water General Permit requirements because the stormwater retention basin does not discharge offsite to a storm drain or surface receiving water. Implementation of the DESCP required in Condition of Certification **SOIL & WATER-2** which includes maintenance of the proposed retention basin to remove accumulated sediment and utilizing a vault based treatment BMP to remove hydrocarbons and metals from stormwater will ensure that potential stormwater related impacts are less than significant. Staff also recommends that Condition of Certification **SOIL & WATER-3 (SPPE CONDITION HYDROLOGY & WATER-3)** be maintained. Condition of Certification **SOIL & WATER-3** requires the project to collect all stormwater runoff in the onsite retention basin. In addition Condition of Certification **SOIL & WATER-3** requires the project to obtain approval for an Industrial Activities SWPPP prior to offsite discharge of stormwater.

## Water Supply

GWF proposes to use high quality groundwater pumped from an onsite well at the Hanford LP to supply water at GWF Hanford. To mitigate this groundwater use, GWF proposes to transfer surface water supplied by the Angiola Water District to the Kings County Water District to offset agricultural groundwater pumping in the vicinity of the project site. Since the Tulare Groundwater Basin is already experiencing critical overdraft conditions, staff considered the potential for groundwater pumping to lead to significant impacts to the quantity and quality of groundwater available in the area. Staff also considered the potential for impacts to the quantity of surface water available related to the project's proposed mitigation plan.

Approximately 111 afy of water will be required for GWF Hanford process and service water requirements based on 8,000 hours of operation (GWF, 2008). This represents an

8 afy increase over the permitted maximum water use for HEPP, and a 96 afy increase over the maximum and most recent annual “as operated” water use. In addition, the existing Hanford LP utilizes 500 afy of groundwater (GWF, 2009). An increase in groundwater pumping at the site of 96 afy represents a 685 percent increase as compared to the “as operated” conditions for HEPP and about a 20 percent increase in total pumping at the HEPP and Hanford LP site. This increase in groundwater pumping would exacerbate overdraft conditions in the basin and could result in an increase in groundwater drawdown in the vicinity of the project site.

The California Department of Water Resources has determined that the Tulare Lake groundwater basin is currently experiencing critical over-draft conditions. Average annual groundwater pumping is about 648,000 afy (GWF, 2000). The DWR estimates that pumping is about 229,000 afy beyond the estimated safe yield of the aquifer (GWF, 2000). Given the existing critical overdraft conditions, additional pumping of 96 afy could result in significant groundwater supply impacts in the vicinity of the project site.

To mitigate these potentially significant impacts, GWF has entered into a water banking agreement with the Kings County Water District. The July 2000 water banking agreement for HEPP revised an earlier 1987 agreement between GWF and the Kings County Water District for mitigation of groundwater pumping at the Hanford LP. Staff has not reviewed the earlier 1987 agreement, and GWF has not provided details on their previous commitments related to the Hanford LP. In the July 2000 HEPP water banking agreement, GWF committed to the purchase of a State Water Project entitlement right, and through an exchange agreement, delivery of Kings River water to the Kings County Water District. The exchange program includes (GWF, 2000):

1. Purchase of SWP entitlement from the Angiola Water District.
2. Delivery of SWP water from the Angiola Water District to the J.G. Boswell Company which has entitlements to Kings River water.
3. J.G. Boswell Company then delivers Kings River water to GWF at the Peoples Ditch Weir.
4. GWF then transfers the entitlement at the Peoples Ditch Weir to the Kings County Water District for either percolation at the district’s recharge ponds southwest of GWF Hanford or diversion to offset other groundwater pumping for irrigation.

The 2001 Energy Commission Decision for HEPP included a groundwater mitigation ratio of 1.76 to 1 (CEC, 2001) to protect for drought conditions. The Kings County Water District indicates that GWF has also committed to mitigate pumping at the Hanford LP at a 1:1 ratio (KCWD, 2009). As of the September Petition to Amend, GWF indicates that they have banked a surplus of 9,031 acre-feet with the Kings County Water District. This surplus banked water is meant to offset future water use at the HEPP.

Staff contacted the Kings County Water District to better understand and evaluate the effectiveness of the groundwater mitigation program. The Kings County Water District primarily delivers the banked water directly to agricultural users to offset need for groundwater pumping by those agricultural users. This delivery method decreases groundwater pumping in the vicinity of the GWF Hanford site, limiting groundwater drawdown. In addition, by providing an offset to groundwater pumping that would otherwise occur, this delivery method limits the potential for losses associated with

evaporation to reduce the quantity of water banked under the agreement. The Kings County Water District indicated that the Water Banking Agreement with GWF has been very effective and was a “model water banking agreement” that they use for other groundwater development applications. Assuming water banking to mitigate annual water use at GWF Hanford of about 195 afy (111 afy x 1.76), the 9,031 acre-feet surplus with Kings County Water District would mitigate for about 46 years of operation at GWF Hanford.

To mitigate for potentially significant groundwater impacts associated with project pumping, staff recommends Condition of Certification **SOIL & WATER-4 (SPPE CONDITION HYDROLOGY & WATER-4)** that limits groundwater pumping to a maximum of 111 afy and requires that all groundwater pumping be mitigated at a ratio of 1.76:1. In addition, to help the CEC monitor groundwater pumping and mitigation, staff recommends Condition of Certification **SOIL & WATER-5 (SPPE CONDITION HYDROLOGY & WATER-5)** that requires the project owner to report monthly groundwater pumping and water use at GWF Hanford and to report all mitigation credits with the Kings County Water District.

Staff also considered the potential for surface water diversions to impact the quantity of surface water available on Sacramento-San Joaquin Delta. While the Kings River North Fork flows to the San Joaquin River, the State Water Controller only directs flows to the North Fork for seasonal flood releases (GWF, 2000). The water banking agreement with Kings County Water District only allows for deliveries of surface water when flood releases are not occurring, so diversions for water banking do not occur when the Kings River North Fork is flowing and do not impact flows towards the San Joaquin River. Outside of seasonal flood releases the Kings River is entirely diverted for local agricultural use and to the State Water Project. The Kings River entitlement included in the GWF-Boswell agreement is a pre-1914 water right that would be diverted from the Kings River regardless of the GWF-Boswell agreement (GWF, 2000). Thus, staff determined that the surface water diversions from the Kings River would not result in significant impacts to flows on the San Joaquin River and fresh water discharge to the Sacramento-San Joaquin Delta.

## Backup Water

Back-up water supply and fire water supply would be potable water provided by the City of Hanford through an existing connection. The applicant provided an August 2000 “will serve” letter from the City of Hanford Department of Public works indicating that there was adequate supply to serve the HEPP without negatively impacting the City’s water system. Since water use at GWF Hanford on a flow rate basis (gallons per minute) is similar to HEPP, staff concurs with the applicant that the City has adequate supplies for back up and fire water needs.

The City of Hanford water supply is provided by groundwater pumped from 18 deep water wells in the Hanford Industrial Park. Using this City-supplied groundwater is subject to the same groundwater supply impacts as groundwater pumped at the project site. To limit potential impacts associated with use of City-supplied groundwater, staff believes mitigation should be required for all City-supplied back-up water in accordance with Condition of Certification **SOIL & WATER-4.**

### Wastewater

Wastewater from process streams at GWF Hanford including WSAC blow down and water from the oil/water separator will be routed to the neighboring Hanford LP cooling tower for recycle and reuse prior to discharge to the City of Hanford sewer system. Water collected in the oil holding tank in the oil/water separator would be hauled offsite for disposal at a licensed facility. Sanitary wastewater will also be discharged to the City's sewer system.

Wastewater is discharged to the City's sanitary sewer system for treatment at the City's wastewater treatment plant under an Industrial Wastewater Discharge Permit issued to GWF for the Hanford LP and HEPP. The wastewater stream for GWF Hanford will continue to meet all the requirements of the existing Industrial Wastewater Discharge Permit including limits on flow rate or volume discharged and constituents including electrical conductivity.

GWF provided a copy of the Industrial Wastewater Discharge Permit in the AFC (GWF, 2008). However, the permit submitted expired on January 1, 2004. Staff assumes that GWF mistakenly included an old permit in the AFC, because HEPP is not permitted to operate without a valid permit in place. Provided GWF Hanford can obtain and adhere to a current, valid Industrial Waste Discharge Permit, there will not be any significant impacts associated with wastewater discharge at GWF Hanford. Staff has included Condition of Certification **SOIL & WATER-6 (SPPE CONDITION HYDROLOGY & WATER-6)** requiring GWF Hanford to obtain a valid Industrial Wastewater Discharge Permit and to adhere to all conditions and requirements set forth in the permit.

## CUMULATIVE IMPACTS

Cumulative impacts consist of impacts that may occur as a result of the proposed project in combination with impacts from other past, present and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Temporary and permanent disturbances associated with construction of the proposed project would cause accelerated wind- and water-induced erosion. However, staff has concluded that the implementation of proposed mitigation measures as described in an approved SWPPP and DESCP would ensure that the project would not contribute significantly to cumulative erosion and sedimentation impacts. Stormwater discharge would be retained on site and would not exacerbate flooding conditions in the area.

GWF Hanford would use a maximum of 111 afy of groundwater pumped from the existing Hanford LP groundwater well. As described above, GWF Hanford has in place a Water Banking Agreement with Kings County to mitigate groundwater pumping related to GWF Hanford at a 1.76:1 mitigation ratio. GWF stated that the existing Hanford LP pumps on the order of 500 afy, which is mitigated under a separate mitigation agreement. Given the current critical overdraft conditions in the Tulare Lake Groundwater Basin, the combined pumping from both the GWF Hanford and Hanford LP projects could cause potentially significant cumulative impacts to groundwater supplies in the vicinity of the projects if the pumping for the projects was not mitigated. Since groundwater pumping for both projects will be mitigated through the existing

Water Banking Agreement, staff concludes that potentially significant cumulative impacts to groundwater supply in the vicinity of the project site will be mitigated to a less than significant level.

The wastewater discharge associated with GWF Hanford will meet the waste discharge requirements set forth by the City of Hanford as required to meet the Public Owned Treatment Works (POTW) permit requirements with the Central Valley Regional Water Quality Control Board. Therefore, no wastewater-related cumulative impacts are expected.

## COMPLIANCE WITH LORS

The Energy Commission's power plant certification process requires staff to review each of the proposed project's elements for compliance with LORS and policies.

### SWRCB POLICY 75-58 AND 2003 INTEGRATED ENERGY POLICY REPORT

In accordance with the water conservation provisions established in the California State Constitution and SWRCB Resolution 75-58, the Energy Commission established a water source and use policy in its *2003 Integrated Energy Policy Report (IEPR)*, stating that "the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'." In addition, California Water Code Section 13550 requires the use of recycled water for industrial purposes subject to recycled water being available subject to a number of criteria including that the quantity and quality are sufficient for the use and the cost is reasonable.

Given the clear intent of the California Water Code to encourage recycled water use for industrial processes and the intent of State Water Resource Control Board and Energy Commission polices to require the use of recycled water where environmentally beneficial and economically feasible, Staff examined GWF Hanford's proposed use of high quality groundwater. Staff addressed three primary questions related to the project's proposed use of high quality groundwater as compared to the use of other lesser quality water sources:

1. Is recycled water or agricultural wastewater available in sufficient quantities for the project's water supply?
2. Could recycled water or agricultural wastewater be utilized without creating environmentally undesirable impacts?
3. Would use of recycled water or agricultural wastewater be economically feasible?

The City of Hanford Wastewater Treatment Plant is approximately 1.2 miles from GWF Hanford. This wastewater treatment plant produces secondary treated wastewater in sufficient quantities to supply GWF Hanford. The water quality of City's secondary treated wastewater was relatively good as compared to the standards laid out in SWRCB policies 75-58. Average total dissolved solids were about 600 mg/l which is well below the SWRCB's definition for fresh waters (TDS below 1,000 mg/l) and of

better quality than the water utilized by many power plants. Therefore, Staff concluded that recycled water was available.

Utilizing the City's secondary treated water would require a 2-mile pipeline, which could be constructed without creating environmentally undesirable impacts. While the City provides the secondary treated effluent to local farmers for irrigation, use of the effluent at GWF Hanford would not negatively impact the local water balance. Local farmers could utilize higher quality groundwater for irrigation to replace any supplies lost, and GWF Hanford could target the lesser quality effluent for its industrial process water. Staff concluded that the City's secondary treated effluent could be utilized without creating environmentally undesirable impacts.

Therefore, staff asked the applicant to develop planning level costs for the use of secondary treated effluent. In Data Response 24, the applicant indicated that use of secondary treated effluent would require a capitol investment $1.29 million and an offsite annual disposal cost of $18,000 (GWF, 2009a). The capital costs included installation of a pump station and pipeline, tertiary treatment system, additional treatment systems, and wastewater treatment. Based on the scale of these increased costs, staff concluded that use of recycled water was economically feasible.

Following this Data Response, staff and the applicant met to discuss the feasibility of recycled water. Staff requested that the applicant examine the potential for this in greater detail and develop an equivalent annual cost comparison between the proposed water supply and use of recycled water. The applicant's revised cost estimate for utilizing recycled water included $7.98 million in capital costs and $2.4 million in annual costs (GWF, 2009b). In the more detailed cost estimate, capital costs increased significantly for the tertiary treatment system ($1.85M vs. $580K) and the wastewater treatment/zero liquid discharge system ($5.24M vs. $150K). The capital costs were based on estimates provided by Siemens and the applicant consulted the Turlock Irrigation District for costs associated with operations and maintenance of recycled water treatment and Zero Liquid Discharge (ZLD) systems (GWF, 2009b). Treating effluent to tertiary standards to address the availability of secondary treated wastewater and incorporating a zero liquid discharge system to meet the Hanford Wastewater Treatment Plant's discharge standards were the primary drivers for initial capital costs.

To develop the equivalent annual costs estimate, the applicant spread the capital costs over 9 years, and added in the operation and maintenance costs. On a per Megawatt Hours (MWH) comparison, the applicant estimated that use of recycled water would cost about $10.30 per MWH vs. about $1.27 per MWH for the proposed groundwater supply assuming 3,500 hours of annual operation (GWF, 2009b). After the initial capital costs are recovered over the 9 year finance period, costs for using recycled water would decrease to $7.33 per MWH. Based on the analysis provided by the applicant, it does not appear that utilizing recycled water is economically feasible at this time.

Staff also considered the increased efficiency offered by the proposed GWF Hanford amendment. The proposed project would increase electrical generation by about 26 percent with no additional natural gas usage and about 8 percent more water usage over the currently licensed project (assuming maximum operations).

GWF Hanford proposes to use fresh water for evaporative cooling of intake air and a WSAC for lubricant oil cooling. GWF Hanford is also planning to use an alternative cooling technology to reduce the amount of water required for plant operation: an air-cooled condenser system (ACC). The ACC has a significantly higher capital cost but will conserve water compared to typical wet cooling technologies, allowing the plant to use 80 – 90 percent less water. Staff concurs with GWF Hanford that the use of an ACC is an economically sound practice that provides environmental benefits from significantly reduced water use.

The proposed maximum annual water use of 111 afy is relatively modest for a gas-fired power plant due to the incorporation of dry cooling technology. Given these increases in efficiency, the use of dry cooling technology, and the high costs associated with utilizing recycled water, Staff concludes that the proposed project would meet the requirements of the SWRCB and Energy Commission Policies and the California Water Code.

## OTHER LORS COMPLIANCE

Staff has reviewed the project elements and concludes that the proposed GWF Hanford would comply with all applicable LORS addressing protection of water resources, stormwater management, erosion control, and the drinking water and wastewater discharge requirements, assuming that staff's proposed conditions of certification are adopted and implemented.

The project would comply with:

- The Clean Water Act and the authority granted to the State to enforce coverage under the NPDES by the Central Valley Regional Water Quality Control Board and the Kings County to administer the requirements and preparation of the SWPPPs and Drainage, Erosion and Sediment Control Plan;
- The Resource Conservation Recovery Act of 1976 by the proper handling and discharge of wastewater;
- The California Constitution, Article X, Section 2 by utilizing dry cooling to limit the use of groundwater for all plant operation uses;
- The Porter-Cologne Water Quality Control Act by the implementation of the DESCP and SWPPP and adherence to Industrial Waste Discharge Permit conditions;
- The California Safe Drinking Water and Toxic Enforcement Act by establishing secondary containment in chemical storage areas;
- Title 23 of the California Code of Regulations requiring the Regional Board to issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable including permitting under the General NPDES Permits for Discharge of Stormwater associated with both construction activity;
- The SWRCB Resolution 75-58 by using dry cooling technology to limit the use of groundwater for all non-potable plant operational uses;
- The City of Hanford Municipal Code Chapter 13.08 by meeting the water quality limits for industrial discharges to the City of Hanford sewer system.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has not identified any unmitigable potentially significant impacts to Soil and Water Resources for the GWF Hanford and believes the project will comply with all applicable Laws, Ordinances, Regulations and Standards (LORS) provided the proposed conditions of certification are implemented.

Staff concludes the following:

- Implementation of Best Management Practices during GWF Hanford construction in accordance with effective Storm Water Pollution Prevention Plans and a Drainage Erosion and Sediment Control Plan would avoid significant adverse effects that could otherwise result in significant transport of sediments or contaminants from the site by wind or water erosion.
- Significant impacts due to the proposed use of groundwater for the project's process water supply would be mitigated through a water banking agreement with the Kings County Water District.
- Potentially significant cumulative impacts due to the combined groundwater use at GWF Hanford and the Hanford LP can be mitigated through a water banking agreement with the Kings County Water District.
- The proposed use of dry cooling technology including an Air Cooled Condenser will significantly decrease groundwater use by the project.
- The project would not be located within the 100-year flood plain, and would not increase flood conditions downstream of the project.
- The discharge of wastewater under the conditions stipulated in the Industrial Wastewater Discharge Permit will meet City of Hanford standards.

Where the potential for impacts has been identified, staff is proposing mitigation measures to reduce the impact to less than significant. The mitigation measures, as well as specifications for LORS conformance, are included as conditions of certification.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

~~**SOIL & WATER-1** See SPPE CONDITION HYDROLOGY & WATER 1~~

~~**SPPE CONDITION HYDROLOGY & WATER-1** Prior to beginning any site mobilization, the project owner shall obtain CPM approval of the Storm Water Pollution Prevention Plan (SWPPP) as required under the General Storm Water Construction Activity Permit for the project.~~

~~**Verification:** At least 14 days prior to the start of any site mobilization, the project owner will submit a copy of the SWPPP to the CPM for review and approval. Approval of the plan by the CPM must be received prior to the initiation of any site mobilization activities.~~

**SOIL & WATER-1** The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) permit for discharges of storm water associated with construction activity. The project

owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire GWF Hanford Combined Cycle Power Plant Project (GWF Hanford).

**Verification:** The project owner shall submit to the compliance project manager (CPM) a copy of the construction SWPPP prior to site mobilization and retain a copy on site. The project owner shall submit a copy of the construction SWPPP to the Central Valley Regional Water Quality Control Board (RWQCB) for review and comment. The project owner shall submit copies to the CPM of all correspondence between the project owner and the RWQCB regarding the General NPDES permit for the discharge of storm water associated with construction activities within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include copies of the Notice of Intent and the Notice of Termination sent to the State Water Resources Control Board for the project construction.

~~**SOIL & WATER-2** See SPPE CONDITION HYDROLOGY & WATER 2~~

~~**SPPE CONDITION HYDROLOGY & WATER-2** Prior to beginning any site mobilization activities, the project owner shall obtain CPM approval for erosion control and revegetation plans that address all project elements.~~

~~**Verification:** The erosion control and revegetation plan shall be submitted to the CPM prior to start of any site mobilization. Approval of the final plan by the CPM must be received prior to the initiation of any site mobilization activities.~~

**SOIL & WATER-2** Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in offsite flooding potential, meet local requirements, and identify all monitoring and maintenance activities. To prevent stormwater and soil contamination, chemical and petroleum based palliatives shall not be used for dust control. The plan should include a vault based BMP targeting hydrocarbons and metals for the GWF Hanford stormdrain prior to discharge into the retention basin. Monitoring activities shall include routine measurement of the volume of accumulated sediment in the stormwater retention basin. Maintenance activities must include removal of accumulated sediment from the retention basin when an average depth of 0.5 feet of sediment has accumulated in the retention basin. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification CIVIL-1. The DESCP shall contain the following elements. All maps shall be presented at a legible scale.

***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features to include watercourses, washes, irrigation and drainage canals, and sensitive areas.

***Site Delineation*** – The site and all 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.

***Watercourses and Critical Areas*** – The DESCP shall show the location of all nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site.

***Drainage*** – The DESCP shall include hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow. Provide hydraulic calculations to support the selection and sizing of the drainage network, retention facilities and best management practices (BMPs). Spot elevations shall be required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet in flat terrain or to the limits of the offsite drainage basins.

***Clearing and Grading*** – The plan 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, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

***Project Schedule*** – The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.

***Best Management Practices*** – The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.

***Erosion Control Drawings*** – The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

**Verification:** No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Kings County and the CPM for review and comment. A copy of the comments from Kings County shall be submitted to the CPM no later than 60 days prior to the start of site mobilization for review and approval. The CPM shall consider comments received from Kings County. During construction, the project owner shall provide an analysis in the monthly compliance report 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 stormwater BMP monitoring and maintenance activities.

~~**SOIL & WATER-3** Prior to site mobilization, the project owner shall submit to the Compliance Project Manager (CPM), a copy of a valid water service agreement for water supplies for the project from an authorized water purveyor, or a copy of a valid well permit for the project from the appropriate licensing agency.~~

~~**Verification:** A copy of the water service agreement or well permit shall be submitted to the CPM prior to site mobilization.~~

~~**SOIL & WATER-4** Prior to ground disturbance, the project owner shall submit to the CPM a copy of a valid permit or agreement from the appropriate approving agency for wastewater discharge.~~

~~**Verification:** The permit or agreement for wastewater discharge shall be submitted to the CPM prior to ground disturbance.~~

~~**SPPE CONDITION HYDROLOGY & WATER-3** During project operation the project owner will not discharge any stormwater off-site. All stormwater will be collected and directed to the on-site evaporation/infiltration basin. Any stormwater leaving the site during commercial operation will require a General Industrial Activity Storm Water Permit and SWPPP. Approval for the final Industrial Activities SWPPP must be obtained from the CPM prior to commercial operation and/or offsite discharge of stormwater.~~

~~**Verification:** Should stormwater be discharged off-site, the project owner will submit to the CPM a copy of the SWPPP prepared under the requirements of the General Industrial Activity Storm Water Permit prior to the start of commercial operation and/or off-site stormwater discharge.~~

**SOIL & WATER-3** During project operation the project will not discharge any stormwater offsite. All stormwater shall be collected and directed to the onsite retention basin. The project owner shall submit a Notice of Non-Applicability (NONA) to the RWQCB to apply for an exemption to general NPDES permit. If conditions at the site change and the project will discharge stormwater from the site, the project owner shall 1) comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity, 2) develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of the site, and 3) discharge solely stormwater from the site.

**Verification:** Prior to commencing operations, the project owner shall submit a letter from the RWQCB indicating that there is no requirement for a general NPDES permit for discharges of stormwater associated with industrial activity to the CPM. At least 30 days prior to the discharge of stormwater during commercial operation, the project owner shall submit copies to the CPM of the operational storm water pollution prevention plan for the GWF Hanford site. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the RWQCB about the general NPDES permit for discharge of storm water associated with industrial activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination.

~~**SPPE CONDITION HYDROLOGY & WATER-4** The HEPP will mitigate all use of groundwater. This Water Mitigation Plan will include the following components:~~

~~1. The purchase agreement for 181 acre-feet of Table A Entitlement SWP water between the Angiola Water District and GWF Power Systems.~~

~~2. The agreement between the Tulare Lake Basin Water Storage District and GWF which grants GWF the right to utilize the District's facilities to deliver and convey the 181 acre-feet of water from the SWP to J.G. Boswell.~~

~~3. The exchange agreement between J.G. Boswell and GWF which allows the 181 acre-feet of SWP water owned by GWF to be delivered to J.G. Boswell in exchange for 181 acre-feet of J.G. Boswell in exchange for 181 acre-feet of J.G. Boswell Kings River entitlement.~~

~~4. The water banking and mitigation agreement between KCWD and GWF allows the 181 acre-feet of Boswell Kings River Entitlement to be delivered to the KCWD on behalf of GWF.~~

~~**Verification:** The project owner will submit the complete Water Mitigation Plan at least 30 days prior to the start of operation. The Water Mitigation Plan will discuss all terms and conditions and all parties involved in the agreement, and contain copies of all agreements executed as part of the Water Mitigation Plan. Any changes made to the Water Mitigation Plan will be provided to the CPM for review at least 14 days prior to the effective date of the proposed change. The Water Mitigation Plan will remain in effect for the life of the project, and the project will not operate without the Water Mitigation Plan in effect.~~

**SOIL & WATER-4** The GWF Hanford shall not use more than 111 acre feet of groundwater in any one year. GWF Hanford will mitigate all use of groundwater at a ratio of 1.76:1 (banked surface water to pumped groundwater). The Water Banking and Mitigation Agreement with Kings County Water District manages the GWF Hanford water banking account. The account has a balance of approximately 9,031 acre-feet. The Water Mitigation Plan shall include:

1. The Water Banking and Mitigation Agreement between Kings County Water District and GWF Hanford that has banked surface water to mitigate future groundwater pumping at GWF Hanford; and,

2. The annual water usage by GWF Hanford supplied by the Hanford LP water supply well and any backup water supplied by the City of Hanford. The total annual usage will be mitigated at a ratio of 1.76:1 and the mitigated usage will be deducted from the GWF Hanford water banking account balance. A summary of GWF Hanford water banking account activity along with the remaining account balance will be submitted as part of the Annual Compliance Report to the CPM.

In addition, back-up water provided by the City of Hanford shall only be used when groundwater provided by the existing groundwater supply system at GWF Hanford is not available due to unplanned outages or maintenance. All potable water provided by the City of Hanford for back-up water supply shall be subject to the same limits on annual use and the mitigation requirements described above for groundwater pumped at the site.

**Verification:** The project owner shall submit the complete Water Mitigation Plan at least 30 days prior the start of operation. The Water Mitigation Plan will discuss all terms and conditions and all parties involved in the agreement, and contain copies of all agreements executed as part of the Water Mitigation Plan. Any changes made to the Water Mitigation Plan shall be provided to the CPM for review at least 14 days prior to the effective date of the proposed change. The Water Mitigation Plan shall remain in effect for the life of the project, and the project will not operate without the Water Mitigation Plan in effect.

~~**SPPE CONDITION HYDROLOGY & WATER-5** The project owner will record on a monthly basis the amount of groundwater pumped by the project. This information will be supplied to the Energy Commission and the Kings County Water District.~~

~~Verification: The project owner will submit a groundwater use summary to both the CPM and the KCWD on an annual basis for the life of the project. The annual summary will include the~~ monthly ~~range, monthly average, and total groundwater use by the project in both gallons-per-minute and acre-feet. For subsequent years the annual summary will also include the yearly range and yearly average groundwater use by the project. Any significant changes in the water supply for the project during construction or operation of the plant will be noticed in writing to the CPM at least 30 days prior to the effective date of the proposed change.~~

**SOIL & WATER-5** The project owner shall monitor the use of groundwater at the site and report total usage to the CPM. Prior to the use of groundwater during operation by the GWF Hanford, 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 volumes of water supplied to the GWF Hanford from each water source. Those metering devices shall be operational for the life of the project. The project owner shall monitor the amount of surface water banked with the Kings County Water District for GWF Hanford under the Water Mitigation Agreement.

The project owner shall prepare an annual Water Use Summary, which will include the monthly range and monthly average of daily non-potable water usage in gallons per day, and total water used by the project on a monthly

and annual basis in acre-feet. The Water Use Summary shall include the annual surface water banked with the Kings County Water District on behalf of GWF and identify the quantity of water banked to offset water use at GWF Hanford and the Hanford LP. All communications with the Kings County Water District shall reflect the 1.76:1 mitigation ratio for water use at GWF Hanford. Potable water use on-site shall be recorded on a monthly basis. For subsequent years, the annual Water Use Summary shall also include the yearly range and yearly average water use and water banked by the project. The annual 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 GWF Hanford, the project owner shall submit to the CPM conclusive proof that metering devices have been installed and are operational on the groundwater supply and distribution system. If there is a significant change in the water supply source(s), the new source(s) supply and distribution system shall also have metering devices. Any water used from the new source(s) shall be incorporated into the annual Water Use Summary within 30 days of hook-up. The project owner will document total groundwater usage and report groundwater usage to the CPM. The project owner will document total surface water banked with Kings County Water District and report surface water banking to the CPM. The project owner will report all disruptions to the groundwater supply, the water treatment process, the volume of backup water used, and the total annual groundwater use for the year, and the two years prior, in the annual compliance report.

If there is a significant change in the water supply source(s), the new source(s) supply and distribution system shall also have metering devices. Any water used from the new source(s) shall be incorporated into the annual Water Use Summary within 30 days of hook-up.

The project owner shall submit a Water Use Summary to the CPM in the annual compliance report. The summary report shall distinguish between recorded water use of groundwater and backup water. The project owner shall provide a report on the servicing, testing and calibration of the metering devices in the annual compliance report.

**SOIL** **~~SPPE CONDITION HYDROLOGY~~ & WATER-6** The project owner shall ~~will~~ obtain a valid ~~final~~ Industrial Discharge Permit prepared in accordance with the City of Hanford's Pretreatment Program for the project's wastewater discharge to the City's POTW. The project will not operate without a valid permit in place.

**Verification:** The Applicant will obtain and provide a copy of final Industrial Discharge Permit issued by the City of Hanford for the project's wastewater discharge to the POTW to the CPM at least 14 days prior to the POTW receiving any wastewater discharge from the project. Any change to either the chemical or physical parameters or volume of the discharge permitted by the Industrial Discharge will be noticed in writing to both the CPM and the City of Hanford during both construction and/or operation. The project owner will notify the Energy Commission in writing of any changes to the Industrial Discharge Permit, either instituted by the project owner or the City of Hanford, including any permit renewal. The project owner will provide the CPM with the annual

monitoring report summary required by the Industrial Discharge Permit, and will fully explain any violations, exceedances, enforcement actions, and remedial actions.

**SOIL & WATER-~~5~~7** All straw wattles and straw bales for BMP's will be certified weed free. All seed mixtures will be approved by the CPM before application.

**Verification:** The project owner will provide to the CPM evidence of weed free certification for all straw wattles and bales. The project owner will obtain CPM approval for all seed mixes prior to application.

~~**SOIL & WATER-68** All seed mixtures will be approved by the CPM before application.~~

~~**SOIL & WATER-79** To prevent stormwater and soil contamination the Project Owner shall not use chemical and petroleum based palliatives as dust control. Prior to beginning any site mobilization, the project owner shall obtain CPM approval of the Storm Water Pollution Prevention Plan (SWPPP) as required under the General Storm Water Construction Activity Permit for the project.~~

~~**Verification:** At least 14 days prior to the start of any site mobilization , the project owner will submit a copy of the SWPPP to the CPM for review and approval. Approval of the plan by the CPM must be received prior to the initiation of any site mobilization activities.~~

## REFERENCES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California Energy Commission (CEC). 2001c. Hanford Energy Park Peaker Project Staff Assessment for Emergency Permit, published on May 4, 2001.

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GWF Power Systems Company, Inc. 2001. Hanford Energy Park Peaker – California Emergency Peaker Power Plant Permit Application, Hanford, California.

GWF Power Systems Company, Inc. 2000. Application for Small Power Plant Exemption (SPPE) Hanford Energy Park (HEP), Hanford, California.

Kings County Water District (KCWD). 2009. Telephone communication with Don Mills, administrator, re: Water Banking Agreement with GWF Energy, LLC, on May 27, 2009.

Regional Water Quality Control Board, Central Coast Region. 2007. Waste Discharge Requirements for Kings Waste and Recycling Authority for Post-Closure Maintenance Hanford Municipal Solid Waste Landfill, Kings County, California. August 8, 2007.

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# TRAFFIC AND TRANSPORTATION

**Testimony of James Adams**

## INTRODUCTION

With respect to traffic and transportation, the applicant's petition to amend has three substantive changes compared to staff's previous analysis of the project: 1) construction workforce estimates have changed; 2) existing traffic volumes have been updated; and 3) the City of Hanford and Kings County traffic-related documents have changed (GWF Hanford 2008a, pg. 3-79). In addition, staff has created **TRAFFIC AND TRANSPORTATION Figures 1 and 2,** which show the regional and local transportation system.

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

In general, the applicable federal, state and local LORS have not changed since the project was analyzed in the original proceeding in 2002. However, subsequent to the beginning of operations of the Hanford Energy Park Peaker (HEPP) in 2001, the City of Hanford adopted a new General Plan in 2002 that included a revised Circulation Element. In addition, the Kings County Association of Governments adopted a Regional Transportation Improvement Plan (RTIP) in 2008 that would improve the level of service (LOS) on SR-198 (Kings County 2008).

## ANALYSIS

Staff has reviewed the petition for potential environmental effects and consistency with applicable LORS. Based on this review, staff determined that the proposed amendment would not be a significant change from the original project in terms of traffic and transportation impacts. However, traffic congestion on some of the local roads has increased and staff is recommending a new Traffic and Transportation Condition of Certification.

As noted above, there are three changes from the original project proposal. The first change involves the use of 154 peak construction workers compared with 129 workers noted in the SPPE application (GWF Hanford 2008a, pg. 3-84). The second change involves updated traffic levels in the area, resulting in increased congestion and reduced LOS on State Route (SR)-99 and 11th Avenue. For example, the morning and afternoon peak traffic period on SR-99 from SR-137 to SR-198 is LOS F, and the LOS on 11$^{th}$ Avenue between Houston Avenue and Hanford-Armona Road is E throughout the day (GWF Hanford 2008, Tables 3.11-1 and 11-2, pp. 3-80 and 3-82; also see **TRAFFIC AND TRANSPORTATION Figures 1 and 2**). These LOS levels are unacceptable to Caltrans and the City of Hanford, respectively.

The third change is the adoption of new planning documents that affect transportation in the project area. The City of Hanford's Circulation Element in the 2002 General Plan notes that an overall LOS standard of C, with a peak LOS D in some instances, is acceptable on city streets and roads (City of Hanford 2002, pg. CI-4). One of the

projects contained in the Kings County 2008 RTIP is constructing a new four lane section of SR-198 from SR-43 to SR-99 (Kings County 2008, pg. 9).

Staff has reviewed the project changes and has identified the following impacts on the local traffic and transportation system. The slight increase in peak construction worker traffic (21 trips per day) is not a significant change when compared with the originally proposed project. The increase in traffic congestion and related deterioration in LOS for the segment of SR-99 and 11th Avenue identified earlier is a significant change since the original project was analyzed. LOS E on 11th Street is not acceptable pursuant to the city of Hanford's Circulation Element, and LOS F on the relevant segment of SR-99 is below Caltran's acceptable LOS D. Staff is proposing Condition of Certification **TRANS-6,** which requires construction workers and truckers be advised to avoid using the portion of SR-99 noted above during peak traffic periods, and the portion of 11th Street identified earlier. The construction of the new section of SR-198 could overlap with the Hanford plant construction but the current route of SR-198 would be used until the new section is completed in about two years. However, due to the State budget issues, the SR-198 construction start-up could be delayed indefinitely (Kings County 2009).

## CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the increased construction workforce related to traffic and transportation is not a significant change. The increased congestion on a portion of SR-99 during peak periods and on a portion of 11th are significant changes, and staff is proposing a new Condition of Certification **TRANS-6** that would replace the original **TRANS-6**. The project would comply with all applicable LORS.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

~~**TRANS-6** Linear facility construction impacts on traffic. Prior to initiation of ground disturbance within the public right-of-way, the applicant shall submit a TCP to the CPM for review and approval. The TCP shall provide methods designed to minimize disruption of traffic including the use of the minimum traffic lane area required for construction, delineating only the area that will be under construction in the next 24 hour period, and use of signs and traffic flagmen to direct traffic around construction areas.~~

~~Verification: The project owner shall obtain approval for the TCP from the CPM before initiating construction in the public right-of-way. The CPM may periodically inspect the construction to ensure that the plan is being implemented.~~

**TRANS-6** The project owner shall advise construction contractors and subcontractors that workers and truck traffic should avoid using SR-99 between SR-137 and SR-198 during morning and afternoon peak periods, and 11th Street between Houston Avenue and Hanford-Armona Road.

**Verification:** At least 30 days prior to earth-moving activities, the project owner shall provide a copy of letters sent to project construction contractors and subcontractors to the CPM for review and approval that direct workers to avoid the portions of SR-99 and 11th Street noted above.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

City of Hanford 2002. Hanford General Plan. Circulation Element, revised in 2002.

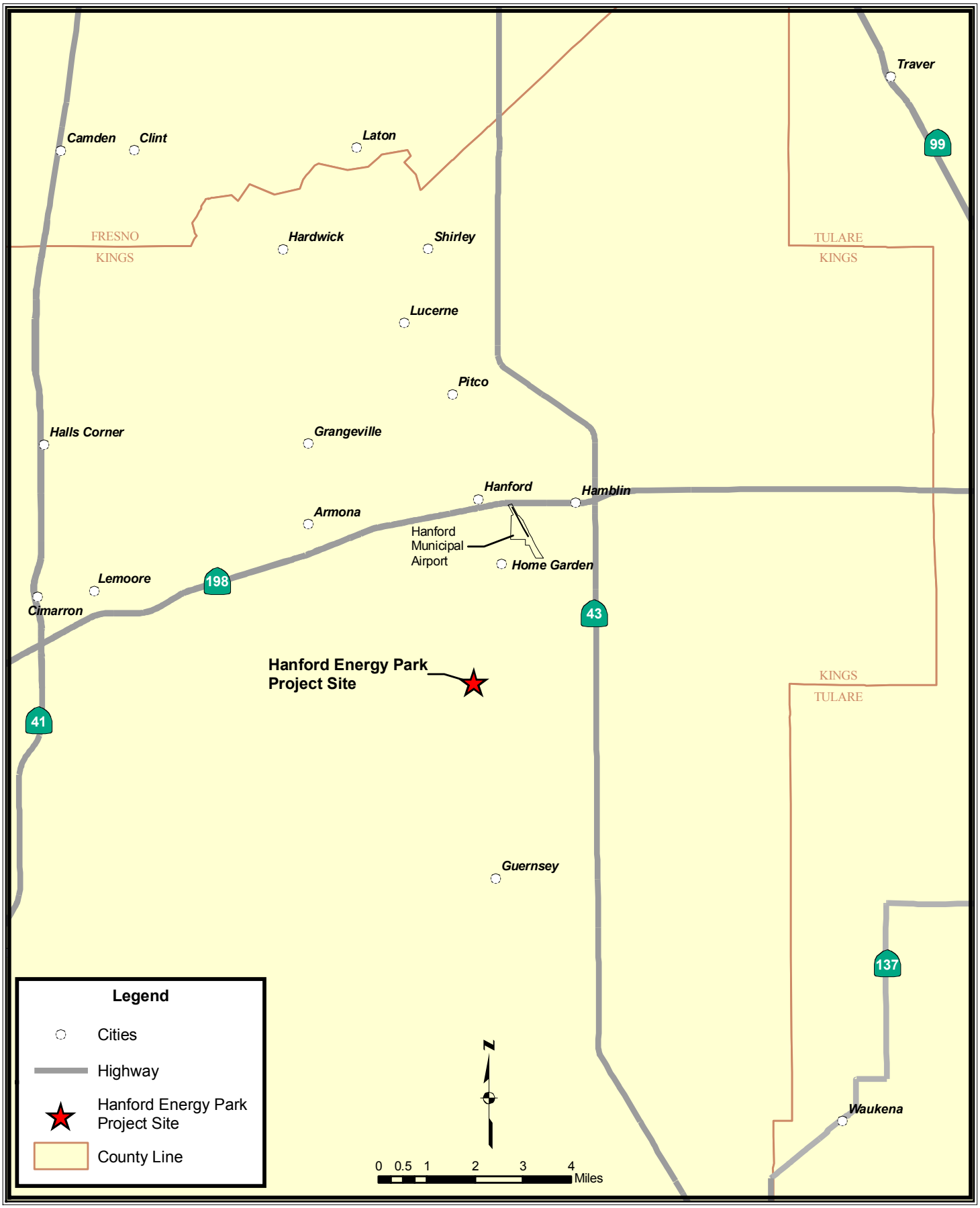
GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

Kings County 2008. Regional Transportation Improvement Program. Adopted: January 23, 2008.

Kings County Association Governments 2009. E-mail from Terri King, Executive Director, to James Adams, California Energy Commission, on February 6, 2009.

**TRAFFIC & TRANSPORTATION - FIGURE 1**

Hanford Energy Park - Regional Transportation System

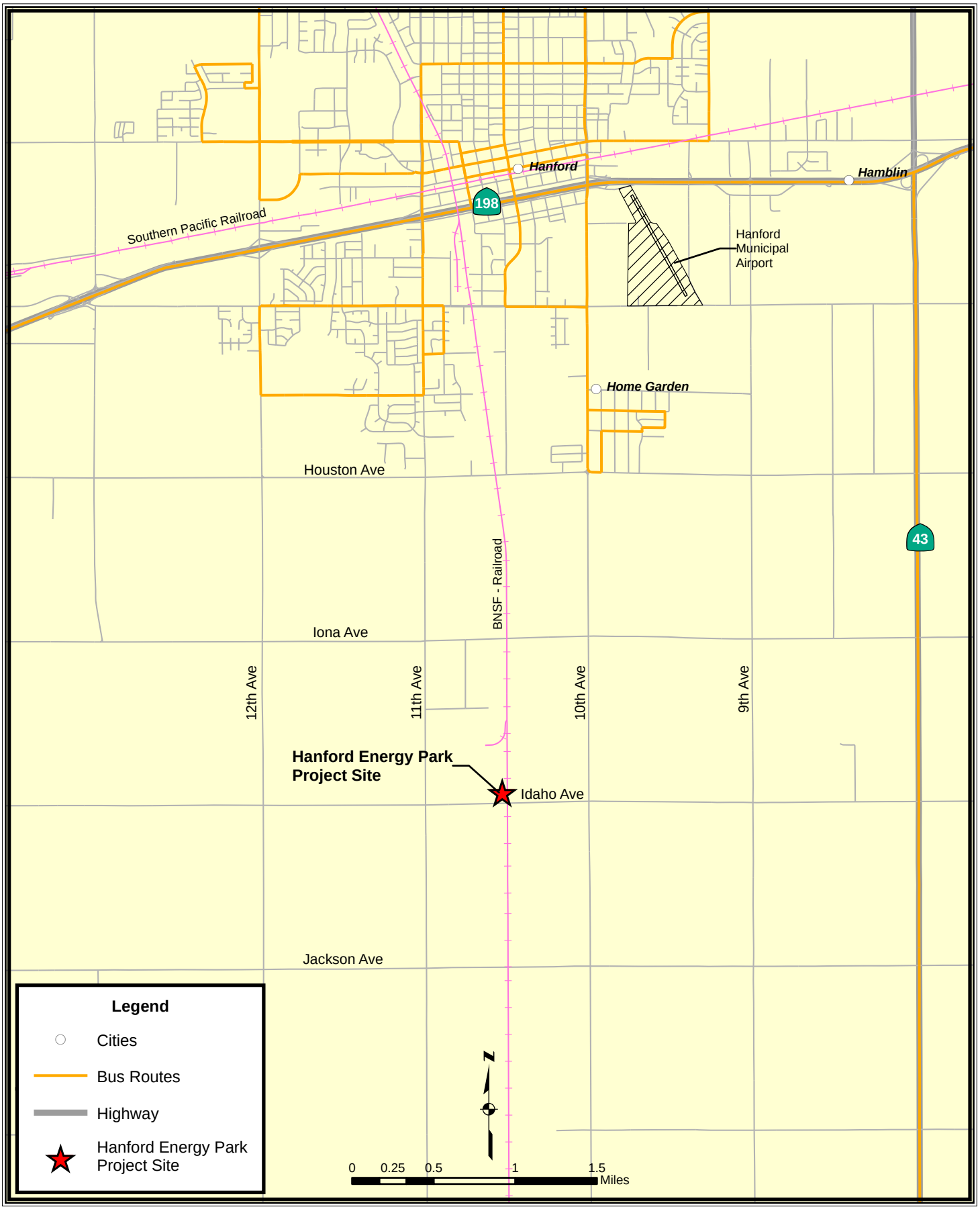



**CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2009**

SOURCE: California Energy Commission - Tele Atlas

**TRAFFIC & TRANSPORTATION - FIGURE 2**

Hanford Energy Park - Local Transportation System




**CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008**

SOURCE: California Energy Commission - Tele Atlas

# TRANSMISSION LINE SAFETY AND NUISANCE

**Testimony of Obed Odoemelam, Ph.D.**

## INTRODUCTION

This analysis addresses whether the transmission line safety and nuisance aspects of the Hanford Energy Park Peaker (HEPP) Project would be changed by the proposed amendment to convert the peaking units to combined cycle units, thereby necessitating specific changes to the conditions of certification specified in the related Energy Commission Decision of April 26, 2001.

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

There are no new or changed transmission line and safety-related laws, ordinances, regulations, and standards (LORS) that would be applicable to the amended project.

## ANALYSIS

This analysis is based, in part, on information provided in the HEPP Small Power Plant Exemption application (GWF Power Systems Company, Inc., 2000), GWF Hanford Amendment (GWF Energy, LLC., 2008), the Staff Assessment for the HEPP, Docket No. 01-EP-71 (CEC, 2001b) and the Energy Commission's Final Decision of April 2001 on the application for the Emergency Peaker for the HEPP Project (CEC 2001a). The purpose of staff's initial analysis was to assess whether the proposed line construction and operational plan adequately incorporated the measures necessary for compliance with health and safety LORS of concern for the 115 -kV lines of the type proposed for the project. The analysis focused on the following issues relating primarily to the physical presence of the line or secondarily to the physical interactions of the line's electric and magnetic fields:

- Aviation safety
- Interference with radio-frequency communication
- Audible noise
- Fire hazards
- Hazardous shocks
- Nuisance shocks, and
- Electric and magnetic field (EMF) exposure

Staff assessed the applicant's proposed mitigation measures and determined that their implementation would be adequate to ensure that the line impacts of concern would be below the levels of potential significance. Staff's proposed condition of certification, specified in the April 26, 2001 Energy Commission Decision, were intended to ensure implementation. The proposed amendment to add one new power generator to the existing two generators would increase generating capacity without affecting the

transmission line design and operational plan necessary to ensure that the line impacts of concern would remain at insignificant levels.

## CONCLUSIONS AND RECOMMENDATIONS

Since the proposed amendment would increase generating capacity without affecting the line design and operational plan bearing on the field and non-field impacts addressed in the Final Staff Assessment, staff does not consider it necessary to recommend modifications to the related conditions of certification specified in the Energy Commission Decision of April 26, 2001, as Transmission System Engineering-1 (**TSE-1)**.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

None.

## REFERENCES


California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

GWF Power Systems Company, Inc. 2000. Application for Small Power Plant Exemption (SPPE) Hanford Energy Park Project (HEP) Hanford, California.

GWF Power Systems Company, Inc. 2001. Application for Emergency Peaker (EP) Hanford Energy Park Peaker Project (HEPP) Hanford, California April 2001.

# VISUAL RESOURCES

**Testimony of Marie McLean**

## INTRODUCTION

GWF Energy, LLC (GWF) has petitioned the California Energy Commission to amend the license for the 95-megawatt (MW) Hanford Energy Park Peaker (HEPP) Project, issued May 7, 2001. GWF wishes to convert the HEPP to a combined-cycle power plant with a nominal 25 MW (net) of additional generating capacity, resulting in a nominal generating capacity of 120 MW net. Once converted, the new facility will be known as GWF Hanford Combined-Cycle Power Plant (GWF Hanford). See **VISUAL RESOURCES Figure 1,** Location Map, for the location of GWF Hanford.

Visual elements to be considered in the conversion include the addition of two once-through steam generators (OTSGs) with rectangular stacks approximately 91.5 feet tall by 13 feet wide by 9 feet long; a new 74 foot-tall by 240-foot wide air-cooled condenser (ACC); steam turbine generator (STG); generator step-up transformer and circuit breaker into the existing on-site 115 kV switchyard; and demolition and removal of the two existing oxidation catalyst and selective catalytic reduction (SCR) systems, including the existing catalyst housing and 85-foot stacks. In addition, approximately 5.3 acres would be temporarily disturbed outside the existing fence line for construction laydown and parking.

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

See **VISUAL RESOURCES Table 1** for information on LORS pertaining to this project. See **VISUAL RESOURCES Table 2** for City of Hanford Recommendations incorporated into the Energy Commission's May 7, 2001 Decision pertaining to this project. Those recommendations are to be carried forward in this amendment.

**VISUAL RESOURCES Table 1**
**Laws, Ordinances, Regulations, and Standards (LORS)**

| APPLICABLE LAW | DESCRIPTION |
|---|---|
| **Federal** | |
| Transportation Equity Act for the 21st Century of 1998, and Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005. | Designed to protect federally managed lands or a recognized National Scenic Byway or All-American Road within its vicinity. Does not apply to this project. |
| **State** | |
| California Streets and Highways Code, Sections 260 through 263 – Scenic Highways | Designed to ensure the protection of highway corridors that reflect the State's natural scenic beauty. No scenic highways are located near the GWF Hanford location |

| Local | |
|---|---|
| Kings County General Plan, adopted December 28, 1993, and last amended February 10, 1998. | Kings County General Plan, Open Spaces, includes policies for designated scenic highways. No scenic highways are in the vicinity of GWF Hanford. |
| City of Hanford Municipal Code, Title 17, Zoning, Chapter 17.30.030 Industrial Zones, HI, Heavy Industrial ,and Section 17.30.080; updated June 2008 | Contains all codified ordinances adopted by the Hanford City Council. Updated June 2008. Sections cited pertain specifically to this project. |

**VISUAL RESOURCES Table 2**
**City of Hanford Recommendations Incorporated in**
**May 2001 Energy Commission Decision and Continued in This Amendment**

| RECOMMENDATION | PURPOSE |
|---|---|
| **Open and Unlandscaped Portions of Site** | |
| All open and unlandscaped portions of the site to be maintained in good condition, free from weeds, dust, trash, and debris . | To conform with intent of *Municipal Code*. Incorporated in Conditions of Certification. |
| **Color of Facility** | |
| All equipment to be painted, where feasible, and maintained so as to not show rust or corrosion. | To conform with intent of *Municipal Code*. Incorporated in Conditions of Certification. |
| **Lighting** | |
| All lighting to be hooded and directed on site. | To conform with intent of *Municipal Code*. (Section 17.39.030 (C.1) of Code pertains to this project.) Incorporated in Conditions of Certification. |
| **Fencing** | |
| If block fencing is not constructed with peaker plant facility, six-foot-tall, solid wall or six-foot fence with slats is to be installed around the facility. | To confirm with intent of *Municipal Code.* Incorporated in Conditions of Certification. |

## ANALYSIS

Staff has reviewed the September 2008 Petition to Amend the Energy Commission's license issued for the GWF Hanford Combined-Cycle Power Plant, as well as the Hanford Energy Park Peaker Project (HEPP) Staff Assessment for Emergency Permit, dated May 4, 2001, and the Energy Commission's May 2001 decision, and concludes that the design changes proposed do not significantly alter the visual resources findings found in the Energy Commission's May 2001 decision pertaining to the HEPP.

Staff based its decision on photographic analysis of three key observation points (KOPs) provided by the applicant in its September 2008 application as well as on an analysis of visible water vapor plumes.

Staff also determined that with the implementation of the Energy Commission's conditions of certification for visual resources, the construction and operation of the GWF Hanford will not result in any significant adverse visual resource impacts.

## KEY OBSERVATION POINTS (KOPS)

The applicant submitted photographs, descriptions and post-construction simulations of three Key Observation Points (KOPs) for analysis. A photograph and description was provided for a fourth KOP, but not a simulation, as the new facilities would be almost completely screened from that view. Staff agrees that the existing Hanford LP facilities would screen the new facilities from this KOP, and therefore no analysis of that KOP is included in this assessment. The three KOPs chosen for analysis are:

1. KOP1, Idaho Avenue, East of Project Site
2. KOP2, Tenth Avenue, Southeast of Project Site
3. KOP3, Eleventh Avenue, Northwest of Project Site

Those KOPs were used to (1) compare the most visibly prominent structures of the original HEPP with those that would result from the conversion of the HEPP to a combined-cycle plant; and (2) assess the visual impacts of those structures on the surrounding landscape. See **VISUAL RESOURCES Figure 2**, Key Observation Points, for a location map of the project and the three KOPs.

For the HEPP currently occupying the site, the most visible components consist of two 85-foot tall stacks, two 50-foot tall air pollution control system structures; and a 50-foot tall combustion turbine inlet air structure. Those components would be demolished and removed from the site.

The most visible components of the new GWF Hanford would be two 67-foot OTSGs; two 92-foot tall OTSG stacks; and an ACC that would be 74 feet high, 240 feet long, and 42 feet wide.

Staff has reviewed the three KOPs and concludes that the proposed prominent structural changes would not significantly alter the visual resources analysis in the May 2001 Staff Assessment. Staff's conclusions were based on the following visual analyses:

1. In the May 2001 *Hanford Energy Park Peaker Project Staff Assessment for Emergency Permit*, staff determined that the "project site is located in an area of low visual quality, chaotic in a manner typical of industrial landscapes." Staff did not select nor evaluate Key Observation Points (KOPs) in its May 2001 Staff Assessment.
2. Staff conducted an analysis of three of the KOPs included in the September 2008 *Petition for License Amendment, GWF Hanford Combined-Cycle Power Plant,* which are detailed below:

a. KOP1 presents a view of the site from along Idaho Avenue, looking northwest, approximately one-tenth mile from the main entrance to the plant. Various warehouses and industrial buildings as well as a grain-processing facility are located along Idaho Avenue, including the Cal-Central Business Park.

   From this KOP, the most prominent structures introduced to the project site—the ACC and OTSGs—are clearly visible. See **VISUAL RESOURCES Figure 3**, KOP1, GWF Hanford Combined-Cycle Power Plant, Looking Northwest from Idaho Avenue; and **VISUAL RESOURCES Figure 4**, KOP1, Simulated View, GWF Hanford Combined-Cycle Power Plant, Looking Northwest from Idaho Avenue.

   From this KOP, which is located in an area zoned Heavy Industrial, visual contrast is moderate. The four largest new project additions are clearly visible—the OTSG stacks, STG, and fire water tank. However, the ACC adds a form and line completely new to the site. Because of its location, the ACC is clearly visible and contrasts with other elements. Contrast is muted, however, because the ACC will be painted to blend with other facilities on the site.

   The new additions, particularly the ACC, are dominant at this KOP. This industrial area does not contain high-quality visual views; hence, view blockage is low. Because of the highly industrial nature of this area, visual sensitivity at this KOP is moderately low; and the visual change brought about by the introduction of the new elements to the site is moderate. Those two ratings result in an adverse but less than significant rating for this KOP.

b. KOP 2 presents a view of the project site from 10$^{th}$ Avenue, looking northwest about one-half mile southeast of the project site. The foreground view is dominated by intact open land; the midground, by industrial buildings and warehouses. See **VISUAL RESOURCES Figure 5**, KOP2, GWF Hanford Combined-Cycle Power Plant, Looking Northwest from 10$^{th}$ Avenue; and **VISUAL RESOURCES Figure 6**, Simulated View, GWF Hanford Combined-Cycle Power Plant, Looking Northwest from 10$^{th}$ Avenue.

   From this KOP, the industrial nature of the setting results in a moderately low visual contrast. The most visible component is the ACC. Its horizontal form and line blend with other horizontal structures in the KOP, including the grain processing facility to the left. And its color helps it to blend with the other on-site components, thus minimizing its impact.

   Even with the addition of the new components, the project does not dominate the site. Instead, the new components are codominant with other elements in the KOP, including the industrial buildings to its right and left. In addition, the strongly industrial nature of the setting precludes views; so view blockage is low, and visual sensitivity is moderately low. At this KOP, visual change resulting from GWF Hanford is moderately low, resulting in an impact of adverse but less than significant.

c. KOP 3 presents a view of the project site from 11th Avenue, looking southeast from about one-half mile from the project site. GWF Hanford is located center left in this KOP. In this KOP, the foreground is dominated by intact open land. A grain processing facility to the left of the power plant dominates the midground. See **VISUAL RESOURCES Figure 7**, KOP3, Existing View, GWF Hanford Combined-Cycle Power Plant, Looking Southeast from 11th Avenue; and **VISUAL RESOURCES Figure 8**, KOP 3, Simulated View, GWF Hanford Combined-Cycle Power Plant, Looking Southeast from 11th Avenue.

   Visual contrast from this KOP, located in a heavily industrialized area, is low. The form, line and color of the new additions—the ACC and OTSG stacks—blend in with the existing diagonal and horizontal structures. And the OTSG stacks help to obscure the ACC, thus diminishing its impact.

   The most dominant components at this KOP are the grain processing facility, warehouses, and related structures to the right of the new additions. Hence, dominance is moderately low. In addition, the new additions do not block any views in this highly industrial area. As a result, view blockage is low as is visual sensitivity and visual change. The *low* rating for visual sensitivity and visual change result in an impact of *not significant.*

## LIGHT AND GLARE

Additional visible lighting would occur as a result of the construction and operation of GWF Hanford Combined-Cycle Power Plant. The existing Condition of Certification **VIS-4** addresses this potential impact.

## VISIBLE VAPOR WATER PLUMES

Whenever steam is used to generate electricity, water vapor plumes are formed. However, the project as amended will use an air-cooled condenser that does not produce water vapor plumes. Consequently, the visible water vapor plume analysis done for this project indicated a less than significant impact from visible water vapor plumes. See **Appendix VR-1** for the complete analysis.

## CONDITIONS OF CERTIFICATION

Visual conditions of certification are designed to help minimize visual impacts from the project. In addition to the six conditions of certification included in the Energy Commission's May 2001 decision for the HEPP, staff proposes two new conditions of certification, Condition of Certification **VIS-7** and Condition of Certification **VIS-8** in the "Proposed Conditions of Certification" section below.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has reviewed the Petition for License Amendment submitted by the applicant in September 2008 and concludes that the design changes proposed do not significantly alter the visual resources findings included in the Energy Commission's May 7, 2001, decision pertaining to the HEPP.

Staff has determined that with the implementation of the six conditions of certification for Visual Resources included in the May 4, 2001, *Hanford Energy Park Peaker Staff Assessment,* and adopted by the Energy Commission in its May 7, 2001, decision as well as staff's proposed Condition of Certification **VIS-7** and Condition of Certification **VIS-8**, included in this analysis, the construction and operation of the GWF Hanford will not result in any significant adverse visual resource impacts.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

In addition to the existing Visual Resources Conditions of Certification, Staff has proposed Visual Resources Condition of Certification **VIS-7** to screen the construction laydown and parking area to be located north of the current boundary of the HEPP site. Staff has also proposed Condition of Certification **VIS-8** to mitigate impacts of project construction.

**VIS-7** The project owner shall reduce the visibility of construction equipment, materials, and activities at the project site and at any material or equipment storage or staging area with temporary screening, such as fabric attached to fencing or berms, prior to the start of ground disturbance. Screening shall be of an appropriate height, design, opacity, and color for each specific location, as determined by the CPM.

The project owner shall submit to the CPM for review and approval a specific screening plan for satisfying those requirements.

**Verification:** At least 30 days prior to the start of site mobilization, the project owner shall submit the screening plan to the CPM for review and approval. The screening shall be installed during the site mobilization phase. The project owner shall notify the CPM when installation is completed.

The project owner shall provide the CPM with electronic color photographs after installing screening at the power plant site and at staging and material and equipment storage areas indicating the effectiveness of the screening.

**VIS-8** The project owner shall ensure that visual impacts of the project construction are adequately mitigated by implementing the following measures:

All evidence of construction activities, including ground disturbance in staging and storage areas, shall be removed and remediated upon completion of construction. Any vegetation removed in the course of construction will be replaced on a 1-to-1, in-kind basis. Such replacement planting shall be monitored for a period of three years to ensure survival. During this period all dead plants shall be replaced.

The project owner shall submit a plan for restoring the surface conditions of any areas temporarily disturbed during construction of the amended project. The plan shall include grading to the original grade and contouring and revegetation of temporarily disturbed areas.

The project owner shall not implement the plan until receiving written approval of the submittal from the California Energy Commission Compliance Project Manager.

**Verification:** At least 60 days prior to the start of site mobilization, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plans are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days after completing the surface restoration that the areas disturbed during construction are ready for inspection.

## REFERENCES


GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

California Department of Transportation; www.dot.gov/hq/LanadArch/.

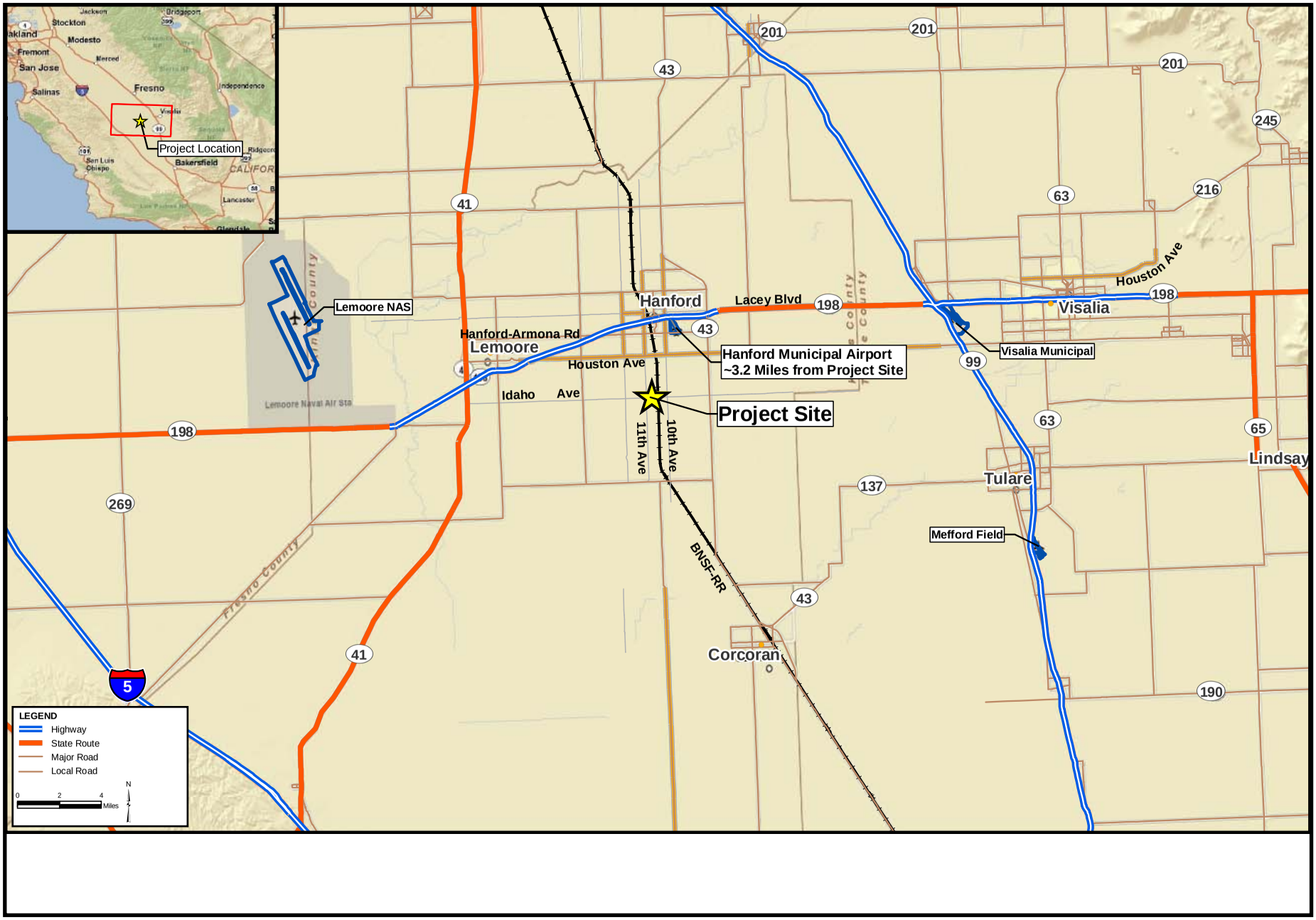
*California Streets and Highways Code*; Sections 260-263, Scenic Highways.

Hanford Municipal Code, City of Hanford, California; updated June 2008; http://www.ci.hanford.ca.us/City%20Clerk%20Municipal%20Code.htm.

Kings County General Plan, amended February 10, 1998; www.county of kings/Plan/General Plan.htm.

**VISUAL RESOURCES - FIGURE 1**

GWF Hanford Combined Cycle Power Plant - Location Map



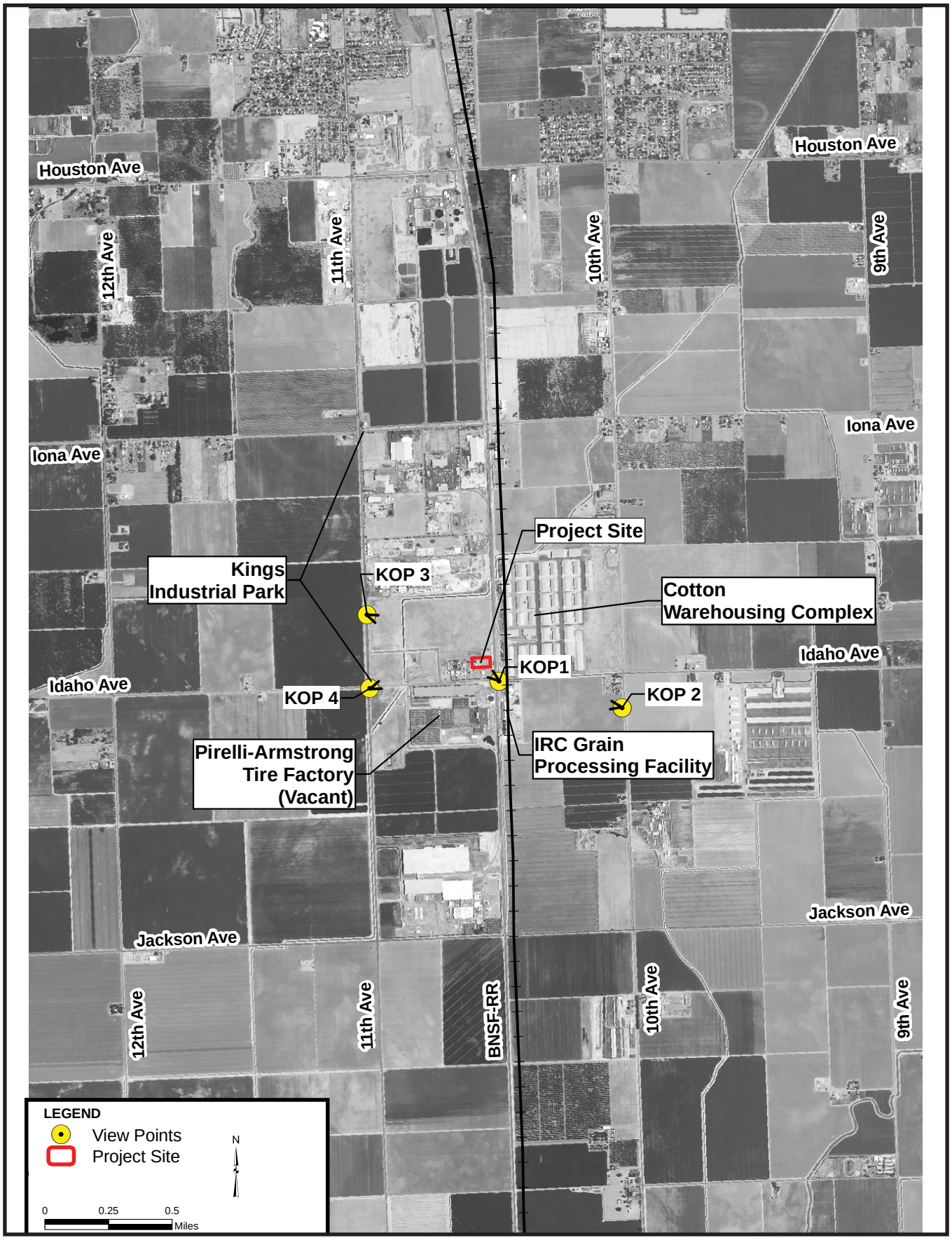



**CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009**

SOURCE: AFC Figure 1-1

**VISUAL RESOURCES - FIGURE 2**

GWF Hanford Combined Cycle Power Plant - Key Observation Points




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

SOURCE: AFC Figure 3.12-1

**VISUAL RESOURCES - FIGURE 3**

GWF Hanford Combined Cycle Power Plant - KOP 1 - Existing View Looking Northwest from Idaho Avenue

SOURCE: AFC Figure 3.12-2

**VISUAL RESOURCES - FIGURE 4**

GWF Hanford Combined Cycle Power Plant - KOP 1 - Simulated View Looking Northwest from Idaho Avenue

SOURCE: AFC Figure 3.12-2

**VISUAL RESOURCES - FIGURE 5**

GWF Hanford Combined Cycle Power Plant - KOP 2 - Existing View Looking Northwest from 10th Avenue

SOURCE: AFC Figure 3.12-3

**VISUAL RESOURCES - FIGURE 6**

GWF Hanford Combined Cycle Power Plant - KOP 2 - Simulated View Looking Northwest from 10th Avenue

SOURCE: AFC Figure 3.12-3

**VISUAL RESOURCES - FIGURE 7**

GWF Hanford Combined Cycle Power Plant - KOP 3 - Existing View Looking Southeast from 11th Avenue

SOURCE: AFC Figure 3.12-4

**VISUAL RESOURCES - FIGURE 8**

GWF Hanford Combined Cycle Power Plant - KOP 3 - Simulated View Looking Southeast from 11th Avenue

SOURCE: AFC Figure 3.12-4

# APPENDIX VR-1
# VISIBLE PLUME MODELING ANALYSIS
**Testimony of William Walters, P.E.**

## INTRODUCTION

The following provides the assessment of the Hanford Combined Cycle Power Plant (Hanford) project gas turbine/once-through steam generator (OTSG) exhaust stack visible water vapor plumes. Staff completed a modeling analysis for the applicant's proposed unabated gas turbine/OTSG design based on data provided by the applicant. This evaluation does not consider existing plume sources at the adjacent petroleum coke power generating facility, which was not licensed by the Energy Commission and is not part of the Petition for License Amendment.

## PROJECT DESCRIPTION

The proposed Hanford project would utilize two General Electric LM6000 gas turbines that would be modified to operate in either simple-cycle mode or combined cycle mode. OTSG's differ from standard heat-recovery steam generators (HRSGs) in that OTSG's can operate in both combined-cycle and simple-cycle mode, able to withstand the high exhaust temperatures in simple cycle mode with no water in the steam generator. Duct burners are not proposed. The project's steam power cycle cooling would be accomplished by a new air cooled condenser that would not cause visible water vapor plumes. Gas turbines have no visible water vapor plume potential when operating in simple cycle mode due to the very high exhaust temperatures in that mode; therefore, only the OTSG exhausts (i.e. operating in combined cycle mode) will be modeled for potential visible water vapor plumes.

Additionally, the proposed wet surface air condenser (WSAC) could also create visible water vapor plumes if operated with water sprays under very cold conditions. However, the project design requires the use of spray water in the WSAC only under extremely warm ambient conditions, which essentially eliminates the potential for visible water vapor plumes from the WSAC.

## VISIBLE WATER VAPOR PLUME MODELING METHODS

## PLUME FREQUENCY AND DIMENSION MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate plume frequency for the gas turbine/OTSG exhausts. This model provides conservative estimates of plume frequency. This model uses estimated 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), which determine temperatures at the plume centerline, but this model does not incorporate building downwash.

## 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:

> The Energy Commission has identified a “clear” sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set[17] used 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 hours with unlimited ceiling height (i.e. hours with a sky opacity equal to or less than 50 percent). 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 percent), 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 percent 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.

## OTSG VISIBLE WATER VAPOR PLUME MODELING ANALYSIS

Staff evaluated the Applicant’s Amendment Petition (GWF Energy 2008a) and performed an independent psychrometric analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for each OTSG stack.

## HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the Applicant, the frequency of visible water vapor plumes can be estimated. The operating data for these stacks are provided in **VISIBLE PLUME Table 1**.

[17] This analysis uses a five year Lemoore Naval Air Station meteorological data set (1992 through 1995 and 1997) that was obtained from the National Climatic Data Center (NCDC).

**VISIBLE PLUME Table 1**
**OTSG Exhaust Parameters [a]**

| Parameter | OTSG Exhaust Parameters | | | | |
|---|---|---|---|---|---|
| Stack Height | 91.5 feet (27.89 meters) | | | | |
| Stack Diameter | 9.6 feet (2.93 meters) | | | | |
| Ambient Conditions | Molecular [b] Weight | Moisture (by mole) | Moisture Content [b] (by weight) | Exhaust Flow Rate (klb/hr) | Exhaust Temp (°F) |
| **Full Load No Duct Firing** | | | | | |
| 15 °F | 28.2 | 9.33% | 5.95% | 1,120 | 288 |
| 63 °F | 28.4 | 10.39% | 6.58% | 1,048 | 272 |
| 115 °F | 28.0 | 11.45% | 7.36% | 955 | 283 |

Source: AFC (GWF Energy 2008a, Attachment C2, Table C2.3)
Note(s): a. Full load operation values that were extrapolated or interpolated between hourly ambient condition data points as necessary.
b. Calculated using exhaust composition data.

## HRSG VISIBLE WATER VAPOR PLUME MODELING ANALYSIS

**VISIBLE PLUME Table 2** provides the CSVP model visible water vapor plume frequency results for year round full load combined cycle operation using a five-year (1992-1995, 1997) Lemoore Naval Air Station meteorological data set, obtained from the NCDC.

**VISIBLE PLUME Table 2**
**Staff Predicted Hours with HRSG Steam Plumes**
**Lemoore NAS 1992-1995, 1997 Meteorological Data**

| Case | Available (hr) | Plume (hr) | Percent |
|---|---|---|---|
| All Hours | 43,824 | 477 | 1.09% |
| Daylight Hours | 22,177 | 119 | 0.54% |
| Daylight No Rain No Fog | 19,384 | 10 | 0.05% |
| Seasonal Daylight No Rain No Fog* | 7,371 | 10 | 0.14% |
| Seasonal Daylight Clear Hours | 2,492 | 6 | 0.24% |

*Seasonal conditions occur anytime from November through April.

A visible water vapor plume frequency of 20 percent of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. Staff's modeling results indicate that the visible water vapor plume frequencies for the project's proposed gas turbine/HRSG are predicted to be well less than 20 percent of seasonal daylight clear hours.

## CONCLUSIONS

Visible water vapor plumes from the proposed Hanford gas turbine/OTSG exhausts are expected to occur infrequently, only under the coldest periods with high relative humidity, well below 20 percent of seasonal daylight clear hours. Therefore, no further visual impact analysis of the expected plume sizes has been completed.

No visible water vapor plumes will be emitted from the air cooled condenser, and little to no visible water vapor plumes are expected to be emitted from the WSAC.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

# WASTE MANAGEMENT

**Testimony of Ellie Townsend-Hough**

## INTRODUCTION

On October 1, 2008, GWF Energy LLC (GWF) (project owner) filed a petition with the California Energy Commission to modify the Hanford Energy Park Peaker (HEPP) Project. The petition proposes to modify the existing 95-megawatt (MW) simple-cycle HEPP power plant and convert the facility into a combined-cycle power plant with a nominal 25 MW of additional generating capacity.

This analysis addresses project changes that would be associated with managing waste generated from demolition, construction and operation activities at the proposed HEPP and any hazardous wastes already existing on-site. Only those aspects of the HEPP that have changed because of the proposed amendment and that affect conditions of certification for Waste Management, as contained in the Energy Commission Decision adopted May 10, 2001 (CEC 2001), are examined. The modified facility will be referred to as GWF Hanford Combined-Cycle Power Plant (GWF Hanford). The technical scope of this analysis encompasses solid wastes existing on-site and those generated during facility demolition, construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

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

The LORS applicable to the HEPP, as described in the Energy Commission Staff Assessment (May, 2001), have not changed.

## ANALYSIS

Staff reviews whether any existing or potential releases of hazardous substances at a site would pose a risk to public health and environmental receptors. Review of the compliance record for the project shows no significant hazardous waste release from the present project, indicating that current site conditions do not present a significant risk. In addition, modification of Condition of Certification **WASTE-2**, deletion of **WASTE-3,** and the addition of **WASTE-5** would ensure that if potentially hazardous conditions were encountered, Energy Commission staff would be notified and the appropriate mitigation would be implemented.

Staff reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept. Staff uses a waste volume threshold equal to 10 percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal waste at a particular facility would be significant.

GWF Hanford will generate nonhazardous solid waste that will add to the total waste generated in Kings County and in California. The estimated amounts are shown in **WASTE MANAGEMENT Table 1** (GWF Hanford/CH2MHILL).

**WASTE MANAGEMENT Table 1**
**Waste Generated**

| | **Construction** tons (cubic yards) | **Operation** tons per year (cubic yards/year) | **Landfill Capacity** cubic yards |
|---|---|---|---|
| **Non-Hazardous** | 583.5 (398) | 5.1 (3.4) | 435,975.3[1] |
| **Hazardous** | 101.2 (67.5) | 0.4 (0.26) | 13, 200,000[2] |

**Notes:**

1 Kings County 2007 landfill totals- www.ciwmb.ca.gov/Landfills/Tonnages//Default
2 Combined permitted capacity of Clean Harbors' Buttonwillow Landfill (Kern County) and the Waste Management Kettleman Hills Facility.

Based on **WASTE MANAGEMENT Table 1**, GWF Hanford's contribution would represent less than 1 percent of the county's total remaining landfill capacity. Staff concludes that disposal of the waste generated during demolition, construction, and operation of GWF Hanford would not result in any significant adverse impacts. There will be no new or additional unmitigated significant environmental impacts associated with the proposed changes.

Staff proposes to modify Condition of Certification **WASTE-1** to ensure the project owner maintains compliance with California Code of Regulations Title 22, Section 66262.12 for identification of U.S. EPA hazardous waste generators. Also to ensure wastes are handled and disposed of properly, staff proposes to delete **WASTE-3** and replace it with **WASTE-4**.

## CONCLUSIONS AND RECOMMENDATIONS

The project will produce additional non-hazardous waste and hazardous waste, both liquid and solid. management of the waste generated during demolition, construction and operation of GWF Hanford would not result in any significant adverse impacts.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff proposes minor modifications to the Waste Management Conditions of Certification as listed in the Energy Commission Decision for the Hanford Energy Park Peaker Plant (CEC 2001).

**WASTE-1** The project owner shall use the existing ~~obtain a~~ hazardous waste generator identification number from the Department of Toxic Substances Control required for ~~prior to~~ producing any hazardous waste.

**Verification:** The project owner shall keep its copy of the identification number on file at the project site.

**WASTE-2** The project owner shall have an environmental professional available for consultation during soil excavation and grading activities. The environmental

professional shall be given full authority to oversee any earth moving activities that have the potential to disturb contaminated soil. The environmental professional shall meet the qualifications of such as defined by the American Society for Testing and Materials designation E ~~1527-97~~ 1527-05 Standard Practice for Phase I Environmental Site Assessments.

**Verification:** If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the environmental professional shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and make a recommended course of action. The environmental professional shall have the authority to suspend construction activity at that location. If, in the opinion of the environmental professional, remediation is to be required, the project owner shall consult with the CPM and a decision will be made by the CPM ~~within 24 hours as to how to proceed~~.

~~**WASTE-3** Any hazardous waste resulting from the construction and operation of the project shall be stored, handled, and disposed of as required by federal regulations and federally mandated state and local regulations.~~

~~**Verification:** Prior to construction the project owner shall provide the CPM documentation that Kings County Environmental Health the California Department of Toxic Substances Control has reviewed and approved the proposed practices for storage, handling, and disposal of any hazardous wastes generated by the demolition, construction and operation of the facility.~~

**WASTE-4** Prior to the start of construction and operation, the project owner shall prepare and submit to the Energy Commission CPM, for review and comment, a waste management plan for all wastes generated during construction and then operation and maintenance of the facility, respectively. The plans shall contain, at minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated, and hazard classifications;
- Methods of managing each waste, including but not limited to: waste testing methods to assure correct classification, specific waste segregation and storage procedures and facilities, treatment methods and companies contracted with for treatment services, methods of transportation and companies contracted with for transportation, disposal requirements and sites, employee hazardous materials training, employee protection, spill response and reporting, and recycling and waste minimization/reduction plans; and
- Methods to be put into place to audit and ensure continuing compliance with the Work plan and all applicable LORS.

**Verification:** No less than 30 days prior to the start of construction the project owner shall submit the construction waste management plan to the CPM for review.

The operation waste management plan shall be submitted no less than 30 days prior to the start of project operation.

The project owner shall submit any required revisions within 20 days of notification by the CPM (or mutually agreed upon date).

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods.

**WASTE-5** Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

**Verification:** The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

## REFERENCES


California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

GWF Hanford/CH2MHILL. Data Responses 1-11, dated January 2009.

# ENGINEERING ANALYSIS

# FACILITY DESIGN

Testimony of Steve Baker

## INTRODUCTION

GWF Energy, LLC seeks approval to convert the Hanford Energy Park Peaker (HEPP) Project to a combined cycle power plant by adding a condensing steam turbine generator, two once-through steam generators with selective catalytic reduction and carbon monoxide catalyst, an air-cooled condenser, condensate and boiler feed pumps and piping, a water treatment skid, a step-up transformer and a circuit breaker; and by modifying existing water and drainage systems. The 95 MW HEPP was certified by the California Energy Commission on April 26, 2001. The plant began operation on September 1, 2001.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The Energy Commission Decision included two Conditions of Certification relating to Facility Design, **GEN-1** and **GEN-2**.

## ANALYSIS

The analysis associated with the original application has not changed as a result of the proposed modification, except that some additional components would be added to the project.

The original project was certified and built under a state of emergency. No such emergency exists at present. In order to assure that the new features of the project are designed, constructed and inspected in accordance with the applicable engineering LORS, staff proposes incorporating in the Energy Commission Decision for this amendment the Facility Design Conditions of Certification typically included in all Energy Commission Decisions. To this end, staff proposes replacing the existing Facility Design Conditions of Certification **GEN-1** and **GEN-2** with typical Conditions of Certification listed below.

## CONCLUSIONS AND RECOMMENDATIONS

The proposed modification from a simple cycle peaker to combined cycle will not result in impacts on facility design. Staff recommends approval of this request and proposes to replace the existing Conditions of Certification **GEN-1** and **GEN-2** with the typical conditions used for all power plant projects, **GEN-1** through **GEN-8**, **CIVIL-1** through **CIVIL-4**, **STRUCT-1** through **STRUCT-4**, **MECH-1** through **MECH-3**, and **ELEC-1,** listed below.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

No mitigation measures are required for Facility Design beyond replacing Conditions of Certification **GEN-1** and **GEN-2** with the following conditions of certification:

~~**GEN-1** The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Code (CBC) and all other applicable LORS in effect at the time initial design plans are submitted to the CBO for review and approval.~~

~~**Verification:** Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) after receipt of the Certificate of Occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy.] The project owner shall keep copies of plan checks and CBO inspection approvals at the project site.~~

~~**GEN-2** 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 description of, and a list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.~~

~~**Verification:** Prior to the start of rough grading, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The project owner shall provide schedule updates in the Monthly Compliance Report.~~

**GEN-1** The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the Transmission System Engineering section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

**Verification:** Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

**GEN-2** Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

**Verification:** At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **FACILITY DESIGN Table 1**, below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

## FACILITY DESIGN Table 1
## Major Structures and Equipment List

| Equipment/System | Quantity (Plant) |
|---|---|
| Steam Turbine and Generator (STG) Foundation and Connections | 1 Lot |
| Once-Through Steam Generator (OTSG) & Stack Structure, Foundation and Connections | 2 |
| STG Main Transformer Foundation and Connections | 1 |
| CEMS Enclosure Structure, Foundation and Connections | 2 |
| Air Cooled Condenser Structure, Foundation and Connections | 1 |
| Water Treatment Area Structure, Foundation and Connections | 1 |
| Boiler Feedwater Pump Foundation and Connections | 4 |
| OTSG Blowdown Tank and Sump Structure, Foundation and Connections | 1 |
| Condensate Tank and Pumps Structure, Foundation and Connections | 1 |
| Waste Water Treatment Facility Structure, Foundation and Connections | 1 |
| STG Electrical Equipment Foundation and Connections | 1 |
| STG Lube Oil Skid Foundation and Connections | 1 |
| High Pressure and Large Diameter Piping and Pipe Racks | 1 Lot |
| Substation, Switchboards, Transformers, Buses and Towers | 1 Lot |
| Electrical Cables/Duct Banks | 1 Lot |
| Prefabricated Assemblies | 1 Lot |

**GEN-3** The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2007 CBC, adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

**Verification:** The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid.

**GEN-4** Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the Resident Engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the Transmission System Engineering section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;
3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;
4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-5** Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at

least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the conditions of certification in the Transmission System Engineering section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for

review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-6** Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the Transmission System Engineering section of this document.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Inspect the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

**Verification:** At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project

owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

**GEN-7** If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

**Verification:** The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

**GEN-8** The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

**Verification:** Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe .pdf 6.0) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

**CIVIL-1** The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;

3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

**CIVIL-2** The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

**Verification:** The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

**CIVIL-3** The project owner shall perform inspections in accordance with the 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

**Verification:** Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

**CIVIL-4** After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

**Verification:** Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final

grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

**STRUC-1** Prior to the start of any increment of construction of any major structure or component listed in **FACILITY DESIGN Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **FACILITY DESIGN Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports, and anchorage; and
3. Large field-fabricated tanks.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and
5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

**Verification:** At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component

listed in **FACILITY DESIGN Table 1** of Condition of Certification **GEN-2**,above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

**STRUC-2** The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

**Verification:** If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**STRUC-3** The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

**Verification:** On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-

mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

**STRUC-4** Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

**Verification:** At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

**MECH-1** The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **FACILITY DESIGN Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);

- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Kings County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **FACILITY DESIGN Table 1**, Condition of Certification **GEN-2,** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**MECH-2** For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.
3. At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

**Verification:** The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

**MECH-3** The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

**ELEC-1** Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the Transmission System Engineering section of this document.

A. Final plant design plans shall include:
   1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
   2. system grounding drawings.

B. Final plant calculations must establish:
   1. short-circuit ratings of plant equipment;
   2. ampacity of feeder cables;
   3. voltage drop in feeder cables;
   4. system grounding requirements;

5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

**Verification:** At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

# GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

**Testimony of Dal Hunter, Ph.D., C.E.G.**

## INTRODUCTION

GWF is seeking approval to modify the Hanford Energy Park Peaker (HEPP) Project by adding once-through steam generators, a steam turbine generator and associated equipment to the two operating General Electric LM6000 combustion turbine generators. An air cooled condenser would also be required.

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

At the time of certification, LORS applicable to Geology, Mineral Resources, and Paleontology were identified in staff's Final Staff Assessment. These LORS will continue to apply to the amended project, and no new LORS have been identified. The California Building Code has been updated to the 2007 edition and is in effect for the proposed upgrade project.

## ANALYSIS

Energy Commission Geology, Mineral Resources, and Paleontology staff reviewed the petition and assessed the impacts of this proposal on environmental quality, public health and safety. In order to ensure protection of any paleontological resources that might be encountered during construction, staff proposes its typical Paleontological Conditions of Certification (below).

## CONCLUSIONS AND RECOMMENDATIONS

It is staff's opinion that with the implementation of the Geology and Mineral Resources Conditions of Certification below, the project as modified will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff proposes that Condition of Certification **PALEO-1** be deleted and replaced with Condition of Certification **PAL-1**, and that Conditions of Certification **PAL-2** through **PAL-7** be added to the existing HEPP license:

~~**PALEO-1 The project certified under this emergency process shall not cause any significant impact to paleontological resources on the power plant site or linear rights of way.**~~

**PAL-1** The project owner shall provide the compliance project manager (CPM) with the resume and qualifications of its paleontological resource specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project

owner shall keep resumes on file for qualified paleontological resource monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontological resource monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

**Verification:** (1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and obtain 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 lay-down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the project or its linear facilities changes, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week and until ground disturbance is completed.

**Verification:** (1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 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 the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and

data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;
5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;
6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;
7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;
9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and
10. A copy of the paleontological Conditions of Certification.

**Verification:** At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS and acceptance of the PRMMP by the project owner evidenced by a signature.

**PAL-4** Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of 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 other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those 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 paleontological sensitivity;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

**Verification:** (1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

(4) In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

**PAL-5** The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations

that were identified as potentially fossil bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.
2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources Conditions of Certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.
4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event, where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month; general descriptions of training and monitored construction activities; and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

**Verification:** The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

**PAL-6** The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils,

identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

**Verification:** The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see Condition of Certification **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

**PAL-7** The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

**Verification:** Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the Executive Director.

# Certification of Completion
# Worker Environmental Awareness Program
# Hanford Combined-Cycle Power Plant (01-EP-7C)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

| No. | Employee Name | Title/Company | Signature |
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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

Paleo Trainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/__

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

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# POWER PLANT EFFICIENCY

Testimony of Erin Bright

## BACKGROUND

GWF Energy, LLC (GWF) seeks approval to convert the 95-MW Hanford Energy Park Peaker (HEPP) Project to a 120-MW combined cycle power plant by adding a condensing steam turbine generator, two once-through steam generators with selective catalytic reduction and carbon monoxide catalyst, an air-cooled condenser, a water treatment skid, a step-up transformer and a circuit breaker; and by modifying existing water and drainage systems.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

There are no LORS that apply to the efficiency of a power plant such as Hanford.

## ANALYSIS

### PROJECT ENERGY REQUIREMENTS

The HEPP, as certified, was predicted to consume natural gas fuel at a rate of 450 million BTU per hour (MMBTU/hr) per turbine unit, higher heating value (HHV).

With the proposed additional power generation equipment in place, the project is predicted to burn natural gas at a nominal rate up to approximately 465 MMBtu/hr (HHV) per turbine unit. While this is an increase over the certified project, it is a relatively small increase. Staff believes this increase in maximum fuel consumption will create no adverse impacts on fuel supplies beyond those analyzed for the project as originally certified.

### ENERGY USE EFFICIENCY

Under expected project conditions, electricity would be generated at a full-load efficiency up to approximately 49.6 percent lower heating value (LHV), compared to the 37.5 percent LHV of the original peaking facility at full load operation. The conversion would thus provide a 24 percent improvement in project fuel efficiency at full load operation, which represents a substantial improvement over the certified project. Energy Commission staff considers this a beneficial impact on energy supplies.

## MITIGATION MEASURES AND CONDITIONS

The original project certification includes no Efficiency Conditions of Certification. Energy Commission staff believes no such conditions are warranted by the amendment and propose none.

## CONCLUSIONS AND RECOMMENDATIONS

The requested change, converting from a simple cycle peaker plant to a dual function combined cycle plant, would result in significantly improved fuel efficiency. From the

standpoint of Power Plant Efficiency, staff recommends that the Petition be granted. This recommendation is based on the following:

1. There will be no new or additional significant impacts to Power Plant Efficiency associated with this action.
2. The amendment is based on new information that was not available during the licensing proceedings.
3. The proposed modification retains the intent of the original Energy Commission Decision.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

None.

## REFERENCES

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

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# POWER PLANT RELIABILITY

**Testimony of Erin Bright**

## INTRODUCTION

GWF Energy, LLC (GWF) seeks approval to convert the 95-MW Hanford Energy Park Peaker (HEPP) Project to a 120-MW combined cycle power plant by adding a condensing steam turbine generator, two once-through steam generators with selective catalytic reduction and carbon monoxide catalyst, an air-cooled condenser, a water treatment skid, a step-up transformer and a circuit breaker; and by modifying existing water and drainage systems.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

There are no LORS that apply to the reliability of a power plant such as Hanford.

## ANALYSIS

In the absence of reliability LORS, Energy Commission staff analyzes the project to determine whether it will likely be built in accordance with the typical industry standards 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.

From the standpoint of reliability, the overall design of the power plant would be changed very little from the certified project. While the two-on-one combined cycle configuration differs from the simple cycle configuration of the certified project in operation, the amended project would function just as reliably. In either configuration, the option exists to operate either one or both of the gas turbines. This redundancy provides a level of reliability that adequately reduces the chance that the entire power plant will be put out of service by a single equipment failure. Any differences in reliability between the certified and amended power plants would rest chiefly on the steam system (steam turbine generator, air cooled condenser and once through steam generators) being added. The amended project makes up for any possible reliability deficiencies in the steam system, however, by retaining its ability to operate in simple cycle mode.

## CONCLUSIONS AND RECOMMENDATIONS

The requested change, converting from a simple cycle peaker plant to a dual function combined cycle plant, would likely have little or no effect on Power Plant Reliability. From this standpoint, staff recommends that the Petition be granted.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

The original project certification includes no Conditions of Certification pertaining to Power Plant Reliability. Energy Commission staff believes no such conditions are warranted by the amendment and propose none.

## REFERENCES

California Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

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# TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Arachchige and Mark Hesters

## INTRODUCTION

GWF Energy, LLC (GWF), proposes to interconnect a 25 MW steam turbine (ST) to the existing Hanford Energy Park Peaker (HEPP) Project. The modified facility would be renamed the GWF Hanford Combined-Cycle Power Plant (GWF Hanford), and would have a new nominal generating capacity of 120 MW. The interconnection point would be the 115 kV bus at Pacific Gas & Electric Company's (PG&E) Hanford switchyard, located on the GWF Hanford project site. The planned operation date for the proposed project is May 1, 2012. The detailed descriptions of the design facilities are discussed in the amendment petition section 2.1, 2.3, 2.2.11 and Figure 2.6, pages 2.1 to 2.13.

## PROJECT INTERCONNECTION INFORMATION

The GWF Hanford project would utilize combined-cycle technology by recovering heat from the two existing 50 MW combustion turbine generators through use of two once-through steam generators, which would produce steam to power a new 27 MW steam turbine-generator (STG) to create a maximum net output of 120 MW. The new STG auxiliary load would be 2 MW, resulting in a maximum steam generator output of 25MW. The new 32 megavolt-ampere (MVA), 13.8kV STG would be connected to the low side of its dedicated 13.8/115kV, 30/40 MVA step-up transformer through a 15kV, 2000 ampere gas-insulated (SF6) breaker. The high side of the step-up transformer would be connected to the 115 kV Hanford switchyard bus through a 115kV, SF6 breaker capable of carrying full-load current.

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

- California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction,* specifies uniform requirements for the construction of overhead electric lines. Compliance with this order ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of overhead electric lines, and for the safety of the general public.

- CPUC General Order 128 (GO-128), *Rules for Underground Electric Line Construction,* establishes uniform requirements for the construction of underground electric lines. Compliance with this order also ensures both reliable service and a safe working environment for those working in the construction, maintenance, operation, or use of underground electric lines, and for the safety of the general public.

- National Electric Safety Code 2007 provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.

- California Independent System Operator (California ISO) planning standards also provide the standards and guidelines that assure adequacy, security and reliability during the planning process of the California ISO's electric transmission facilities. The California ISO planning standards incorporate both the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) planning standards. With regard to power flow and stability simulations, the California ISO's planning standards are similar to those of the NERC and WECC, and to the NERC's planning standards for transmission system contingency performance. However, the California ISO's standards provide additional requirements that are not found in the NERC or WECC planning standards. The California ISO standards apply to all participating transmission owners that either interconnect to the California ISO-controlled transmission grid, or that interconnect to neighboring grids not operated by the California ISO and then transmit (wheel) the power into the ISO-controlled grid (California ISO 2002a).

## SCOPE OF SYSTEM IMPACT STUDY (SIS)

The system impact study for the GWF Hanford project was performed by Navigant Consulting Inc. (NCI) at the request of GWF Energy to identify the transmission system impacts of the project on PG&E's 115/230/500 kV system. The study included power flow, short circuit studies, and transient and post-transient analysis (GWF 2009a, System Impact Study). The study modeled the proposed project for a net output of 127 MW. The base case was developed from PG&E's 2013 base case series and has a 1-in-10 year extreme weather load for the Greater Fresno Area. The base case included all California ISO approved major PG&E transmission projects, and modeled all proposed higher-queued generation projects that are scheduled to be operational by 2013. The detailed assumptions are described in the study. The power flow studies were conducted with and without the GWF Hanford project connected to PG&E's grid at the Hanford switchyard, using 2013 Heavy Summer and 2013 Light Spring base cases. The power flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted using the 2013 Heavy Summer base case to determine whether the project would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if the GWF Hanford project would overstress existing substation facilities.

## SYSTEM IMPACT STUDY RESULTS:

The System Impact Study identified pre-project overload criteria violations under the 2013 Heavy Summer and 2013 Light Spring conditions. Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the California ISO's generator interconnection queue. The study concludes that the addition of the project would cause a number of pre-existing normal and/or emergency overloads to increase and would cause some new normal and emergency overloads. These new overloads include one Spring Peak N-1 overload and three Summer Off-Peak N-2 overloads.

## OVERLOAD MITIGATION:

Normal Contingency (N-0) mitigation: The power flow study results showed that the project would cause no new normal overloads and only slightly increased overloads that existed on the Pre-Project case. Therefore, there is no mitigation needed for N-0 conditions.

Single Contingency (N-1) mitigation: The power flow study results showed that GWF Hanford would create one new facility overload. The proposed mitigation is to re-rate the Chowchilla-Certainteed 115kV section of line to a higher wind-speed rating. This line is approximately 16 miles from the Wilson-Merced 115-kV lines, which according to PG&E's 2006 Expansion Plan were re-rated to a 4 feet-per-second (fps) rating prior to 2002. Using similar re-rate values on the Chowchilla-Certainteed Jct line, the emergency rating could potentially increase to 471 amps at 4 fps. This new rating would be sufficient to eliminate the emergency overload. In the event a re-rate is not a viable option, the Chowchilla-Certainteed 115 kV line can be re-conductored with 397.5 AAC conductors with a normal ampacity rating of 440 Amps in order to mitigate the predicted facility overload.

Double Contingency (N-2) mitigation: The power flow study results showed that the GWF Hanford facility would create three new overloads. GWF proposed a Special Protection Scheme (SPS) that would curtail the project generation to mitigate any overloads caused by the N-2 contingencies.

## DYNAMIC STABILITY AND REACTIVE MARGIN STUDY RESULTS:

Dynamic stability studies were conducted to determine whether the Hanford project would create instability following certain outages. The studies indicated that the project would not cause voltage drops of 5 percent or more from the pre-project levels, or cause the PG&E system to fail to meet applicable voltage criteria. Dynamic Stability and Reactive Margin Study results showed that the transmission system's performance relative to the applicable reliability guidelines would not be negatively affected by the GWF Hanford project due to the selected disturbances.

## SHORT CIRCUIT STUDY RESULTS:

Short circuit studies were performed to determine the degree to which the addition of GWF Hanford project would increase 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 maximum three-phase and single-line-to-ground fault currents at these buses, both with and without the project, and information on the breaker duties at each location are summarized in the tables of the System Impact Study Report (GWF Hanford project, 2009b, SIS tables on Page 14). The SIS concluded that the project would not trigger a need for any circuit breaker upgrades.

## CONCLUSION AND RECOMMENDATIONS

- The GWF Hanford project would have some adverse impacts in the system, but the selected mitigation measures are appropriate to offset the impacts. No new downstream upgrades in the PG&E system would be needed because of the addition of new capacity to Hanford switchyard. Staff considers the study results and mitigation acceptable.

- Additionally, the proposed interconnection would not affect the GWF Hanford project's ability to comply with all applicable Laws, Ordinances, Regulations and Standards (LORS). Therefore, staff recommends that Condition of Certification **TSE-1** be replaced and **TSE-2** through **TSE-7** be added to ensure both system reliability and conformance with LORS.

## PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

~~**TSE-1** The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to requirements listed below:~~

~~The power plant switchyard, outlet line and termination shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95, CPUC Rule 21, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", Title 8 CCR, Sections 2700-2974, CPUC Decision 93-11-013, Federal Communications Commission Part 15, Public Resources Code 4292-4296, and National Electric Code (NEC).~~

~~**Verification:** Within 15 days after cessation of construction the project owner shall provide a statement to the CPM from the registered engineer in responsible charge (signed and sealed) that the switchyard and transmission facilities conform to the above listed requirements.~~

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.

**Verification:** 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.

**Verification:** 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.

**Verification:** The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for 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:

Receipt or delay of major electrical equipment;

Testing or energization of major electrical equipment; and

The number of electrical drawings approved, submitted for approval, and still to be submitted.

**Verification:** 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 power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 and General Order 98 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.
2. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
3. 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.
4. The project conductors shall be sized to accommodate the full output from the project.
5. Termination facilities shall comply with applicable PG&E interconnection standards.
6. 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; and,
   b. A copy of the executed LGIA signed by the California ISO and the project owner.

**Verification:** At least 60 days prior to the start of construction of transmission facilities (or a lessor number of days mutually agreed 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 and General Order 98 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,"[18] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards.

[18] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

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 5) 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 provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

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

1. 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.

**Verification:** The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. 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-7** The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC; Title 8, CCR, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

**Verification:** Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

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."

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 Energy Commission (CEC). 2001a. Decision for the GWF Power Systems Co., Inc., Hanford Energy Park Peaker Project Application for Certification, Docket No. 01-EP-7, Kings County, published on June 21, 2009.

California Energy Commission (CEC). 2001. Staff Assessment for Hanford Energy Park Peaker Project Application for Certification (01-EP-7), Kings County, California, published on May 14, 2001.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008

# HANFORD ENERGY PARK PEAKER PROJECT (01-EP-7C)
# PREPARATION TEAM

| | |
|---|---|
| EXECUTIVE SUMMARY | Matt Trask |
| INTRODUCTION | Matt Trask |
| PROJECT DESCRIPTION | Matt Trask |
| AIR QUALITY | William Walters, P.E. and Matthew Layton, P.E. |
| BIOLOGICAL RESOURCES | Joy Nishida |
| CULTURAL RESOURCES | Beverly E. Bastian |
| LAND USE | Robert Fiore |
| NOISE AND VIBRATION | Shahab Khoshmashrab |
| PUBLIC HEALTH | Alvin Greenberg, PhD |
| SOCIOECONOMIC RESOURCES | Hedy Koczwara |
| SOIL AND WATER RESOURCES | Mark Lindley, P.E. |
| TRAFFIC AND TRANSPORTATION | James Adams |
| TRANSMISSION LINE SAFETY AND NUISANCE | Obed Odoemelam, PhD |
| VISUAL RESOURCES | Marie McLean |
| WASTE MANAGEMENT | Ellie Townsend-Hough |
| FACILITY DESIGN | Steve Baker |
| GEOLOGY AND PALEONTOLOGY | Dal Hunter, Ph.D., C.E.G. |
| POWER PLANT EFFICIENCY | Erin Bright |
| POWER PLANT RELIABILITY | Erin Bright |
| TRANSMISSION SYSTEM ENGINEERING | Sudath Arachchige and Mark Hesters |
| COMPLIANCE PROJECT SECRETARY | Marci Errecart |

## MATHEW TRASK

Project Manager, Technical Analyst, Public and Agency Outreach Specialist

## ACADEMIC BACKGROUND

B.A., Science and Investigative Journalism, University of California, Santa Cruz
A.S., Engineering, West Valley College, Saratoga

## PROFESSIONAL EXPERIENCE

Mathew Trask has more than 24 years of wide-ranging experience in the energy and environmental fields. He previously worked as a power plant operator, electrician, sound and vibration analysis technician, electrical engineer, science journalist, photographer, and public outreach specialist, and is now a consultant working in the energy and environmental fields. He has extensive knowledge of the electric and natural gas utility industry, including the areas of engineering, policy and law, regulation, and marketplace economics. He has a thorough knowledge of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) and has managed environmental assessments conducted under both laws. As a technical analyst, Mr. Trask specializes in visual resources, noise, energy and public utilities, land use and planning, and environmental justice analyses. He has managed public outreach programs and environmental analysis for electric power generating projects, natural gas pipeline and storage projects, water conveyance and storage projects, wineries and vineyards, railroad projects, and telecommunications projects.

### Current Employment: Aspen Environmental Group — July 2001 to present

- Siting Project Manager, working as extension to the staff of the California Energy Commission's Systems Assessment and Facilities Siting Division, managing the Commission's review of Applications for Certification (AFCs) submitted by power plant developers seeking licenses to construct new gas-fired power plants (2001-2002). Manage all phases of the CEC's assessment of the potential environmental and technical impacts associated with the construction and operation of new power plants, working closely with division staff and applicant personnel. Staff Assessments include the CEQA-equivalent of an Environmental Impact Report, plus analysis of plant design, reliability and efficiency. Project management includes review and approval of all work products, and the facilitation of workshops and meetings held with the applicant, staff, other agency personnel and the general public concerning various issues related to individual AFCs. Issues include the potential impacts of plant development on listed species under the state and federal Endangered Species Acts, the assessment of proposed cooling and process water sources and conveyance methods, analysis of land use zoning and planning, and assessment of air quality impacts and proposed mitigation measures.

### Previous Employment

- Independent Consultant/Senior Technical Analyst, subcontracted through Aspen Environmental Group to the California Energy Commission, conducting initial site assessment under the Peaker Power Plant Permitting Program (2001). Provided initial site assessment of potential peaker power plant sites throughout California. Assessments included establishing contact with the site owner or developer, contacting local and regional governmental agencies for zoning and other information, conducting site tours, and preparing site assessment reports. Reports included analysis of natural gas and electric transmission infrastructure needs and availability, and of potential impacts a peaker plant project could have on air quality, biological resources, cultural resources, hazardous materials, land use and planning, noise, public services, traffic and parking, and visual resources. Because of the need for expediency, all reports were provided electronically, and included several digital photographs, via e-mail and compact-disk.

- Project Manager/Technical Analyst for the California Public Utility Commission (CPUC), as an Independent Contractor and an employee of Environmental Science Associates (ESA), for the

divestiture of more than 35 power plants and associated assets by San Diego Gas and Electric Company (SDG&E), Pacific Gas and Electric Company (PG&E) and Southern California Edison Company (Edison); 1997 to 2001. Worked as Project Manager and technical analyst for the CEQA review of applications by the state's three largest utilities to sell or market value their thermal power plants. Managed all public process, conducted technical analysis and wrote several sections of the Initial Study and the Mitigated Negative Declaration for SDG&E's and Edison's Divestiture Applications. Also conducted public outreach programs and provided analysis for the CPUC for the Initial Study and Mitigated Negative Declaration for PG&E's first divestiture application; and for the Environmental Impact Report (EIR) for PG&E's second divestiture application, including analysis for the project alternatives, findings of significance, utility and services, and energy and natural resources sections. Also wrote responses to agency and public comments as part of the Final EIR for PG&E's second divestiture application. Worked with CPUC Project Managers Martha Sullivan, Bruce Kaneshiro, Andrew Barnsdale, Judith Iklé and Billie Blanchard to arrange and facilitate more than 60 public meetings, conferences and workshops with government officials, community leaders and industry stakeholders involved in the divestiture.

- Project Manager and Technical Analyst for the Napa County Conservation, Development and Planning Department; 2000. As an Independent Consultant, managed the production of the Environmental Impact Report on the application by Beringer Wine Estates to develop a 25 million square feet winery and associated vineyard on a 210-acre site near the Napa County Airport. This facility, when built, will be the largest winery in Napa County, and one of the five largest in the country. Working closely with the County Planning Department and the County Counsel's office, this EIR was produced on a fast track and was completed in less than half the time normally allotted for similar projects. Also managed the consultation process under the federal Endangered Species Act with the Army Corps of Engineers and the US Fish and Wildlife Service related to the presence of an endangered species, the vernal pool fairy shrimp (*Branchinecta conservatio*), on the development site. Challenging issues included the calculating air quality impacts from the expected hundreds of daily truck trips to and from the facility, the delineation of wetlands on the site, determining conformance with local planning guidelines and zoning ordinances, and analyzing the expected water quality effects on nearby No-Name Creek, Fagan Slough, and Napa River.

- Technical Analyst/Independent Consultant for the City of South Gate for evaluation of the Application for Certification submitted to the California Energy Commission by Sunlaw Energy for authority to construct and operate the planned Nueva Azalea Power Plant Project in the City of South Gate; 2000. If approved, the Nueva Azalea plant would have been a 550 MW natural gas-fired combined cycle power plant located at the eastern edge of the city limits on a 13.5-acre site next to the 710 Interstate Freeway. Conducted visual resources analysis of the innovative project design and planned lighting display as to whether its would constitute a safety hazard to drivers on the 710 Freeway; also analyzed environmental justice issues and conducted an evaluation of the plant engineering design and the eight transmission options for interconnecting the project at a nearby Southern California Edison substation.

- Technical Analyst for the National Park Service on the Comprehensive Management Plan and accompanying Environmental Impact Statement for the Merced River through Yosemite National Park following designation of the waterway as a Wild and Scenic River; ESA, 2000. Conducted visual resources, land use, and public services (Park Operations) analyses to determine the potential impacts in those areas resulting from implementing any of five alternatives for the Management Plan, as required by the Wild and Scenic Rivers Act and the National Park Organic Act. Issues included balancing the preservation of traditional viewing places along the river of the granite features along the walls of the Yosemite Valley with the need to preserve the wild state of the river and its banks.

- Project Manager for Public Outreach and Environmental Impact Report Production for the CPUC for the proposed Lodi Gas Storage Project; 1998-1999. As an employee of Public Affairs Management

(PAM), conducted public outreach and environmental analysis, and managed production of the EIR for the CPUC's CEQA review of the application by Western Hub Services to develop a new gas storage project near Lodi and a related 31-mile pipeline to connect the facility to PG&E's pipeline system. Major environmental issues included wetlands impact and public safety concerns for seven major waterway crossings, and visual impacts of project development. Management of the public process was especially challenging, with more than 350 people attending the public meetings arranged for this controversial project.

- Technical Analyst for the Bay Area Water Users Association's (BAWUA's) Water System Master Plan (WSMP); PAM, 1998-1999. Coordinated the planning process for the 31-agency BAWUA in its first attempt in 25 years to craft a new comprehensive plan for the management of water resources from the City and County of San Francisco's Hetch Hetchy Water and Power system. Conducted analysis of water supply alternatives, new facility proposals, and conservation methods, and helped facilitate WSMP committee meetings. Also conducted technical analysis and public outreach for the City and County of San Francisco for its plan to develop a recycled water system.

- Technical Analyst/Project Manager for the Section of Environmental Analysis of the US Department of Transportation's Surface Transportation Board for the environmental reviews under NEPA of several railroad mergers and acquisition applications, including the merger of the Union Pacific and Southern Pacific railroads, and the acquisition of Conrail by Norfolk Southern and CSX Corporation; PAM, 1997-1998. Major work included: analysis of impact from increased rail traffic on surface street traffic patterns and emergency vehicle access in Reno, Wichita, and the greater Cleveland metropolitan area; conducting outreach efforts with Native American Tribes and the general public in the Reno area, concerning impact on local fisheries; and analysis of Environmental Justice issues related to rail traffic in low-income areas.

- Project Manager/Independent Consultant, Power Plant Maintenance System Analysis, Kansai Electric; 1995-1997. Managed production of a series of major reports for Japan's largest electric utility on the practices of US electric utilities in the management of preventative and corrective maintenance programs at gas-fired, coal-fired, nuclear, biomass, wind and geothermal power plants. Kansai was seeking to diversify its generation base as a means of increasing system reliability and reducing its reliance on a single power plant technology (i.e., nuclear power) to produce power in the greater Tokyo Bay area. Produced six major reports, each greater than 300 pages, and dozens of follow-up reports providing cost/benefit analysis, including environmental costs and benefits, of power plant upgrades or replacements.

- Managing Editor, Clearing Up and California Energy Markets newsletters; Energy NewsData 1990-1995. Managed production and wrote more than 1,000 articles for these two weekly publications covering the integrated electric and natural gas utility industry in the Western Half of North America, including the areas of marketplace economics, policy and law, regulation, and research and development. Over more than five years on staff, covered the US Congress and Executive Branch, the California Legislature and Governor's office, state and federal court systems, the California Public Utility Commission and California Energy Commission, the Federal Energy Regulatory Commission, the Bonneville and Western Area Power Administrations, the North American Electric Reliability Council, and the US Department of Energy.

- Information Specialist/Business Development Specialist for the National Center for Appropriate Technology; 1988-1989. Provided technical and economic analysis for dozens of new energy projects, ranging from small run-of-the-river hydroelectric projects to large wind farms. Specialized in site suitability assessment for wind, biomass and solar power applications, and in assisting small businesses in startup of new energy projects, including cost/benefit analysis, permitting, and financing.

# DECLARATION OF
## Matt Trask

I, **Matt Trask** declare as follows:

1. I am presently under contract through Aspen Environmental Group to the California Energy Commission in the **Compliance Unit** of the Siting, Transmission and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony in Executive Summary, Introduction and Project Description for the Hanford Combined-Cycle Power Plant based on my independent analysis of the Petition to Amend the project and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 23, 2009 Signed: _____

At: Sacramento, California

**DECLARATION OF**
**MATTHEW S. LAYTON**

I, Matthew S. Layton, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Supervising Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the greenhouse gas analysis in the Air Quality section for the Hanford Combined-Cycle Power Plant Final Staff Assessment based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/23/09

Signed: Matthew Layton

At: Sacramento, California

# MATTHEW S. LAYTON

## Experience Summary

Twenty five years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

## Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

## Experience

**1987-present** – Senior Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Public Heath; and
- Transmission Line Safety and Nuisance.

Prepared Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

**1983-1986** -- Control Systems Engineer, Bechtel Power Corporation. Managed a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment. Performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions. Initiated purchase orders for testing and formulated test objectives and test plans. Developed and implemented plant equipment maintenance and surveillance program based on test results, vendor recommendations and industry operating experiences. Trained client in environmental qualification engineering analysis and equipment maintenance program. Prepared client for NRC audits and presentation.

**1981-1983** -- Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

# DECLARATION OF
**Will Walters, P.E.**

I, Will Walters, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Air Quality** and **Visual Resources**, for the Hanford Combined-Cycle Power Plant Conversion Amendment based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 17, 2009 Signed: _____

At: Agoura Hills, California

**WILLIAM WALTERS, P.E.**
**Air Quality Specialist**

**ACADEMIC BACKGROUND**
B.S., Chemical Engineering, 1985, Cornell University

## PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring,.

### Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center; Starwood Power Plant; and Riverside Energy Resource Center Units 3 and 4 Project (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Carlsbad Energy Center; Community Power Project; Panoche Energy Center; San Gabriel Generating Station; Sentinel Energy Project; and Victorville 2 Hybrid Power Project.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (including expert witness testimony); Eastshore Energy Power Plant (including expert witness testimony); Carlsbad Energy Center (in progress), Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; and the Blythe Energy Power

Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; and Starwood Power-Midway Peaking Power Plant.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.
- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- **Other Projects:**
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.

- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.
- Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.

## Camp Dresser & McKee, Inc. 1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

## Planning Consultants Research 1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

## Aspen Environmental Group/Clean Air Solutions 1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot’s Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

## Fluor Daniel, Inc. 1990 to 1995 and 1996 to 1997

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

## Jacobs Engineering Group 1988 to 1990

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

### CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

### AWARDS

- California Energy Commission Outstanding Performance Award 2001

**JOY NISHIDA**
Biologist

## Experience Summary

Twenty-six years experience in the biological field, including botanical consulting, curatorial management of vertebrate and herbarium collections, college-level instruction, and conducting biological resources impact analyses for inclusion in environmental documents.

## Education

- California State Polytechnic University, Pomona—Master of Science, Biological Sciences
- California Polytechnic State University, San Luis Obispo—Bachelor of Science, Environmental & Systematic Biology and Natural Resources Management (Forestry Concentration)
- Certified Arborist — International Society of Arboriculture
  No. WE-8078A, expires 12/31/10

## Professional Experience

**July 2008 to Present**—Planner II: Siting, Transmission & Environmental Protection Division – California Energy Commission, Sacramento

As a staff biologist, primary duties include conducting impact analyses to biological resources for power plant siting projects. Other duties include evaluating compliance with accepted Conditions of Certification related to biological resource technical areas for power plant facilities and coordinating with biological resource protection and management agencies, environmental organizations, universities, and special interest groups to assure their biological input into Commission programs.

**January 2008 to July 2008**—Environmental Scientist: Regional Programs Unit, Division of Financial Assistance – State Water Resources Control Board, Sacramento

Using scientific judgment, provided technical and administrative review of environmental documents for projects receiving financial assistance from the State Water Board. Reviewed and commented on environmental documents for wastewater treatment and water reclamation facilities, watershed protection, nonpoint source pollution control, and other local assistance projects to assure compliance with the California Environmental Quality Act and other Division's environmental review process. Participated in applicant meetings, prepared Agenda and Resolution language for various projects seeking local funding assistance from the State Water Board, developed environmental review summaries of projects to be funded, initiated consultation with federal authorities, developed mitigation measures, and resolved environmental concerns related to proposed projects. Coordinated interagency review of environmental documents subject to crosscutting federal regulations, and organized and maintained the Environmental Services filing system, library, and database.

**April 2005 to January 2008**—Botanist, Wetland Ecologist, and Certified Arborist - Jones & Stokes, Sacramento

Organized and conducted general plant surveys and directed plant surveys for special-status plant species, vegetation mapping, arborist surveys, and wetland delineations extensively throughout California. Wrote wetland delineation reports, arborist reports, and biological resource sections for the following environmental documents: Environmental Impact Reports, Environmental Impact Statements, Natural Environment Studies, Initial Studies, and Biological Analyses. Dealt with the legal requirements regarding the protection of biological resources and developed mitigation to prevent significant impacts. Coordinated the efforts of sub-consultants, clients, and coworkers in the development of environmental documents.

**1990-2005**—Botanical Consultant – Nishida Botanical Consulting

Worked as an independent contractor to consulting firms, educational facilities, and federal agencies. Duties included organizing and conducting floral inventories, directed searches for special-status plant species, vegetation mapping, monitoring revegetation sites, assisting in wetland delineations, and analyzing impacts on botanical resources.

**1990-1996**—Instructional Support Technician– California State University, Northridge

As a collections manager for the Department of Biology Herbarium and Vertebrate Collections, responsibilities included the acquisition, preparation, curation, and reorganization of the teaching and research collections. Implemented a database for the vertebrate collections. Recruited and supervised volunteers to assist in the collections. Also supervised graduate students. Other duties included instructional assistance with Botany and Vertebrate classes in the lab and in the field.

**1987-1989**—Biological Sciences Department Part-time Lecturer– California State Polytechnic University, Pomona

Taught and prepared majors and non-majors freshman level Biology labs.

# DECLARATION OF
## Joy Nishida

I, **Joy Nishida** declare as follows:

1. I am presently employed by the California Energy Commission in the **Biological Resources Unit** of the Siting, Transmission and Environmental Protection Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Biological Resources** for the Hanford Combined-Cycle Power Plant based on my independent analysis of the Petition to Amend the project and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 24, 2009 Signed: Jy Nishida

At: Sacramento, California

**Beverly E. Bastian**
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

| Education | Field | Degree | Year |
|---|---|---|---|
| University of California, Davis | Anthropology | B.A | 1967 |
| University of California, Davis | Anthropology | M.A | 1969 |
| Tulane University | Anthropology | A.B.D. | 1975 |
| University of Mississippi | American History | (courses only) | 1989 |
| University of California, Santa Barbara | Public (American) History and Historic Preservation | A.B.D. | 1996 |

## Experience

*State of California, California Energy Commission* *2005 to present*
*Planner II, Siting, Transmission, and Environmental Protection Division, Environmental Office, Biological and Cultural Unit*
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed 50-MW+ power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; identifying California Register of Historical Resources-eligible cultural resources; developing mitigation measures to reduce to insignificant any impacts to Register-eligible cultural resources; providing expert testimony on my analyses and recommendations in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants; coordinating environmental review of power plant projects with cultural resources specialists in sister state agencies and in federal agencies; supervising and reviewing the work of Commission cultural resources consultants; reviewing the CEQA documents of sister state agencies; and developing internal procedures and guidelines to improve cultural resources review of applications.

*State of California, Department of Parks and Recreation* *2001 to 2005*
*Historian II, Cultural Resources Division, Cultural Resources Support Unit*
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

*Department of Social Sciences, American River College* *2000 to 2002*
*Instructor (part-time), American History*
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate ability to organize information, to speak effectively to the public, and to train and direct other personnel.

*Department of Sociology and Anthropology, University of Mississippi* *1987 to 1989*
*Archaeologist, Center for Archaeological Research*
All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

*Gilbert Commonwealth, Inc.* *1984 to 1987*
*Historical Archaeologist and Project Manager, Environmental Unit*
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

*Tennessee Valley Authority (personal services contract)* *1979 to 1981, 1983-1984*
*Historical Archaeologist (self-employed)*
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log-cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

*Other Archaeological Projects* *1966 to 1981*

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**Professional Societies**

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
National Council on Public History
Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

# DECLARATION OF
**Beverly E. Bastian**

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources,** for the Hanford Energy Peaker Plant, based on my independent analysis of the Petition to Amend the project and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 25, 2009 Signed: Beverly E. Bastian

At: Sacramento, California

**Resume of Robert Fiore**
**Planner II**
**California Energy Commission (CEC)**
**Siting, Transmission and Environmental Protection**

**Experience Summary**:

**August '08 to Present**
California Energy Commission (CEC), Siting, Transmission and Environmental Protection – Prepare staff analyses pertaining to Land Use, Transportation and Traffic, Visual Resources and Socioeconomics; assess and evaluate power plant siting projects for compliance with laws, ordinances, regulations and standards (LORS) and for potential environmental impacts; manage and prioritize multiple power plant siting projects; process amendment petitions; formulate conditions of certification; interpret codes, ordinances and policies; understand systems and processes; perform entitlement processing; participate in site visits to provide community perspective; prepare testimony and make presentations in public; and coordinate the work of multidisciplinary specialists. Projects include Orange Grove Project, San Joaquin Solar and Salton Sea Unit 6.

**Oct. 2002 - March 2008**
Civil Engineering Consulting – Assemble and lead project teams consisting of planners, engineers, architects, consultants and technicians to develop large-scale master planned communities; direct projects from pre-acquisition, through site assessment and project approval, to construction by coordinating external and internal acquisition, planning, design and construction departments or consultants; perform due diligence and site assessments; calculate development costs and manage multi-million dollar project budgets; and, solve problems related to site and infrastructure design, soils, traffic, environmental impacts, utility placement, housing, recreation, architecture, landscaping, rights-of-way, etc.

**June 1998 – Aug. 2002**
Planning and Financial Consulting - Power plant siting and expansion planning and permitting in response to the power crisis; facility assessments and survey including total ownership costs, life cycle costs, alternatives evaluation and recommendations; calculate costs and apportionments and integrate databases; ensure federal, state and local regulatory compliance; perform trend analysis and forecasting, socio-economic data research, needs assessments, fiscal studies, infrastructure inventory analysis, fee studies and feasibility studies.

**Jan. 1990 – Jan. 1998**
Local Government Land Planning - Wrote elements of the General Plan, zoning regulations and development standards; Wrote portions of EIR's and EIS's; managed and/ or prepare reports analyzing impacts from development projects and ensure compliance with CEQA and NEPA and the CA Map Act.

# DECLARATION OF
**Roberta Fiore**

I, Robert Fiore, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the Hanford Combined-Cycle Power Plant Conversion Amendment based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 23, 2009 Signed: _____

At: Sacramento, California

**Shahab Khoshmashrab**
Mechanical Engineer

## Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

## Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

## Professional Experience

**2001-2009**--Mechanical Engineer, Siting, Transmission & Environmental Protection– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

**1998-2001**--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

**1995-1998**--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

# DECLARATION OF
## SHAHAB KHOSHMASHRAB

**I, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **NOISE AND VIBRATION**, for **Hanford Energy Park Peaker Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 18, 2009 Signed: _____

At: Sacramento, California

# ***Risk Science Associates***

**121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047**
**415-479-7560 fax 415-479-7563**
**e-mail agreenberg@risksci.com**

## Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
**Principal Toxicologist**

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

## Years Experience: 26

## Education:

| | | |
|---|---|---|
| B.S. | 1969 | Chemistry, University of Illinois Urbana |
| Ph.D. | 1976 | Pharmaceutical/Medicinal Chemistry, University of California, San Francisco |
| Postdoctoral Fellowship | 1976-1979 | Pharmacology/Toxicology, University of California, San Francisco |
| Postgraduate Training | 1980 | Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM |

## Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

## Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

## Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

## Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group

January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions

January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee

September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group

January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

## Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

## Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979
Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

## Experience

### General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due

to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

**Sites with EPA, RWQCB and/or DTSC Oversight**

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach,

Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

**Examples**

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca. (March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

**Military Bases**

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

**Examples**

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

**Liquefied Natural Gas (LNG)**

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

**Infrastructure Security**

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

**Air Pathway Analysis**

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

**Examples**

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

**Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments**

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

**Examples**

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.

- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpath Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa  Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

**Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality**

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

**Examples**

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

**Mercury Contamination**

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

**Examples**

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

# DECLARATION OF
**Alvin J. Greenberg, Ph.D.**

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Public Health** section for the **GWF Hanford Expansion Project Amendment** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 18, 2009 Signed: Alvin J. Greenberg

At: Sacramento, California

**HEDY KOCZWARA**
**Associate Environmental Scientist**

**ACADEMIC BACKGROUND**
M.S., Earth Systems, Stanford University, 2001
B.S., Earth Systems, Stanford University, 2000

## PROFESSIONAL EXPERIENCE

Ms. Koczwara is an environmental scientist with management and technical experience preparing Environmental Impact Reports and Statements in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Her project experience includes both linear and site-specific projects such as transmission lines, pipelines, power plants, and infrastructure development and improvement projects. She prepares technical analyses, coordinates with specialty subcontractors, and she provides management support in client interaction, public involvement, and supervises overall document coordination. She has performed the alternatives analysis for several power plant siting cases and controversial transmission line projects, which ultimately incorporated alternatives developed during the screening process into the approved project design.

### Aspen Environmental Group — 2002 to present

- **California Energy Commission (CEC).** Under Aspen's CEC contract, Ms. Koczwara is an author and technical specialist in the environmental review of power plant applications. She researches and writes planning and siting reports, such as alternative analyses, in compliance with CEQA and NEPA. Each alternative site evaluation involves identifying potential locations that would meet most of the objectives stated by the applicant, but that could have less impact on the environment. Analyses have included the following proposed power plants and reports:
  - **Sentinel Power Plant (2007-ongoing).** Project manager, researcher, and writer of the Socioeconomic analysis for this proposed 850 MW power plant in unincorporated Riverside County near Desert Hot Springs.
  - **CEC Power Plant Siting Alternatives Analyses.** Ms. Koczwara has researched, updated, and written the alternatives analyses for the following 11 power plant siting projects: Palmdale Hybrid Power Plant; South Bay Replacement Project (SBRP); Avenal Energy Power Plant Project; San Francisco Electricity Reliability Project (SFERP); Blythe Energy Project, Phase Two; East Altamont Energy Center; El Segundo Power Redevelopment Project; El Segundo Cooling Options Report; Roseville Energy Facility Power Plant Project; SMUD Cosumnes Power Plant Project; and SMUD Cosumnes Cooling Options Report.
  - **Colusa Generating Station (CGS) Project (2007)**. Project manager, researcher, and writer of the Transmission System Engineering Assessment, which is attached as an appendix to the Staff Assessment and analyzes the indirect impacts of future reconductoring of the 8.75-mile Shasta-Flanagan-Keswick 230 kV transmission line and associated substation upgrades. The reconductoring project would be required as a result of the CGS project for the plant to operate at full capacity. The Final Staff Assessment was released on November 30, 2007.
  - **Chevron Richmond Power Plant Replacement Project (2007-2008).** Project manager, researcher, and writer of the Socioeconomic analysis for Chevron's proposed addition of 60 MW net generation to its existing Refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond in Contra Costa County. The Applicant withdrew its SPPE application in September 2008.

- **Blythe Energy Project Transmission Line Modifications (2004-2006).** Researched and wrote the alternatives analysis and coordinated on the level and scope of the alternatives analysis between the CEC (CEQA lead agency) and the two NEPA lead agencies, the Western Area Power Administration and U.S. Bureau of Land Management, was required for this joint Staff Assessment/Environmental Assessment. More than 23 alternatives were considered, and five transmission alternatives, plus the No Project Alternative/Action, were carried through for full evaluation.
- **WESTCARB Carbon Sequestration Demonstration Projects (2005-present).** Ms. Koczwara researched and wrote one CEQA Initial Study and three USDOE environmental documents for multi-site, multi-state pilot studies and preliminary investigations of methods for sequestering CO2 at terrestrial sites and in geologic formations for the Public Interest Energy Research (PIER) group at the CEC.
- **Comparative Study of Transmission Alternatives Background Report (2004).** Researched and wrote portions of the draft report, which presents background information related to transmission alternatives and the transmission planning process. The information in the report is being used to assess potential approaches to evaluation of non-transmission alternatives to transmission projects. Ms. Koczwara also attended the public workshop where the report was disseminated. The workshop was a forum for discussion regarding transmission alternatives methodology. Following the workshop, Ms. Koczwara prepared a summary of the workshop and comments received as an appendix to the final white paper report.
- **Hydroelectric Energy/Environment Report (2003).** Collected and logged data on over 200 hydroelectric power plants from FERC licenses. The final draft of the report was published in October 2003.
- **Coastal Study (2003).** Researched and wrote the alternative cooling technologies section for a statewide evaluation of California's 25 coastal power plants. The report was used to facilitate licensing of repower and replacement projects by providing better pre-filing guidance to developers, and minimizing data adequacy and other issues that could delay licensing.

- **Sunrise Powerlink Project EIS/EIR, California Public Utilities Commission (CPUC) and Bureau of Land Management (BLM).** Under contract to the CPUC, and under a Memorandum of Understanding with the Bureau of Land Management (BLM), Ms. Koczwara has provided management support, attended public meetings, and has written numerous EIR/EIS sections for a highly controversial 150-mile transmission line from Imperial County to coastal San Diego County. The 500 kV line would pass through Anza-Borrego Desert State Park, and a 230 kV line would continue through rural San Diego County with both overhead and underground segments. Ms. Koczwara researched and analyzed route segment alternatives for a comprehensive Alternatives Screening Report that screened over 100 alternatives, 27 of which were carried forward for full evaluation. Ms. Koczwara also wrote the Socioeconomics, Services, and Utilities section and the setting and impacts for Connected Actions, Future Transmission Expansion, Cumulative Impacts, among others. She managed the writing of the Environmental Justice analysis and was responsible for compiling and writing the Comparison of Alternatives, which identified the overall Environmentally Superior Alternative out of 27 route segments, options, transmission and system alternatives and non-wire alternatives. She also wrote the BLM Record of Decision and is assisting with implementation of the Mitigation Monitoring Compliance and Reporting Program.
- **CPUC When-Needed Environmental Services, CPUC.** Project Manager, Public Involvement Specialist, and/or technical writer for Socioeconomics, Public Utilities and Environmental Justice for Aspen's on-call contract for provision of CEQA services to the CPUC's Energy Division. Currently Project Manager for PG&E's Seventh Standard 115/21 kV Substation Project in Bakersfield.
- **Riverway Substation Project MND, CPUC (2007)**. As Deputy PM, Ms. Koczwara wrote the Project Description, website content, and assisted with all-around management support for this

substation project in Visalia. SCE proposed to built a 1.7-acre 66/12 kV low-profile substation and approximately 1,200 feet of underground 66 kV subtransmission lines.

- **Devers-Palo Verde No. 2 Transmission Line Project EIR/EIS, CPUC and BLM**. Ms. Koczwara served on the project management team and in this role she managed preparation of the 100-page Alternatives Screening Report, which evaluated and screened over 30 alternatives. She also prepared the Introduction, Alternatives, and part of the Executive Summary sections for the EIR/EIS. The EIR/EIS evaluated a proposed 280-mile 500 kV and 230 kV transmission line between the Palo Verde generating hub in Arizona and SCE's system in Riverside County.

- **Jefferson-Martin 230 kV Transmission Line Project EIR, CPUC**. Ms. Koczwara served as the assistant to the Project Manager on this major and controversial 27-mile transmission line through scenic San Mateo County in the Hwy 280 corridor, urban Colma and Daly City, and across San Bruno Mtn. This high profile project is an essential component of San Francisco's energy supply, and involved coordination with numerous local and regional jurisdictions, as well as the development of 38 alternatives including the No Project Alternative into a 200-page Alternatives Screening Report.

- **South San Joaquin Irrigation District's (SSJID) Acquisition of the Pacific Gas and Electric Company System, San Joaquin County.** On behalf of San Joaquin County, Aspen prepared an application and an EIR on SSJID's proposal to acquire specific electric distribution assets currently owned and operated by PG&E within southeastern San Joaquin County. Responsible for writing the Socioeconomics, Visual, Cultural Resources, Land Use, Public Services/Utilities, Agricultural Resources, and Recreation sections for the application and prepared the same sections for the EIR. The EIR was certified in June 2006.

- **Kirby Hills Natural Gas Storage Facility IS/MND, CPUC**. As Deputy Project Manager, Ms. Koczwara was responsible for the research and writing of the Aesthetics, Agricultural Resources, Population and Housing, Public Services, and Utilities and Service Systems sections of the IS/MND for the proposed use of a depleted gas reservoir in Solano County, for the temporary storage of natural gas by Lodi Gas. The project consists of the drilling of 10 injection/withdrawal wells, and the construction of 7 miles of pipeline and ancillary facilities. A CPCN was granted in March 2006.

## PREVIOUS EXPERIENCE

Ms. Koczwara was a Facilities Coordinator at *Publicis and Hal Riney* from November 2001 to May 2002. She managed the daily office operations of a 14-department, 300-person advertising company and organized the scheduling, setup, and operation of client meetings and company events. She also has worked as a laboratory and fieldwork researcher at Stanford University (Palo Alto, California) and James Cook University (Townsville, Australia) from 1999 to 2001. Her work focused primarily on biological, ecological, and marine geochemical analyses.

## TRAINING AND PROFESSIONAL ORGANIZATIONS

- 2006 Environmental Award for Los Angeles Unified School District's New School Construction Program EIR (certified in June 2004), American Planning Association (APA), Los Angeles Section
- 2004 AEP Outstanding Environmental Analysis Document, Jefferson-Martin Final EIR
- 2009 AEP Outstanding Environmental Analysis Document Merit Award, Sunrise Powerlink Project EIR/EIS
- *UC Davis Extension Courses Attended*: Planning in California: An Overview and Update; GIS for Resource Managers and Professionals; National Environmental Policy Act Overview and Refresher, Making Effective Use of Mitigated Negative Declarations, and California Environmental Quality Act Two-Day Workshop.

# DECLARATION OF
## Hedy Koczwara

I, **Hedy Koczwara** declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities **Siting OFFICE** of the Systems Assessments and Facilities Siting Division as a **Staff Professional**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Socioeconomics** for the Hanford Energy Park Peaker (01-EP-07) Request to Amend License for Conversion to GWF Hanford Combined-Cycle Power Plant based on my independent analysis of the Petition to Amend the project and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 17, 2009 Signed: _____

At: San Francisco, California

# Mark Lindley, P.E.

Senior Associate

Mr. Lindley is a water resources engineer with experience in creek and wetland restoration design and construction, environmental impact/CEQA review, hydraulic design, surface and groundwater hydrology, field data collection, water quality, and remediation. His graduate studies focused on the application of analytical and numerical modeling techniques to hydraulic routing and sedimentation in wetlands, impoundments, detention basins and sediment control structures.

Mr. Lindley combines his expertise in technical analyses and engineering design with project management responsibilities to effectively address client needs. His technical work has included analysis and engineering design guidance in creek and wetland restoration projects, as well as hydraulic design guidance for flood control projects and environmental impact analysis for CEQA projects. Mr. Lindley also has significant experience in environmental site characterization and in the design, construction and operation of soil and groundwater remediation and treatment systems.

Mr. Lindley has provided developed construction documents including plans, specifications, and contract documents for creek and wetland restoration projects. He has provided construction management services for creek restoration projects including the implementation of grade control structures, toe protection, and biotechnical stream bank stabilization methods. He has also managed construction of wetland restoration projects including slough channel excavation, levee breaching and lowering, levee and wind wave berm construction, installation of culverts and hydraulic structures, and re-vegetation.

Additionally, Mr. Lindley has managed work efforts to collect data for physical characterization of project sites that include small and full-scale field studies for marsh and estuarine monitoring, stream monitoring, topographic and hydrographic surveying, and groundwater monitoring.

**Education**

M.S., 1994 — Biosystems & Agricultural Engineering, Oklahoma State University, Stillwater, OK

B.S., 1989 — Mechanical Engineering, University of Kentucky, Lexington, KY

**Professional Registration**

2004 Civil Engineer, California (License No. C 66701)

**Awards**

Phoenix Award for Outstanding Master's Student—First Runner-Up

**Professional Affiliations**

American Society of Agricultural Engineers

**Selected Project Experience**

**Carrizo Energy Solar Farm Project, Environmental Impact Review.** California Valley, California. Provided environmental review of a proposed solar thermal power plant in California Valley for the California Energy Commission. The environmental review was focused on the impacts of the proposed use of groundwater on the neighboring groundwater users. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's stormwater management plans.

**Selected Project Experience**
*Continued*

**GWF Hanford Expansion Project, Environmental Impact Review.** Hanford, California. Provided environmental review for the expansion of an existing single cycle natural gas fired power plant to a combined cycle plant for the California Energy Commission. The environmental review was focused on the feasibility of utilizing recycled water as an alternative water supply to the projects proposed us of groundwater meet State water policies. Other analyses included assessing potential flooding and water quality impacts related to the plant's stormwater management plans including a proposed infiltration basin.

**GWF Henrietta Expansion Project, Environmental Impact Review.** Kings County, California. Provided environmental review for the expansion of an existing single cycle natural gas fired power plant to a combined cycle plant for the California Energy Commission. The environmental review was focused on the feasibility of utilizing recycled water as an alternative to the Project's proposed use of Central Valley Project and State Water Project water to meet State water policies. Other analyses included assessing potential flooding and water quality impacts related to the plant's stormwater management plans including a proposed infiltration basin.

**San Francisco Electric Reliability Project, Environmental Impact Review.** San Francisco, California. Provided environmental review of a proposed power plant in San Francisco for the California Energy Commission. The environmental review was focused on the utilization of recycled wastewater from the City of San Francisco's combined sewer system and treated onsite for power plant evaporative cooling. In addition, the project site was located in a historic industrial area with existing subsurface impacts from previous land uses that required specific assessment and management to limit risks to onsite workers and neighboring businesses and residences. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

**Soil and Water Resource Compliance Reviews, Storm Water Pollution Prevention Plan review and implementation.** Throughout California. Provided technical review of construction and operation Storm Water Pollution Prevention Plans (SWPPPs) for several power plants located throughout California on behalf of the California Energy Commission. Review of SWPPPs to determine if the SWPPPs met the requirements of Conditions of Certification specified in the Energy Commission's licensing decision and included sufficient detail and specified appropriate Best Management Practices (BMPs) to address potential erosion and water quality impacts. Site visits involved inspection of installed BMPs to verify that the measures included in the SWPPP were properly installed in preparation for the rainy season.

**Blythe Energy Project - Phase II, Environmental Impact Review.** Blythe, California. Provided environmental review of a proposed power plant in Blythe for the California Energy Commission. The environmental review was focused on the impacts of the proposed use of groundwater on the neighboring Colorado River. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's evaporation pond, retention basin, and storm water drainage channels.

**University of California – Santa Cruz, Stormwater Improvement Projects.** Santa Cruz County, California. Developed the design of stormwater management projects intended to increase infiltration and percolation of runoff from paved surfaces to address impacts of increased runoff on downstream creeks. Conducted analysis and design of detention facilities, bio-retention facilities, vegetated bio-swales, and infiltration channels. Managed the development of the designs from the conceptual level through final design and construction.

**Selected Project Experience**
*Continued*

**Windemere Development, Surface Runoff Management.** Contra Costa County, California. Conducted analysis and design of water quality treatment and flood control detention facilities for the Windemere Development. Developed a sediment management and monitoring plan for a wetland detention basin, collecting runoff from the Windemere Development.

**Wendt Ranch Development, Surface Runoff Management.** Contra Costa County, California. Conducted hydrologic and hydraulic analysis and design of water quality treatment and flood control detention facilities for the Wendt Ranch Development.

**San Mateo Detention Basin.** San Mateo County, California. Provided technical review for a multi-objective detention basin included in a Mixed Use Development that is intended to function as stormwater detention, water quality enhancement and fire water storage. Provided qualitative design input on the conceptual design approach, and comment on design aspects such as water quality volume calculation methodology, water quality treatment, outlet structure hydraulics, pond configuration, and potential opportunities for habitat enhancement.

**Interstate 5 - Runoff Management Plan.** Orange County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

**Knightsen, Runoff Management Plan.** Contra Costa County, California. Developed a conceptual runoff management plan utilizing treatment wetlands and bio-swales to treat runoff and agricultural wastewater while addressing local flooding issues.

**Bahia Wetland Restoration Project – Planning, Design, and Construction.** Novato, California. Managed the planning, permitting, design, and construction of an approximately 375-acre tidal and seasonal wetland restoration project for Marin Audubon Society. Planning services included development of preliminary designs and assistance with permitting with the Regional Water Quality Control Board, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, San Francisco Bay Conservation and Development Commission, and the local Planning Department. Design services included developing construction plans, specifications, and contract documents. Construction period services included construction management and engineering oversight.

**Petaluma Marsh Restoration Project, Construction Management.** Marin County, California. Provided construction management and observation services for the Petaluma Marsh Restoration Project, which entailed re-creation of a 102-acre tidal marsh on diked and subsided farmland. The restoration plan included excavation of tidal slough channels, breaching and lowering the existing perimeter levee, creation of wind-wave berms, construction of a significant new levee to protect and adjacent railroad easement, and revegetation.

**Lincoln Creek Restoration, Creek Restoration Design.** Auburn, California. Developed Creek Restoration design plans for day-lighting a 500-foot reach of Lincoln Creek within the Auburn School Park Preserve for the City of Auburn. Conducted hydraulic analyses and engineering design for the restored creek to determine design sections and rock sizes that met the client's aesthetic requirements for the park and engineering design/stability requirements. Developed design drawings from conceptual level through 100% construction plans.

**Selected Project Experience**
*Continued*

**Hamilton Seasonal Wetland Design Guidelines, Wetland Design.** Novato, California. Developed design guidelines for seasonal wetland at the Hamilton Airfield. Provided water balance and percolation analyses related of placement of dredged materials at pilot seasonal wetland sites.

**Selected Project Experience**
*Continued*
*(Prior to PWA)*

**HP Valley Groundwater Treatment System, Construction Management, Monitoring, Operations.** Santa Rosa, California. Managed the construction of a groundwater pump and treatment system to remediate groundwater impacted by volatile organic compounds for Hewlett Packard. Managed the post construction operation and maintenance of the system and groundwater monitoring including reporting to the Regional Water Quality Control Board.

**HP Soil Vapor and Groundwater Treatment System, Construction Management, Monitoring, Operations.** Palo Alto, California. Managed the construction of a groundwater pump and treatment system and soil vapor extraction system to remediate soil groundwater impacted by volatile organic compounds for Hewlett Packard. Managed the post construction operation and maintenance of the system and groundwater monitoring including reporting to the Regional Water Quality Control Board and Santa Clara Valley Water District.

**Dual Phase Extraction and Treatment System, Construction Management, Monitoring, Operations.** San Francisco, California. Managed the construction of a dual phase extraction and treatment system remediate soil and groundwater impacted by petroleum hydrocarbons. Managed the post construction operation and maintenance of the system and groundwater monitoring including reporting to the Regional Water Quality Control Board and San Francisco Department of Public Health.

# DECLARATION OF
## Mark Lindley

I, **Mark Lindley** declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the **Siting OFFICE** of the Systems Assessments and Facilities Siting Division as a **Senior Technical Specialist II/Project Manager**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Soil and Water Resources**, for the GWF Hanford Combined Cycle Amendment to Amend-Application for Certification, based on my independent analysis of the Petition to Amend the project and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: JUNE 29, 2009 Signed: _____

At: San Francisco, California

**James S. Adams, M.A.**
**Environmental Protection Office**
**California Energy Commission**
**1516 Ninth Street**
**Sacramento, CA 95814-5504**
**PH (916) 653-0702, FAX (916) 651-8868**
**jadams@energy.state.ca.us**

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics, traffic and transportation, land use and visual resources. Work on special projects as requested.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an intervention by the Surfrider Foundation before the California Public Utilities Commission regarding decommissioning issues concerning Humboldt Bay, Diablo Canyon and San Onofre nuclear reactors.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 1 served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

## EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic
Honors. Member of PI GAMMU MU Honor Society since 1986.

## MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

# DECLARATION OF
**James Adams**

I, James Adams declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission, and Environmental Protection Division as an Environmental Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Traffic and Transportation for the Staff Assessment for the Hanford Energy Park Project (01-EP-07), based on my independent analysis of the Amendment and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/17/09 Signed: James Adams

At: Sacramento, California

DR. OBED ODOEMELAM

EDUCATION:

1979-1982 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1987-
The Present: California Energy Commission: Staff Toxicologist.

Responsible for the technical guidance of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electric and magnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels and working groups on issues related to multiple chemical sensitivity, building ventilation standards, electric and magnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development, utilization, and conservation. Testimonies are usually on public health, air quality, waste management, ventilation standards, and transmission line safety and nuisance and are prepared using specific assessment guidelines I helped develop for statewide use. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, serve on research statewide assessment committees, and prepare scientific reports for publication.

1985-1989 California Energy Commission: Health and Safety Specialist I.

Responsible for assessing the potential impacts of criteria and non-criteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture: Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

# DECLARATION OF
Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, Transmission, and Environmental Protection Division as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission Line safety and Nuisance** for Hanford Energy Peaker Plant based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/16/09 Signed: O Odoemelam

At: Sacramento, California

# MARIE McLEAN

## QUALIFICATIONS SUMMARY

Twenty years experience in the field of environmental research, analysis, and planning, with specific emphasis on the economics of water, energy, and land use and its social, visual, and cultural ramifications. Specific projects involved (1) assessing economic costs and benefits of water delivery contracts and energy sales; (2) conducting and presenting visual analyses of historic and other local, state, and federal resources; (3) preparing local, state, and federal resource assessment forms; (4) determining and communicating benefits and costs of proposed development projects (housing, energy, and water) on the social and economic life of communities in which they are located; and (5) as member of local design review, historic preservation, and housing boards, recommended programs and policies and monitored their implementation.

## RECENT PROFESSIONAL EXPERIENCE

California Energy Commission, Planner II, Environmental Office-Facilities Siting, January 2008—present.

Conduct technical analyses for complex facility siting cases and planning studies in the area of socioeconomics and visual resources.

Electricity Oversight Board; June 1, 2007—December 31, 2008.

Developed, conducted, and presented economic studies on energy markets and transmission projects; California Independent System Operator (CAISO) market redesign and technology upgrade program; and investigated, analyzed, and reported the effects of existing and proposed energy programs on supply, demand, and rates.

California Department of Water Resources, State Water Project Analysis Office, June 2001—July 31, 2007.

Developed and implemented complex analyses of the social, economic, and financial ramifications of contracted and proposed water deliveries and transfers and changes to valuation methods for selling energy in deregulated markets. Researched, identified, and reported on market activities in energy and water and their economic effects on ratepayers.

## EDUCATION

Bachelor of Arts, Economics, California State University, Sacramento, 1983

# DECLARATION OF
**Marie McLean**

I, Marie McLean, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission, and Environmental Protection Division as an Environmental Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Visual Resources for the Final Staff Assessment for the Hanford Energy Peaker Project Amendment (01-EP-07C) based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 28, 2009 Signed: Marie McLean

At: Sacramento, California

# Ellen Townsend-Hough

## SUMMARY

I am a chemical engineer with 29 years of experience. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I perform inspections work involved in the design and construction of thermal electrical generating power plants. I have a working knowledge of the California Environmental Quality Act. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

## PROFESSIONAL EXPERIENCE

### Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

- Review and analyze compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

### Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

### Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

**Writing**

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

## EMPLOYMENT HISTORY

| | | |
|---|---|---|
| 2002-Present | Associate Mechanical Engineer | California Energy Commission (CEC)<br>Sacramento CA |
| 1999-2002 | Advisor to CEC Commissioner | CEC<br>Sacramento CA |
| 1989-1999 | Associate Mechanical Engineer | CEC<br>Sacramento CA |
| 1992-1993 | Managing Partner | EnvironNet<br>Sacramento CA |
| 1988-1989 | Sales Engineering Representative | Honeywell Inc<br>Commerce CA |
| `1987-1988 | Chemical Engineer | Groundwater Technology<br>Torrance CA |
| 1985-1986 | Technical Marketing Engineer | Personal Computer Engineers<br>Los Angeles CA |
| 1985-1985 | Energy Systems Engineer | Southern California Gas Company<br>Anaheim CA |
| 1980-1985 | Design Engineer | Southern California Edison<br>Rosemead CA |
| 1975-1980 | Student Chemical Engineer | Gulf Oil Company<br>Pittsburgh PA |

## EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

**Continuing Education**

*Hazardous Material Management Certificate, University California Davis*
*Urban Redevelopment and Environmental Law, University of California Berkley*
*Analytical Skills, California Department of Personnel Administration (DPA) Training Center*
*Legislative Process/Bill Analysis, DPA Training Center*
*Federally Certified Environmental Justice Trainer*

***References furnished upon request.***

# DECLARATION OF
## Ellen Townsend-Hough

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Siting Transmission& Environmental Protection Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Waste Management for the GWF Hanford Combined-Cycle Power Plant based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 18, 2009 Signed: Ellen Townsend-Hough

At: Sacramento, California

**STEVE BAKER**, P.E.
Senior Mechanical Engineer

## Experience Summary

Thirty-five years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

## Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California —
  No. M27737 expires 6/30/2010

## Professional Experience

**1990 to Present**--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

**1987 to 1990**--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

**1981-1986**--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

**1974-1981**--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

# DECLARATION OF
**Steve Baker**

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Facility Design**, and supervised preparation of the staff testimony on **Power Plant Efficiency, Power Plant Reliability, Noise and Vibration** and **Geology and Paleontology**, for the GWF Hanford Combined-Cycle Power Plant Conversion Amendment based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 30 2009 Signed: Steve Baker

At: Sacramento, California

# Robert D. Hunter, Ph.D., C.E.G.
## Engineering Geologist
## Vice President

**Education**

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Earth Science – 1972 – California State University, Fullerton

**Registrations**

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

**Experience**

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant
- Humboldt Bay Repowering Project
- Victorville Power Project

- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring )
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)
- Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

## Affiliations

- Association of Engineering Geologists

## Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

# DECLARATION OF
## Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter**, declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an engineering geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Geology and Paleontology**, for the Hanford Energy Park Peaker Project based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 16, 2009 Signed: _____

At: Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

exp 3.31.11

**Erin Bright**
Mechanical Engineer

## Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

## Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

## Professional Experience

**2007 to Present**-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

**2006 to 2007**--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

# DECLARATION OF
## Erin Bright

I, Erin Bright, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency** and **Power Plant Reliability** for the Hanford Combined-Cycle Power Plant Conversion Amendment based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/14/09 Signed: _____

At: Sacramento, California

**Sudath Arachchige**
**1916 Ackleton Way**
**Roseville CA 95661-USA Phone 916-786-6468**

## EDUCATION:

Bachelor of Science in Electrical Engineering at California State University Fullerton

## ATTAINMENTS:

Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton.

## EXPERIENCE:

**November-2001 to Present**: - Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.

Conduct and perform planning studies and contingency analysis including power flow, short-circuit, stability, and post-transient analysis to maintain reliable operation of the power system. Investigates and analyzes Grid Planning problems and provides appropriate information to Grid Planning Engineers. Develops automated computer programs and other advance analysis methods for comprehensive evaluation of the operational performance of the transmission system.

Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/ISO/PTO transmission systems and proposed system additions; provide support and analyses associated with Reliability Must-Run (RMR) contracts and the Local Area Reliability Services (LARS) process; review new generation interconnection studies; provide congestion analyses; and provide support for regulatory filings.

**June-1998 to November-2001**: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.

Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

**June-1993 to May-1998**:- Substation Electrical Engineer, City of Anaheim, California.

Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor bank allocation program, and Load Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.

Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and maintence of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current and fault current.

# DECLARATION OF
**Sudath E. Arachchige**

I, Sudath E. Arachchige, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection Division as a Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering**, for the Hanford Combined-Cycle Power Plant Conversion Amendment based on my independent analysis of the Petition for Amendment and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 09/23/09 Signed: Sudath E Arachchige

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has sixteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

# DECLARATION OF
## Mark Hesters

I, **Mark Hesters** declare as follows:

1. I am presently employed by the California Energy Commission in the **Strategic Transmission Planning Office** of the Siting, Transmission and Environmental Protection Division as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **Hanford Energy Park** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/22/09 Signed: _____

At: Sacramento, California