Competitive
Power Ventures, Inc.

January 8, 2009

Ms. Melissa Jones
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Data Adequacy Supplement, CPV Vaca Station (08-AFC-11) Application for Certification

Dear Ms. Jones:

In accordance with the provisions of Title 20, California Code of Regulations, CPV Power Development, Inc. hereby submits this Supplement in Response to Data Adequacy Review of the Application for Certification for CPV Vaca Station, a 660 MW, natural gas-fired power plant to be located in the City of Vacaville, Solano County, California.

As an officer of CPV Power Development, Inc., I hereby attest, under penalty of perjury, that the contents of this application are truthful and accurate to the best of my knowledge.

Dated this 8th day of January, 2008.

Douglas F. Egan
CPV Power Development, Inc.

8403 Colesville Road, Suite 915, Silver Spring, MD 20910
Phone: (240) 723-2300
Fax: (240) 723-2339

Application for Certification

Supplement in Response to Data Adequacy Review

CPV Vaca Station

Submitted by

CPV Vacaville, LLC

Submitted to

California Energy Commission

With Technical Assistance by

CH2MHILL

January 2009

ES122007003SAC

Supplement

In Response to Data Adequacy Review

of the

Application for Certification

for

CPV Vaca Station

Vacaville, California

(08-AFC-11)

Submitted to the:

California Energy Commission

Submitted by:

CPV Vacaville, LLC

With Technical Assistance by:

Sacramento, California

January 2009

Contents

Section Page

Tables

Figures

Attachments

Introduction

This supplement to CPV Vacaville, LLC's (CPV's) Application for Certification (AFC) for the CPV Vaca Station Project (CPVVS) (08-AFC-11), responds to comments that California Energy Commission (CEC) Staff have made as a result of their data adequacy review of the AFC. The intention of this supplement is to provide all additional information necessary for Staff to find that the AFC contains adequate data to begin a power plant site certification proceeding under Title 20, California Code of Regulations and the Warren-Alquist Energy Resources Conservation and Development Act.

The format for this supplement follows the order of the AFC and provides additional information and responses to CEC information requests for several disciplines. Only sections for which CEC Staff posed requests or questions related to data adequacy are addressed in this supplement. If the response calls for additional appended material, it is included at the end of each subsection. Appended material is identified by the prefix "DA" indicating an item submitted in response to a Staff Data Adequacy comment, a number referring to the applicable AFC chapter, and a sequential identifying number. For example, an attachment in response to a Transmission System Engineering comment would be Attachment DA3.0-1, because the AFC section describing electrical transmission is Section 3.0. Tables are also numbered in this way. Appended material is paginated separately from the remainder of the document.

Each subsection contains data adequacy questions or information requests, with numbers and summary titles and, in parentheses, the citation from Appendix B, Title 22, California Code of Regulations (Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification) indicating a particular information requirement for the AFC. Each item follows with the CEC Staff comment on data adequacy for this item, under the heading "Information required to make AFC conform with regulations" followed by CPV's response to the information request and the information requested.

3.0 Transmission System Engineering (1)

1. One-Line Diagrams (Appendix B (b) (2) (C))

A detailed description of the design, construction, and operation of any electric transmission facilities, such as power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from the proposed power plant to the load centers to be served by the facility. Such description shall include the width of rights of way and the physical and electrical characteristics of electrical transmission facilities such as towers, conductors, and insulators.

Information required to make AFC conform with regulations:

1. *Please provide detail drawings for the take off structures required for interconnecting the one-mile long generation tie-lines from the power plant to the new switchyard.*
2. *Please provide detail drawings for the dead-end structure and 230 kV transmission poles required for the transmission lines to loop-in and loop-out of the new project switchyard.*
3. *Please provide conductor type, size and length of the loop-in and loop-out transmission circuits which interconnect the new project switchyard with the Vaca-Dixon to Lambie and Vaca-Dixon to Peabody transmission lines.*
4. *Please resubmit Figure 3.2-2, Energy Facility One-Line Diagram. Show all equipment ratings including bay arrangement of the breakers, disconnect switches, buses, and generation tie-lines, etc. which are required for the addition of the project (information provided in the AFC and the System Impact Study is inconsistent).*

Response: CPVVS will be interconnected with the regional electrical grid by looping the two 230-kV transmission lines (Vaca-Dixon to Lambie and Vaca-Dixon to Peabody) into a new 230-kV switchyard and by the construction of a new approximately one-mile-long, single-circuit, three-phase 230-kV tie line.

Figure DA3.0-1 is a local system one-line diagram showing the electric transmission system in the vicinity of the CPVVS. Figure DA3.0-2 shows typical pull-off H-frame structure in the interconnection switchyard and at the power plant substation, typical dead-end pole, and typical transmission pole design that could be used for the transmission line.

The proposed interconnecting 230-kV transmission circuit will be designed in double (or, optionally, single) circuit configuration, supported by steel-pole structures at appropriate intervals. The transmission line will consist of double 1590 kcmil ACSR (Falcon) or, optionally, single 1780 kcmil ACSS (Chukar/ACSS) conductor(s) per phase.

The proposed line will exit the CPVVS onsite switchyard in a slack span configuration from the take-off structures. The exit span will vary in length to accommodate the route option selected and will connect the pull-off structures to a new steel-pole, heavy-angle structure. The heavy-angle structure will be constructed to accommodate the turn necessitated by the

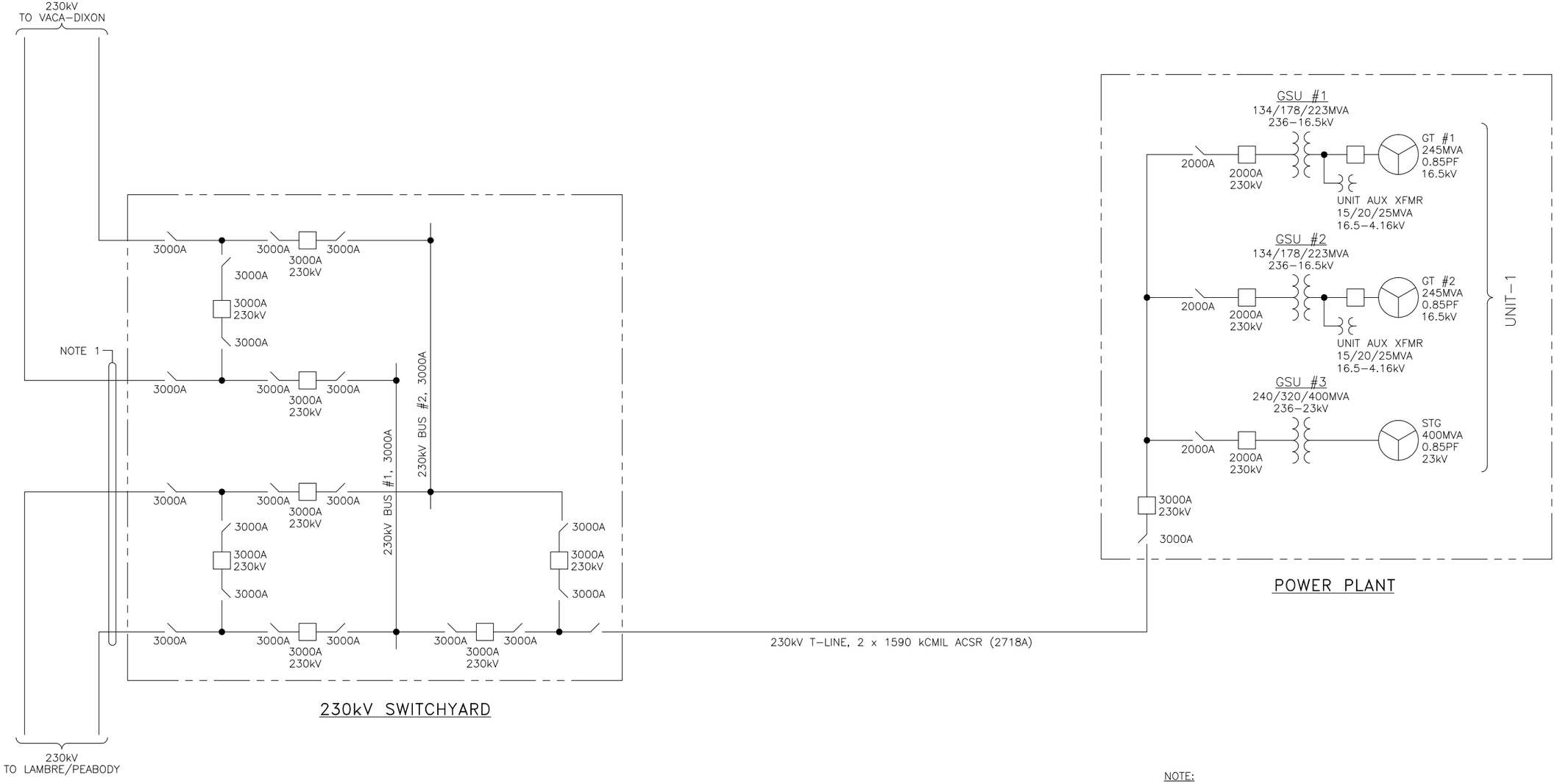
selected option. The transmission line steel-pole structures will be dead-end and tangent-type design and will be spaced based on engineering criteria.

The interconnection 230-kV switchyard will utilize 230-kV gas-insulated circuit breakers in a breaker-and-a-half bus arrangement to obtain a high level of service reliability. The switchyard and all equipment will be designed for an interrupting capacity of at least 50,000 kilo-ampere (and up to 63,000 kA, if necessary). The main buses, as well as the bays, will be designed to carry at least 3,000 amperes on a continuous basis. The size of the conductor for loop-in and loop-out of the switchyard for connecting to the PG&E transmission lines can be single 2156 kcmil ACSS (Bluebird/ACSS). PG&E will select a new conductor for re-conductoring these 230-kV lines, and the conductor PG&E select will also be used for loop-in and loop-out.

Station service power will be provided via the local PG&E distribution facilities near the Switchyard or by a 230/13.8/4.16-kV step-down transformer. Auxiliary controls and protective relay systems for the 230-kV switchyard will be located in a control building.

The power plant substation will utilize 230-kV gas-insulated circuit breakers with a single breaker for each of the three generating units and an individual generator step-up transformer for each of the three generating units. The substation and all equipment will be designed for an interrupting capacity of at least 50,000 kA (and up 63,000 kA, if necessary). The main buses, as well as the bays, will be designed for to carry at least 3,000 amperes on a continuous basis.

.



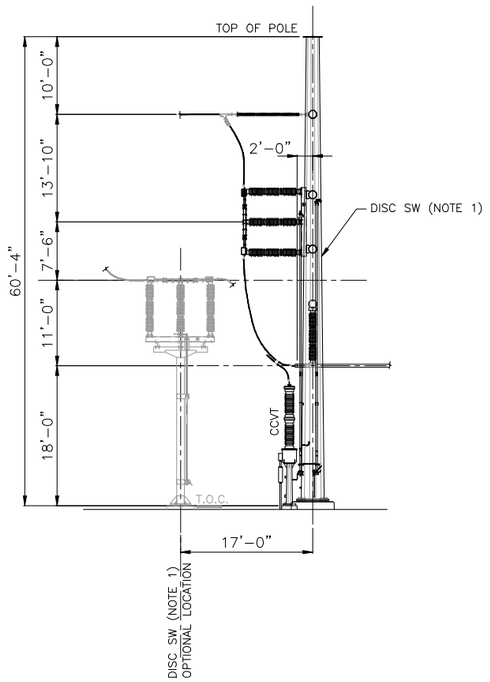
NOTE:

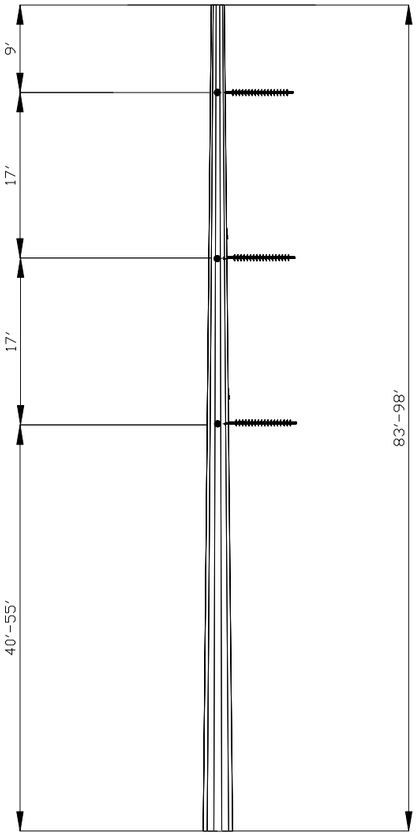
1. THIS CONDUCTOR CAN BE SINGLE 2156kCMIL ACSS (BLUBIRD ACSS). PG&E WILL SELECT TRANSMISSION LINE CONDUCTOR FOR RE–CONDUCTORING IN THE FUTURE AND THIS CONDUCTOR SHALL BE THE SAME.

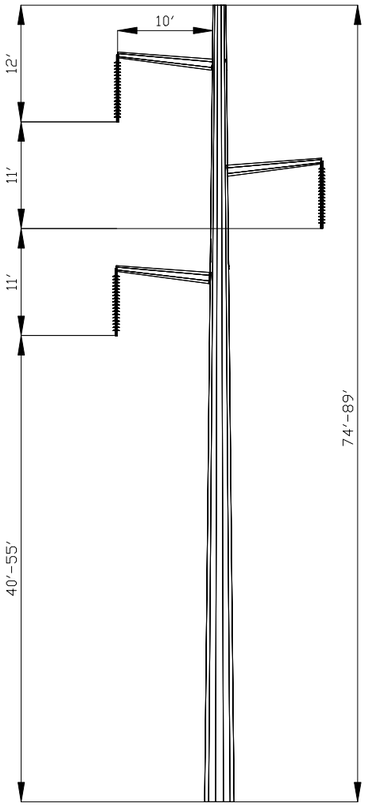
PRELIMINARY - DO NOT USE FOR CONSTRUCTION

FIGURE DA 3.0-1
PROJECT AND SWITCHYARD ONE-LINE DIAGRAM
CPV VACA STATION
VACAVILLE, CA

Source: Pike Electric, Inc., 01/08/2008







H-FRAME PULL-0FF STRUCTURE
230kV INTERCONNECTION SWITCHYARD
230kV POWER PLANT SUBSTATION (SIMILAR)

230kV DEADEND POLE
(NOTE 2)

TYPICAL TRANSMISSION POLE

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

NOTES:

1. AS AN OPTION DISCONNECT SWITCH CAN BE MOUNTED AT GRADE LEVEL.
2. DEADEND POLE FOR CONNECTION TO PG&E 230kV LINE WILL NEED TO BE REVIEWED BY PG&E.

Source: Pike Electric, Inc., 01/08/2008

FIGURE DA 3.0-2
DETAIL DRAWINGS OF TYPICAL TAKE-OFF STRUCTURE, DEAD-END STRUCTURE, AND TRANSMISSION POLE
CPV VACA STATION
VACAVILLE, CA

5.1 Air Quality (2–4)

2. Greenhouse Gas Emission Rates (Appendix B (g) (8) (E))

The emission rates of criteria pollutants and greenhouse gases (CO2, CH4, N2O, and SF6) from the stack, cooling towers, fuels and materials handling processes, delivery and storage systems, and from all on-site secondary emission sources.

Information required to make AFC conform with regulations:

Please provide the emission rates of greenhouse gases (CO2, CH4, N2O, and SF6) from all sources including the stacks, cooling tower, fuels and materials handling processes, delivery and storage systems, and from all on-site secondary emission sources.

Response: Greenhouse gas (GHG) emissions from the project have been calculated using methods and emission factors from the California Air Resources Board's (ARB) Regulation for the Mandatory Reporting of Greenhouse Gas Emissions.[1] Calculations are based on the maximum proposed annual fuel use and corresponding generation. The results are summarized in Table DA5.1-1, and the calculations are shown in detail in Tables DA5.1-2A and DA5.1-2B.

TABLE DA5.1-1
CPV Vaca Station Greenhouse Gas Emissions

Unit	CO_2 metric tonnes/yr	CO_2 metric tonnes/MWh	CO_2eq metric tonnes/yr*
CTGs/HRSGs	2,093,306	0.397	2,095,282
Auxiliary Boiler	7,531	Not applicable	7,538
Breakers	0	Not applicable	113
Total	2,100,837	0.397	2,102,933

*Includes CH_4, N_2O and SF_6.

In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires 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. To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

[1] California Air Resources Board, "ARB Compendium of Emission Factors and Methods to Support Mandatory Reporting of Greenhouse Gas Emissions" (Appendix A of the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, Subchapter 10, Article 2, sections 95100 to 95133, title 17, California Code of Regulations) http://www.arb.ca.gov/regact/2007/ghg2007/frofinoal.pdf =

TABLE DA5.1-2A
CPV Vaca Station Greenhouse Gas Emissions (GE CTGs)

Unit	Rated Capacity, MW	Operating Hours per year	Maximum Fuel Use, MMBtu/yr	Estimated Gross MWh	Maximum Emissions, metric tonnes/yr				Estimated Emissions, metric tonnes/MWh		
					CO_2	CH_4	N_2O	SF_6	CO_2	CH_4	N_2O
CTG, base load	500.0	5,260	19,093,800	2,630,000	1,009,489	17.18	1.91	0.00	0.384	6.53E-06	7.26E-07
CTG, peak load	600.0	3,500	16,289,000	2,100,000	861,199	14.66	1.63	0.00	0.410	6.98E-06	7.76E-07
Auxiliary boiler	n/a	3,850	142,450	n/a	7,531	0.13	0.01	0.00	n/a	n/a	n/a
Breakers	—	—	—	—	0	0.00	0.00	4.72E-03			
Total	—	—	35,525,250	4,730,000	1,878,220	31.97	3.55	4.72E-03	0.397	6.76E-06	7.51E-07
CO_2eq					1,878,220	671	1,101	113			
							TOTAL	1,880,105			

Natural Gas GHG Emission Rates[a]

Emission Factors, kg/MMBtu

	CO_2[b]	CH_4[c]	N_2O[c]	SF_6[e]
Natural Gas	52.870	9.00E-04	1.00E-04	n/a
Global Warming Potential[d]	1	21	310	23,900

[a]Calculation methods and emission factors from ARB, "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions," December 2007

[b]GHG Mandatory Reporting Regulation Appendix A, Table 4; heat content 1000 to 1025 Btu/scf.

[c]GHG Mandatory Reporting Regulation Appendix A, Table 6.

[d]GHG Mandatory Reporting Regulation Appendix A, Table 2.

[e]Sulfur hexafluoride (SF6) will be used as an insulating medium in five new 230 kV breakers. Estimates of the SF6 contained in a breaker of this size range from 161 to 208 lbs, depending on the manufacturer. Breaker manufacturers guarantee leakage rates below 1%, so a maximum leakage rate of 1% per year is assumed.

TABLE DA5.1-2B
CPV Vaca Station Greenhouse Gas Emissions (Siemens CTGs)

Unit	Rated Capacity, MW	Operating Hours per year	Maximum Fuel Use, MMBtu/yr	Estimated Gross MWh	Maximum Emissions, metric tonnes/yr				Estimated Emissions, metric tonnes/MWh		
					CO_2	CH_4	N_2O	SF_6	CO_2	CH_4	N_2O
CTG, base load	560.0	5260	21,544,057	2,945,600	1,139,034	19.39	2.15	0.00	0.387	6.58E-06	7.31E-07
CTG, peak load	670.0	3500	18,049,400	2,345,000	954,272	16.24	1.80	0.00	0.407	6.93E-06	7.70E-07
Auxiliary boiler	n/a	3850	142,450	n/a	7,531	0.13	0.01	0.00	n/a	n/a	n/a
Breakers	—	—	—	—	0	0.00	0.00	4.72E-03			
Total	—	—	39,735,906	5,290,600	2,100,837	35.76	3.97	4.72E-03	0.397	6.76E-06	7.51E-07
CO_2eq					2,100,837	751	1,232	113			
							TOTAL	2,102,933			

Natural Gas GHG Emission Rates[a]

Emission Factors, kg/MMBtu

	CO_2[b]	CH_4[c]	N_2O[c]	SF_6[e]
Natural Gas	52.870	9.00E-04	1.00E-04	n/a
Global Warming Potential[d]	1	21	310	23,900

[a]Calculation methods and emission factors from ARB, "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions," December 2007

[b]GHG Mandatory Reporting Regulation Appendix A, Table 4; heat content 1000 to 1025 Btu/scf.

[c]GHG Mandatory Reporting Regulation Appendix A, Table 6.

[d]GHG Mandatory Reporting Regulation Appendix A, Table 2.

[e]Sulfur hexafluoride (SF6) will be used as an insulating medium in five new 230 kV breakers. Estimates of the SF6 contained in a breaker of this size range from 161 to 208 lbs, depending on the manufacturer. Breaker manufacturers guarantee leakage rates below 1%, so a maximum leakage rate of 1% per year is assumed.

ARB adopted early action GHG-reduction measures in October 2007. On December 11, 2008, ARB adopted a scoping plan that identifies how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff will draft regulatory language to implement its plan and will hold additional public workshops on each measure, including market mechanisms.

SB 1368, also enacted in 2006, and regulations adopted by the CEC and the Public Utilities Commission pursuant to the bill, prohibit utilities from entering into long-term commitments with any baseload facilities that exceed the Emission Performance Standard (EPS) of 0.500 metric tones of CO_2 per megawatt-hour (1,100 pounds CO_2/MWh). Specifically, the EPS applies to baseload power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of 5 years or more, including contracts with power plants located outside of California. If a project, in-state or out of state, plans to sell baseload electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS.

Since the project is permitted for more than 60 percent annual capacity factor, it must emit less than 0.500 mt CO_2/MWh to meet the EPS. The project is expected to emit 0.397 mt CO_2/MWh, (CO_2, not CO_2-equivalent), as shown in Table DA5.1-1. Therefore, the facility will comply with the EPS. As the CEC's 2007 Integrated Energy Policy Report[2] 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. (p. 184)

Thus, in both the context of the California Environmental Quality Act and CEC's Integrated Energy Policy Report, the proposed project would not be expected to cause a significant cumulative impact and furthers the state's strategy to reduce fuel use and GHG emissions. Further, even though it is possible to quantify how many gross GHG emissions are attributable to a project, it is difficult to determine whether this will result in a net increase of these emissions, and, if so, by how much. Therefore, it would be speculative to conclude that any given project results in a cumulatively significant adverse impact resulting from GHG emissions.

At this time, neither the state nor the AQMD has adopted thresholds of significance or methodologies for analyzing GHG emission impacts under CEQA. The State Office of Planning and Research has begun the process of drafting proposed guidelines for analyzing GHG emissions, but these guidelines are not expected to be adopted until January 2010. Additionally, ARB has just adopted a scoping plan to achieve the emission reduction targets of AB 32. In the interim period while the AB 32 and CEQA GHG-related regulatory

[2] CEC-100-2007-008-CMF, December 5, 2007, accessed at http://www.energy.ca.gov/2007_energypolicy/

programs are being developed, projects may be judged on whether they will hinder the emission-reduction goals of AB 32.

The CEC has issued several decisions concerning projects subject to its decision since passage of AB 32. Recently, the Final Commission Decision on the 660 MW Colusa Generating Station (CGS) discussed the schedule by which ARB will develop regulations to manage GHG emissions and imposed a condition of certification AQ-SC8 that:

> "…requires the project owner to report the quantities of relevant greenhouse gases emitted as a result of electric power production."

More important was the following finding:

> We find that AQ-SC8, with the reporting of GHG emissions, will enable the project to be consistent with the regulations and policies described above (referring to AB 32 and Senate Bill 1368 ([Electricity Greenhouse Gas Emissions Standards]).

As a routine matter, the CEC includes such reporting requirements in its decisions. The Applicant will comply with similar requirements, should they be imposed on the CPV Vaca Station.

In the absence of established thresholds of significance or methodologies for assessing impacts, this analysis of GHG emission impacts consists of quantifying project-related GHG emissions, determining their significance in comparison to the goals of AB 32, and discussing the potential impacts of climate change within the state as well as strategies for minimizing those impacts.

3. Modeling Protocol (Appendix B (g) (8) (I) (iii))

A protocol for a cumulative air quality modeling impacts analysis of the project's typical operating mode in combination with other stationary emissions sources within a six mile radius which have received construction permits but are not yet operational, or are in the permitting process. The cumulative inert pollutant impact analysis should assess whether estimated emissions concentrations will cause or contribute to a violation of any ambient air quality standard.

Information required to make AFC conform with regulations:

Please provide a copy the of air quality modeling protocol described in AFC Appendix 5.1F.

Response: AFC Appendix 5.1F, Cumulative Impacts Analysis for the CPVVS Facility, describes the procedure that will be used to evaluate the cumulative impacts that the project and other nearby large projects will have on existing air quality. The analysis itself will be submitted separately.

The text in Appendix 5.1F is excerpted from the modeling protocol that was submitted to CEC on May 12, 2008. The modeling protocol described in detail the dispersion modeling procedures that were to be used for all of the air quality impact analyses performed for the project. The description of the dispersion modeling procedure has been integrated into the AFC.

A copy of the May 12 submittal is included as Attachment DA5.1-1.

4. Proposed Particulate Mitigation (Appendix B (g) (8) (K))

A detailed description of the mitigation, if any, which an applicant may propose, for all projects impacts from criteria pollutants that currently exceed state or federal ambient air quality standards, but are not subject to offset requirements under the district's new source review rule.

Information required to make AFC conform with regulations:

Please provide a description of mitigation proposed for particulate matter less than 2.5 microns (PM2.5) because it is a pollutant that currently exceeds the ambient air quality standards but is not subject to offset requirements under the new source review rule.

Response: $PM_{2.5}$ is a subset of PM_{10}. Although state and federal standards have been promulgated, YSAQMD has not established offset requirements for $PM_{2.5}$.

Almost all of the PM_{10} emissions from combustion sources are also $PM_{2.5}$. As a result, almost all of the PM_{10} emissions from the project are also $PM_{2.5}$. The only exception relates to PM emissions from the cooling tower. As shown in Table 5.1A-4 of the AFC, 34 percent of the cooling tower PM_{10} emissions are $PM_{2.5}$ (please note that first set of emissions in Table 5.1A-4 are incorrectly labeled "$PM_{10.}$" The correct label is "PM").

Most of the PM_{10} offsets that are being provided for the project come from combustion sources. As a result, the PM_{10} offsets will mitigate $PM_{2.5}$ emissions as well. The Applicant will provide a summary of the $PM_{2.5}$ emissions and offsets once the offset package becomes better defined.

ATTACHMENT DA5.1-1

Air Quality Modeling Protocol

sierra research

1801 J Street
Sacramento, CA 95811
Tel: (916) 444-6666
Fax: (916) 444-8373

Ann Arbor, MI
Tel: (734) 761-6666
Fax: (734) 761-6755

May 12, 2008

Eric Knight
Energy Facility Licensing Program Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Subject: Modeling Protocol for Competitive Power Venture's Proposed Power Plant in Vacaville, California

Dear Mr. Knight:

Please find attached the emissions modeling protocol for Competitive Power Venture's (CPV) proposed power plant project to be located in Vacaville, California. CPV will be applying to the California Energy Commission for certification, to the Yolo-Solano Air Quality Management District for a Determination of Compliance, and to the U.S. Environmental Protection Agency for a Prevention of Significant Deterioration Permit. The project is expected to be subject to District requirements for air quality modeling analyses. Attached for your review and approval is a description of the analytical approach that will be used to comply with modeling requirements for the project. We intend to file applications with the agencies at the end of June 2008 and are requesting approval of the modeling protocol by May 27, 2008.

We would be pleased to meet with you and your staff to discuss this protocol if such a meeting would be useful. We look forward to working with you. If you have any questions, please do not hesitate to call me at (510) 464-8028. Thank you for your attention in this matter.

Sincerely,

Steve Hill

Steve Hill

cc: Andrew Welch

sierra research

Air Dispersion Modeling and Health Risk Assessment Protocol
CPV Vacaville Project
Vacaville, California

submitted to:

Yolo-Solano Air Quality Management District
California Energy Commission
U.S. Environmental Protection Agency, Region 9

prepared for:

Competitive Power Ventures

May 2008

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95811
(916) 444-6666

Air Dispersion Modeling and Health Risk Assessment Protocol
CPV Vacaville Project
Vacaville, California

Submitted to:

Yolo-Solano Air Quality Management District
California Energy Commission
U.S. Environmental Protection Agency, Region 9

prepared for:

Competitive Power Ventures

May 2008

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95811
(916) 444-6666

Air Dispersion Modeling and Health Risk Assessment Protocol
CPV Vacaville Project
Vacaville, California

Table of Contents

List of Tables

Page

List of Figures

Page

1. INTRODUCTION

Competitive Power Ventures (CPV) intends to submit an Application for Certification (AFC) to the California Energy Commission (CEC) and an Application for a Determination of Compliance (equivalent to Authority to Construct permits) to the Yolo-Solano Air Quality Management District (AQMD or District). CPV will also submit an Application to the U.S. Environmental Protection Agency (USEPA) for a federal Prevention of Significant Deterioration (PSD) Permit.

The Project would include the construction and operation of a new simple-cycle or combined-cycle power plant in Vacaville, California.

Certification by the CEC will be needed because the Project will generate more than 50 MW of electric power, and the Project will be classified as a new major source under District New Source Review regulations—Rule 3.4—because emissions of reactive organic compounds (ROC) and nitrogen oxides (NOx) are each expected to exceed 25 tons per year, and carbon monoxide (CO) emissions are expected to exceed 100 tons per year.

The Project is also expected to be subject to federal PSD requirements (40 CFR 52.21). The facility is expected to be a "major stationary source" because it has the potential to have emissions in excess of the major source threshold for at least one attainment pollutant; increases of several federal attainment pollutants are expected to be significant because the net emission increase of those pollutants will exceed the thresholds in 40 CFR 52.21(b)(23)(i). The specific attainment pollutants subject to PSD review will be described in the application documents. Emissions of the federal attainment pollutant sulfur dioxide (SO_2) will be below the applicability threshold and, therefore, not subject to federal PSD requirements.

The Applicant will submit air quality impact analyses to the District, the CEC, and USEPA. Air dispersion modeling for these analyses will address criteria pollutants and toxic air contaminants (TACs) as required by District Regulation 3; CEC requirements[1]; and criteria pollutants as required by applicable USEPA regulations for PSD permits. The purpose of this document is to present the procedures for meeting District, CEC, and USEPA air quality modeling requirements for the proposed project.

[1] Summarized in CEC Data Adequacy Worksheets, revised March 28, 2007, and available at *http://www.energy.ca.gov/sitingcases/documents/index.html*.

The modeling will address both potential maximum criteria pollutant impacts and health impacts from toxic air contaminants. This protocol describes the modeling procedures that will be used, which follow modeling guidance provided by the USEPA in its "*Guideline on Air Quality Models*" (USEPA, 2005), the National Park Service's "*Permit Application Guidance for New Air Pollution Sources*" (Bunyak, 1993), the "*Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report*" (U.S. Forest Service et al, December 2000), and the "*Interagency Workgroup on Air Quality Modeling (IWAQM) Phase II Recommendations*" (USEPA,1998).

Impacts from operation of the facility will be compared to the criteria shown in Table 1.

Table 1
Air Quality Impact Analyses

Air Quality Criteria	VOC [a]	NO_2	$PM_{10}/PM_{2.5}$ [e]	CO	SO_2
PSD Significant Impact Levels [b]	NA[d]	√	√	√	√
PSD Monitoring Exemption Levels [b]	NA	√	√	NA	√
Ambient Air Quality Standards (AAQS)	NA	√	√	√	√
Class I and Class II Visibility [c]	NA	√	√	NA	√
Impacts to Soils and Vegetation [c]	NA	√	√	NA	NA
Class I Area Acid Deposition [c]	NA	√	√	NA	√

Notes:
a. VOC emissions are used as a surrogate for ozone impacts in the PSD review process; no ozone modeling will be carried out.
b. For pollutants subject to PSD review.
c. If project is subject to PSD review.
d. Not applicable.
e. USEPA guidance (71 FR 6727) provides that compliance with the $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) should be evaluated using the PM_{10} NAAQS and not modeled directly.

2. FACILITY DESCRIPTION AND SOURCE INFORMATION

The Project will be located adjacent to the existing Easterly Wastewater Treatment Plant, which is located at 6040 Vaca Station Road, Elmira, California. It will be constructed on currently vacant land to the immediate southeast of the Treatment Plant. The property will be leased from the City of Vacaville. Figure 1 is an aerial view of the area. Travis Air Force Base (AFB), where the nearest meteorological monitoring station is located, can be seen in this view. Figure 2 is a more focused aerial view of the project site showing the immediate surroundings, including the nearby community of Elmira and the treatment plant on the east side of Vaca Station Road. Vacaville housing developments can be seen on the west side of Leisure Town Road.

CPV is proposing to construct a new simple-cycle or combined-cycle power plant; the specific plant type will be determined before application documents are submitted. All combustion devices in the power train will be fueled with California Public Utilities Commission (PUC)-quality natural gas. The project may include the installation of a natural gas- or Diesel-fueled emergency standby generator engine and a Diesel-fueled emergency fire water pump engine. The power plant is expected to operate up to 365 days per year and 24 hours per day.

The new emitting units will utilize Best Available Control Technology (BACT).

Figure 1
Aerial View of the Region around the Proposed Project

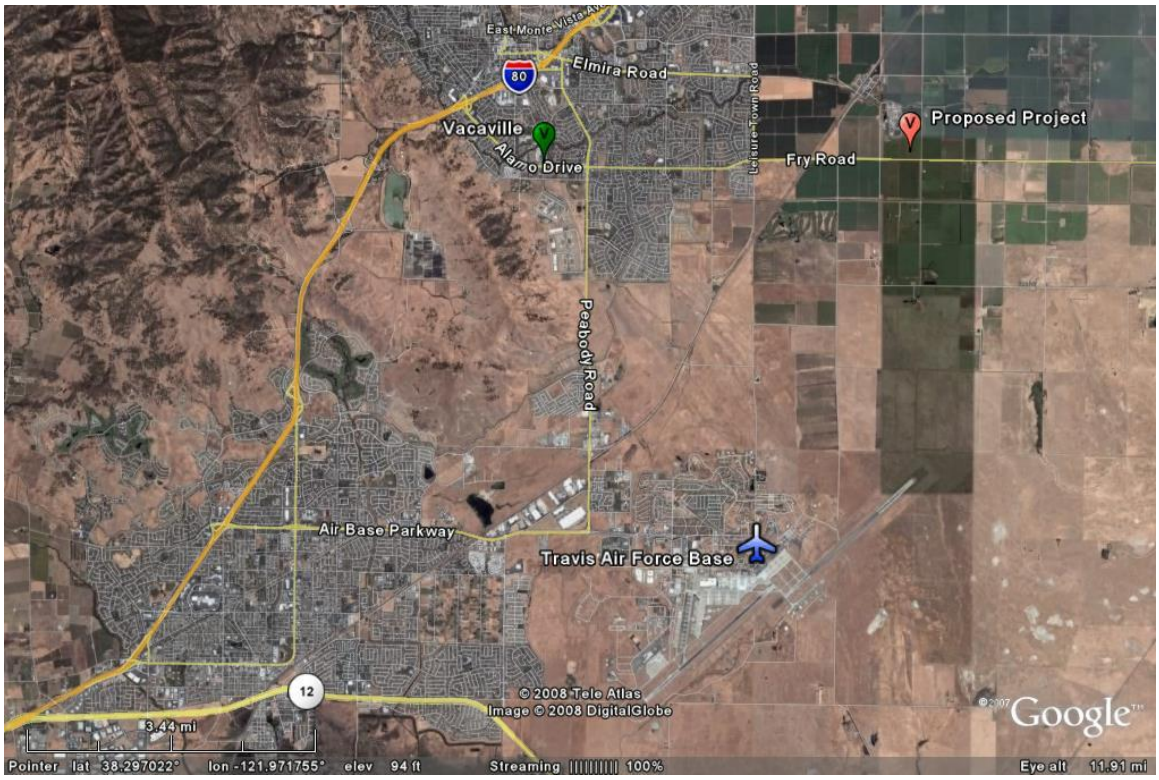
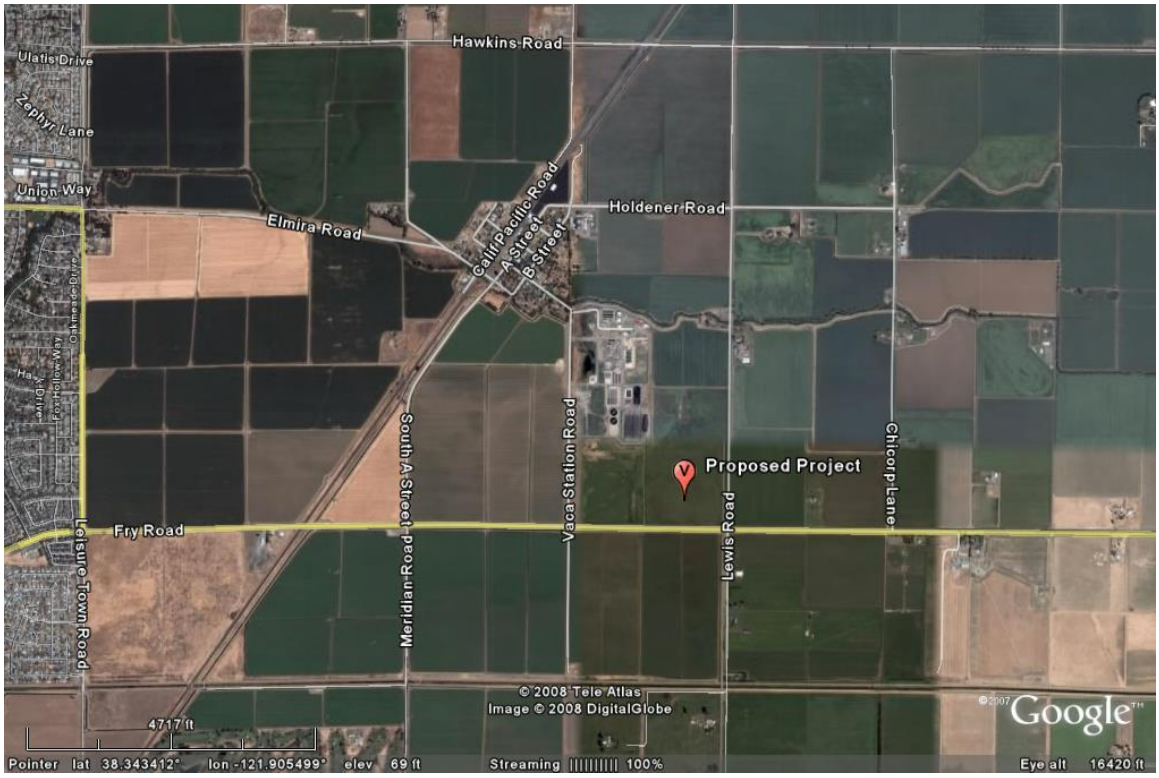


Figure 2
Aerial View of the Immediate Vicinity
Around the Proposed Project



3. DISPERSION MODEL INPUT

3.1 AERMOD Modeling

The following USEPA air dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources' operating parameters and their locations:

- American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) model, also known as AERMOD (Version 07026);
- Building Profile Input Program – Plume Rise Model Enhancements (BPIP-PRIME, Version 04274); and
- SCREEN3 (Version 96043).

The following models are not expected to be used, but they are listed in the event that an optional specialized modeling analysis is necessary for the project. In addition to the information listed below, further information on the use of CTDMPLUS is provided in Appendix A.

- Complex Terrain SCREEN (CTSCREEN, Version 94111)
- Complex Terrain Dispersion Model (CTDMPLUS, Version 93228)
- Visibility Screening Model (VISCREEN (Version 88341)
- CALPUFF (Version 5.8)

The main air dispersion modeling will be conducted with AERMOD Version 07026. The air quality modeling analysis will follow the January 2008 USEPA AERMOD Implementation Guide and EPA's "Guideline on Air Quality Models" (USEPA, 2005). USEPA default options will be used.

AERMOD can account for building downwash effects on dispersing plumes. Stack locations and heights and building locations and dimensions will be input to BPIP-PRIME. The first part of BPIP-PRIME determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-specific building dimensions for each structure that is used by AERMOD to evaluate wake effects. The BPIP-PRIME output is formatted for use in AERMOD input files.

Simple, Complex, and Intermediate Terrain Impacts – The AERMOD air dispersion model[2] to be used for simple, complex, and intermediate terrain is a steady-state, multiple-source, Gaussian dispersion model designed for use with stack emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources (i.e., complex terrain). The AERMOD model requires hourly meteorological data consisting of wind direction and speed (with reference height), temperature (with reference height), Monin-Obukhov length, surface roughness length, heights of the mechanically and convectively generated boundary layers, surface friction velocity, convective velocity scale, and vertical potential temperature gradient in the 500-meter layer above the planetary boundary layer. The model assumes that there is no variability in meteorological parameters over a one-hour time period, hence the term "steady-state."

Standard AERMOD control parameters will be used, including stack tip downwash, non-screening mode, non-flat terrain, and sequential meteorological data check. The stack-tip downwash algorithm will be used to adjust the effective stack height downward following the methods of Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top. The rural default option will be used by not invoking the URBANOPT option.[3]

It is expected that the main modeling for the project will be accomplished with AERMOD. Companion software, AERMET (Version 06341), will be used to arrange meteorological data from Travis AFB into the format required by AERMOD. The surface characteristics appropriate to the land uses surrounding the meteorological station at Travis AFB—namely surface roughness length, albedo, and Bowen Ratio—will be computed for use in AERMET using the AERSURFACE (Version 08009) software released by the USEPA on January 9, 2008. AERSURFACE obtains the needed values from its internal US Geological Survey National Land Cover Data archives.

Appendix A contains information on two additional models —Complex Terrain Screening Model (CTSCREEN) and the Complex Terrain Dispersion Model PLUS (CTDMPLUS)—and the meteorological data needed to run them, which will be used if needed for supplemental modeling of air dispersion to receptors in terrain above stack-top height.

3.2 Ambient Ratio Method and Ozone Limiting Method

Annual NO_2 concentrations will be calculated using the Ambient Ratio Method (ARM), adopted in Supplement C to the Guideline on Air Quality Models (USEPA, 1995). The

[2] AERMOD has been adopted as a guideline model by USEPA as a replacement for ISCST3. AERMOD incorporates an improved downwash algorithm as compared to ISCST3 (Federal Register, November 9, 2005; Volume 70, Number 216, Pages 68218-68261).

[3] Although the URBANOPT in AERMOD offers the user the opportunity to set the quantitative value of the surface roughness around the project site, it should be recognized that the rural vs. urban option in AERMOD is primarily designed to set the fraction of incident heat flux that is transferred into the atmosphere. This fraction becomes important in urban areas having an appreciable "urban heat island" effect due to a large presence of land covered by concrete, asphalt, and buildings.

Guideline allows a nationwide default of 75% for the conversion of nitric oxide (NO) to NO_2 on an annual basis and the calculation of NO_2/NOx ratios.

If NO_2 concentrations need to be examined in more detail, the Plume Volume Molar Ratio Method (PVMRM) adaptation of the Ozone Limiting Method (Cole and Summerhays, 1979) will be used. AERMOD PVMRM calculates the NO_2 concentration using hourly ozone data. Hourly ozone data collected at the Vacaville-Urbati Drive monitoring station during the years 2003-2007 will be used in conjunction with PVMRM to calculate hourly NO_2 concentrations from hourly NOx concentrations. Missing hourly ozone data will be substituted prior to use with day-appropriate values (e.g., from the previous day, or the next day, for the same hour). Any other missing hourly ozone data will be substituted with 40 ppb ozone (typical ozone tropospheric background level).

The PVMRM involves an initial comparison of the estimated maximum NOx concentration and the ambient O_3 concentration left in the plume after reaction of NO with O_3 to determine which is the limiting factor to NO_2 formation. If the remaining O_3 concentration is greater than the maximum NOx concentration, total conversion is assumed. If the NOx concentration is greater than the remaining O_3 concentration, the formation of NO_2 is limited by the remaining ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion.

3.3 Fumigation Modeling

The SCREEN3 model will be used to evaluate inversion breakup fumigation impacts for short-term averaging periods (24 hours or less), as appropriate. The methodology in USEPA 1992b (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) will be followed for these analyses. Combined impacts for all sources under fumigation conditions will be evaluated, based on USEPA modeling guidelines.

3.4 Health Risk Modeling

A health risk assessment (HRA) will be performed according to the Office of Environmental Health Hazard Analysis "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" (August 2003). The HRA modeling will be prepared using the California Air Resources Board's (CARB's) Hotspots Analysis and Reporting Program (HARP) computer program (Version 1.3, October 18, 2005).[4] HARP will be used to assess cancer risk as well as non-cancer chronic and acute health hazards. Because the TACs emitted by the Project include polycyclic aromatic hydrocarbons (PAHs), the HRA will address not only the inhalation pathway, but also the following three pathways: dermal absorption, and soil and mother's milk ingestion.

[4] HARP has not yet been revised to utilize AERMOD, and the CARB "onramp" software that allows HARP to incorporate AERMOD output files is still in beta testing. Therefore, the HRA will use the "Option 8" procedure described in the HARP How-To Guide. See Section 3.11 below.

3.5 Meteorological Data

Hourly surface meteorological data (e.g., hourly wind speed and direction, temperature, cloud cover) for Travis AFB in Fairfield during the period 2003-2007 were obtained from the National Climatic Data Center (NCDC). The Travis AFB station is located approximately 5.3 miles southwest of the project site. Upper air data will be taken from the Oakland International Airport monitoring station located approximately 46 miles south-southwest of the project site.

USEPA requires the use of meteorological data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates in the Clean Air Act at Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the "*On-Site Meteorological Program Guidance for Regulatory Modeling Applications*" (1987b). The representativeness of the data depends on (a) the proximity of the meteorological monitoring site to the area under consideration, (b) the complexity of the topography of the area, (c) the exposure of the meteorological sensors, and (d) the period of time during which the data are collected. As discussed below, the proposed Travis AFB meteorological data are representative of conditions at the project site.

Representativeness has been defined in the PSD Monitoring Guideline (USEPA, 1987a) as data that characterize the air quality for the general area in which the proposed project would be constructed and operated. Because of the reasonably close proximity of the meteorological data site to the proposed project site (distance between the project site and the Travis AFB monitoring location is approximately 5.3 miles), the same large-scale flat agricultural land topography that influences the meteorological data monitoring station also influences the proposed project site in the same manner. The elevated terrain to the north of both Travis AFB and Vacaville "steer" the dominant sea breeze from the Pacific Ocean along the Sacramento River drainage that includes both the meteorological monitoring and project locations. Similarly, but far less frequently, wind draining from the elevated terrain to the north will pass over both locations, further assuring representativeness of the Travis AFB meteorological data in modeling air dispersion from the project. The height of and distance to this elevated terrain are similar at the two locations, although the elevated terrain on the north side of Interstate 80 is nearer to the project site than to Travis AFB.

Representativeness has also been defined in the "*Workshop on the Representativeness of Meteorological Observations*" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Representativeness is best evaluated when sites are climatologically similar, as are the

project site and the Travis AFB meteorological monitoring station. Representativeness has additionally been defined in the PSD Monitoring Guideline (USEPA, 1987a) as data that characterize the air quality for the general area in which the proposed project would be constructed and operated. As discussed above, because of the relative proximity of the Travis AFB meteorological data site to the proposed project site, the same large-scale topographic features that influence the meteorological data monitoring station also influence the proposed project site in the same manner.

3.6 Receptor Grids

Receptor and source base elevations will be determined from USGS Digital Elevation Model (DEM) data using the 7½-minute format (10- to 30-meter spacing between grid nodes). All coordinates will be referenced to UTM North American Datum 1927 (NAD27), Zone 10. The AERMOD receptor elevations will be interpolated among the DEM nodes according to standard AERMAP procedure. For determining concentrations in elevated terrain, the AERMAP terrain preprocessor receptor-output (ROU) file option will be chosen. Hills will not be imported into AERMOD for CTDM-like processing.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. A 250-meter resolution coarse receptor grid will be developed and will extend outwards at least 10 km (or more as necessary to calculate the significant impact area).

In addition, a nested grid will be developed to efficiently identify the maximum impact area(s). This nested grid will have the following resolutions:

- 25-meter resolution along the facility fence line in a single tier of receptors composed of four segments extending out to 100 meters from the fence line;
- 100-meter resolution from 100 meters to 1,000 meters from the fence line; and
- 250-meter resolution from 1 km out to at least 10 km from the site.

When maximum first-high or maximum second-high impacts occur in the 100- or 250-meter spaced areas, an additional refined receptor grid with 25-meter resolution will be placed around each maximum coarse grid impact and extended out to a distance of two coarse grid spacings from the coarse grid maxima[5] in all directions from that point of impact. Concentrations within the facility fence line will not be calculated.

The following 7.5-minute USGS Digital Elevation Model (DEM) quadrangles in California will be employed for modeling the Project:

- Allendale;
- Elmira;

[5] Email from Sierra Research to Keith Golden of CEC, July 11, 2006.

- Dixon; and
- Dozier.

If more distant impacts are encountered in the AERMOD results, other quadrangles that may be needed include the following (listed from approximately nearest, to farthest):

- Fairfield South;
- Fairfield North;
- Mount Vaca;
- Monticello Dam;
- Winters;
- Merritt;
- Davis;
- Saxon;
- Liberty Island;
- Rio Vista;
- Birds Landing; and
- Denverton.

3.7 Modeling Scenarios

Pollutant emissions to the atmosphere from the proposed project will occur from combustion of natural gas in the combustion turbines and emergency equipment. The expected emission rates will be based on vendor data and additional conservative assumptions of equipment performance. Turbine emissions and stack parameters, such as flow rate and exit temperature, will exhibit some variation with ambient temperature. To calculate the maximum air quality impacts, a screening analysis will be performed to evaluate each operating scenario (e.g., minimum load, full-load operation with and without duct firing [if applicable] at a range of ambient temperatures) on a pollutant-specific basis. Each of these operating conditions has unique performance characteristics that affect plume dispersion and thus predicted impacts. This screening analysis is most relevant to analyses for short-term impacts. The temperatures used for the short-term screening analysis (i.e., design cold ambient, annual average, and design hot ambient) will be selected to closely reflect the range of possible site conditions. The results of this screening analysis will be used to select the operational scenarios that produce the maximum ambient impacts in refined modeling.

Refined modeling of these maximum-impact scenarios will be based on five years (2003-2007) of meteorological data and will identify the general locations of maximum impacts on the coarse grid of receptors, around which fine grids will be used to identify the locations of maximum impacts within 25 meters.

Details of Operating Scenarios

Maximum emissions during normal operation would occur during periods of maximum fuel consumption, which would occur at peak load. Besides normal operation, three other modes of operation would occur: commissioning (one initial period), startup, and shutdown. Table 2 gives more detail on all four operating modes.

Table 2
Operating Modes of the Combustion Gas Turbines

Mode	Description
Commissioning	The process of fine-tuning each of the turbines and their associated emission control systems. The facility will follow a systematic approach to optimize performance of the turbines and the associated control equipment. NOx and CO emissions are expected to be greater during commissioning than during normal operation. This one-time mode affects only the initial year of operation.
Start-up	Startup NOx and CO emissions are higher because the combustors are not fully optimized, and catalyst systems have not reached optimal temperatures.
Normal Operation	Normal operation begins after the turbines and the control equipment are working optimally at their design levels. Emissions may vary between the design hot, annual average, and design cold ambient conditions.
Shutdown	Shutdown occurs at the initiation of the turbine shutdown sequence and ends with the cessation of turbine firing. Typically, the shutdown process will emit less than the start-up process, and thus this mode will be represented by the analysis of start-up emissions.

3.8 Ambient Air Quality Data

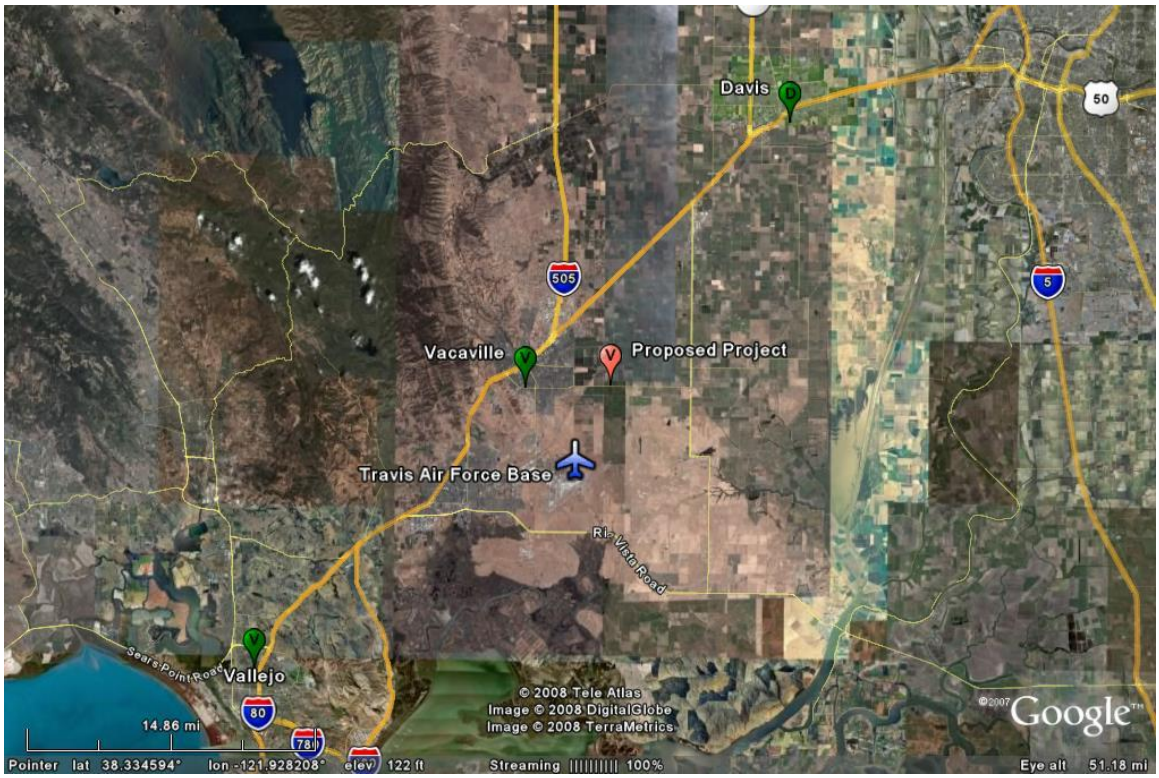
The Travis AFB station, located 5.3 miles southwest of the project site, is the closest standardized meteorological monitoring station, and is shown in Figure 1. For air quality data, the closest district-, state-, or federal-operated stations are used to provide the representative background ambient levels for the project site during 2005-2007. These are shown in Table 3. Figure 3 shows the monitoring station locations in Davis, Vacaville and Vallejo.

Table 3
Background Concentrations (maximum values shown in bold), 2005-2007 (µg/m^3)

Pollutant	Averaging Time	2005	2006	2007
	Davis - UCD Campus			
NO_2	1-Hour (1st high)	80.7	84.5	**86.4**
	Annual	16.9	**16.9**	15.0
	Vallejo			
SO_2	1-Hour	29.3	42.7	**53.3**
	3-Hour	21.0	**31.5**	26.2
	24-Hour (1st high)	**13.3**	10.7	10.7
	Annual	**2.7**	2.7	2.7
	Davis - UCD Campus			
CO	1-Hour	**1,000**	1,000	[a]
	8-Hour (CA. 1st high)	**767**	622	[a]
	Vacaville			
PM_{10}	24-Hour (CA. 1st high)	35	**60**	39
	Annual (CA)	16.4	**18.2**	14.0
	Vallejo			
$PM_{2.5}$	24-Hour (3-Year Avg 98th Percentile)	33	36	[a]
	Annual Arith. Mean (CA)	[b] -	**12.4**	[a]
	Nat'l 3-Year Avg AAM [c]	**10**	10	[a]

Notes:
[a] 2007 data unavailable
[b] Insufficient data
[c] Annual arithmetic mean

Figure 3
Proposed Ambient Air Quality Monitoring Stations for the Proposed Project



For PM_{10} and $PM_{2.5}$, the following data will be used to represent project background:

- For PM_{10}, the highest 24-hour average and annual average values between 2005 and 2007 will be used to represent project background.

- For analyses of $PM_{2.5}$ 24-hour impacts for state purposes, the three-year average of the 98th percentile 24-hour monitored levels for the period between 2005 and 2007 will be used to represent project background. For analyses of annual impacts for state purposes, the highest monitored annual average between 2005 and 2007 will be used to represent project background. The maximum modeled 24-hr and annual $PM_{2.5}$ impacts for the project will be added to the above project background levels to confirm that the project will not cause or contribute to a violation of an air quality standard for state purposes. As noted above, the assessment of $PM_{2.5}$ impacts for federal purposes will rely on the PM_{10} analysis as a surrogate, consistent with EPA guidance.

3.9 Class I Area Impact Analysis and Class II PSD Significance Thresholds

In general, projects located within 100 km of Class I areas are required to evaluate impacts to visibility and other air quality-related values at those Class I areas as part of a PSD permit evaluation. The nearest Class I areas and their distances from the project are listed below.

- Point Reyes National Seashore 84 km
- Mokelumne Wilderness 149 km
- Desolation Wilderness 158 km
- Emigrant Wilderness 175 km
- Yosemite National Park 181 km
- Pinnacles Wilderness 210 km

The Federal Land Managers (FLMs) have developed a screening methodology for determining whether a proposed project is likely to have a significant impact on a Class I area when located within, or near to, the 100 km threshold. Under this procedure, the estimated sum of maximum NOx, SOx, and PM_{10} emissions (in tons per year) from the Project is divided by the distance of each of the above nearest Class I areas from the Project (in km) (National Park Service, 2007). Because the quotient is expected to be substantially less than the FLM threshold level of 10, it is expected that the Project, although a major source, will not be required by the FLMs to evaluate impacts to visibility and other air quality related values at Class I areas.

The maximum ground-level concentrations of PSD pollutants are not expected to exceed the Class II PSD significance thresholds and, hence, analysis of PSD Class II increment consumption is not expected to be required. If PSD Class II increment consumption needs to be analyzed, then a separate protocol will be prepared for EPA.

3.10 Ambient Air Quality Impact Analyses

In evaluating the impacts of the proposed project on ambient air quality, the modeled ambient impacts of the project will be added to background concentrations, and the sum compared to state and federal ambient air quality standards for SO_2, NO_2, PM_{10}, $PM_{2.5}$,[6] and CO, in accordance with the procedure described below.

In accordance with USEPA guidelines,[7] the highest second-highest[8] modeled concentrations will be used to demonstrate compliance with the short-term federal standards and the highest modeled concentration will be used to demonstrate compliance with the federal annual and all state standards.

Based on the results of the screening procedure, the operating case that produces the highest modeled ambient concentration for each individual pollutant and averaging period will be used in the refined air quality impact analysis. The screening analysis will identify the operating cases that produce the highest concentration for each pollutant and averaging period, and will provide the specific stack parameters (stack height, stack diameter, exhaust temperature, and exhaust velocity) that will be used to evaluate compliance with applicable PSD increments and compliance with the AAQS for all applicable pollutants and averaging periods.

Compliance with ambient air quality standards will be demonstrated in accordance with the process outlined in the October 1990 Draft NSR/PSD Workshop Manual (p. C.51, "The Compliance Demonstration"). The first step in the compliance demonstration is to determine, for each pollutant and averaging period, whether the proposed new equipment will cause a significant ambient impact anywhere. As indicated in the Workshop Manual, "[i]f the significant net emissions increase[9] from a proposed source would not result in a significant ambient impact anywhere, the application is usually not required to go beyond a preliminary analysis in order to make the necessary showing of compliance for a particular pollutant." The significance levels for air quality impacts are shown in the Table 4. If the maximum modeled impact for any pollutant and averaging period is below the appropriate significance level, no further analysis is necessary.

If the modeled impacts from the Project are above the PSD significance thresholds shown in Table 4, the second step of the compliance demonstration is required to show that the proposed new source, in conjunction with existing sources, will not cause or contribute to a violation of any ambient air quality standard.[10]

---

[6] As noted above, analyses of the $PM_{2.5}$ AAQS will be performed for state purposes only.
[7] 40 CFR Part 51, Appendix W, Sections 10.2.3.2 and 10.2.3.3
[8] "a. For new or modified sources predicted to have a significant ambient impact and to be located in areas designated attainment or unclassifiable for the SO_2, Pb, NO_2, or CO NAAQS, the demonstration as to whether the source will cause or contribute to an air quality violation should be based on: The highest estimated annual average concentration determined from annual averages of individual years; or (2) the highest, second-highest estimated concentration for averaging times of 24-hours or less."
[9] Note that this guidance requires modeling only for pollutants for which there is a significant net increase.
[10] Because the applicable EPA guidance does not define significance levels for $PM_{2.5}$, $PM_{2.5}$ impacts will be addressed through the PM_{10} analysis for PSD purposes.

Table 4 Significance Levels for Air Quality Impacts in Class II Areas[a] (µg/m^3)					
	Averaging Period				
Pollutant	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	1.0	5	--	25	--
PM_{10}	1.0	5	--	--	--
NOx	1.0	--	--	--	--
CO	--	--	500	--	2000

a. From 40 CFR 51.165.

The impacts of existing sources are represented by existing ambient air quality data, stated in Section 8.2.1 of Appendix W to 40 CFR Part 51 as follows:

> *Background concentrations are an essential part of the total air quality concentration to be considered in determining source impacts. Background air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources. Typically, air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration.*

Because ambient PM_{10} and $PM_{2.5}$ levels result from both directly emitted particulate matter and secondary particulate formation, it is appropriate to rely on the locally monitored air quality data for PM_{10} and $PM_{2.5}$ to represent background concentrations in the project area.

The impact of the proposed new equipment will be modeled using the maximum allowable emission limits as proposed in the application and the design capacities of the turbines, assuming continuous operation, in accordance with the guidance in Table 8-2 of Appendix W. If the predicted total ground-level concentration obtained by adding the maximum impact of the proposed new equipment to the monitored background concentrations is below the state or federal ambient air quality standard for each pollutant and averaging period, no further analysis is required for that pollutant and averaging period.

If a more refined analysis of potential 1-hour NO_2 impacts is needed, then the following procedure would be used to combine background concentrations of 1-hour average NO_2 concentrations during the period 2003 through 2007 (contemporaneous with meteorological data) with modeled impact concentrations. A set (between 10 and 50) of the highest 1-hour NO_2 impacts would be examined for their year, Julian date, and hour of day occurrence. For each, the corresponding (i.e., same year, Julian date, and hour of day) background concentration of 1-hour NO_2 would be added to the modeled

concentration to determine the overall impact and compared with the California 1-hour NO_2 ambient air quality standard of 338 $\mu g/m^3$.

If a more refined analysis of potential $PM_{2.5}$ impacts is needed for state purposes, a separate procedure would be followed to combine background concentrations of 24-hour average $PM_{2.5}$ concentrations during the period 2003 through 2007 (contemporaneous with meteorological data) with modeled impact concentrations. Because $PM_{2.5}$ measurements are taken on a once-in-six-day basis, each $PM_{2.5}$ measurement would be presumed to represent the day of measurement and each of the five subsequent days. Missing data would be filled in by interpolation using data from the data immediately preceding and following the missing data point. These day-specific project background data would be combined with contemporaneous modeled project impacts to evaluate compliance with the $PM_{2.5}$ AAQS for non-PSD purposes. The highest three-year average of the combined project plus background 98th percentile 24-hour average concentrations would then be used to evaluate compliance with the 24-hour average $PM_{2.5}$ AAQS for state purposes. The highest three-year average of the combined project plus background annual average concentrations would be used to evaluate compliance with the annual average $PM_{2.5}$ AAQS for state purposes.

3.11 Health Risk Assessment

A health risk assessment (HRA) will be performed according to the Office of Environmental Health Hazard Analysis "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" (August 2003). The HRA modeling will be prepared using CARB's Hotspots Analysis and Reporting Program (HARP) computer program (Version 1.3, October 18, 2005). The HARP model will be used to assess cancer risk as well as non-cancer chronic and acute health hazards. Because the TACs emitted by the Project include PAHs, the HRA will address not only the inhalation pathway, but also the following three pathways: dermal absorption, and soil and mother's milk ingestion.

The HARP model incorporates the ISCST3 model previously approved by USEPA. CARB offers a software program that allows AERMOD data to be imported into the HARP model, called HARP On-Ramp. A Beta version is available for public evaluation, but has not yet been formally approved for use in health risk assessments. Therefore, a special methodology will be employed to be consistent with using AERMOD for the air dispersion modeling, and retain the health values and risk computations provided by HARP Version 1.3. The methodology used to prepare the HRA has been presented by CARB[11] and is described below. Its use has been approved by the CEC, the BAAQMD, the San Joaquin Valley Air Pollution Control District, and other districts[12] on previous power plant projects.

[11] Procedure is described in Part B of Topic 8 of the HARP How-To Guides: How to Perform Health Analyses Using a Ground Level Concentration.
[12] San Diego APCD and North Coast Unified AQMD

The risk assessment module of the HARP model is run using unit ground level impacts to obtain derived cancer risks for each TAC. Cancer risks are obtained for the derived (OEHHA) method, derived (adjusted) method, and derived (OEHHA) method for worker exposure. The HARP model output is cancer risk by TAC and pathway for each type of analysis, based on an exposure of 1.0 $\mu g/m^3$. Individual cancer risks are expressed in units of risk per $\mu g/m^3$ of exposure. To calculate the weighted risk for each source, the annual average emission rate in grams per second for each TAC will be multiplied by the individual cancer risk for that TAC in units of $(\mu g/m^3)^{-1}$. The resulting weighted cancer risks for each TAC will then be summed for the source. The same approach will be used to determine the non-cancer acute and chronic health hazards potentially associated with the Project.

Health risk from exposure to a carcinogenic TAC is calculated as the product of the exposure concentration times a factor representing the risk per unit concentration (i.e., unit risk) for the TAC. In the case of cancer risk, the unit risk depends on breathing rate, the cancer potency factor of the TAC, dimensional factors, and other terms involving non-inhalation pathways, when relevant. In the case of chronic and acute non-cancer impacts, the health hazard per unit concentration (i.e., unit impact) is normally calculated as 1 divided by the Reference Exposure Level (REL, expressed as a concentration in $\mu g/m^3$) for the TAC.

Exposure concentration is calculated as the product of the actual emission rate (in grams per second)[13] of the TAC times the concentration per unit of emission (i.e., χ/Q for an emission rate of 1 g/s), which is the output from the AERMOD air dispersion modeling calculation. This exposure concentration is the "Unit Concentration."

HARP automatically passes the "Unit Concentration" for a given source and receptor into its risk module where it is multiplied by the actual emission rate (in g/s) for each TAC and the "Unit Risk" for the TAC to produce the calculated risk for the TAC. This is done for all the TACs emitted by a source; and the summed cancer risk, or non-cancer health impact for common toxic endpoints in the case of chronic and acute risk, is the total risk or non-cancer health impact at that receptor from that source. The total cancer risk or non-cancer health impact at a receptor is the sum of the risks or health impacts from all of the sources.

Because HARP is not designed to pass AERMOD "Unit Concentration" outputs to its Risk Module, an alternative procedure will be used. The calculation of cancer risk or non-cancer health impact does not require the variables to be multiplied in any particular order. Therefore, the final result will be the same if, for a given source, the "Unit Risk" for a TAC is multiplied by the actual emissions (g/s) for the TAC, and these products are added together to give a "Source Strength." The "Source Strength" is then used as the source emission rate in AERMOD.

[13] The annual emission rate is the actual long-term emission rate used for analysis of cancer risk and chronic non-cancer health impact, and the one-hour emission rate is the actual short-term emission rate used for analysis of acute non-cancer health impact.

This methodology thus uses HARP to calculate the "Unit Risks" for all carcinogenic TACs and unit chronic and acute health impacts for all non-carcinogenic TACs, including all required exposure pathways and toxic end points as well as receptor types, including residents and workers. The unit risk or unit health impact for each TAC from a source is multiplied by the emission rate of that TAC from the source. These products are summed for all the TACs emitted by the source. This is done for each source. Finally, the resulting "Source Strength" values for all project sources are used as emission rates in AERMOD. The AERMOD output contains the resulting cancer risks and non-cancer chronic and acute health impacts.

3.12 Construction Air Quality Impact Analysis

The potential ambient impacts from air pollutant emissions during the construction of the Project will be evaluated by air quality modeling that will account for the construction site location and the surrounding topography; the sources of emissions during construction, including vehicle and equipment exhaust emissions; and fugitive dust.

Types of Emission Sources − Construction of the Project can be viewed as three main sequential phases: site preparation; construction of foundations; and installation and assembly of the Project turbines and associated equipment. The construction impacts analysis will include a schedule for construction operation activities. Site preparation includes site excavation, excavation of footings and foundations, and backfilling operations.

Fugitive dust emissions from the construction of the project result from the following:

- Excavation and grading at the construction site;
- Onsite travel on paved and unpaved roads and across the unpaved construction site;
- Aggregate and soil loading and unloading operations;
- Raw material transfer to and from material stockpiles; and
- Wind erosion of areas disturbed during construction activities.

Engine exhaust will be emitted from the following sources:

- Heavy equipment used for excavation, grading, and construction of onsite structures;
- Water truck(s) used to control construction dust emissions;
- Diesel-fueled welding machines, gasoline-powered generators, air compressors, and water pumps;
- Gasoline-fueled pickup trucks and Diesel-fueled flatbed trucks used onsite to transport workers and materials around the construction site;
- Transport of mechanical and electrical equipment to the project site;
- Transport of rubble and debris from the site to an appropriate landfill; and
- Transport of raw materials to and from stockpiles.

Emissions from a peak activity day will be modeled. Annual average emissions over the construction period will also be calculated and modeled for comparison with annual standards.

Existing Ambient Levels – The background data discussed earlier will be used to represent existing ambient levels for the construction analysis as well as the analysis of the impacts of project operations.

Model Type − AERMOD will be used to estimate ambient impacts from construction emissions. The modeling options and meteorological data described above will be used for the modeling analysis.

The construction site will be represented as both a set of volume sources and a separate set of area sources in the modeling analysis. Emissions will be divided into three categories: exhaust emissions, mechanically-generated fugitive dust emissions, and wind-blown fugitive dust emissions. Exhaust emissions and mechanically-generated fugitive dust emissions (e.g., dust from wheels of a scraper) will be modeled as volume sources with a height of 6 meters. Wind-blown fugitive dust emissions, sources at or near the ground that are at ambient temperature and have negligible vertical velocity, will be modeled as area sources with a release height of 0.5 meters.

For the construction modeling analysis, the receptor grid will begin at the property boundary and will extend approximately one kilometer in all directions. Receptor spacing will be 60 meters, except for one tier of receptors along the project boundary composed of four segments with 25-meter spacing that extends out 100 meters.

3.13 Cumulative Air Quality Impact Analysis

To address CEC requirements, a cumulative air quality modeling impacts analysis will be performed of the project's typical operating mode in combination with other stationary source emissions sources within a six-mile radius that have received construction permits but are not yet operating, or are in the permitting process. For each criteria pollutant, facilities having an emission increase of less than five tons per year will be considered *de minimis*, and such facilities will be excluded. The District will be requested to provide information on any sources that might be appropriate for a cumulative air quality impact analysis, as defined above.

Upon receipt of sufficient information from the District to allow air dispersion modeling of the non-project sources to be included in the cumulative air quality impact analysis, AERMOD will be used in a procedure similar to that described earlier in this protocol.

3.14 Visibility Analysis

Although visibility is not normally impacted by natural gas-fueled power plants, potential visibility impacts will be analyzed, if required. The two aspects of visibility impact that may be analyzed are potential plume blight and generation of regional haze, both of which were originally intended to be conducted with respect to Class I areas where visibility is an important air quality related value.

Potential plume blight, the ability to see a discrete plume against either a sky or terrain background, would be analyzed in the approximate distance range of 10 km out to 50 km by using the model VISCREEN. The VISCREEN model was designed to be used as a conservative screening tool to determine if an emission source might create a plume visible to an observer positioned at the source side of a specified Class I area, both when looking into, and when looking outside, the Class I area. Because the closest Class I area to the Project is 84 km away, use of VISCREEN would not be appropriate at the Class I areas surrounding the proposed project.

VISCREEN would also be inappropriate to use close to the source (e.g., less than 10 km) because the model was designed to evaluate the potential creation of plume blight in relatively clean air at substantial distances from the emission source. If the model was used at such a close distance as 10 km, it would mean that an observer, looking at the proposed power plant with the plume heading straight towards the observation point, must "see" the plume just as the observer can see the power plant stack itself at such close distances.

If modeling of the plume position, plume blight, or regional haze is needed over a wider range of distances, including close to the source (i.e., less than 10 km) and distances beyond 50 km, then CALPUFF would be the appropriate model. CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion modeling system that simulates the effects of time- and space-varying meteorological conditions on pollutant transport, transformation, and removal. The CALPUFF modeling system is one of the two USEPA preferred/recommended air dispersion models (USEPA, 2007) (AERMOD is the other). CALPUFF can be used on scales from tens of meters from a source to hundreds of kilometers. CALPUFF is the only preferred model available for evaluating the effects of chemical transformation on directly emitted pollutants. Such transformations, especially those that produce nitrate, sulfate, and organic particulates from NOx, SOx and VOC emissions, respectively, are important to the evaluation of potential visibility impacts.

The use of CALPUFF in its complete version requires assembly of a complex wind field data file from multiple meteorological monitoring stations into a special format (i.e., MM5). If CALPUFF (or CALPUFF-LITE) modeling is required for federal purposes, a separate protocol will be prepared for that analysis.

4. REPORTING

The results of the criteria pollutant and TAC modeling will be integrated into the application documents, and will include the following information:

- Project Description – This section of the CEC Application for Certification (AFC) will include a site map and site plan along with descriptions of the emitting equipment and air pollution control systems.

- Model Options and Input – The Air Quality section of the AFC will present model options, screening and refined source parameters, criteria pollutant and TAC emission rates, meteorological data, and receptor grids used for the modeling analyses.

- Air Dispersion Modeling – The Air Quality section and appendices will include the following information:

    - Plot plan showing emission points, nearby buildings (including dimensions), cross-section lines, property lines, fence lines, roads, and UTM coordinates;
    - A table showing building heights used in the modeling analysis;
    - Summaries of maximum modeled impacts for each air quality scenario showing meteorological conditions and receptor location and elevation; and
    - Model input and output files, including BPIP-PRIME and meteorological files, in electronic format on a compact disc, together with a description (README file) of all filenames.

- HRA – The HRA will be contained in the Public Health section and appendix of the AFC, and will include the following:

    - Textual discussion of the methodology and inputs to the construction and operation AERMOD runs;
    - Tables of TAC emission rates, sensitive receptor locations, and health impacts; and
    - Model input and output files in electronic format on a compact disc, together with a description (README file) of all filenames.

5. REFERENCES

Briggs, G.A. (1972). *Discussion on Chimney Plumes in Neutral and Stable Surroundings*. Atmos. Environ. 6:507-510.

Bunyak, John (1993). *Permit Application Guidance for New Air Pollution Sources*. Natural Resources Report NPS/NRAQD/NRR-93/09, US Dept. of the Interior, National Park Service.

Cole, Henry S. and John E. Summerhays (1979). *A review of techniques available for estimating short-term NO2 concentrations*, Journal of the Air Pollution Control Association, Volume 29, Number 8, pages 812-817, August 1979.

Nappo, C. J. et al. (1982). *The Workshop on the Representativeness of Meteorological Observations*, June 1981, Boulder, Co. Bull. Amer. Meteor. Soc., Vol. 63, No. 7, pp. 761-764. American Meteorological Society, Boston, MA.

National Park Service (2007). Personal communication from Dee Morse, Air Resources Division, to Sierra Research, November 9, 2007.

Office of Environmental Health Hazard Analysis (2003). *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, August 2003.

U.S. Forest Service Air Quality Program, National Park Service Air Resource Division, U.S. Fish and Wildlife Service - Air Quality Branch (2000). *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report.* December 2000.

USEPA (1985). *Guideline for Determination of Good Engineering Practice Stack Height* (Technical Support Document for the Stack Height Regulations) - Revised. EPA-450/4-80-023R.

USEPA (1987a). *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, Office of Air Quality Planning and Standards, Research Triangle Park, NC, EPA-450/4-87-007, May 1987.

USEPA (1987b). *On-Site Meteorological Program Guidance for Regulatory Modeling Applications*.

USEPA (1990). *New Source Review Workshop Manual − Draft*. Office of Air Quality Planning and Standards, Research Triangle Park, NC.

USEPA (1992a). *Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models*. Dennis Atkinson and Russell F. Lee, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 7, 1992.

USEPA (1992b). *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*, Revised, Report 454/R-92-019.

USEPA (1995). *Supplement C to the Guideline on Air Quality Models (revised)*. Office of Air Quality Planning and Standards, Research Triangle Park, NC.

USEPA (1998). *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long-Range Transport Impacts*. Air Quality Modeling Group (MD-14), Research Triangle Park. National Park Service - Air Resource Division, Denver, Colorado. USDA Forest Service - Air Quality Program, Fort Collins, Colorado. US Fish and Wildlife Service Air Quality Branch, Denver, Colorado.

USEPA (2000). *Meteorological Monitoring Guidance for Regulatory Modeling Applications*. Publication No. EPA-454/R-99-005. Office of Air Quality Planning & Standards, Research Triangle Park, NC. (PB 2001-103606) (Available at *www.epa.gov/scram001/*)

USEPA (2005). 40 CFR Part 51, Appendix W. *Guideline on Air Quality Models*. Last update November 9, 2005.

USEPA (2007). Technology Transfer Network, Support Center for Regulatory Atmospheric Modeling, Air Quality Models, Dispersion Modeling, Preferred/Recommended Models, http://www.epa.gov/scram001/dispersion_prefrec.htm#calpuff, accessed May 19, 2007.

Appendix A

Information on CTDMPLUS Model

The CTDMPLUS and CTSCREEN Models

Complex terrain impacts may need to be modeled with more accuracy than that provided by AERMOD. The use of more refined modeling techniques is specifically addressed in USEPA's Appendix W[14] modeling guidance, as follows:

> *Since AERMOD treats dispersion in complex terrain, we have merged sections 4 and 5 of appendix W, as proposed in the April 2000 NPR [Notice of Proposed Rulemaking]. And while AERMOD produces acceptable regulatory design concentrations in complex terrain, it does not replace CTDMPLUS for detailed or receptor-oriented complex terrain analysis, as we have made clear in Guideline section 4.2.2. CTDMPLUS remains available for use in complex terrain. [p. 68225]*
>
> *4.2.2 Refined Analytical Techniques*
> *d. If the modeling application involves a well defined hill or ridge and a detailed dispersion analysis of the spatial pattern of plume impacts is of interest, CTDMPLUS, listed in Appendix A, is available. CTDMPLUS provides greater resolution of concentrations about the contour of the hill feature than does AERMOD through a different plume-terrain interaction algorithm. [p. 68233]*

CTSCREEN is the same basic model as CTDMPLUS, except that meteorological data are handled internally in a simplified manner. As discussed in the CTSCREEN users guide,[15]

> *Since [CTDMPLUS] accounts for the three-dimensional nature of plume and terrain interaction, it requires detailed terrain and meteorological data that are representative of the modeling domain. Although the terrain data may be readily obtained from topographic maps and digitized for use in the CTDMPLUS, the required meteorological data may not be as readily available.*
>
> *Since the meteorological input requirements of the CTDMPLUS can limit its application, the EPA's Complex-Terrain-Modeling, Technology-Transfer*

[14] 40 CFR 51 Subpart W, as amended November 9, 2005 at 70 FR 68218, "Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions."
[15] USEPA, EPA-600/8-90-087, "User's Guide to CTDMPLUS: Volume 2. The Screening Mode (CTSCREEN)," October 1990.

Workgroup developed a methodology to use the advanced techniques of CTDMPLUS in situations where on-site meteorological measurements are limited or unavailable. This approach uses CTDMPLUS in a "screening" mode--actual source and terrain characteristics are modeled with an extensive array of predetermined meteorological conditions.

This CTDMPLUS screening mode (CTSCREEN) serves several purposes in regulatory applications. When meteorological data are unavailable, CTSCREEN can be used to obtain conservative (safely above those of refined models), yet realistic, impact estimates for particular sources.

Therefore, the use of the CTSCREEN version of CTDMPLUS is consistent with USEPA guidance.

Meteorological Data for CTDMPLUS

The discussion in the text focused on meteorological data needed to run AERMOD. As also discussed, an additional model—Complex Terrain Dispersion Model PLUS (CTDMPLUS)—may be used in lieu of the model Complex Terrain Screening Model (CTSCREEN) for receptors in the terrain above stack-top height. CTDMPLUS is a USEPA-approved air dispersion model, and is fully supported with user guidance documentation.[16]

CTDMPLUS requires an extensive suite of meteorological data composed of not only wind speed, direction, and temperature, but also horizontal and vertical wind direction standard deviations (sigma theta and sigma phi, respectively), and vertical wind speed standard deviation (sigma w). The AERMOD-compatible meteorological data set derived from measurements taken at Travis AFB, California, does not include these non-standard measurements.

It is possible to develop conservative values for the standard deviation parameters sigma theta, sigma phi, and sigma w that are consistent with the available meteorological data, and use them to prepare a meteorological data set that is usable in CTDMPLUS and yields conservative (i.e., high) ground-level concentrations.

If modeling with CTDMPLUS is required, an ISCST3-compatible meteorological data set will be developed for the same five years of 2003-2007. The ISCST3 meteorological data set would be used to create the CTDMPLUS-compatible meteorological data set. Because all three of these Gaussian dispersion models—ISCST3, AERMOD, and CTDMPLUS—require upper air data as well as surface data, the upper air data from the Oakland Metropolitan Airport (ID No. 23230) would be used because it is the same station to be used to develop the AERMOD-compatible meteorological dataset.

[16] USEPA. Technology Transfer Network, Support Center for Regulatory Atmospheric Modeling, *http://www.epa.gov/scram001/dispersion_prefrec.htm#ctdmplus*

The following meteorological parameters are needed for CTDMPLUS and would be taken directly from the AERMET files:

- Observed mixing height, provided as the height of the convective or planetary boundary layer (PBL);
- Calculated mixing height, provided as the height of the mechanical, or surface, boundary layer (SBL);
- Friction velocity (USTAR);
- Monin-Obukhov length (L); and
- Roughness length (Z_O).

The remaining standard deviations (sigma values) are not available from AERMOD and must be obtained from ISCST3-compatible files that would be developed from the Travis AFB, CA meteorological data. Stability classes determined by MPRM[17] or PCRAMMET[18] from the measured Travis AFB meteorological data would be used to select the most conservative values from the following ranges recommended in USEPA's Meteorological Monitoring Guidance document:[19]

Stability Category	Sigma Phi (σ_Φ) Regulatory Range (degrees)	Sigma Theta (σ_θ) Regulatory Range (degrees)
A	>11.5	>22.5
B	10.0 – 11.5	17.5 – 22.5
C	7.8 – 10.0	12.5 – 17.5
D	5.0 – 7.8	7.5 – 12.5
E	2.4 – 5.0	3.8 – 7.5
F	< 2.4	< 3.8

[17] The Meteorological Processor for Regulatory Models
[18] EPA meteorological preprocessor
[19] Tables 6-8a and 6-9a in Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-005, US EPA Office of Air and Radiation, Office of Air Quality Planning and Standards, February 2000.

The most conservative values (that is, the values that produce the highest modeled impacts) for sigma theta and sigma phi within each range would be determined by conducting a sensitivity analysis for all combinations of stack conditions to be modeled using CTDMPLUS and receptor locations for which CTDMPLUS would be used (that is, receptors above stack height). The sensitivity analysis would use the upper and lower values of each range for each stability category. For example, for stability category D, four combinations would be evaluated as follows:

σ_Φ	σ_θ
5.0	7.5
5.0	12.5
7.8	7.5
7.8	12.5

For stability category A, maximum values for σ_Φ and σ_θ of 15.0 and 27.0, respectively, would be evaluated. For stability category F, minimum values for σ_Φ and σ_θ of 1.0 and 2.0, respectively, would be evaluated.

Sigma-w would be estimated by multiplying sigma-phi (after conversion from degrees to radians) by the horizontal wind speed.

5.3 Cultural Resources (5–13)

5. Mitigation Measures (Appendix B (g) (1))

…provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Information required to make AFC conform with regulations:

Please incorporate mitigation measures for impacts to the integrity of setting of new built-environment resources, if any are identified in the required new built-environment survey. See item B (g) (2) (c). This may be addressed via the response to item B (g) (2) (e) (i).

Response: The built-environment resources report does not recommend mitigation measures for built-environment resources. Attachment DA5.3-1 contains the report.

6. Cultural Survey (Appendix B (g) (2) (C))

The results of new surveys or surveys less than 5 years old shall be provided if survey records of the area potentially affected by the project are more than five (5) years old. Surveys to identify new cultural resources must be completed by (or under the direction of) individuals who meet the Secretary of the Interior's Professional Standards for the technical area addressed.

New pedestrian archaeological surveys shall be conducted inclusive of the project site and project linear facility routes, extending to no less than 200' around the project site, substations and staging areas, and to no less than 50' to either side of the right-of-way of project linear facility routes. New historic architecture field surveys in rural areas shall be conducted inclusive of the project site and the project linear facility routes, extending no less than .5 mile out from the proposed plant site and from the routes of all above-ground linear facilities. New historic architecture field surveys in urban and suburban areas shall be conducted inclusive of the project site, extending no less than one parcel's distance from all proposed plant site boundaries. New historic architecture field reconnaissance ("windshield survey") in urban and suburban areas shall be conducted along the routes of all linear facilities to identify, inventory, and characterize structures and districts that appear to be older than 45 years or that are exceptionally significant, whatever their age.

Information required to make AFC conform with regulations:

a) *The resume of the specialist whose built-environment survey is reported in the AFC does not evidence the qualifications to meet the required Secretary of the Interior's Professional Standards for architectural history. Please provide a new built-environment survey completed by or under the direction of a specialist who meets the standards.*

b) *Please have a qualified architectural historian survey the area 0.5 mile out from the proposed plant site and from the proposed transmission line route for structures and districts that appear older than 45 years.*

Response: The built-environment resources report includes the architectural historian's resume and the results of the built-environment field survey. The report is included here as Attachment DA5.3-1.

7. Cultural Survey (Appendix B (g) (2) (C))

A technical report of the results of the new surveys, conforming to the Archaeological Resource Management Report format (CA Office of Historic Preservation Feb 1990), which is incorporated by reference, shall be separately provided and submitted (under confidential cover if archaeological site locations are included).

Information required to make AFC conform with regulations:

Please provide a separate technical report that includes the methods, personnel, and findings for two project-sponsored surveys: 1) the pedestrian archaeological survey reported in the AFC, written by a qualified archaeologist, and 2) the new built-environment windshield survey, written by a qualified architectural historian. Report contents for the archaeological part of the report must be those specified by the ARMR format, including a 1:24,000 map showing survey coverage.

Response: The technical report of findings of the pedestrian archaeological survey (Appendix 5.3B of the AFC) was submitted to the CEC Executive Office under a request for confidentiality on October 27, 2008. This report includes the contents specified by the ARMR format, including a 1:24:000-scale map showing survey coverage. This map is also included as Figure 5.3-1 in the AFC. The built-environmental windshield survey report is included here as Attachment DA5.3-1.

8. Architectural Resources (Appendix B (g) (2) (C))

Information included in the technical report shall also be provided in the Application for Certification, except that confidential information (archaeological sites or areas of religious significance) shall be submitted under a request for confidentiality pursuant to Title 20, California Code of Regulations, §2501 et seq. At a minimum, the technical report shall include the following:

Information required to make AFC conform with regulations:

Please incorporate into AFC Section 6.7 non-confidential information on any new archaeological and/or architectural resources identified from the new built-environment survey.

Response: The built-environmental windshield survey report is included here as Attachment DA5.3-1. This document is incorporated by reference into AFC Section 5.3, Cultural Resources.

9. Architectural Survey (Appendix B (g) (2) (C) (ii))

The survey procedures and methodology used to identify cultural resources and a discussion of the cultural resources identified by the survey;

Information required to make AFC conform with regulations:

Please have a qualified architectural historian include the methods and findings from the new survey in the new built-environment survey report.

Response: The built-environmental windshield survey report is included here as Attachment DA5.3-1 and includes a discussion of methods and findings.

10. Cultural Forms (Appendix B (g) (2) (C) (iii))

Copies of all new and updated DPR 523(A) forms. If a cultural resource may be impacted by the project, also include the appropriate DPR 523 detail form for each such resource;

Information required to make AFC conform with regulations:

Please provide copies of DPR 523 forms for any new built-environment resources identified in the new built-environment survey.

Response: The built-environmental windshield survey report included here as Attachment DA5.3-1 includes DPR 523 forms for each of the built-environment resources that is located within 0.5 mile of the project site. Because the project would not impact any of these properties, detail forms are not been included.

11. Maps (Appendix B (g) (2) (C) (iv))

A map at a scale of 1:24,000 U.S. Geological Survey quadrangle depicting the locations of all previously known and newly identified cultural resources compiled through the research required by Appendix B (g)(2)(B) and Appendix B (g)(2)(C) (ii); and

Information required to make AFC conform with regulations:

Please provide a revised copy of the USGS 7.5' quadrangle map(s) of the literature search area, under confidential cover, depicting the locations of all known archaeological and architectural resources previously identified and all new built-environment resources identified in the new built-environment survey.

Response: AFC Appendix 5.3B (submitted under a request for confidentiality) includes a map showing the literature search area and the locations of all known archaeological resources within the literature search area. The built-environmental windshield survey report is included here as Attachment DA5.3-1 and includes a copy of the USGS 7.5-minute quadrangle map of the built-environment windshield survey area.

12. Architecture Qualifications (Appendix B (g) (2) (C) (v))

The names and qualifications of the cultural resources specialists who contributed to and were responsible for literature searches, surveys, and preparation of the technical report.

Information required to make AFC conform with regulations:

Please add the name(s) and qualifications of person(s) doing the new built-environment survey.

Response: The built-environmental windshield survey report is included here as Attachment DA5.3-1 and includes a copy of the resume of the architectural historian who conducted the built-environment survey.

13. Cultural Mitigation Measures (Appendix B (g) (2) (E) (i))

A discussion of measures proposed to mitigate project impacts to known cultural resources;

Information required to make AFC conform with regulations:

Applicant needs to incorporate mitigation measures for impacts to the integrity of setting of new built-environment resources, if any are identified in the required new built-environment survey.

Response: The built-environmental windshield survey report is included here as Attachment DA5.3-1. The survey report indicates that mitigation measures are not necessary for the built environment.

ATTACHMENT DA5.3-1

Built-Environment Resources Report

CPV Vaca Station Built-Environment Survey Report and Assessment

PREPARED FOR: Competitive Power Ventures

PREPARED BY: Jessica B. Feldman/CH2M HILL

COPIES: Doug Davy/CH2M HILL

DATE: December 24, 2008

Introduction

This section supplements Section 5.3 of the Application for Certification for the CPV Vaca Station (CPVVS) which discusses the potential effects of the project on cultural resources, specifically the built environment. Please refer to that section for a discussion of the regional and historical setting, the specific results of the archival research and consultation with local historical societies. This supplemental document was prepared by Jessica B. Feldman, a Cultural Resource Specialist who meets the Professional Qualification Standards for Architectural History as stated in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, as defined in 36 *Code of Federal Regulations* (CFR) 61. Ms. Feldman has over 11 years of experience in compliance with federal, state, and local laws relating to cultural and community resources and land use planning and her resume is included as Appendix A to this document. This project does not require review under federal regulations such as the National Historic Preservation Act (NHPA), among others, because it is not a federal undertaking (federally funded or permitted).

Architectural Survey

The architectural resources survey was conducted on November 19, 2008 by Jessica B. Feldman. The purpose of this windshield survey was to determine whether potentially historic buildings and structures (more than 45 years of age) are located within 0.5 mile of the project site and aboveground linear facilities, such as transmission lines. The results of the California Historical Resources Information System (CHRIS) Northwest Information Center search revealed no locally listed properties within 0.5 mile of the project site. There are no properties listed in the California Register of Historic Resources (CRHR) or National Register of Historic Places (NRHP) within 0.5 of the project site.

Preliminary research using historical United States Geological Survey (USGS) topographic maps and aerial maps identified three properties containing structures that meet the age criteria within 0.5 miles of the project site: 6014, 6018 and 6021 Lewis Road, all of which are in the vicinity of Elmira. Figure 1 depicts the area surveyed and shows the locations of the three structures.

The surveyor took digital photographs of each property and associated structures, and noted general building information, including style, type and alterations. The field survey also included a review of other buildings and structures within the 0.5 survey area to determine if any additional properties appeared to meet the age criteria. No other properties were identified in the field; this was later confirmed using online data from the Solano County Assessor/Recorder (http://www.co.solano.ca.us/depts/assessor_recorder/assessor_recorder_home.asp).

Additionally, the survey team conducted a windshield survey of the nearby community of Elmira to establish typical local residential and agricultural architectural characteristics and styles. Following the survey, information was sought from the online Solano County Assessor/Recorder to firmly establish year-built data. None of the aforementioned properties have year-built data and their date of construction has been estimated by the surveyor. State of California Department of Parks and Recreation forms (DPR-523A) were prepared for these properties and are included in Appendix B.

6014 Lewis Road is a farmstead, a complex of buildings comprised of a residence, a silo, a tankhouse, barns and sheds. The residence is one and a half-story with a rectangular footprint, built circa 1910. The side gable roof has a moderate pitch. It has a one-story rear addition with a shed roof, which does not appear on the 1970 aerial photo. The exterior appears to be asbestos shingle, probably added in the 1950s. The visible windows are one-over-one wood sash, paired and tripled on the primary façade. The front door is located on the north side, facing the driveway. Windows on the north façade are one-over-one wood sash with sidelights. There is a brick chimney on the north side. The house is in good condition.

Just to the south of the residence is a rectangular shed with a side gable roof. Its original purpose and current use are not known. It appears to have a concrete block foundation, with stained horizontal wood siding beginning at the sill line. The roof has wood shingles and the windows appear to be wood casements. The door types are a mix of replacement sliding glass and stained wood. This structure appears in the 1970 aerial photo but it is not visible in the 1957 aerial photo. It is in good condition. This shed was likely not a part of the original farmstead.

Just to the east of the shed is a wood tankhouse. The roof is barely visible above the shed's roof. The tankhouse is similar to others noted in the nearby town of Elmira. It may be visible on the 1937 aerial photo, but is not definitive. It has a square footprint and is approximately one story high. It has slightly splayed walls and a flat roof with boxed eaves. It is hidden from the road by the crib barn and the rectangular shed. To the southeast of the tankhouse is a three-story, concrete silo. The silo first appears on the 1970 aerial photo. Its general condition is not known.

Immediately to the south of the shed there is a large wood crib barn along Lewis Road, which appears to be a transverse frame crib barn with a raised monitor roof. Its original purpose and current use are not known. In addition, it is difficult to date the building; there appears to be a structure with a similar footprint and different roof style at this location in the 1937 aerial photo but a structure with a similar footprint and roof appears conclusively on the site on the 1957 aerial photo. The barn has a concrete foundation and horizontal

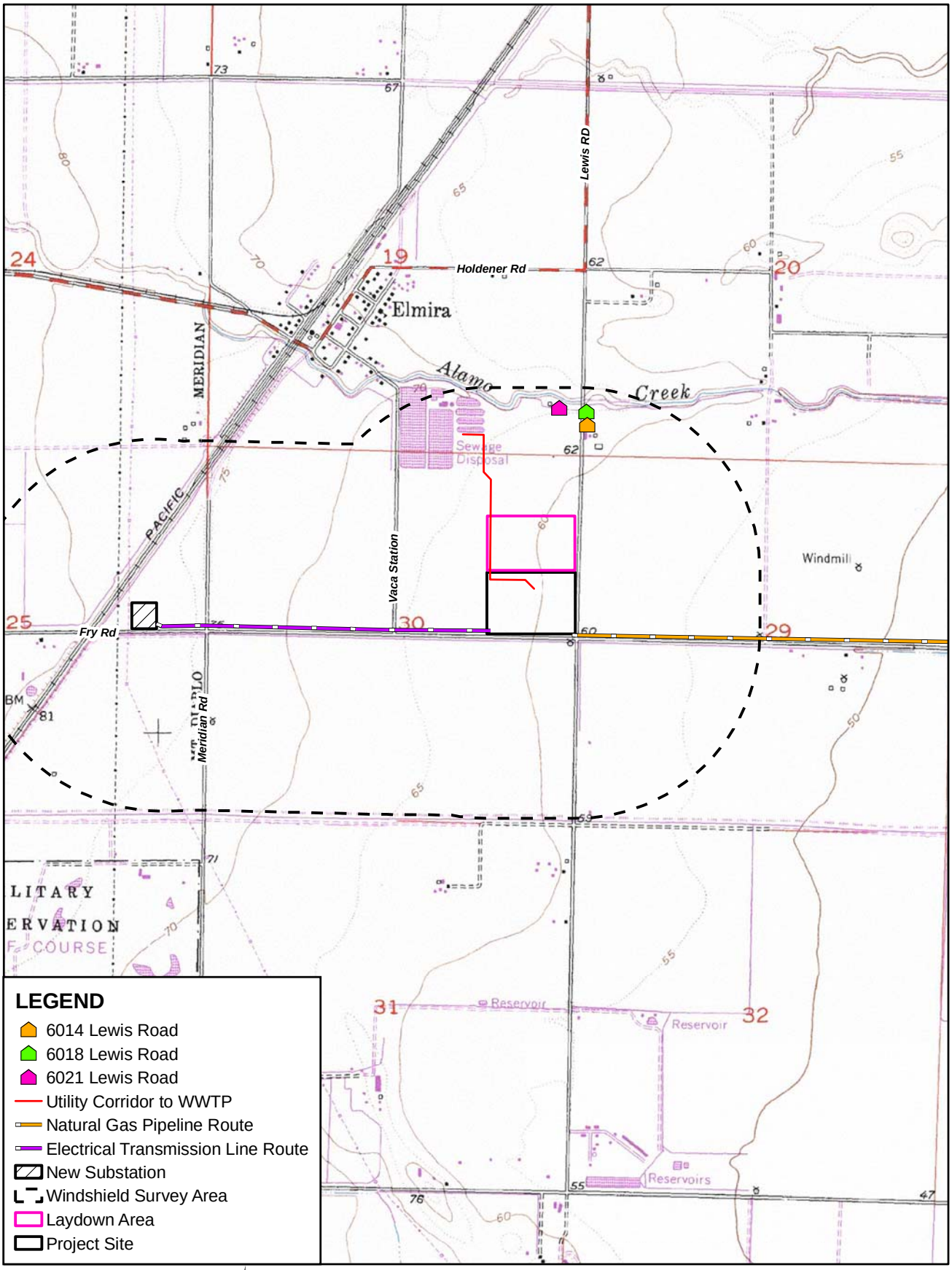


FIGURE 1
BUILT ENVIRONMENT RESOURCES
CPV VACA STATION
VACAVILLE, CA

CH2MHILL

SAC\\ZION\SACGIS\PROJ\VACAVILLE_AFC_370668\MAPFILES\BUILT_ENVIORNMENT.MXD MHASKELL 12/29/2008 12:27:04

wood siding. The eaves are wide and have exposed rafters. There are no windows but open spaces between framing elements along the walls. The roof may have been covered by corrugated metal sheets but most of the roof is exposed. The barn is in poor condition.

To the southeast of the concrete silo is an L-shaped shed with open bays on the north. It appears to have a shed-roof. It does not appear in the 1970 aerial photo indicating it was built at least in the last 38 years.. Its original purpose and current use are also not known. Its condition is not known.

To the south of the L-shaped shed is a barn with two-story frame, with two facades (one is projected forward). This building appears as a three bay barn attached to a single bay barn. The barn faces Lewis Road, south of the residence. Between these barns and the road is an enclosed paddock. Although the portion of the barn with three bays has a higher roof pitch (which may indicate a loft area), both have moderately pitched front gable roofs. Both are also clad in metal sheeting. Based on historic aerial photographs and topographic maps, it appears that the section on the south was constructed first sometime after 1908 and before 1953, and the northern section appears to have been added between 1937 and 1953.

The residence appears on the 1917 topographic map, without any outbuildings. The northernmost metal clad barn, crib barn and possibly the water tower appear in the 1953 topographic map. Additional structures appear in the 1968 topographic map. The number and general position of the buildings remains set in the 1973 and 1980 topographic maps. The 1937 aerial photo shows the metal barn was smaller and there were several outbuildings located north of the barn and southeast of the house. These are no longer on the site and appear from the 1970 aerial photo to have been cleared by that time. By 1957, the metal clad barn had been enlarged to its current size. It is estimated that the residence was built circa 1910, based on its visual evidence and the historical topographic maps. It can be inferred that additional farm-related structures were constructed between 1917 and 1927. Some have been removed from the property since 1970.

6018 Lewis Road is a one-story, single family residence with a side gable roof. It is lacking any decorative elements to distinguish the primary style. The footprint of the house is rectangular and the exterior is smooth stucco. There is an entry porch on the north side, with a side gable roof (lower than the main roof) supported by wood king posts. The porch roof, which may not date to the original period of construction, has composition shingle, while the main roof appears to be wood shingle. There is a brick chimney located on the north side of the building. The house is in good condition.

The house is located on the east side of Lewis Road, south of Aliso Creek. The house appears first on USGS topographic maps in 1953, and on aerial maps taken in 1937. No assessor information was found that firmly stated the year it was constructed. It is estimated to have been constructed circa 1930.

The single-family residence located at **6021 Lewis Road** is a simple Bungalow style house, built circa 1900. It is one-story, with a low hipped roof and a raised foundation. The exterior is wood clapboard and the roof, which has extended eaves, is clad with wood shingles. The house has a square footprint, with a raised porch on one half of the primary façade. The porch has a shed-style roof, supported by wood posts. It has a simple wood railing. The

visible windows are replacement sliding aluminum sash. The house is in fair to good condition, with some alterations, such as the windows.

The house is located along Aliso Creek, on the west side of Lewis Road. There is a mowed lawn in front, and some ornamental trees between the house and Lewis Road. There are also mature eucalyptus trees between the rear of the house and the site of the former barn and barnyard area.

The house appears on USGS topographic maps in 1908 and 1917, and on aerial photos taken in 1937 and 1957. No assessor information was found that firmly stated the year it was constructed. A barn, located west of the house, is visible in the 1937 aerial photo, and in the 1953 topographic map, but not earlier. It was still present on the 1980 topographic map but it has been removed since that time.

Results of Evaluation

None of these properties are known to be associated with events that have made significant contributions to the broad patterns of local or regional history or the cultural heritage of California or the United States; therefore they are not eligible for the California Register of Historical Resources (CRHR) under Criterion 1. No known persons who are important to local, California or national history have been identified as having any association with these properties; therefore they are not eligible for the CRHR under Criterion 2. Neither 6018 nor 6021 Lewis Road meet Criterion 3 of the CRHR as neither is a distinctive example of a type, period, region or method of construction and neither is representative of the work of a master.

Individually, the residence at 6014 Lewis Road does not meet Criterion 3 of the CRHR because it does not embody the distinct characteristics of a type, period, region or method of construction and does not possess high artistic value. The crib barn does embody distinctive characteristics of a type (crib barns) that were common throughout the interior areas of California. However, it has lost integrity of setting, materials, and workmanship through alterations and neglect.

The tankhouse, which also embodies the distinctive characteristics of a type (tankhouses) known in this region, is not a significant local example. There are far better examples with greater integrity in the community of Elmira. None of the remaining buildings on this property are eligible for the CRHR under Criterion 3 as none is an important representative of a type of building or period of construction and none of these buildings represent the work of a master or posses high artistic value.

As a larger entity, the farmstead at 6014 Lewis Road, containing a crib barn, tankhouse, concrete silo, enclosed shed, open shed, metal barn, paddock and residence, does appear to meet the definition of a district (a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development) but it does not appear to be important for historical, architectural, engineering or cultural values. Over the past 100 years, since the 1908 USGS map of the Vacaville Quad was produced, the property had been altered with the addition and removal of buildings and structures.

Between 1908 and 1917, the topographic maps indicate only one structure, most likely the residence, at this location. It can be inferred that there were other buildings at this location but it cannot be known what those buildings were, what purpose they served and what form they took. The 1937 aerial photo shows the house, the original footprint of the metal barn, the tankhouse, and possibly the corn crib, along with at least four other buildings. One of these unidentified buildings is a large building with a square footprint between the house and metal barns. This aerial view also shows fields on the south and east of the buildings. It is not known what has been planted in these fields, but there appear to be paths or farm roads leading from the farmstead into these areas.

The 1953 topographic map shows the house and three additional buildings, one of which is definitively the metal barn. The remaining two buildings may be the corn crib and tankhouse, but this cannot be proved. The 1957 aerial photo shows the house, the enlarged metal barn, the corn crib and the tankhouse, as well as the large square building noted in the 1937 aerial photo and approximately three additional buildings. South and east of the farmstead are plowed fields, with a clear farm road leading from the rear of the metal barn into the fields. The house, corn crib, metal barn, tankhouse and square building appear on the 1968 topographic, along with one small building which is on the east side of the corn crib.

In the 1970 aerial photo, the house, crib barn, expanded metal shed, tankhouse, shed (on the north side of the crib barn and the west side of the tankhouse), the square building and the concrete silo. The areas south and east of the farmstead appear fallow in this image, and there is no clear path or road leading from the farmstead through this area. The 1973 and 1980 topographic maps show the number and location of buildings at this address as exactly the same as it looked in 1968.

No information about the people associated with this property or what types of agricultural activities have been associated with the farmstead have been located through online and local archival research. Within the historic context of the community of Elmira, within the vicinity of Vacaville, Solano County, this is not a significant property and is not eligible the CRHR under Criteria 1, 2 or 3.

Environmental Analysis

Appendix G, Environmental Checklist Form of the CEQA Guidelines, addresses significance criteria with respect to cultural resources (Public Resources Code Sections 2100 et seq.). Appendix G(V)(a,b,d) indicates that an impact would be significant if the project will have the following effects:

- Cause a substantial adverse change in the significance of a historical resource
- Cause a substantial adverse change in the significance of an archaeological resource
- Disturb any human remains, including those interred outside formal cemeteries

Project investigations included archival research; review of all cultural resource investigation reports within the CPVVS; and a complete built environment field survey. The investigations indicated no significant historic properties within 0.5 mile of the project site.

Therefore, no impacts to cultural resources are expected during construction or operation of the project and mitigation measures are not recommended.

References Cited or Consulted

Carley, Rachel. *The Visual Dictionary of American Domestic Architecture*. New York, NY: Henry Holt and Company. 1994.

Federal Writers' Project of the Works Progress Administration for the State of California. *The WPA Guide to California, The Federal Writers' Project Guide to 1930s California*. Introduction by Gwendolyn Wright. New York, NY: Pantheon Books. 1984.

Hayes, Derek. *Historical Atlas of California*. Berkeley and Los Angeles CA: University of California Press. 2007.

McAlester, Virginia and Lee. *A Field Guide to American Houses*. New York, NY: Alfred A. Knopf. 1984.

Noble, Allen G. and Richard K. Cleek. *The Old Barn Book, A Field Guide to North American Barns & Other Farm Structures*. New Brunswick, NJ: Rutgers University Press. 1995.

Office of Historic Preservation. *California Historical Landmarks*. Sacramento, CA: California State Parks. 1996.

Woodbridge, Sally B. *California Architecture, Historic American Buildings Survey*. San Francisco, CA: Chronicle Books. 1988.

APPENDIX A

Jessica Feldman Resume

Jessica B. Feldman

Architectural Historian

Education

M.A., Historic Preservation Planning, Cornell University, 2001
B.A., History, Minor in Art History, William Smith College, 1993

Distinguishing Qualifications

- Qualified as a historian, an architectural historian, and a historic preservationist under the Secretary of the Interior's Historic Preservation Professional Qualification Standards, as defined in 36 *Code of Federal Regulations* (CFR) 61.
- Experienced in cultural resource investigations in compliance with the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and a variety of other federal cultural resource regulations.
- Specializes in the analysis and preservation of historic bridges.

Relevant Experience

Ms. Feldman is a cultural resource specialist with more than 11 years of experience in compliance with federal, state, and local laws relating to cultural and community resources and land use planning. Ms. Feldman has been extensively involved in the management of and participation in cultural resource investigations in compliance with the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and a variety of other federal, state, and local cultural resource regulations.

Representative Projects and Dates of Involvement

Cultural Resource Specialist, Glendale Water Treatment Plant, City of Glendale, Maricopa County, October 2008 to present. The City of Glendale proposes to construct a 10-mgd Groundwater Treatment Plant (GWTP) to provide operational flexibility and meet the growing demands of Glendale. Conducted site a windshield survey of the proposed route of conveyance and wells sites. The survey was undertaken to verify the presence of cultural, architectural, and engineering resources that appear to be 50 years or older in the APE. It was determined that two wells are already in existence National Register-listed properties: The Manistee Ranch and the Sahuaro Ranch. Research was conducted and a cultural resource survey report is being prepared. Preparing the cultural resources impacts section for an Environmental Assessment.

Cultural Resource Specialist, Chula Vista Energy Upgrade Project, City of Chula Vista, San Diego County, June 2008 to August 2008. The Lorenzo Anderson House, which is in the vicinity of the proposed project and is listed on the local register of historic sites, is an historical resource for the purposes of CEQA. Conducted background research and site survey and prepared of DPR-523 inventory forms, per the Office of Historic Preservation guidelines. Prepared Technical Memorandum, which included discussion of environmental consequences of proposed project on this historical resource, according to CEQA guidelines.

Cultural Resource Specialist, Post Office Plaza Project, City of Reno, Washoe County, May 2008 to present. The City of Reno has a Memorandum of Understanding with the United States

Postal Service to purchase the USPS building located at 50 S. Virginia Street in downtown Reno (Washoe County). The Post Office is listed in the National Register of Historic Places. Upon purchasing the property, the City plans on redeveloping this building and its site with a two phased project approach. Phase 1 of this project consists of relocating the existing parking on the North side of the building to the South side of the building adjacent to Mill Street. In addition, the existing parking lot on the North side of the building will be converted into a terraced plaza that will provide access from the street level to the river level.

Cultural Resource Specialist; SW Gibbs Street Pedestrian Bridge over I-5, Oregon Department of Transportation, City of Portland, Multnomah County, February 2008 to present. The project is a new pedestrian and bicycle bridge over I-5 providing connections between the historic South Portland Neighborhood Association (formerly known as Corbett, Terwilliger and Lair Hill neighborhoods) and the new South Waterfront developments on the Willamette River. The west landing of the bridge is within the South Portland Historic District, which is listed in the National Register of Historic Places. Ms. Feldman will prepare a Cultural Resources Baseline Report, Determinations of Eligibility (DOE) forms, and Finding of Effect (FOE) forms.

Cultural Resource Specialist; State Route 94 PSR-PDS; San Diego County, CA; October 2007 to present. On behalf of the SANDAG, CH2M HILL is preparing a Project Study Report-Project Development Support for the proposed State Route (SR) 94 Improvements Project (Caltrans). The project proposes to add two high occupancy vehicle (HOV) lanes along SR 94 from the I-805 interchange to downtown, and to direct HOV connectors from I-805 and I-15 to SR 94. Ms. Feldman conducted background research and a field review in preparation of a Preliminary Environmental Assessment Report (PEAR), a standard Caltrans report format. The highway is within one block of two locally significant historic districts and two locally significant cemeteries.

Cultural Resource Specialist; Salem River Crossing NEPA-EIS; Marion and Polk Counties, Salem, Oregon; August 2007 to present. The project proposes to improve mobility and safety across the Willamette River in the Salem-Keizer metropolitan area while alleviating congestion on the Marion and Center Street bridges and on the connecting highway and arterial street systems. In support of a preliminary concept analysis, prepared an evaluation matrix ranking each of the 13 alternatives. Additional work will include the preparation of a Cultural Resources Technical Report in support of the Draft EIS.

Cultural Resource Specialist, Fontana Energy Center Project Application For Certification; San Bernardino County, CA; October 2007 to present. Fontana Energy Center LLC (Calpine) proposes to construct a new power plant on the property of California Steel Industries, Inc., in Fontana, CA. The California Steel Industries, Inc. property is situated on the former Kaiser Steel mill site (California Point of Historical Interest #71). Ms. Feldman will prepare a cultural resources inventory report as supporting documentation for the appropriate cultural resources section of the Application for Certification (AFC), as required by the California Energy Commission (CEC). This includes background research, field survey and preparation of DPR-523 inventory forms, per the Office of Historic Preservation guidelines.

Cultural Resource Specialist; Sellwood Bridge NEPA-EIS; Multnomah County, vicinity of Portland, Oregon; February 2007 to present. The 1925 Sellwood Bridge is considered functionally obsolete and will be replaced or rehabilitated. The bridge is eligible for the

National Register of Historic Places. The project area includes one National Register-listed church, as well as a National Register-eligible late 19th century cemetery and associated Superintendent's House, and interurban corridor. Prepared the existing setting discussion for historic resources discipline report and conducted effects analysis for the Draft Environmental Impact Statement (Draft EIS).

Cultural Resource Specialist; Tacoma/Pierce County HOV Project, WBNV and EBNV Connector; Washington Department of Transportation; Tacoma and Pierce County, Washington; August 2006 to present. Conducted field survey and research, and used this information to prepare the historic context and discipline report for the EIS. This is part of the larger Tacoma/Pierce County HOV project, which will widen 35 miles of Interstate 5 and introduce High Occupancy Vehicle lanes to decrease traffic congestion between the Pierce/King County line and State Route 16 in the Tacoma and Fife area. The proposed project includes the demolition of the Nalley Valley Viaduct, which was evaluated for potential eligibility for the National Register of Historic Places.

Cultural Resource Specialist; Tacoma/Pierce County HOV Project, Pacific to POT (Port of Tacoma), Environmental Assessment, Washington Department of Transportation; Pierce County, Washington; September 2006 to present. Conducted field survey and research of historic resources, and will use this information to prepare the discipline report in support of the final environmental document. This is part of the larger Pierce County HOV project, which will widen 35 miles of Interstate 5 and introduce High Occupancy Vehicle lanes to decrease traffic congestion between the Pierce/King County line and State Route 16 in the Tacoma and Fife area. The alignment will require the acquisition of an easement on a potentially historic local park, which will be dealt with through the Section 4(f) process.

Cultural Resource Specialist; Tacoma/Pierce County HOV Project, POT (Port of Tacoma) to KCL (King County Line), Environmental Assessment, Washington Department of Transportation; Pierce County, Washington; September 2006 to present. Conducted field survey and research of historic resources, and will use this information to prepare the discipline report in support of the final environmental document. This is part of the larger Pierce County HOV project, which will widen 35 miles of Interstate 5 and introduce High Occupancy Vehicle lanes to decrease traffic congestion between the Pierce/King County line and State Route 16 in the Tacoma and Fife area.

Cultural Resource Specialist; Water Treatment Plant and Bicycle Lake Water Main Extension; U.S. Army and Fort Irwin DPW; Fort Irwin, California; January 2007 to May 2007. Prepared the cultural resources impacts section for an Environmental Assessment. The proposed project will construct a new water treatment plant and the associated infrastructure to provide potable water to existing and future populations at the facility.

Task Leader, Cultural Resources; Paducah GNEP Siting Study; Paducah Uranium Plant Asset Utilization, Inc.; vicinity of Paducah, Kentucky; February 2007 to May 2007. The final product is a site evaluation study or Detailed Site Report which would provide the applicable regulatory, permitting, and licensing requirements that are required or may be required to permit and license a GNEP facility, provide all relevant, readily available environmental regulatory and permitting information for the PGDP and surrounding area that is pertinent to siting a GNEP facility, identify data gaps that will need to be filled for siting a GNEP facility. Prepared relevant sections of the site report relating to cultural resources. This project had a

short turn-around and limited hours, with specific protocols, milestones and deadlines that had to be met. In addition, supporting documentation was difficult to obtain but this was accomplished on time.

Cultural Resource Specialist; Russell City Energy Center, Application for Certification, Calpine Corporation; City of Hayward, California; January 2007 to March 2007. Prepared appropriate State of California Department of Parks and Recreation forms for the evaluation of three structures located at the project site. This included the preparation of an historic context, requiring intensive research at local repositories, and a site visit. The proposed project, a new energy facility west of the City of Hayward, California, requires a California Energy Commission license. The DPR forms were prepared as part of the supporting documentation for the application of the CEC license.

Cultural Resource Specialist; PG&E Humboldt Bay Power Plant Modernization Project, Application for Certification, Pacific Gas & Electric; vicinity of Eureka, California; October 2006 to December 2006. Conducted site visit and prepared evaluation of the power plant as an historic district, according to the State of California Department of Parks and Recreation guidelines and format. PG&E are proposing to upgrade and modernize the plant. The site visit and historic district evaluation were prepared as supporting documentation for the Application of Certification.

Cultural Resources Specialist; Diestelhorst Bridge Preservation and Rehabilitation Plan; City of Redding; Redding, California; August to December 2006. Prepared the historic context and applied the Secretary of the Interior's Standards for Rehabilitation of Historic Structures for the Diestelhorst Bridge in Redding, California. The bridge, which was built in 1914, was the first reinforced concrete bridge over the Sacramento River, and its completion linked the Shasta and Siskiyou County seats. The Bridge is eligible for the National Register of Historic Places. The proposed project will convert the structure to a pedestrian facility.

Experience Prior to CH2M HILL

Architectural Historian; Jones & Stokes (formerly Myra L. Frank and Associates); November 2000 to June 2006. Preparation of Section 106 documents in support of the Environmental Impact Statement (EIS) for the Dallas Area Rapid Transit (DART) NW alignments and Mid-Jordan Light Rail (Salt Lake City, Utah); preparation of historic bridge evaluations for Caltrans in support of Historic Property Survey Reports and Finding of Effect Reports, used as basis for Environmental Impact Reports (EIRs), for Los Angeles, Riverside, San Bernardino and Madera Counties; preparation of National Register nominations for General Services Administration (GSA)-owned courthouses and post offices throughout the United States; preparation of Historic American Building Survey (HABS) and Historic American Engineering Record (HAER) level data forms for properties in the City of Long Beach.

Past responsibilities included directing a survey team for the Caltrans statewide historic bridge inventory update; leading an intensive architectural survey for the City of Riverside of more than 1,300 parcels in the downtown area, which led to the preparation of determinations of eligibility and historic property inventory forms; surveying proposed Historic Preservation Overlay Zones for the City of Los Angeles to determine contributing and non-contributing buildings; and conducting historical documentations and evaluations of state-owned buildings

in Sacramento, Los Angeles, and Marysville, which resulted in environmental analyses of those structures in anticipation of seismic retrofitting, and/or other proposed alterations.

Architectural Historian/Lead List of Classified Structures (LCS) Historian; National Park Service, National Capital Region; February 1996 to July 1998 and May 1999 to August 1999. **Was r**esponsible for editing and maintaining regional historic structures database; identified, monitored and evaluated cultural resources at regional parks, including Rock Creek Park and Harpers Ferry National Historical Parks; advised park management on treatment of cultural resources; identified potential threats to structures; planned and conducted historical research to be used for park planning documents and Section 110 review; provided peer review for non-point source (NPS) and non-NPS historical studies; supervised seasonal employees and interns; made contributions to the preparation of historic preservation documentation; conducted intensive survey of and compiled background materials on 19th century homestead and cemetery sites at Prince William Forest Park; made presentations to park staff and public organizations on research results, and beta-tested new historic structures database for entire national park system.

Employment History

Jones & Stokes (formerly Myra L. Frank and Associates); Architectural Historian; November 2000 to June 2006

National Park Service, National Capital Region; Architectural Historian/Lead LCS Historian; February 1996 to July 1998 and May 1999 to August 1999

APPENDIX B

DPR-523 Forms

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code Reviewer Date

Page 1 **of** 1 ***Resource Name or #:** 6014 Lewis Road, vicinity of Elmira, Solano County

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Elmira **Date:** 1980 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: 6014 Lewis Road City: Vicinity of Elmira, unincorporated Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

Parcel number: 0142-150-010

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

6014 Lewis Road is a farmstead, a complex of buildings comprised of a residence, a silo, a tankhouse, barns and sheds. The residence is one and a half-story with a rectangular footprint, built circa 1910. The side gable roof has a moderate pitch. It has a one-story rear addition with a shed roof, which does not appear on the 1970 aerial photo. The exterior appears to be asbestos shingle, probably added in the 1950s. The visible windows are one-over-one wood sash, paired and tripled on the primary façade. The front door is located on the north side, facing the driveway. Windows on the north façade are one-over-one wood sash with sidelights. There is a brick chimney on the north side. The house is in good condition.

Just to the south of the residence is a rectangular shed with a side gable roof. Its original purpose and current use are not known. It appears to have a concrete block foundation, with stained horizontal wood siding beginning at the sill line. The roof has wood shingles and the windows appear to be wood casements. The door types are a mix of replacement sliding glass and stained wood. This structure appears in the 1970 aerial photo but it is not visible in the 1957 aerial photo. It is in good condition. This shed was likely not a part of the original farmstead.

See continuation sheet.

***P3b. Resource Attributes:** (List attributes and codes)

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☒District ☐Element of District ☐Other (Isolates, etc.)

P5a.

P5b. Description of Photo: (View, date, accession #)
Looking east/southeast towards primary façade, 11/19/2008.

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
Ca.1910

***P7. Owner and Address:**
Not available through assessor records

***P8. Recorded by:** (Name, affiliation, and address)
Doug Davy and Jessica B. Feldman, CH2M HILL

***P9. Date Recorded:** 05/30/08

***P10. Survey Type:** (Describe)
Reconaissance survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Application for Certification, CPV Vaca Station, November 18, 2008.

***Attachments:** ☒NONE ☐Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

***P3a. Description (continued):**

Just to the east of the shed is a wood tankhouse. The roof is barely visible above the shed's roof. The tankhouse is similar to others noted in the nearby town of Elmira. It may be visible on the 1937 aerial photo, but is not definitive. It has a square footprint and is approximately one story high. It has slightly splayed walls and a flat roof with boxed eaves. It is hidden from the road by the crib barn and the rectangular shed. To the southeast of the tankhouse is a three-story, concrete silo. The silo first appears on the 1970 aerial photo. Its general condition is not known.

Immediately to the south of the shed there is a large wood crib barn along Lewis Road, which appears to be a transverse frame crib barn with a raised monitor roof. Its original purpose and current use are not known. In addition, it is difficult to date the building; there appears to be a structure with a similar footprint and different roof style at this location in the 1937 aerial photo but a structure with a similar footprint and roof appears conclusively on the site on the 1957 aerial photo. The barn has a concrete foundation and horizontal wood siding. The eaves are wide and have exposed rafters. There are no windows but open spaces between framing elements along the walls. The roof may have been covered by corrugated metal sheets but most of the roof is exposed. The barn is in poor condition.

To the southeast of the concrete silo is an L-shaped shed with open bays on the north. It appears to have a shed-roof. It does not appear in the 1970 aerial photo indicating it was built at least in the last 38 years.. Its original purpose and current use are also not known. Its condition is not known.

To the south of the L-shaped shed is a barn with two-story frame, with two facades (one is projected forward). This building appears as a three bay barn attached to a single bay barn. The barn faces Lewis Road, south of the residence. Between these barns and the road is an enclosed paddock. Although the portion of the barn with three bays has a higher roof pitch (which may indicate a loft area), both have moderately pitched front gable roofs. Both are also clad in metal sheeting.

P5a. (Additional Photos)

P5b. Description of Photo: (View, date, accession #) Looking southeast at the enclosed shed, open shed, concrete silo and tankhouse. Taken on November 19, 2008.

P5a. (Additional Photos)

P5b. Description of Photo: (View, date, accession #) Looking east at the metal barns and enclosed paddock. Taken on November 19, 2008.

P5b. Description of Photo: (View, date, accession #) Looking southeast at the main residence. Taken on May 30, 2008.

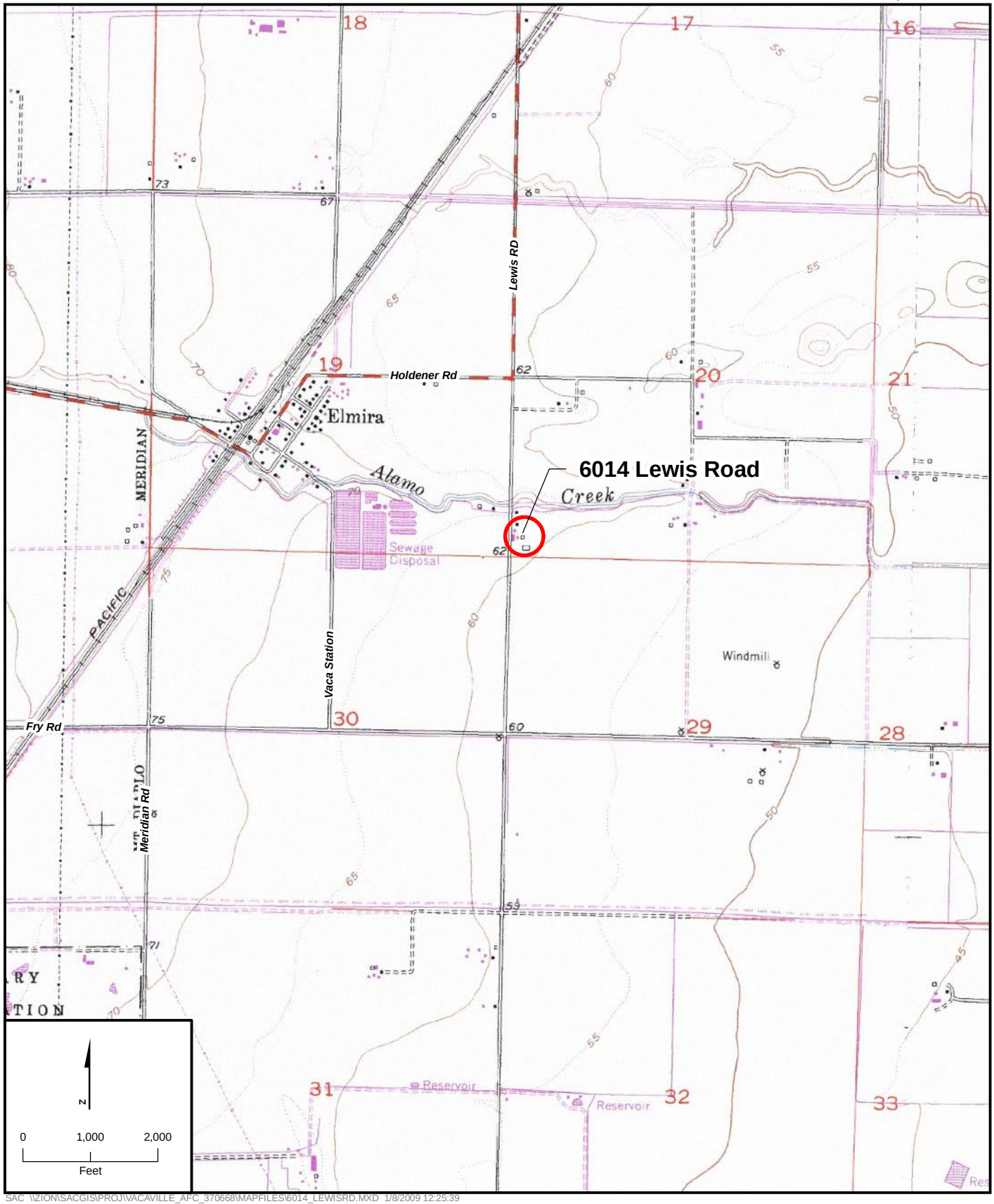
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#
Trinomial:

LOCATION MAP

Map Name: Elmira 24K Topographic Quadrangle
Dozier 24K Topographic Quadrangle

Resource Name or #: 6014 Lewis Road
Scale: 1:24,000 Date of Map: 01/08/09



SAC \\ZION\SACGIS\PROJ\VACAVILLE_AFC_370668\MAPFILES\6014_LEWISRD.MXD 1/8/2009 12:25:39

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code | Reviewer | Date

Page 1 **of** 1 *__Resource Name or #:__ 6018 Lewis Road, vicinity of Elmira, Solano County

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Elmira **Date:** 1980 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: 6018 Lewis Road City: Vicinity of Elmira, unincorporated Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

Parcel number: 0142-150-010

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

6018 Lewis Road is a one-story, single family residence with a side gable roof. It is lacking any decorative elements to distinguish the primary style. The footprint of the house is rectangular and the exterior is smooth stucco. There is an entry porch on the north side, with a side gable roof (lower than the main roof) supported by wood king posts. The porch roof, which may not date to the original period of construction, has composition shingle, while the main roof appears to be wood shingle. There is a brick chimney located on the north side of the building. The house is in good condition.

The house is located on the east side of Lewis Road, south of Aliso Creek. The house appears first on USGS topographic maps in 1953, and on aerial maps taken in 1937. No assessor information was found that firmly stated the year it was constructed. It is estimated to have been constructed circa 1930.

***P3b. Resource Attributes:** (List attributes and codes)

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a.

P5b. Description of Photo: (View, date, accession #)
Looking east/southeast towards primary façade, 05/30/08.

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
Ca.1930

***P7. Owner and Address:**
Not available through assessor records

***P8. Recorded by:** (Name, affiliation, and address)
Doug Davy, CH2M HILL
Jessica B. Feldman, CH2M HILL

***P9. Date Recorded:** 05/30/08

***P10. Survey Type:** (Describe)
Reconaissance survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Application for Certification, CPV Vaca Station, November 18, 2008.

***Attachments:** ☒NONE ☐Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

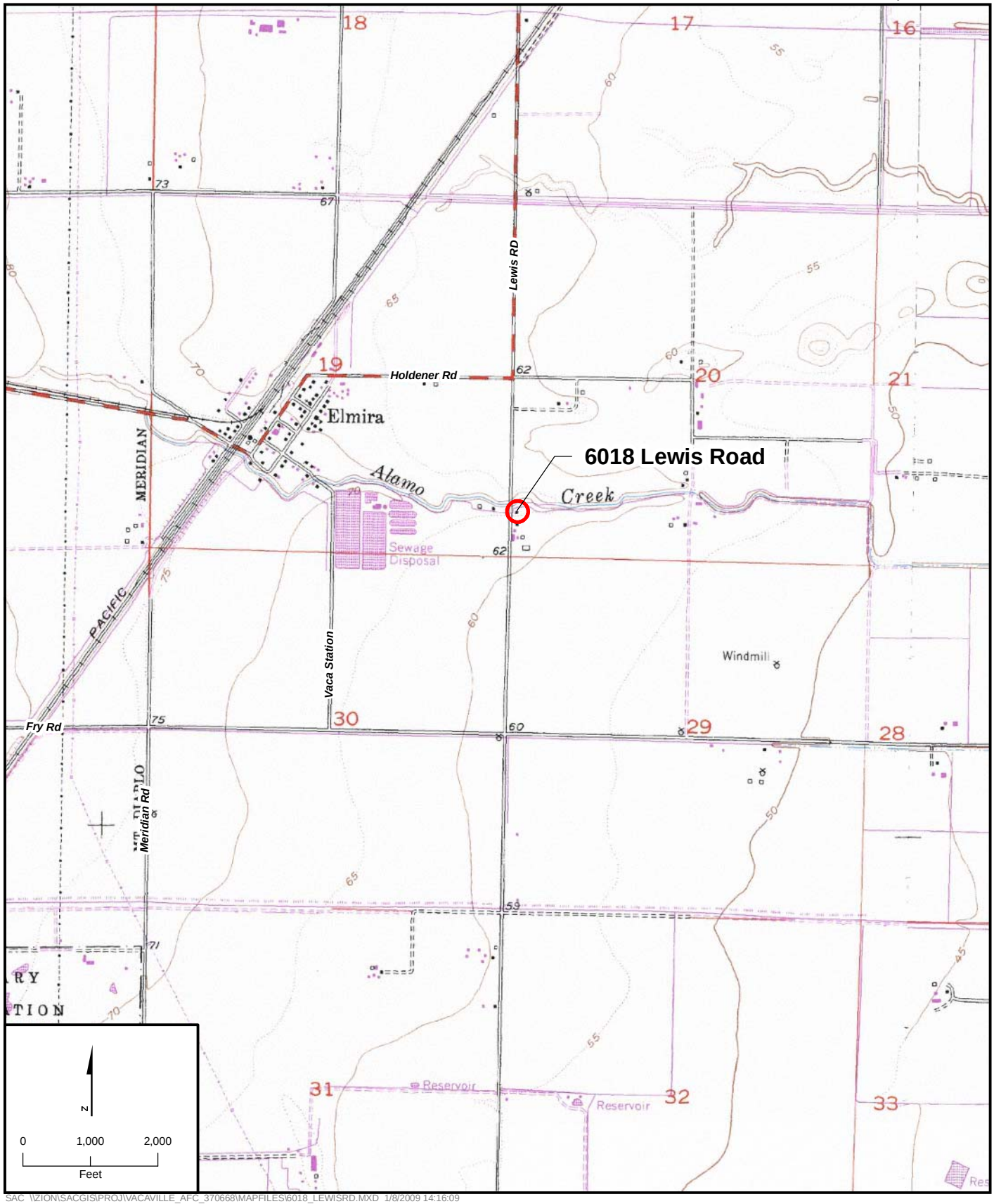
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#
Trinomial:

LOCATION MAP

Map Name: Elmira 24K Topographic Quadrangle
Dozier 24K Topographic Quadrangle

Resource Name or #: 6018 Lewis Road
Scale: 1:24,000 Date of Map: 01/08/09



SAC \\ZION\SACGIS\PROJ\VACAVILLE_AFC_370668\MAPFILES\6018_LEWISRD.MXD 1/8/2009 14:16:09

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 **of** 1 ***Resource Name or #:** 6021 Lewis Road, vicinity of Elmira, Solano County

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Elmira **Date:** 1980 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: 6021 Lewis Road City: Vicinity of Elmira, uninorporated Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

Parcel number: 0142-110-020

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single-family residence located at 6021 Lewis Road is a simple Bungalow style house, built circa 1900. It is one-story, with a low hipped roof and a raised foundation. The exterior is wood clapboard and the roof, which has extended eaves, is clad with wood shingles. The house has a square footprint, with a raised porch on one half of the primary façade. The porch has a shed-style roof, supported by wood posts. It has a simple wood railing. The visible windows are replacement sliding aluminum sash. The house is in fair to good condition, with some alterations, such as the windows.

The house is located along Aliso Creek, on the west side of Lewis Road. There is a mowed lawn in front, and some ornamental trees between the house and Lewis Road. There are also mature eucalyptus trees between the rear of the house and the site of the former barn and barnyard area.

The house appears on USGS topographic maps in 1908 and 1917, and on aerial photos taken in 1937 and 1957. No assessor information was found that firmly stated the year it was constructed. A barn, located west of the house, is visible in the 1937 aerial photo, and in the 1953 topographic map, but not earlier. It was still present on the 1980 topographic map but it has been removed since that time.

***P3b. Resource Attributes:** (List attributes and codes)

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a.

P5b. Description of Photo: (View, date, accession #)
Looking west/southwest towards primary façade, 05/30/08.

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
Ca.1900

***P7. Owner and Address:**
Not available through assessor records

***P8. Recorded by:** (Name, affiliation, and address)
Doug Davy, CH2M HILL
Jessica B. Feldman, CH2M HILL

***P9. Date Recorded:** 05/30/08

***P10. Survey Type:** (Describe)
Reconaissance survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Application for Certification, CPV Vaca Station, November 18, 2008.

***Attachments:** ☒NONE ☐Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

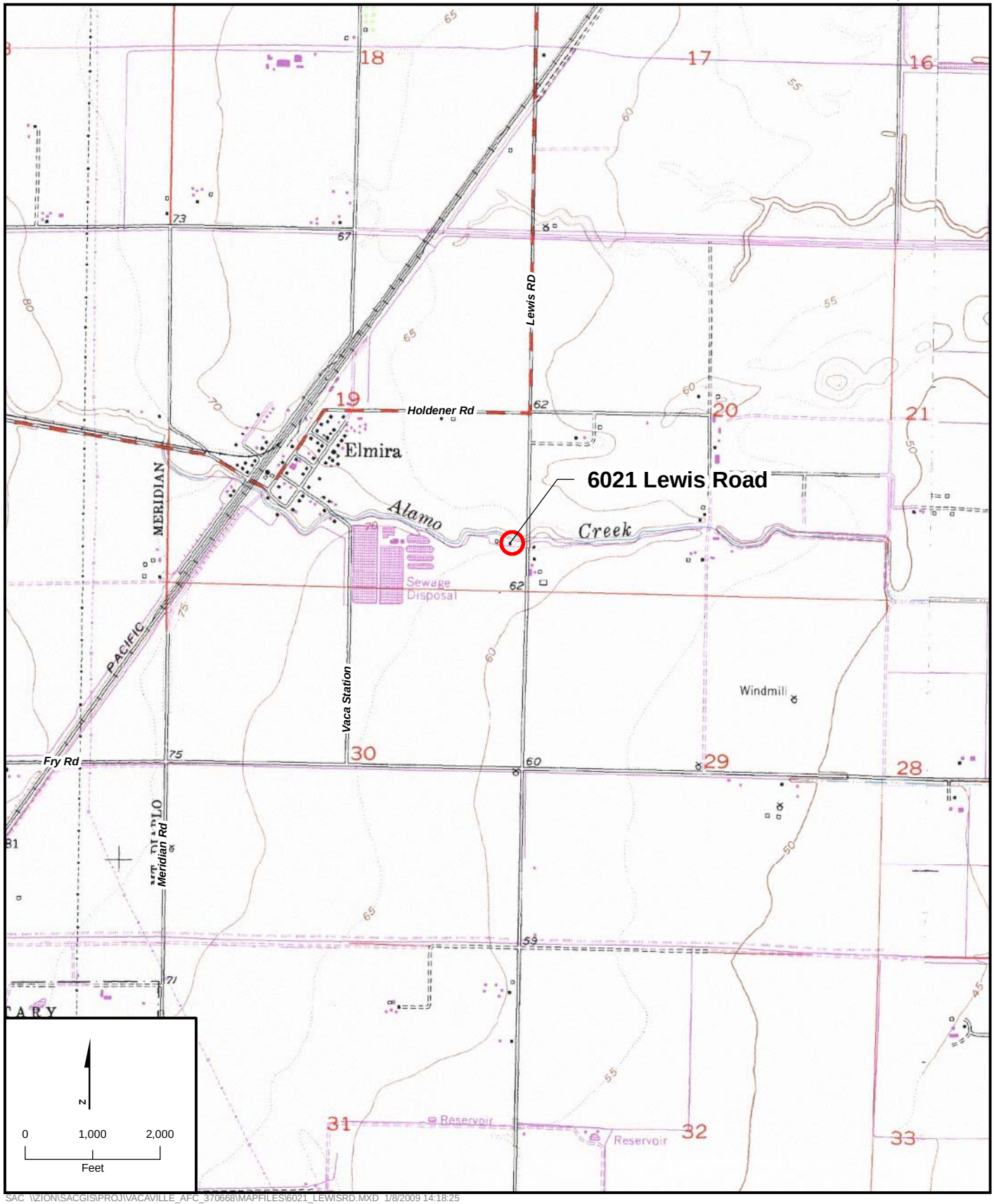
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#
Trinomial:

LOCATION MAP

Map Name: Elmira 24K Topographic Quadrangle
Dozier 24K Topographic Quadrangle

Resource Name or #: 6021 Lewis Road
Scale: 1:24,000 Date of Map: 01/08/09



SAC \\ZION\SACGIS\PROJ\VACAVILLE_AFC_370668\MAPFILES\6021_LEWISRD.MXD 1/8/2009 14:18:25

5.6 Land Use (14)

14. Agricultural Information (Appendix B (g) (3) (D) (i))

Crop types, irrigation systems, and any special cultivation practices;

Information required to make AFC conform with regulations:

Please provide crop types, irrigation systems and cultivation practices.

Response: According to Mr. Gary Archer, a local realtor familiar with project area crops and agricultural practices, the crops most frequently grown in the project area are field corn and Sudan grass (for silage), alfalfa, and winter wheat. Irrigation practices include mostly surface delivery from small canals. No special cultivation practices are necessary for these crops.

5.7 Noise (15)

15. Ambient Noise Measurements (Appendix B (g) (4) (B))

A description of the ambient noise levels at those sites identified under subsection (g)(4)(A) which the applicant believes provide a representative characterization of the ambient noise levels in the project vicinity, and a discussion of the general atmospheric conditions, including temperature, humidity, and the presence of wind and rain at the time of the measurements. The existing noise levels shall be determined by taking noise measurements for a minimum of 25 consecutive hours at a minimum of one site. Other sites may be monitored for a lesser duration at the applicant's discretion, preferably during the same 25-hour period. The results of the noise level measurements shall be reported as hourly averages in L_{eq} (equivalent sound or noise level), L_{dn} (day-night sound or noise level) or CNEL (Community Noise Equivalent Level) in units of dB(A). The L10, L50, and L90 values (noise levels exceeded 10 percent, 50 percent, and 90 percent of the time, respectively) shall also be reported in units of dB(A).

Information required to make AFC conform with regulations:

The ambient noise survey described in the AFC was conducted at only one location, the southern boundary of the project site. Please conduct an ambient noise measurement at each of the three residential receptors identified in the AFC Section 5.7.2.1 as being located approximately 800 feet to the southeast, 1,900 feet to the north, and 1,600 feet to the east of the project site. Please measure the ambient noise levels at these locations continuously from 10:00 p.m. to 7:00 a.m., and again during the daytime hours for a period of at least one hour.

Response: Per e-mail correspondence from CEC Project Manager Rod Jones on December 22, 2008, Staff has agreed that the Applicant may provide this information as a response to a data request, during the Discovery phase of site certification.

5.12 Traffic and Transportation (16–18)

16. FAA Compliance (Appendix B (g) (5) (B))

If the proposed project including any linear facility is to be located within 20,000 feet of an airport runway that is at least 3,200 feet in actual length, or 5,000 feet of a heliport (or planned or proposed airport runway or an airport runway under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration), discuss the project's compliance with the applicable sections of the current Federal Aviation Regulation Part 77 – Objects Affecting Navigable Airspace, specifically any potential to obstruct or impede air navigation generated by the project at operation; such as, a thermal plume, a visible water vapor plume, glare, electrical interference, or surface structure height. The discussion should include a map at a scale of 1:24,000 that displays the airport or airstrip runway configuration, the proposed power plant site and related facilities.

Information required to make AFC conform with regulations:

Please clarify if the proposed project including any linear facility is to be located within 20,000 feet of an airport runway (e.g., at Travis Air Force Base) that is at least 3,200 feet in actual length, or 5,000 feet of a heliport (or planned or proposed airport runway or an airport runway under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration). If there are proposed power plant site and related facilities within 20,000 feet, as stated, please provide a map at a scale of 1:24,000 that displays the airport or airstrip runway configurations.

Response: Section 3.4.3 of the AFC "Aviation Safety" states the following:

> Federal Aviation Administration (FAA) Regulations, 14 Code of Federal Regulations (CFR) Part 77, establish standards for determining obstructions in navigable airspace and set forth requirements for notification of proposed construction. These regulations require FAA notification for construction over 200 feet above ground level. In addition, notification is required if the obstruction is lower than specified heights and falls within restricted airspace in the approaches to public or military airports and heliports. For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.3 nautical miles) from the runway. For airports with runways measuring 3,200 feet or less, the restricted space extends 10,000 feet (1.7 nautical miles). For public or military heliports, the restricted space extends 5,000 feet (0.8 nautical mile).
>
> The nearest public airport to the CPVVS is the Nut Tree Airport, a general aviation airport with one runway 4,700 feet long. The nearest point at the Nut Tree Airport runway to the CPVVS is about 3.56 nautical miles (4.1 miles). Therefore, the CPVVS is beyond the restricted airspace.
>
> The nearest military airport to the CPVVS is Travis Air Force Base. This airfield has two runways that are each 11,000 feet long. The nearest point on the nearest runway to the CPVVS is about 3.3 nautical miles (3.8 miles) from the CPVVS. Therefore, the CPVVS is beyond the restricted airspace.

The nearest heliport to CPVVS is the Vaca Valley Hospital heliport, located at 1000 Nut Tree Road, Vacaville. The heliport is 2.9 miles (15,065 feet) from the CPVVS, beyond the restricted airspace.

Measuring from the southern boundary of the CVPVS site to the northern end of the Travis Air Force Base runway, the distance is 20,592 feet. The relationship of the project site to the Travis Air Force Base and Nut Tree Airport is depicted on AFC Figure 5.12-1. Figures DA5.12-1 and DA5.12-2 show this more clearly at a scale of 1:24,000.

Since the time the AFC was filed, it has come to our attention that, under the provisions of the Travis Air Force Base Land Use Compatibility Plan, any developments located within Airport Compatibility Zone C with a structure taller than 100 feet must apply for an airspace protection review before the Solano County Airport Land Use Commission. It is unlikely, however, that the project will be found a hazard to air navigation, given its distance from Travis Air Force Base runways.

Reference Cited:

Solano County Airport Land Use Commission. 2002. Travis Air Force Base Airport Land Use Compatibility Plan. Prepared by Shutt Moen and Associates, Santa Rosa, California. Adopted by the Solano County Airport Land Use Commission, June 13, 2002.

17. Road Features (Appendix B (g) (5) (C) (vi))

An identification of any road features affecting public safety.

Information required to make AFC conform with regulations:

Please provide information on any road features affecting public safety or clarify if none exist.

Response: Major roadways near the project area include Fry and Lewis Roads. Although Fry Road conveys a relatively large traffic volume for a rural roadway, it is a well-maintained road with ample shoulder. Stop signs control traffic at such crossing roads as Lewis, Vaca Station, and Meridian roads, and there is an electric signal where Fry Road encounters Leisure Town Road at the boundary of the more densely populated residential area of Vacaville. Periodically along Fry Road are private lanes that connect rural farms and homes to Fry Road. These are potentially hazardous, as vehicles are sometimes traveling rapidly along Fry Road. Other than this, however, there are no road features that would diminish public safety.

18. Transportation of Hazardous Materials (Appendix B (g) (5) (E))

A discussion of project-related hazardous materials to be transported to or from the project during construction and operation of the project, including the types, estimated quantities, estimated number of trips, anticipated routes, means of transportation, and any transportation hazards associated with such transport.

Information required to make AFC conform with regulations:

Please provide a discussion of project-related hazardous materials to be transported during construction and operation, specifically pertaining to estimated quantities and estimated number of trips. Also, please identify any transportation hazards associated with such transport.

Response: As described in AFC Section 5.12.2.2, Transport of Hazardous Materials, the only regulated substance to be delivered to the site regularly will be aqueous ammonia. It is anticipated that the CPVVS plant will require one ammonia delivery every 5 days, with a maximum of six deliveries per month. Ammonia will be delivered to the site in DOT-certified vehicles with design capacities of 6,500 gallons. Transportation hazards and anticipated routes associated with this transport are described in detail in AFC Sections 5.12.2.2 and 5.5.2.2.

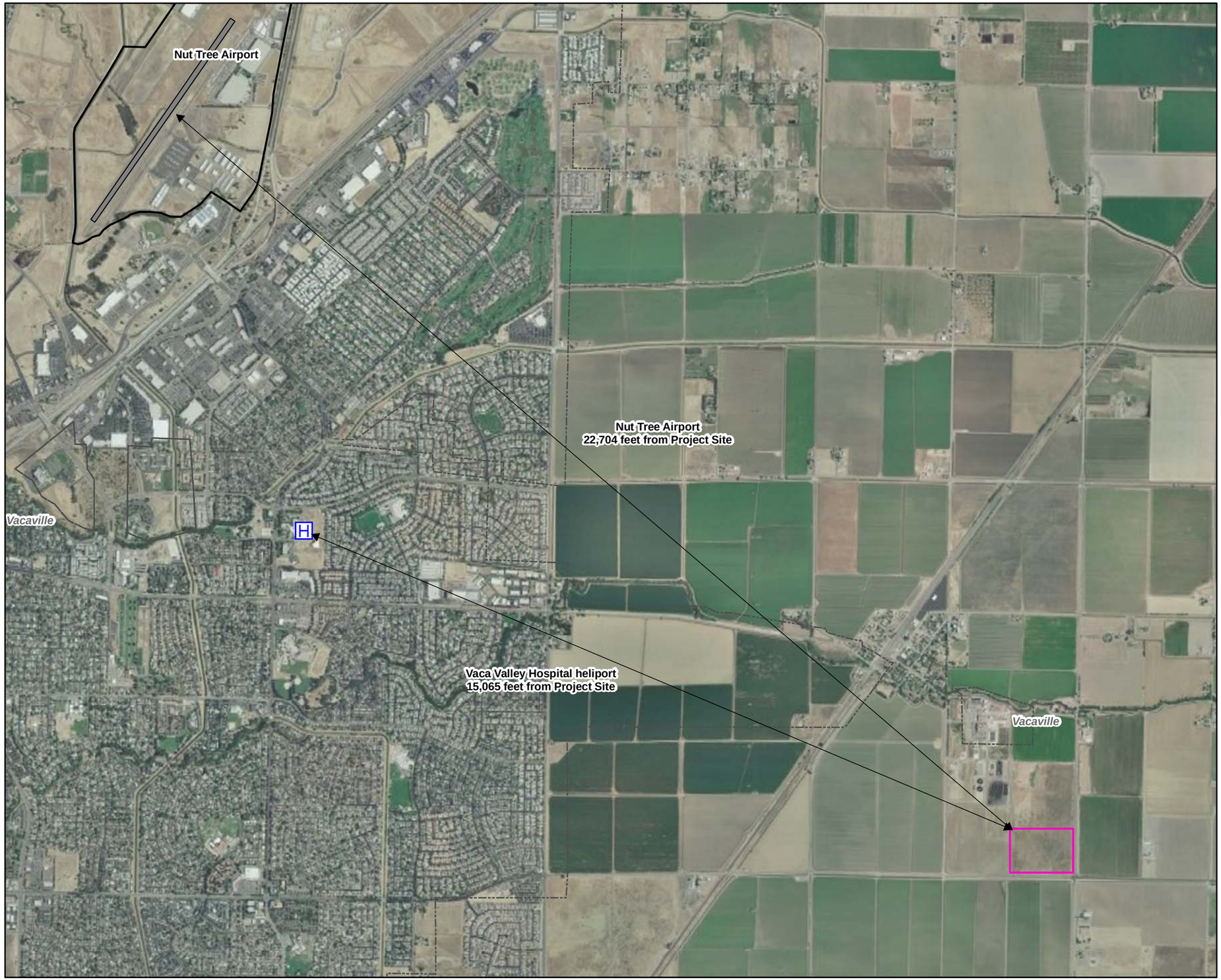


FIGURE DA 5.12-1
AIRPORT LOCATIONS
CPV VACA STATION
VACAVILLE, CA

CH2MHILL

LEGEND

Project Site

Runway

Travis Air Force Base Boundary

N

0 1,000 2,000

Feet

FIGURE DA 5.12-2
AIRPORT LOCATIONS
CPV VACA STATION
VACAVILLE, CA

CH2MHILL

SAC\\ZION\SACGIS\PROJ\VACAVILLE_AFC_370668\MAPFILES\TRAVISAFB_AIRPORT.MXD MHASKELL 12/29/2008 11:53:45

5.13 Visual Resources (19)

19. Photographic Reproductions (Appendix B [(g) (6) (F)])

Provide:

i) full-page color photographic reproductions of the existing site, and

ii) full-page color simulations of the proposed project at life-size scale when the picture is held 10 inches from the viewer's eyes, including any project-related electrical transmission lines, in the existing setting from each key observation point. If any landscaping is proposed to comply with zoning requirements or to mitigate visual impacts, include the landscaping in simulation(s) representing sensitive area views, depicting the landscaping five years after installation; and estimate the expected time until maturity is reached.

Information required to make AFC conform with regulations:

Please provide full color photographic reproductions of the existing site, including laydown and parking areas.

Response: Figures DA5.13-1 and DA5.13-2 provide full-color photographic depictions of the existing site and laydown area.

View of the proposed plant site, looking southeast from the western edge of the proposed plant site.

FIGURE DA 5.13-1
VIEW OF THE PROPOSED PLANT SITE (FACING SOUTHEAST)
CPV VACA STATION
VACAVILLE, CA

View of the proposed site and laydown areas, looking northeast from the western edge of the proposed plant site.

FIGURE DA 5.13-2
VIEW OF THE PROPOSED PLANT SITE (FACING NORTHEAST)
CPV VACA STATION
VACAVILLE, CA