6.3 AIR QUALITY

This section addresses the air quality impacts of construction and operation of the VV2 Project. It covers both the power generating facilities and its linear facilities (natural gas, reclaimed and backup water supply pipelines, sanitary wastewater pipeline, and transmission lines). The air quality assessment covers the specific air quality information required by the CEC guidelines for an AFC, including:

- A description of laws, ordinances, regulations, and standards (LORS) that regulate sources of air pollution;
- Baseline climate and air quality data to describe existing conditions in the Project area;
- A description of the fuels and control technologies that will be employed to reduce the emissions from the Project;
- Information on criteria air pollutant sources, fuel(s) used, and operations to allow quantification of pollutant emissions and potential impacts on ambient air quality during Project construction and operation;
- Mitigation of potential impacts through use of pollution control technologies, emission offsets and other mitigation measures; and
- Information required by the Mojave Desert Air Quality Management District (MDAQMD) in order to issue a Determination of Compliance for the VV2 Project.

This section focuses on "criteria" pollutant emissions, i.e., those pollutants for which there are ambient air quality standards set to protect health and the environment. There are seven primary criteria pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter (PM10), fine particulate matter (PM2.5), and lead. The VV2 Project will emit insignificant amounts of lead, and hence it is not discussed further. Requirements (LORS) related to air toxic compounds, their emissions, and their potential impact on public health are addressed in Section 6.11, Public Health.

6.3.1 LORS Compliance

Construction and operation of the VV2 Project will be performed in accordance with the applicable LORS. The applicable Federal and California air quality LORS are summarized in Table 6.3-1.a. and briefly discussed below.

6.3.1.1 Federal Requirements

The U.S. Environmental Protection Agency (EPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS) and enforcing the Federal Clean Air Act (CAA). Various Federal programs have been developed to regulate sources of air

pollutants, including stationary, mobile and area sources. These programs include New Source Review (NSR) and other permitting requirements, as well as emissions standards for new and modified sources, and compliance monitoring. Most of these Federal programs have been delegated to the MDAQMD for implementation in the local area.

Table 6.3-1.a
Summary of Federal and California Air Quality LORS Applicable to the VV2 Project

Regulation[1]	Applicability	Where Addressed in AFC
Federal:		
Prevention of Significant Deterioration (PSD) Clean Air Act (CAA) §160-169A, 42 USC §7470-7491, 40CFR Parts 51 and 52.	Requires PSD review, facility permitting, Best Available Control Technology (BACT) and increment consumption analysis for significant emissions from new major sources	Sections 6.3.1.1, 6.3.3 and 6.3.4.2
CAA, Sections 171 – 193, 42 USC, Section 7501	Requires New Source Review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which area is designated non-attainment for National Ambient Air Quality Standards (NAAQS)	Sections 6.3.1.1, 6.3.1.3 and 6.3.3
CAA, Section 401 (Title IV), 42 USC, Section 7651	Requires reductions in NO_x and SO_2 emissions to reduce acid deposition	Sections 6.3.1.1, 6.3.1.3 and 6.3.1.5
CAA, Section 501 (Title V), 42 USC, Section 7661	Establishes a comprehensive permit program for major stationary sources	Sections 6.3.1.1, 6.3.1.3, 6.3.1.4 and 6.3.1.5
CAA, Section 111, 42 USC, Section 7411, (Title 40 CFR, Part 60)	Establishes national performance standards for new stationary sources	Sections 6.3.1.1, 6.3.1.3, 6.3.3.1 and 6.3.3.3
CAA, Section 114, 42 USC, Section 7414, (Title 40 CFR Part 64)	Requires the operation, maintenance and monitoring of emission control systems	Sections 6.3.1.1, 6.3.3 and 6.3.5.2
Emergency Planning and Community Right-to-Know Act, 42 USC Chapter 116	Requires reporting of releases of toxic materials to the environment if the facility manufactures, processes or otherwise uses more than specified quantities of toxics	Section 6.3.1.1

Table 6.3-1.a
Summary of Federal and California Air Quality LORS Applicable to the VV2 Project

Regulation[1]	Applicability	Where Addressed in AFC
State:		
California Health and Safety Code (H&SC) Section 41700	Prohibits discharges of quantities of air contaminants that cause injury, detriments, nuisance, or annoyance	Sections 6.3.1.2 and 6.3.1.3
California Code of Regulations (CCR) Title 17 Section 93115	Specifies emission standards for Stationary Compression Ignition Engines	Sections 6.3.1.2 and 6.3.3.3
1. Regulations dealing with air toxic emissions such as the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and California Air Toxic Control Measures (ATCM) are discussed in Section 6.11, Public Health		

New Source Review

The Federal CAA requires any new major stationary sources of air pollution, and any major modifications to existing major stationary sources, to obtain a construction permit before commencing construction. This process is known as New Source Review (NSR). NSR refers to the pre-construction review and permitting programs under CAA Title I, Parts C and D, that must be satisfied before new construction or major modifications can begin on major sources. The Prevention of Significant Deterioration (PSD) program (CAA Title I, Part C) is EPA's NSR permitting program for sources located in areas that attain the NAAQS (attainment areas) and in areas for which there is insufficient information to determine status (unclassified areas). Its counterpart, (CAA Title I, Part D), is for sources located in areas that do not attain the NAAQS (non-attainment areas), and is often called the non-attainment NSR (NNSR) program. EPA Region IX currently issues PSD permits to applicable sources within the MDAQMD, but the non-attainment NSR program is administered by the MDAQMD.

Prevention of Significant Deterioration

The PSD regulations, which can be found at Title 40 CFR, Section 52.21, apply to the construction of major sources in areas that are currently in attainment or unclassified for the NAAQS. A major source is defined as a facility with potential to emit equal to or greater than 250 tons per year (tpy) of any criteria pollutant. In addition, the rules provide a list of 28 major facility categories that are subject to the PSD provisions if they

have the potential to emit greater than 100 tons per year. The proposed VV2 facility is on the list of 28 major facility categories.

The PSD program is designed to prevent further significant deterioration of areas that are currently in attainment or unclassified. The PSD regulations accomplish this goal by imposition of Best Available Control Technology (BACT) and dispersion modeling analyses to ensure that allowable increments of degradation will not be exceeded.

As discussed later, the Project area attains the NAAQS for NO_x and CO, but does not attain the national standards for ozone or PM10. Total emissions for the Project will be greater than the 100-tons per year PSD major source threshold for NO_x and CO. Therefore, the PSD program major source requirements will apply to emissions of these two pollutants.

Title V

Title V of the CAA Amendments of 1990 requires a Federal Operating Permit for major sources of criteria pollutants and a compliance plan for meeting applicable regulatory requirements. Covered major sources must submit an annual compliance certification and must renew the Title V permit every five years. Requirements for State/locally administered Title V programs are outlined in 40 CFR Part 70. The MDAQMD maintains its own set of regulations (i.e., District Regulation XII) applicable to Federal Operating Permits. Emissions thresholds for Title V applicability vary depending on the attainment status of the area. A Title V permit contains all of the requirements specified in different air quality regulations that affect an individual facility or project. The VV2 Project will be subject to the Title V program and will be required to obtain a Title V permit from the MDAQMD in a timely manner.

Title IV

Title IV of the CAA Amendments of 1990 requires implementation of an acid rain permit program (42 USC §7651; 40 CFR Part 72). These regulations require reductions in emissions of sulfur dioxide and nitrogen oxides from subject facilities in order to reduce the adverse effects of acid deposition. Under this program, the VV2 Project must obtain emission allowances for SO_x emissions and meet monitoring requirements for NO_x. MDAQMD has been delegated by EPA to implement the Title IV program with EPA Region IX oversight. The requirements for this program are contained in MDAQMD Rule 1210.

New Source Performance Standards (NSPS)

The VV 2 Project is also subject to specific New Source Performance Standards (NSPS). Enforcement of the NSPS has been delegated to the MDAQMD.

NSPS are Federal standards promulgated for new and modified sources in designated categories codified in 40 CFR Part 60. NSPS are emission standards that are progressively tightened over time in order to achieve on-going air quality improvement without unreasonable economic disruption. The NSPS impose uniform requirements on new and modified sources throughout the nation. These standards are based on the best demonstrated technology (BDT) for emission control. BDT refers to the best system of continuous emissions reduction that has been demonstrated to work in a given industry, considering economic costs and other factors, such as energy use. In other words, a new source of air pollution must install the best control system currently in use within that industry.

The format of the standard can vary from source to source. It can be a numerical emission limit, a design standard, an equipment standard, or a work practice standard. Primary enforcement responsibility of the NSPS rests with EPA, but this authority can be delegated to the States or local air districts. States can adopt an NSPS or impose limitations of their own, as long as the State requirements are at least as stringent as the Federal requirements. The NSPS potentially applicable to the proposed VV2 Project are summarized below.

Subpart A – General Provisions. – Any source subject to an applicable standard under 40 CFR Part 60 is also subject to the general provisions of Subpart A. Because the proposed Project is potentially subject to Subpart KKKK – NO_x Emission Limits for New Stationary Combustion Turbines, the requirements of Subpart A will also apply. The Project operator will comply with the applicable notifications, performance testing, recordkeeping and reporting outlined in Subpart A.

Subpart KKKK – NOx Emission Limits for New Stationary Combustion Turbines. The proposed combined-cycle hybrid power plant must comply with the requirements of NSPS Subparts KKKK.[1] MDAQMD emission limitations or BACT requirements are, however, more restrictive than the NSPS requirements, as is discussed in Section 6.3.3.

The NO_x standard for units firing natural gas, and rated at greater than 850 MMBtu/hr heat input, is 15 ppm at 15 percent O_2 (or 54 ng/J of useful output or 0.43 lb/MW-hr).

[1] With the promulgation of 40 CFR Part 60, Subpart KKKK in July 2006, requirements of Subparts GG and Da are superseded by this new regulation.

Compliance is determined on a 30-unit-operating-day rolling average, where "unit operating day," is defined as a 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted in the unit.

The SO_2 standard is 110 ng/J (or 0.9 lb/MW-hr) gross output. Operators can also comply with an alternative standard, limiting potential sulfur emissions to below 26 ng/J (0.06 lb/MMBtu) heat input. Fuel sulfur monitoring is required each unit operating day. However, options are available to reduce frequency or entirely avoid the necessity to monitor (e.g., representative sampling according to the schedule in Part 75, Appendix D or tariff sheet attesting that sulfur content is < 0.05 percent by weight).

At the 2 ppm level required by BACT, the VV2 Project NO_x emissions will meet the NSPS limit and CEMS will be used to ensure compliance. Pipeline quality natural gas will ensure compliance with the SO_2 standard.

Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE) – Owners and operators of emergency fire-water pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

Owners and operators of emergency stationary CI ICE that are not fire-water pumps and with a displacement of less than 30 liters per cylinder and a maximum engine power less than 2,237 kW must comply with the off-road emission standards specified in 40 CFR Part 89.112 and 40 CFR Part 89.113.

Owners and operators of emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must meet the following requirements: (1) reduce NO_x emissions by 90 percent or more, or limit the emissions of NO_x in the stationary CI ICE exhaust to 1.6 grams per kW-hr (1.2 grams per horsepower (hp)-hr); and (2) reduce particulate matter (PM) emissions by 60 percent or more, or limit the emissions of PM in the stationary CI ICE exhaust to 0.15 g/kW-hr (0.11 g/hp-hr).

If non-emergency use of the engines is restricted to less than 50 hours or as required by fire safety testing, then the above limits do not apply.

Compliance Assurance Monitoring (CAM) Rule

The CAM Rule (40 CFR Part 64) requires facilities to monitor the operation and maintenance of emissions control and report any control system malfunctions to the appropriate regulatory agency. If the emission control system is not working properly, the CAM Rule also requires action to correct the control system malfunction. The CAM

Rule applies to units that employ an active control device with uncontrolled potential to emit levels greater than applicable major source thresholds. Emission units governed by Title V operating permits that require continuous compliance determination methods are generally compliant with the CAM Rule.

The pollutant specific emission units (PSEU) at the VV2 Project include the combustion turbines controlled with Selective Catalytic Reduction (SCR) systems to control NO_x emissions and oxidation catalysts to control CO and VOC. However, these PSEUs are not subject to the CAM Rule because the NO_x emissions are subject to the Acid Rain program, the CO will be continuously monitored as required by a Title V permit, and the catalyst can be shown to be working by the CO continuous emissions monitoring system (CEMS). The dry low-NO_x burners employed by the auxiliary boiler and heater and the drift eliminator installed on the cooling tower are not considered to be "active" control devices, and hence these PSEUs are exempt from the CAM Rule.

Toxic Chemical Release Inventory Program

The Emergency Planning and Community Right-to-Know Act (EPCRA), through the Toxic Chemical Release Inventory (TRI) program, establishes reporting requirements for toxic releases to the environment if the facility: (1) produces more than 25,000 pounds of a listed chemical per year; (2) processes more than 25,000 pounds of a listed chemical per year; or (3) uses more than 10,000 pounds of a listed chemical per year. Electric utilities, in Standard Industrial Classification (SIC) Codes 4911, 4931, and 4939, that combust coal and/or oil for the purpose of generating electricity for distribution in commerce must report under this regulation. The VV2 Project falls under SIC Code 4911, which covers establishments engaged in the generation, transmission, and/or distribution of electric energy for sale. However, the Project will not combust coal and/or oil for the purpose of generating electricity for the distribution in commerce. The VV2 Project will use ammonia, a listed chemical, so it will need to report if it uses more than 10,000 pounds of ammonia in a year.

6.3.1.2 California Requirements

The California Air Resources Board (ARB) became part of the California Environmental Protection Agency (CalEPA) in 1991. The agency is responsible for ensuring implementation of the California Clean Air Act (CCAA), meeting California requirements of the Federal CAA, and establishing California ambient air quality standards (CAAQS). It is also responsible for setting vehicle emission standards and fuel specifications, and for regulating emissions from other sources such as consumer

products and certain types of mobile equipment (e.g., lawn and garden equipment, industrial forklifts).

Title 17 CCR, Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, specifies operating requirements and exhaust emission standards for stationary compression ignition engines, including the requirement to comply with the off-road compression ignition engine emission standards specified in Title 13 CCR, Section 2423. These requirements apply to the emergency diesel generator and emergency firewater pump engines. Although this is an air toxic control measure, it contains emission standards for criteria pollutants as well as diesel particulate matter.

While not directly applicable, a recent ARB regulation, **Sulfur Content of Vehicular Diesel Fuel** – Title 13 CCR, Section 2281, requires that by September 2006, the sulfur content of vehicular diesel fuel sold or supplied in California must not exceed 15 ppm by weight. The VV2 Project will use this fuel in affected equipment and vehicles.

In most cases, California regulations that apply to stationary sources have been adopted as rules by the MDAQMD. For instance, California Health and Safety Code, Section 41700, requires that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or public property." This requirement has been adopted as MDAQMD Rule 402.

California Air Toxic Control Measures (ATCMs) and other regulations dealing with air toxics and diesel particulate matter are also discussed in Section 6.11, Public Health.

6.3.1.3 Local Requirements

The VV2 Project is subject to specific MDAQMD rules and regulations identified in Table 6.3-1.b. The MDAQMD rule that provides the permitting requirements specific to Electric Energy Generating Facilities (EEGF) such as the VV2 Project is Rule 1158. Further, there are several rules that do not apply to an EEGF that is subject to Rule 1158, including Rules 474, 475, 1159 and 1160. The various rules that implement Federal and California requirements for permitting, prohibitions, and source specific requirements in the MDAQMD that are applicable to the VV2 Project are described below.

Table 6.3-1.b
Summary of Local Air Quality LORS Applicable to the VV2 Project

Regulation[1]	Applicability	Where Addressed in AFC
Local:		
MDAQMD Regulation II – Permits R201 (Permit To Construct) R203 (Permit To Operate) R212 (Standards For Approving Permits) R213 (Permit Standards) R213.3 (Additional Standards For Permits To Construct And Operate) R217 (Provisions For Sampling And Testing Facilities) R218 (Stack Monitoring) R221 (Federal Operating Permit)	Defines the requirements for stationary sources to obtain permits	Sections 6.3.1.3, 6.3.1.4 and 6.3.1.5
MDAQMD Regulation III – Fees R301 (Permit Fees)	Identifies the required permit fees	Section 6.3.1.3
MDAQMD Regulation IV – Prohibitions R401 (Visible Emissions) R402 (Nuisance) R403 (Fugitive Dust) R403.2 (Fugitive Dust-Mojave) R404 (Particulate Matter Concentration) R406 (Specific Contaminants) R407 (Liquid and Gaseous Air Contaminants) R408 (Circumvention) R409 (Combustion Contaminants) R430 (Breakdown Provisions) R431 (Sulfur Content of Fuels)	Establishes activities and emissions that are prohibited	Sections 6.3.1.3, 6.3.3 and 6.3.4.1
MDAQMD Regulation IX – Standards of Performance for New Stationary Sources	Implements Federal new source performance standards	Sections 6.3.1.3, 6.3.3.1 and 6.3.3.3
MDAQMD Regulation XI – Source Specific Standards R1113 (Architectural Coatings) R1158 (Electric Utility Operations)	Provides emissions standards and other requirements that are applicable to the VV2 Project	Sections 6.3.1.3 and 6.3.1.5

Table 6.3-1.b
Summary of Local Air Quality LORS Applicable to the VV2 Project

Regulation[1]	Applicability	Where Addressed in AFC
MDAQMD Regulation XII – Federal Operating Permits – Principally: Rule 1200 (General); Rule 1202 (Applications); Rule 1203 (Federal Operating Permits); Rule 1210 (Acid Rain Provisions of Federal Operating Permits)	Implements the Federal Title V Operating Permits Program and the Title IV Acid Rain Program	Sections 6.3.1.3, 6.3.1.4 and 6.3.1.5
MDAQMD Regulation XIII – New Source Review – Principally: R1303 (Requirements) R1304 (Emissions Calculations) R1305 (Emissions Offsets) R1306 (Electric Energy Generating Facilities)	Provides the requirements for major sources of air pollution	Sections 6.3.1.3 and 6.3.3
1. Regulations dealing with air toxic emissions such as Regulation X, Rule 1320 and Rule 1520 are discussed in Section 6.11, Public Health.		

Regulation II – Permits

Rule 201 – Permit to Construct: Rule 201 applies to all sources which may cause the issuance of air contaminants or the use of which may eliminate, reduce or control the issuance of air contaminants and requires a permit prior to construction.

Rule 203 – Permit to Operate: Rule 203 requires that a permit be obtained for the operation of any device which may cause the issuance of air contaminants or the use of which may reduce or control the issuance of these contaminants.

Rule 212 – Standards for Approving Permits: A permit to construct or permit to operate shall be denied unless the applicant shows that the equipment, the use of which may cause the issuance of air contaminants, or the use of which may eliminate, reduce or control the issuance of air contaminants, is so designed, controlled, or equipped with such air pollution equipment that it may be expected to operate without emitting air contaminants in violation of Sections 41700 or 41701 of the California Health and Safety code or of MDAQMD rules.

Rule 213 – Standards for Permits to Construct – Air Quality Impact: This section of Rule 213 requires that a new or modified facilities generating emissions in excess of 250 pounds per day (lb/day) of NO_x, volatile organic compounds (VOC), or any other pollutant with an ambient air quality standard, with the exception of CO for which the limit is 2,500 lb/day, must incorporate BACT on all devices. This portion of this rule also requires that an Air Quality Impact Analysis (AQIA) be performed for air contaminants that exceed these same levels. Precursors of these pollutants must also be included in the analysis.

Rule 213.3 – Additional Standards For Permits To Construct & Operate: A permit to construct for any new or modified major stationary source shall be denied unless the owner or operator has certified in writing prior to the issuance of such permit that all major stationary sources owned or operated by such person (or by any entity controlling, controlled by, or under common control with such person) in California are in compliance, or are on a compliance schedule approved by the appropriate Federal, State or District officials, with all applicable emission limitations and standards which are part of the EPA approved State Implementation Plan, NSPS or NESHAP.

A permit to operate, for any new or modified major stationary source shall be denied unless the agency determines that construction of such new major stationary source would not interfere with the schedule for reasonable further progress set forth in the MDAQMD Implementation Plan.

Rule 217 – Provision For Sampling And Testing Facilities: The MDAQMD may require the applicant or permittee to provide and maintain such facilities as are necessary for sampling and testing.

Rule 218 – Stack Monitoring: This rule may require a facility to provide and maintain in calibration and in good working order a stack monitoring system to measure air contaminants when that facility installs, operates or uses any equipment which emits 900,000 kilograms (992 tons) per year of CO or 90,000 kilograms (99 tons) per year or more of any air contaminant except CO.

Rule 221 – Federal Operating Permit Requirement: This rule requires that any major source must obtain a Federal operating permit.

<u>Regulation III – Fees</u>

Rule 301 – Permit Fees: The rules in this regulation require that facilities pay applicable permit and other associated fees to the district, as defined by the rules in Regulation III.

Regulation IV – Prohibitions

Rule 401 – Visible Emissions: This rule limits opacity of exhaust into the atmosphere darker than Ringelmann Number 1 (20 percent opacity) to no more than an aggregate of three minutes in any one hour.

Rule 402 – Nuisance: This rule prohibits the discharge of air contaminants that cause or have a natural tendency to cause injury, detriment, nuisance or annoyance to people and/or the public or damage to any business or property.

Rule 403 – Fugitive Dust: This rule specifies requirements for controlling fugitive dust from any transport, handling, construction or storage activity.

Rule 403.2 – Fugitive Dust Control for the Mojave Desert Planning Area: This rule specifies requirements for controlling fugitive dust from any construction activities.

Rule 404 – Particulate Matter – Concentration: This rule specifies emission standards for exhaust concentrations of particulate matter. This rule does not apply to steam generators or combustion turbines burning gaseous or liquid fuels.

Rule 406 – Specific Contaminants: This rule limits emissions of sulfur compounds (calculated as SO_2) to less than 500 ppm. This rule also contains limitations restricting emissions on other gases.

Rule 407 – Liquid and Gaseous Air Contaminants: This rule limits CO emissions to less than 2,000 ppm measured on a dry basis, averaged over a minimum of 15 consecutive minutes. The provisions of this subsection do not apply to emissions from internal combustion engines.

Rule 408 – Circumvention: This rule prohibits hidden or secondary rule violations.

Rule 409 – Combustion Contaminants: This rule prohibits the discharge into the atmosphere, from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12 percent of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 25 consecutive minutes.

Rule 430 – Breakdown Provisions: This rule requires the reporting of breakdowns and excess emissions.

Rule 431 – Sulfur Content of Fuels: This rule limits the sulfur compounds in fuel to 800 ppm calculated as hydrogen sulfide at standard conditions, or any fuel having a sulfur content in excess of 0.5 percent by weight.

Regulation IX – Standards for Performance For Stationary Sources

Rule 900 – Standards of Performance for New Stationary Sources: This rule is enacted to adopt by reference all the applicable provisions regarding standards of performance for new stationary sources as set forth in 40 CFR Part 60. This rule is applicable to any new, modified or reconstructed sources of air pollution as specified in any subpart of 40 CFR Part 60 and establishes requirements for general definitions, monitoring, records and administrative requirements. The VV2 power plant will be subject to the requirements of Subpart KKKK – NO_x Emission Limits for New Stationary Combustion Turbines and Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.[2]

Regulation XI – Source Specific Standards

Rule 1113 – Architectural Coatings: This rule is designed to limit VOC in architectural coatings. The VV2 Project will use only compliant coatings as needed for the construction and/or maintenance of the facility.

Rule 1158 – Electric Utility Operations: This rule limits NO_x emissions from electric power generating facilities. This rule applies to all existing electrical generating steam boilers, including any auxiliary boiler used in conjunction with an electrical generating steam boiler, combined-cycle turbine units and to replacement units that are located within the Federal ozone non-attainment area. Compliance with the emission limits is not required during boiler start-up or shut-down periods of up to one hour, nor during the thermal stabilization period for combined-cycle turbine units lasting up to two hours.

Regulation XII – Federal Operating Permits

Rule 1200 – General: The purpose of Regulation XII is to implement the operating permit requirements of Title V of the Federal Clean Air Act (42 USC §7661-7661f). This rule is also intended to comply with the requirements promulgated by the EPA and set forth in 40 CFR Part 70. The provisions of this regulation apply to:

- Any major facility; and
- Any major facility which is subject to a standard, limitation or other requirement under 42 USC §7411, Standards of Performance for New Stationary Sources (Federal CAA 111); or any facility subject to a regulation promulgated pursuant to that

[2] As Rule 900 was last amended in April 1999, it does not yet specifically list Subparts KKKK and IIII, which were promulgated in 2006.

section, published after July 21, 1992 that the EPA does not exempt from the requirements of Title V of the Federal CAA (42 USC §7661-7661f); and

- Any major facility which is subject to a standard or other requirement under 42 USC §7412, Hazardous Air Pollutants (Federal CAA 112); or any facility subject to a regulation promulgated pursuant to that section, published after July 21, 1992 that the EPA does not exempt from the requirements of Title V of the Federal CAA (42 USC §7661-7661f); and
- Any acid rain facility.

The VV2 Project is subject to the requirements under Regulation XII since it meets several of these criteria. Other rules in Regulation XII that directly apply to the VV2 Project include:

Rule 1202 – Applications: This rule requires that any facility that becomes subject to the provisions of this regulation submit an application for a Federal operating permit no later than 12 months after becoming subject to this regulation.

Rule 1203 – Federal Operating Permits: This rule describes the process the agency shall use to issue or modify a Federal operating permit. It specifies that the content of the 5-year permit will be all applicable requirements for the facility, including monitoring, recordkeeping and reporting requirements.

Rule 1210 – Acid Rain Provisions of Federal Operating Permits: This rule requires an affected facility to submit a complete Acid Rain permit application, including a compliance plan, in accordance with the deadlines specified. It then requires the facility to operate in accordance with the application. Monitoring, recordkeeping and reporting requirements are specified.

Regulation XIII – New Source Review

Rule 1300 – General: The purpose of this regulation is to ensure compliance with NSR and PSD requirements, and also to:

- Set forth the requirements for the preconstruction review of all new or modified facilities.
- Ensure that the construction or modification of facilities subject to this regulation do not interfere with the attainment and maintenance of ambient air quality standards.
- Ensure that there is no net increase in the emissions of any non-attainment air pollutants from new or modified major facilities which emit or have the potential to emit any non-attainment air pollutant in an amount greater than or equal to the amounts set forth in District Rule 1303(B)(1).

- Ensure that the construction or modification of facilities subject to this regulation comply with the preconstruction review requirements for Toxic Air Contaminants (TAC) set forth in District Rule 1320.

The provisions of this regulation apply to any new or modified facility or emissions unit which requires a permit pursuant to the provisions of District Regulation II.

Rule 1303 – Requirements: This rule sets forth requirements for BACT and emission offsets. The BACT thresholds that apply to a new major source include both unit specific and facility wide thresholds:

- Any new permit unit which emits, or has the potential to emit, 25 lb/day or more of any non-attainment air pollutant shall be equipped with BACT.
- Any new or modified facility which emits, or has the potential to emit, 25 tons per year or more of any non-attainment air pollutant shall be equipped with BACT for each new permit unit.

For purposes of determining applicability of BACT, potential to emit is defined by District Rule 1301 (UU) and simultaneous emission reductions cannot be used to reduce the potential to emit.

Because the VV2 Project has the potential to emit more than 25 tons per year of NO_x and VOC, which are precursors to ozone, and more than 25 tons per year of PM10, BACT is required for NO_x, VOC and PM10 emissions. Although SO_x is also a precursor to PM10, the VV2 facility-wide potential to emit for SO_x is less than 25 tons per year, and none of the emission units have the potential to emit 25 lb/day or more of SO_x. Therefore, MDAQMD Rule 1303(A) does not require BACT for SO_x.

This rule also requires that offsets be provided for any new or modified facility which emits, or has the potential to emit, a non-attainment air pollutant in an amount greater than or equal to the offset threshold amounts of 25 tons per year for NO_x, VOC, or SO_x, 15 tons per year for PM10, 100 tons per year of CO, 10 tons per year for hydrogen sulfide (H_2S), or 0.6 tons per year for lead. Since the MDAQMD is attainment for CO, H_2S and lead, these thresholds do not apply. Although SO_x is a precursor to PM10, the VV2 Project has a SO_x potential to emit below the 25 tons per year threshold. Therefore, the VV2 Project will be required to offset NO_x, VOC and PM10 emissions under this rule.

Rule 1304 – Emissions Calculations This rule provides the methods to calculate emissions changes from a new or modified facility.

Rule 1305 – Emissions Offsets: This rule provides the procedures and formulas to determine the eligibility of, calculate the amount of, and determine the use of offsets required pursuant to the provisions of District Rule 1303(B). Necessary offsets are

calculated based upon the nature of the facility or modification and the applicable offset ratios. New facilities must offset their potential to emit. Because the VV2 Project is in an ozone non-attainment area, the offset ratio specified for VOC and NO_x is 1.3 to 1, with an additional ratio if interpollutant trading is used. The offset ratio specified for PM10 is 1 to 1.

Rule 1306 – Electric Energy Generating Facilities (EEGF): This rule applies to all EEGF proposed to be constructed in the District and for which an Application for Certification (AFC) has been accepted by the CEC. It also places additional administrative requirements on projects needing approval by the CEC.

6.3.1.4 Involved Agencies and Local Contacts

Air quality permits for the VV2 Project must be obtained from the EPA (PSD permit) and from the MDAQMD (Determination of Compliance, Title V and Title IV). In addition, the ARB provides oversight and must be consulted regarding offsets from other Air Basins (MDAQMD Rule 1305(B)(5)) or when interpollutant trading is used (MDAQMD Rule 1305(B)(6)). Contacts for these agencies are provided in Table 6.3-2.

Table 6.3-2
Administering Agencies and Contact Information

Agency/Address	Contact/Telephone	Permits/Issue
U.S. EPA Region IX 75 Hawthorne Street San Francisco, CA 94105	Gerardo Rios, Chief Permits Office (415) 972-3974	PSD Permit issuance
MDAQMD 14306 Park Avenue Victorville, CA 92392	Alan DeSalvio Supervising Air Quality Engineer (760) 245-1661, ext. 6726	DOC, Title V and Title IV Permit issuance
California ARB P.O. Box 2815 Sacramento, CA 95812	Michael Tollstrup Project Assessment Branch (916) 322-6026	Oversight and consultation on interbasin, interpollutant offset trades

6.3.1.5 Required Permits and Permit Schedule

Table 6.3-3 lists the air quality related permits that are required for the VV2 Project. This table also provides the schedule for when applications for these permits are needed.

Table 6.3-3
Required Air Quality Permits and Permitting Schedule

Permit/Approval	Schedule
PSD Permit	An application for a PSD permit will be submitted to EPA Region IX at about the same time as the AFC is submitted. The CEC will request that the EPA act on the application within the timeframes of the CEC's AFC process, as encouraged by President Bush's Executive Order.
Determination of Compliance (DOC)	As specified in Rule 1158, EEGFs obtain a DOC rather than a permit to construct. An application will be submitted to the MDAQMD at about the same time as the AFC is submitted. The MDAQMD will work within the timeframes of the CEC's AFC process to issue the DOC.
Title V – Federal Operating Permit	The VV2 Project will be required to submit an application for a Title V permit no later than 12 months after commencing commercial operation.
Title IV – Acid Rain Permit	The VV2 Project is required to place a notification in a local newspaper and submit an application to the MDAQMD for an Acid Rain permit 24 months prior to commencing operation. MDAQMD generally incorporates the requirements of Title IV into the facility's Title V permit rather than issuing a separate permit.

6.3.2 Affected Environment

The VV2 Project site is located in the northernmost portion of the City of Victorville, bounded on the west by Helendale Road, on the south by Colusa Road and on the north by the City of Victorville boundary. The site is approximately one mile north of the Southern California Logistics Airport (SCLA), and is within the City-designated SCLA Specific Plan Area. The site is located in a part of California that has been designated as the Mojave Desert Air Basin (MDAB), and the Project is within the jurisdiction of the MDAQMD.

6.3.2.1 Regional Climate

The Project area is located in the Mojave Desert, at an elevation of approximately 2,800 feet above mean sea level (amsl). The local climate is influenced by regional topography, as well as by large scale synoptic weather patterns. Figure 6.3-1 shows the contours of the topography within 6 miles of the VV2 Project.

Weather patterns in the area are generally influenced by moderately intense anticyclonic circulation (e.g., associated with high pressure systems). During the summer, a large subtropical high pressure system off the coast of California keeps the Mojave Desert area

sunny and dry. However, the presence of a thermal low pressure area above the Mojave Desert promotes atmospheric transport from the Los Angeles Basin. During the winter months, the strength of the Pacific High pressure area wanes, and 20 to 30 frontal systems may pass through the area each year. Some of these frontal systems are sufficiently strong to produce rain in the area.

The most significant large-scale phenomena affecting air quality in the Project area are the transport winds from the south and the west. These winds are responsible for bringing ozone and other pollutants through the mountain passes from the Los Angeles Basin and the San Joaquin Valley. As will be discussed later in this section, pollutant transport into the MDAB is the primary reason for the periods of Federal and California ozone standard violations.

The nearest National Weather Service Class 1 weather station is at Daggett, California, about 30 miles northeast of Victorville. Climatological data from Daggett are characteristic of the environment around the Victorville site. A summary of temperature and precipitation data for Daggett is contained in Table 6.3-4. The area is characterized by very hot summer temperatures, with the mean maximum temperatures in July and August exceeding 100°F. Winter temperatures are more moderate, with mean maximum temperatures in the 60s, and lows in the 30s. Minimum temperatures below freezing (32°F) occur on an average of about 30 days per year.

6.3.2.2 Meteorological Data

For air quality impact analyses, hourly meteorological data are needed for modeling purposes. For Victorville, representative hourly surface meteorological data are available from the MDAQMD monitoring site in Victorville (Victorville-14306 Park Avenue), approximately 9 miles south of the Project site. Three years of data, for the years 2002-2004, are used in the impact analyses. Representative upper air data for the same time period were obtained from the Mercury/Desert Rock, Nevada, upper air sounding site (WMO ID 72387) (NCDC, 2006). A wind rose for the Victorville Park Avenue monitoring site for the period 2002-2004 is given in Figure 6.3-2. Quarterly wind roses and frequency distributions are provided in Appendix G.1.

The wind rose shows a very prominent southerly wind direction, with the wind blowing from the south or south-southwest about 30 percent of the time. This is a result of large scale circulation patterns as well as nighttime drainage winds from the San Bernardino Mountains to the south. The highest wind speeds at the monitoring site tend to be during summer afternoons. These high winds occur most frequently when the wind directions are from the south, south-southwest, and west. On an infrequent basis, usually in the fall

Table 6.3-4
Climatic Data For Daggett, California

Temperature (degrees Fahrenheit)									
Means				Extremes		Mean Number of Days			
						Maximum		Minimum	
Month	Daily Max.	Daily Min.	Monthly	Record High	Record Low	90° F & Above	32° F & Below	32° F & Below	0° F & Below
Jan	60.6	35.0	47.8	83	8	0	0	12	0
Feb	65.9	39.6	52.8	86	19	0	0	4	0
Mar	71.1	44.1	57.6	91	23	0	0	2	0
Apr	78.2	49.8	64.0	99	31	3	0	0	0
May	87.4	57.8	72.6	110	42	15	0	0	0
Jun	97.0	65.6	81.3	116	46	25	0	0	0
Jul	103.8	72.9	88.4	117	57	31	0	0	0
Aug	101.5	71.6	86.6	113	55	30	0	0	0
Sep	94.9	64.6	79.8	111	48	24	0	0	0
Oct	82.9	53.9	68.4	100	25	7	0	0	0
Nov	69.2	42.7	55.9	88	21	0	0	3	0
Dec	60.8	35.4	48.1	83	17	0	0	10	0
Year	**81.1**	**52.8**	**66.9**	**117**	**8**	**135**	**0**	**31**	**0**

Precipitation Totals (inches)									
				Snow/Sleet			Mean # or Days		
Month	Mean	Highest Monthly	Highest Daily	Mean	Monthly Max.	Greatest Depth	0.10 or more	0.50 or more	1.0 or more
Jan	0.45	1.97	1.03	0.2	5.0	2.0	1	0	0
Feb	0.27	1.50	0.70	0	0.3		1	0	0
Mar	0.29	1.01	0.88	0			1	0	0
Apr	0.27	1.83	0.65	0			1	0	0
May	0.08	0.49	0.37	0			0	0	0
Jun	0.09	1.24	0.45	0			0	0	0
Jul	0.32	1.12	0.96	0			1	0	0
Aug	0.51	3.22	2.06	0			1	0	0
Sep	0.39	2.31	1.11	0			1	0	0
Oct	0.20	1.01	0.66	0			1	0	0
Nov	0.34	1.74	1.08	0.1	2.4	2.0	1	0	0
Dec	0.41	2.14	1.01	0.6	13.0	7.0	1	0	0
Year	**3.62**	**4.20**	**2.06**	**0.9**	**13.0**	**7.0**	**10**	**0**	**0**

and winter, Santa Ana wind conditions occur that produce high wind speed conditions from the north, north-northeast, and northeast wind direction.

Temperatures in the Project area can be very hot. Table 6.3-5 summarizes the maximum, minimum, and average temperatures by quarter and annually at the Victorville Park Avenue monitoring site for 2002-2004.

Table 6.3-5
Victorville Park Avenue Monitoring Site Temperature Summary, 2002-2004

Month	Temperature (Degrees Fahrenheit)		
	Maximum	**Minimum**	**Average**
January	72.7	25.0	44.5
February	72.8	24.5	50.1
March	82.3	29.1	51.2
April	87.4	39.2	58.9
May	93.8	42.1	65.5
June	99.4	52.6	76.5
July	107.4	62.5	82.6
August	104.3	57.8	79.7
September	97.0	51.5	74.7
October	86.8	42.3	61.2
November	72.7	37.7	54.4
December	63.2	27.1	45.1
Annual	107.4	24.5	62.1
Source: Victorville Park Avenue Monitoring Site, 2002-2004. Calculated from 1-hour data obtained from Air Resources Board.			

6.3.2.3 Ambient Air Quality Data

Federal and California ambient air quality standards are shown in Table 6.3-6. As noted previously, the VV2 Project site is located in the MDAB and is under the jurisdiction of the MDAQMD. The attainment status of the Project area for the Federal and California air quality standards is summarized in Table 6.3-7.

The area around the Project site is classified as attainment or unclassified for the Federal and California standards for all pollutants except ozone, PM10 and PM2.5. The area is classified non-attainment for Federal and California ozone and PM10 standards and non-attainment for the California PM2.5 standard. Federal non-attainment classifications for

ozone and PM10 are differentiated by degree of severity. The area is classified as a moderate non-attainment area for both ozone and PM10.

Table 6.3-6
National and California Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	—	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (11/10/06)

Table 6.3-6
National and California Ambient Air Quality Standards (Continued)

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient a quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

8. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Table 6.3-7
Summary of Attainment Status of the Project Area

Pollutant	Attainment Status	
	Federal Standards	California Standards
Ozone	Non-attainment (Moderate) for the 8-Hour standard	Non-attainment
CO	Unclassified/Attainment	Attainment
NO_2	Unclassified/Attainment	Attainment
SO_2	Unclassified	Attainment
PM10	Non-attainment (Moderate)	Non-attainment
PM2.5	Attainment	Non-attainment
Pb	Attainment	Attainment

The MDAQMD operates several monitoring stations for the measurement of particulate and gaseous pollutants. The locations of these monitoring stations, the pollutants monitored, and the approximate distance from the VV2 Project site are summarized in Table 6.3-8.

Table 6.3-8
Monitoring Sites Near Victorville
in San Bernardino, Los Angeles, and Kern Counties

Monitoring Site	Pollutants Measured at Monitoring Station						Approx Distance from Project Site	County
	O_3	NO_2	SO_2	CO	PM 10	PM 2.5		
Victorville	X	X	X	X	X	X	9 miles	San Bernardino
Hesperia	X				X		17 miles	San Bernardino
Phelan	X						19 miles	San Bernardino
Barstow	X	X		X	X		26 miles	San Bernardino
Lancaster	X	X		X	X	X	43 miles	Los Angeles
Mojave	X	X			X	X	51 miles	Kern

The closest monitoring station to the VV2 Project is located at MDAQMD offices at 14306 Park Avenue in Victorville. This site is expected to provide data that are most representative of the Project site. Because it is more closely situated to populated areas and emission sources (e.g., the I-15 freeway) than the Project site, it is likely to provide conservative estimates of existing air quality (i.e., somewhat higher concentrations). Compared to Victorville, the Hesperia monitoring site, the next closest site, is located closer to Cajon Pass and is influenced more by transported emissions from the Los Angeles Basin.

Tables 6.3-9 through 6.3-14 provide summaries of air quality data and standard exceedances from the past three years (2003-2005)[3]. Data available from the California ARB web site are listed from all monitoring sites in the vicinity of the VV2 Project site in the order of their distance from the Project site.

The Victorville area is non-attainment for the California 1-hour and 8-hour and national 8-hour ozone standards. This non-attainment status is reflected in the ambient monitoring data presented in Table 6.3-9. The VV2 Project will be a source of ozone precursor pollutant emissions.

Table 6.3-10 provides PM10 data in the region. Although the Victorville area is classified as non-attainment for the national 24-hour PM10 standard, the only day that exceeded this standard during 2003 – 2005 was due to a fire in October 2003 when particulates were abnormally high. While there has been a decrease in the number of days over the State standard from 2003 to 2005, three of the five sites listed exceeded the California 24-hour PM10 standard in 2005. The nearest monitor to the VV2 Project site, the station in Victorville, exceeded the California 24-hour standard on only one day in 2005 and 2004 and five days in 2003. The annual PM10 California standard was exceeded at Victorville and other sites in all three years.

October 2003 was a period of intense wildfire activity in Southern California in which hundreds of thousands of acres were burned in the mountains south of Victorville, releasing large amounts of particulate into the air. The highest 24-hour PM10 concentrations in 2003 at the Victorville and Hesperia sites, 181 $\mu g/m^3$ and 129 $\mu g/m^3$ respectively, occurred on the same day (October 30) and were associated with forest fire activity. The Victorville value is flagged in EPA's database with an "E" qualifier code[4] indicating that this measurement was taken during a period of forest fires. Such values are inappropriate for use in determining compliance with air quality standards. Table

[3] Data found on the ARB web site at http://www.arb.ca.gov/adam/welcome.html.
[4] http://www.epa.gov/ttn/airs/airsaqs/manuals/qualifiers.htm

6.3-10 therefore lists the Victorville and Hesperia monitoring sites' 2nd highest measured 24-hour concentrations in 2003, 66 µg/m^3 and 60 µg/m^3, respectively.

Monitoring data for PM2.5, CO, NO_2, and SO_2 (Tables 6.3-11 through 6.3-14) are below the applicable California and national standards and are consistent with the attainment status for these pollutants. Of these four pollutants, only PM2.5 approaches the applicable standards while the other three pollutants are well below.

Table 6.3-9
Ozone Data for Sites Near Victorville

Site	# Days > 1-Hr CAAQS	Highest 1-Hr Obs ppm	# Days > 8-hr NAAQS	Highest 8-Hr Obs ppm
Calendar Year 2005				
Victorville	16	0.131	12	0.107
Hesperia	41	0.140	34	0.120
Phelan	34	0.145	28	0.123
Barstow	3	0.099	4	0.092
Lancaster	42	0.127	31	0.103
Mojave	8	0.113	9	0.096
Calendar Year 2004				
Victorville	8	0.111	4	0.090
Hesperia	28	0.138	21	0.119
Phelan	32	0.117	22	0.104
Barstow	2	0.100	0	0.083
Lancaster	37	0.121	24	0.101
Mojave	8	0.121	3	0.090
Calendar Year 2003				
Victorville	22	0.145	19	0.126
Hesperia	43	0.163	34	0.130
Phelan	44	0.138	31	0.127
Barstow	8	0.105	11	0.095
Lancaster	50	0.156	33	0.120
Mojave	31	0.119	27	0.103

Table 6.3-10
PM10 Data for Sites Near Victorville

Site	# Days > 24-Hr NAAQS	# Days > 24-Hr CAAQS	Annual Average	Highest 24-Hr Average, µg/m^3
Calendar Year 2005				
Victorville [1]	0	1	28.9	61.0
Hesperia [1]	0	1	29.0	58.0
Barstow [1]	0	3	25.5	78.0
Lancaster [2]	0	0	ND [3]	47.0
Mojave [2]	0	0	ND [3]	39.0
Calendar Year 2004				
Victorville	0	1	28.5	56.0
Hesperia	0	0	28.8	50.0
Barstow	0	0	22.2	41.0
Lancaster	0	0	12.4	33.0
Mojave	0	0	19.8	38.0
Calendar Year 2003				
Victorville	1 [6]	5	14.6 [4]	66.0 [6]
Hesperia	0	3	30.5 [5]	60.0 [6]
Barstow	0	5	30.6	72.0
Lancaster	0	1	23.2	54.0
Mojave	0	2	19.3	93.0

[1] Values for Victorville, Hesperia, and Barstow obtained from MDAQMD yearly summary, dated 02/2006.

[2] Values for Lancaster and Mojave obtained from California ARB Website.

[3] ND – Insufficient data to determine valid value so value not reported on the California ARB Website.

[4] Annual average value reported is from California ARB Website due to the inclusion of non-representative yearly 1st highest 24-hour concentration in MDAQMD-computed annual average (see footnote 6).

[5] California ARB and MDAQMD annual average values were computed using a non-representative yearly 1st high concentration produced by a forest fire and therefore the published ARB and MDAQMD annual average values are not representative.

[6] Victorville and Hesperia 24-hr PM10 values listed for 2003 are the 2nd highest measured concentrations. The 1st highest concentrations measured in 2003, 181 µg/m3 and 129 µg/m3 respectively, were associated with abnormally high airborne particulate levels produced by forest fires in late October 2003 and therefore are inappropriate for establishing existing background conditions for the VV2 Project area.

Table 6.3-11
PM2.5 Data for Sites Near Victorville

Site	# Days > 24-Hr NAAQS	Annual Average	Highest 24-Hr Average
Calendar Year 2005			
Victorville [1]	0	9.4	27.0
Lancaster [1]	0	8.9	28.0
Mojave [1]	0	ND [2]	18.1
Calendar Year 2004			
Victorville	0	10.8	34.0
Lancaster	0	8.5	18.0
Mojave	0	ND	17.8
Calendar Year 2003			
Victorville	0	11.4	28.0
Lancaster	0	9.4	25.0
Mojave	0	ND	17.8

[1] All values obtained from California ARB Website.
[2] ND – Insufficient data to determine valid value so value not reported by the ARB.

Table 6.3-12
CO Data for Sites Near Victorville

Site	Highest 1-Hr Obs, ppm	Highest 8-Hr Obs, ppm	# Days > 1- or 8-Hr NAAQS	# Days > 1- or 8-Hr CAAQS
Calendar Year 2005				
Victorville	2.5	1.63	0	0
Barstow	3.3	1.34	0	0
Lancaster	2.9	1.54	0	0
Calendar Year 2004				
Victorville	2.4	1.70	0	0
Barstow	1.6	1.18	0	0
Lancaster	2.9	1.72	0	0
Calendar Year 2003				
Victorville	3.9	2.09	0	0
Barstow	2.7	1.51	0	0
Lancaster	3.2	1.88	0	0

Table 6.3-13
NO_2 Data for Sites Near Victorville

Site	Highest 1-Hr Obs ppm	# Days > 1-Hr CAAQS	Annual Average, ppm
Calendar Year 2005			
Victorville	0.077	0	0.019
Barstow	0.087	0	0.022
Lancaster	0.074	0	0.015
Mojave	0.044	0	ND [1]
Calendar Year 2004			
Victorville	0.080	0	0.021
Barstow	0.101	0	0.023
Lancaster	0.103	0	0.015
Mojave	0.064	0	0.008
Calendar Year 2003			
Victorville	0.090	0	0.022
Barstow	0.095	0	0.024
Lancaster	0.067	0	0.015
Mojave	0.073	0	0.009

[1] ND – Insufficient data to determine valid value so value not reported by the ARB

Table 6.3-14
SO_2 Data for Sites Near Victorville

Site	Highest 1-Hr Obs ppm	# Days > NAAQS	# Days > CAAQS	Annual Average ppm
Calendar Year 2005				
Victorville	0.003	0	0	0.001
Calendar Year 2004				
Victorville	0.003	0	0	0.001
Calendar Year 2003				
Victorville	0.006	0	0	0.001

6.3.3 Control Technology Assessment

MDAQMD Rule 1303(A) requires the use of BACT for:

- Any new permit unit that has the potential to emit 25 pounds per day or more of a non-attainment air pollutant or its precursors; or
- All permit units at a new facility that has the potential to emit 25 tons per year or more of a non-attainment pollutant or its precursors.

As discussed previously, the MDAQMD is designated as non-attainment for the NAAQS and CAAQS for ozone and PM10 and attainment for the NAAQS and CAAQS for CO, NO_2 and SO_2[5]. Because the proposed VV2 Project has the potential to emit more than 25 tons per year of NO_x and VOC, which are precursors to ozone and PM10, and more than 25 tons per year of PM10, BACT is required for NO_x, VOC and PM10 emissions. Although SO_x is also a precursor to PM10, the Project's potential to emit for SO_x is less than 25 tons per year, and none of the emission units have the potential to emit 25 pounds per day or more of SO_x. Therefore, MDAQMD Rule 1303(A) does not require BACT for SO_x. Nevertheless, the VV2 Project will implement BACT for SO_x for the combustion turbines, which is the exclusive use of pipeline quality natural gas.

MDAQMD Rule 1301(K) defines BACT for a new major facility as:

> "(a) The most stringent emission limit or control technique which has been achieved in practice, for such permit unit class or category of source; or
>
> (b) Any other emission limitation or control technique, and/or different fuel demonstrated in practice to be technologically feasible and cost-effective by the APCO or by CARB."

This definition of BACT is similar to the definition of Lowest Achievable Emission Rate (LAER) under the Federal non-attainment NSR regulations. In the following discussion of control technology assessment, BACT as required by MDAQMD rules is referred to as LAER to avoid confusion with the Federal requirement for the use of BACT (which is less stringent than LAER) for attainment pollutants under the PSD regulations.

The Federal PSD regulations require BACT for a new major facility that emits attainment pollutants in amounts that exceed defined significant emission rates. The VV2 Project area is designated attainment for the NAAQS for CO, NO_2 and SO_2. Because LAER is required by MDAQMD Rule 1303(A) for NO_x emissions, BACT requirements under the

[5] The area is also classified attainment for PM2.5, and while this pollutant is not explicitly discussed in this section, it is assumed that control measures for the other pollutants will be sufficient to also reduce PM2.5.

PSD regulations will be more than adequately achieved for NO_x emissions. BACT is required for CO or SO_x if potential emissions exceed 100 tons per year or 40 tons per year, respectively. CO emissions exceed 100 tons per year, and BACT is therefore required. SO_x emissions are less than 40 tons per year, so BACT is not required under PSD for SO_x.

This control technology determination evaluates these five pollutants for each proposed emission unit. Several agencies, including the EPA, ARB and several air districts including the South Coast Air Quality Management District (SCAQMD) maintain data bases of control technology determinations. The SCAQMD has published BACT guidelines applicable to the types of equipment found at power generation facilities. While Victorville is within the MDAQMD, and thus outside SCAQMD jurisdiction, the SCAQMD guidelines were used as an additional resource for the determination of BACT/LAER emission levels for the proposed Project. SCAQMD no longer publishes "presumptive" BACT/LAER emission levels, but rather includes examples of recent BACT/LAER determinations as input to future case-by-case BACT/LAER decisions. This control technology evaluation for the VV2 Project includes a summary of previous BACT/LAER determinations from the SCAQMD's BACT Guidelines and EPA's RACT/BACT/LAER Clearinghouse (RBLC), as well as recent or pending decisions by the California Energy Commission.

EPA guidance recommends that control technology reviews be performed on a "top down" basis, that is, starting with the top level of control that has been demonstrated in practice on a similar emission source. If the top level of control is selected, no further analysis is required. The following BACT/LAER analysis follows the top-down methodology – however, the top level of control is proposed for each pollutant subject to control technology requirements.

6.3.3.1 Combustion Turbines and Heat Recovery Steam Generators

The proposed combustion turbines will operate in combined-cycle mode. In a combined cycle, hot exhaust from the combustion turbine generators is ducted through a waste heat recovery steam generator (HRSG), which may also be fired, to drive a steam turbine generator. The VV2 Project will supplement steam produced in the heat recovery steam generator with steam generation from a solar array. Since the combustion turbine and heat recovery steam generator are coupled together in a combined-cycle configuration, and exhaust through a single stack, they are considered to be one combustion train for purposes of the evaluation of BACT/LAER emissions control.

6.3.3.1.1 LAER for NO_x

Top-down Ranking of Achievable Control Levels

The most recent listings for combined-cycle combustion turbines in this size range provided in Part B of the SCAQMD BACT guidance include:

- Magnolia Power Project, Burbank, California – 2004; NO_x = 2 parts per million (ppm), 3-hr average
- Vernon City Power & Light, Vernon, California – 2004; NO_x = 2 ppm, 1-hr average

The Guidance also references several large combined-cycle projects operating in Massachusetts with NO_x limits of 2 ppm, including ANP Blackstone, IDC Bellingham and Sithe Mystic.

EPA's RBLC shows additional projects permitted in recent years at the 2 ppm NO_x emission rate, including:

- Duke Energy Arlington Valley Energy Facility, Maricopa County, Arizona – 2003
- Sacramento Municipal Utility District Cosumnes Plant, Sacramento County, California – 2003
- Salt River Project Santan Generating Station, Maricopa County, Arizona – 2003

The CEC shows additional projects approved or pending approval at the 2 ppm NO_x emission rate, including:

- Roseville Energy Park, Placer County, California – 2005
- El Centro Unit 3 Repower Project, Imperial County, California – 2007
- Blythe Energy Project II, Riverside County, California – 2005
- Los Esteros Critical Energy Facility, Phase II, Santa Clara County, California – 2006
- South Bay Replacement Project, San Diego County, California – pending

All of the combined-cycle combustion turbine projects listed above employ Selective Catalytic Reduction (SCR) for NO_x control. The basis for the emission rates for the two SCAQMD plants was LAER. See AFC Appendix G.2 for listings of RBLC entries and other projects in the previous four years for NO_x.

Ammonia Slip Associated with SCR

The emission of unreacted ammonia (NH_3), or "ammonia slip," is a necessary collateral emission impact of the operation of SCR, especially when NO_x is being controlled to

LAER levels. Ammonia is a potential contributor to formation of particulate matter in the atmosphere by reaction with gaseous nitric acid or sulfuric acid, although most such reactions are not ammonia-limited due the consistent presence of naturally occurring ammonia in the atmosphere. A trade-off exists between the minimization of NO_x and the minimization of ammonia slip when SCR is used to control NO_x. Even though NH_3 is not a BACT/LAER applicable criteria air pollutant, regulatory agencies routinely limit NH_3 slip emissions in new permits for combined-cycle facilities.

Information from recent permits in the SCAQMD BACT Guidelines provides the following limits for NH_3:

- Magnolia Power Project, Burbank, California; NH_3 = 5 ppm
- Vernon City Power & Light, Vernon, California; NH_3 = 5 ppm

Four facilities in Massachusetts are listed in the RBLC as being permitted at 2 ppm @ 15% O_2 for ammonia slip:

- ANP Blackstone Energy Company, Worcester, Massachusetts – 1999
- ANP Bellingham Energy Company, Norfolk, Massachusetts – 1999
- Cabot Power Corporation, Suffolk, Massachusetts – 2000
- Sithe Mystic Development, Suffolk, Massachusetts – 1999

None of these facilities, however, are equipped with duct burners. Duct burners add to the total stack emissions of NO_x from a combined-cycle system, and complicate the constant temperature window needed to optimize SCR performance in the heat recovery steam generator. Five ppm is determined to be the lowest NH_3 slip level permitted for combined-cycle turbines with duct burners that seek to reduce NO_x to 2 ppm.

The CEC has approved or is pending approval of several projects at an NH_3 emission rate of 10 ppm, including:

- Roseville Energy Park, Placer County, California – 2005
- Blythe Energy Project II, Riverside County, California – 2005
- Los Esteros Critical Energy Facility, Phase II, Santa Clara County, California – 2006

The El Centro Unit 3 Repower Project, Imperial County, California has a 5 ppm NH_3 emission rate that was proposed by the applicant and is expected to be required by the local air pollution control agency. All these facilities will be equipped with duct burners.

Since ammonia is not a criteria air pollutant subject to BACT/LAER, and since the VV2 Project must minimize emissions of NO_x from both the combustion turbines and fired heat recovery steam generators, NH_3 emissions of up to 5 ppm are proposed for ammonia slip.

NO_x LAER Determination for Normal Operation

The VV2 Project proposes a BACT/LAER emission limit of 2.0 ppmvd (15% O_2) NO_x on a 1-hour averaging time using SCR, and an ammonia slip limit of 5 ppmvd (15% O_2) during steady-state, normal operating conditions. Normal operating conditions exclude periods of startup, shutdown and malfunction. The same aggressive limit is proposed when duct burners are also firing in the heat recovery steam generator.

NO_x LAER Determination for Startup and Shutdown

The use of SCR to control NO_x is not technically feasible when the surface of the SCR catalyst is outside of the manufacturer's recommended operating temperature range. Outside of these temperatures, NH_3 cannot be introduced to control NO_x, since the NH_3 will not react with the NO_x completely. Therefore, SCR cannot be used to control NO_x emissions during gas turbine startup or shutdown, when the SCR catalyst temperature is below the minimum operating temperature.

NO_x is emitted in diffusion flame mode in the turbine combustor during the first phases of startup, albeit at low fuel input rates. When turbine load reaches conditions that are predetermined by the turbine control system, the combustors switch to dry low-NO_x (lean pre-mix DLN) operation, and NO_x emissions are controlled with the DLN combustion system of the combustion turbine. Once conditions reach minimum temperature at which NH_3 injection can be initiated, normal operation of the SCR system is rapidly achieved.

The VV2 Project is proposing to permit a gas-fired auxiliary boiler and solar array that will be used to preheat the combined-cycle systems' steam seals and piping, as well as a novel heat recovery steam generator that is designed to enable faster startups. This technology is referred to by the manufacturer (GE) as their "Rapid Start Process" or RSP, and is expected to reduce the duration of startups compared with conventional combined-cycle units. By shortening the duration of startup times, the RSP technology may be capable of reducing total startup emissions on the order of 50 percent.

There are no other technically feasible control techniques to further reduce emissions of NO_x during startup and shutdown. Mass emission rate limits, in pounds per event, proposed during startup and shutdown and the specification of GE's RSP technology

therefore represent LAER for emissions of NO_x during the short-term startup and shutdown events. The following emission rate limits during these periods are proposed:

Hot/warm Startup: 40.0 lb/event per turbine

Cold Startup: 96 lb/event per turbine

Shutdown: 57 lb/event per turbine

6.3.3.1.2 BACT for CO

CO is formed as a result of incomplete combustion of fuel within the gas turbine generating systems.

Top-down Ranking of Achievable Control Levels

In the last four years, projects have been permitted for CO levels ranging from 2.0 to 4.0 ppm. For example, CO listed for similar combined-cycle turbines in the SCAQMD BACT Guidelines include:

- Magnolia Power, Burbank, California, 2004; CO = 2.0 ppm, 1-hr average
- Vernon City Power & Light, Vernon, California, 2004; CO = 2.0 ppm, 3-hr average

Many facilities are listed in the RBLC since 2002 with CO permit limits of 2 ppm @ 15% O_2. Among the most recent projects listed are:

- COB Energy Facility, Klamath, OR – 2003
- Sumas Energy 2 Generation Facility, Whatcom, WA – 2003

The CEC also has a pending approval at the 2 ppm CO emission rate for the South Bay Replacement Project, San Diego County, California.

Duct burners will emit additional CO, which will increase the uncontrolled emission levels entering the oxidation catalyst. Several recent projects, including the Duke Energy Arlington Valley Energy Facility, Maricopa County, AZ and Copper Mountain Power, Clark County, NV have CO permit limits of 3.0 ppm when duct firing and 2.0 ppm when not. A complete listing of RBLC projects, as well as others, is included in Appendix G.2.

CO BACT Determination for Normal Operation

The VV2 Project proposes CO BACT emission limits of 2.0 ppmvd (corrected to 15% O_2) over a one-hour averaging time without duct burners, and 3.0 ppmvd (corrected to 15% O_2) over a one-hour averaging time when duct burners are firing. These emission limits will be achieved with use of an oxidation catalyst.

CO BACT Determination for Startup and Shutdown

CO emissions during startup and shutdown are controlled to a lesser extent than during normal operation because the oxidation catalyst is below its normal operating temperature range. Similar to the emissions of other pollutants, the RSP technology may be capable of reducing total startup CO emissions on the order of 50 percent.

There are no other technically feasible control techniques to further reduce emissions of CO during startup and shutdown. The mass emission rate limits, in pounds per event, proposed to limit CO emissions during startup and shutdown therefore represent LAER, which goes beyond the BACT levels required for this Project.

The following CO emission rate limits during these periods are proposed:

Hot/warm Startup:	329.0 lb/event per turbine
Cold Startup:	410.0 lb/event per turbine
Shutdown:	337.0 lb/event per turbine

6.3.3.1.3 LAER for VOC

VOC is emitted from natural gas-fired turbines as a result of incomplete combustion of fuel and trace organics contained in pipeline-quality natural gas. The most stringent VOC control level for gas turbines has been achieved by those which employ catalytic oxidation, primarily for CO control. An oxidation catalyst designed to control CO can also provide a side benefit of controlling a portion of VOC emissions.

Top-down Ranking of Achievable VOC Control Levels

The lowest levels of VOC listed for similar combined-cycle turbines in the SCAQMD BACT Guidelines include:

- Magnolia Power, Burbank, California, 2004; VOC = 2.0 ppm, 1-hr average
- Vernon City Power & Light, Vernon, California, 2004; VOC = 2.0 ppm, 1-hr average

The lowest VOC emission rate listed in the RBLC is Chambers Energy/American National Power at 0.4 ppm @ 15% O_2. Ms. Ana Della Garza at the Texas Commission on Environmental Quality was contacted and she said that the limit in the permit was actually 0.7 ppm and had been posted incorrectly in the RBLC. She also said that a letter for postponement of construction was submitted by the permittee in 2002, and that the permit was voided in 2003. Therefore, the facility has not been constructed and the 0.7 ppm emission limit has not been achieved in practice.

The next lowest VOC permitted emission rate in the RBLC is 1.0 ppm @ 15% O_2. Facilities listed with this VOC permit limit include:

- Fairbault Energy Park / MN Municipal Power Agency, Rice, MN – 2004
- Mirant Gastonia Power Facility, Gaston, NC – 2002
- Liberty Generating Station, Union, NJ – 2002

The 1 ppm rate at these facilities is without duct firing. Duct burners themselves emit additional VOC, which can double the uncontrolled emission levels entering the oxidation catalyst. For instance, the Duke Energy Arlington Valley project has a VOC limit of 1.4 ppm.

The CEC has recently approved projects at emission rates ranging from 1 ppm to 2 ppm VOC. For instance, Blythe Energy Project II at 1 ppm, Roseville Energy Park at 2 ppm, and pending decisions for South Bay at 1.5 ppm and Los Esteros Critical Energy Facility, Phase II for 2 ppm. Listings in the last four years are provided in Appendix G.2.

VOC LAER Determination for Normal Operation

The VV2 Project proposes the same VOC emissions control technology as the other projects cited above, an oxidation catalyst achieving approximately 40 percent destruction of non-methane, non-ethane organic hydrocarbons as LAER for VOC. The gas turbines with oxidation catalyst will result in VOC concentrations on the order of 1.4 ppmvd at 15% O_2 when the duct burners are not in use. When duct burning is employed, the concentration of VOC emissions will not exceed 2.0 ppmvd at 15% O_2. Compliance with the VOC emission limit will be demonstrated through annual source testing. In addition, continuous CO monitoring will serve to demonstrate that the oxidation catalyst is operating properly.

VOC LAER Determination for Startup and Shutdown

VOC emissions during startup and shutdown are controlled to a lesser extent than during normal operation because the oxidation catalyst is below its normal operating temperature range. Similar to the emissions of other pollutants, the GE RSP technology may be capable of reducing total startup VOC emissions on the order of 50 percent. There are no other technically feasible control techniques to further reduce emissions of VOC during startup and shutdown. The mass emission rate limits, in pounds per event, proposed to limit VOC emissions during startup and shutdown therefore represent LAER.

The following emission rate limits during these periods are proposed:

Hot/warm Startup: 28.0 lb/event per turbine

Cold Startup: 31.0 lb/event per turbine

Shutdown: 29.0 lb/event per turbine

6.3.3.1.4 LAER for PM10

Particulate matter will be emitted by the combined-cycle generating systems due to sulfur, inert trace contaminants and mercaptans in pipeline quality natural gas, dust drawn in from the ambient air, particulate carbon and metals worn from the equipment while in operation, and hydrocarbons resulting from incomplete combustion.

Top-down Ranking of Achievable Control Levels

There have not been any add-on control systems developed for gas turbines between the promulgation of the first New Source Performance Standard for Stationary Turbines (40 CFR 60 Subpart GG, commencing with §60.330) in 1979 to the present. The cost of installing such a device has been and continues to be prohibitive and performance standards for particulate control of stationary gas turbines have not been proposed or promulgated by EPA. Efficient inlet filters are employed on all stationary combustion turbines to protect the rotating parts from damage due to the presence of grit, especially in an environment such as the high desert.

The lowest levels of PM10 emissions listed for similar combined-cycle turbines in the SCAQMD BACT Guidelines include:

- Magnolia Power, Burbank, California, 2004; PM10 = 0.01 gr/scf
- Vernon City Power & Light, Vernon, California, 2004; PM10 = 0.01 gr/scf

Both of these permits also use hourly emission limits to define LAER for PM10.

The RBLC generally cites the use of pipeline quality natural gas as BACT or LAER for PM10 from combined-cycle combustion turbines. The CEC has also indicated the use of pipeline quality natural gas as BACT for the Blythe Energy Project II and the Los Esteros Critical Energy Facility, Phase II, and has imposed hourly emission limits reflecting the capacity of the equipment.

PM10 LAER Determination for Normal Operation

The most stringent particulate matter control method for gas turbines is the use of low-ash fuels such as natural gas, and all known combined-cycle units employ inlet air filters. No add-on control technologies are listed in the EPA RBLC. Inlet air filtration,

combustion control and the use of low or zero-ash fuel (such as natural gas) are the only control methods listed for turbines with PM10 limits. The proposed hourly mass emissions limits of 13.6 lb/hr when the duct burners are off and 24.6 lb/hr when the duct burners are on, and the exclusive use of pipeline quality natural gas represent LAER for the proposed combined-cycle turbines.

PM10 LAER Determination for Startup and Shutdown

Since PM10 emissions result from impurities in the natural gas burned and do not depend on an emissions control system, the proposed LAER mass limits that govern normal operation also represent LAER for PM10 emissions during startup and shutdown.

6.3.3.1.5 BACT for SO_x

A formal BACT analysis is not required for SO_x emissions from the VV2 Project. SO_x emissions are formed exclusively through the oxidation of sulfur present in the fuel. The emission rate is a function of the sulfur content of the fuel, since virtually all fuel sulfur is converted to SO_x. The gas turbines will be fired exclusively with natural gas and will use the same gas that fuels the High Desert Power Project (HDPP). HDPP is required to maintain records of the sulfur content of the gas, and has demonstrated that the sulfur content has remained below 0.2 grains of sulfur per 100 dry standard cubic feet (gr/100 dscf) on an annual average basis. Therefore, this low sulfur content gas will be used for the VV2 Project as well.

Top-down Ranking of Achievable Control Levels

There have not been any add-on control systems for SO_x developed for gas turbines from the promulgation of the first New Source Performance Standard for Stationary Turbines (40 CFR 60 Subpart GG, commencing with §60.330) in 1979 to the present. The cost of installing such a device has been and continues to be prohibitive, and performance standards for SO_x control of stationary gas turbines have not been proposed or promulgated by EPA.

No limits for SO_x are listed for similar combined-cycle turbines in the SCAQMD BACT Guidelines other than monthly mass emission limits. The RBLC generally cites the use of pipeline quality natural gas as BACT for SO_x from combined-cycle combustion turbines.

The CEC has specified a sulfur content limit of 0.5 grains per 100 cubic feet of natural gas for the Blythe Energy Project II to limit SO_x emissions.

SO_x BACT Determination for Normal Operation

The most stringent SO_x control method for gas turbines is the use of near-zero-sulfur fuels such as pipeline quality natural gas. No alternative control technologies are listed in the EPA RBLC. The proposed exclusive use of pipeline quality natural gas with an annual average sulfur content of 0.2 gr/100 dscf, represents BACT for the proposed combined-cycle systems.

SO_x BACT Determination for Startup and Shutdown

Since SO_x emissions result from the oxidation of sulfur in the natural gas burned, the proposed mass limits that govern normal operation also represent BACT for emissions during startup and shutdown.

6.3.3.2 Auxiliary Boiler and HTF Heater

The VV2 Project will include a 35 MMBtu/hr auxiliary boiler and a 40 MMBtu/hr Heat Transfer Fluid (HTF) heater. Both will be fired by pipeline quality natural gas. The auxiliary boiler will operate a maximum of 500 hours per year, and the HTF heater will operate no more than 1,000 hours per year. The auxiliary boiler is primarily designed to shorten the duration of startups as part of GE's RSP technology; therefore, the boiler itself is control technology designed to minimize emissions during startup.

6.3.3.2.1 LAER for NO_x

NO_x is primarily formed within a natural gas combustion process in two ways: (1) the oxidation (within the high temperature environment of the flame) of elemental nitrogen contained in the combustion air (this is referred to as thermal NO_x); and (2) the oxidation of nitrogen contained in the fuel (referred to as fuel NO_x). The rate of formation of thermal NO_x is a function of residence time and free oxygen, and is exponential with peak flame temperature. For conventional boilers fired exclusively with natural gas, it is generally assumed that fuel NO_x formation is of a minimal magnitude.

In general, alternative approaches to minimizing NO_x emissions from a natural gas-fired unit are as follows:

- Combustion modifications / combustion-based control systems
- Flue gas treatment

Combustion-based ("front-end") control mechanisms available for reducing the formation of thermal NO_x emissions include: (1) reduction of local nitrogen concentrations at peak temperature, (2) reduction of local oxygen concentrations at peak temperature,

(3) reduction of residence time at peak temperature, and (4) reduction of peak temperature. Because it is quite difficult to reduce nitrogen levels, most front-end NO_x control techniques have focused on the other three mechanisms.

Available Control Technologies for NO_x

The primary front-end combustion controls for small scale natural gas combustion sources include low-NO_x burners (LNBs), flue gas recirculation (FGR), and reburn technology (which provides an additional level of staged combustion). All burner manufacturers now offer standard LNBs that limit NO_x formation to a range of approximately 0.035 to 0.05 pounds per million Btu heat input (lb/MMBtu) when firing natural gas. New state-of-the-art LNBs, commonly referred to as 9 ppm ultra low-NO_x "California" burners, can achieve NO_x emission rates in the range of what may be achieved through application of flue gas treatment (SCR). Candidate control technologies that were evaluated are summarized in the following sections.

Selective Catalytic Reduction: The key limitation relative to the technical feasibility of SCR for the proposed auxiliary boiler or HTF heater is that the temperature of the exhaust gas will be below the low end of the proper temperature range for the SCR catalyst. More specifically, it is expected that the temperature of the boiler or heater exhaust gas will be on the order of 350°F while the minimum temperature for effective NO_x reduction with SCR is approximately 600°F. Because the temperature of the exhaust gas exiting the units will be well below the low end of the proper SCR temperature range and the auxiliary units will operate only for a limited number of hours per year, and then primarily to shorten the duration of combined-cycle startups as part of an overall LAER control strategy, SCR has never been attempted or considered on any similar unit. It is doubtful that the proposed auxiliary units would even operate at steady-state conditions long enough to introduce NH_3 to an SCR system. This technology is therefore technically infeasible for application to the proposed auxiliary boiler or HTF heater.

Ultra Low-NO_x Burners with Internal Flue Gas Recirculation: Low-NO_x burners that incorporate internal flue gas recirculation are well established for application to industrial-sized package boilers and heaters. Commercially available ultra LNBs are now considered technically feasible, and are capable of limiting NO_x emissions to 9 ppm, which is considered to represent LAER in this type of application.

Reburn Technology: Reburn technology involves staging combustion through the combustion of fuel through a second elevation of burners, which limits the formation of thermal NO_x. Package boilers and heaters do not have the required vertical space or furnace volume for the addition of a second burner, and thus NO_x control through the use

of reburn technology is not considered to be technically feasible for a package boiler application.

Top-down Ranking of Achievable Control Levels

MDAQMD and EPA do not dictate a specific control technology that must be used to achieve established LAER emission rates, and encourage selection of the qualifying technology with the least adverse collateral impacts. For operation of natural gas-fired auxiliary units that will operate very few hours per year, and especially for units that are themselves emission control equipment, the best technology selection to achieve LAER is the 9 ppm ultra-low NO_x burner.

The most recent listings for gas-fired boilers in this size range provided in Part B of the SCAQMD BACT guidance include:

- Los Angeles County Internal Services, Los Angeles, California, 2004; NO_x = 9 ppm
- Clayton Industries, Chatsworth, California, 2002; NO_x = 9 ppm

Several natural gas-fired industrial boilers have also been permitted in Massachusetts with 9 ppm "California Burners" as BACT. The proposed auxiliary boiler will operate to reduce startup duration, and the boiler and heater will operate for very limited hours per year. No similar sources were identified in EPA's RBLC with NO_x emission limits less than 9 ppm.

NO_x LAER Determination for Normal Operation

The application of 9 ppm "California" ultra low NO_x burner technology with limited hours of operation and exclusive use of pipeline quality natural gas represents LAER for the proposed auxiliary boiler and HTF heater. The auxiliary boiler will be equipped with LNBs (9 ppm @ 3% O_2) and will have a NO_x emission rate of 0.011 lb/MMBtu. The HTF heater will also emit less than 0.011 lb/MMBtu of NO_x. The use of low NO_x burners and the emission limit of 0.011 lb/MMBtu represent LAER for the proposed auxiliary boiler and HTF heater.

6.3.3.2.2 BACT for CO

CO emissions in a natural gas burner result from incomplete combustion of organic compounds contained in the gas being burned. Three principal factors contribute to the failure to achieve completion of combustion: (1) insufficient air supply; (2) insufficient residence time; and (3) thermal quenching of the combustion products.

The minimization of CO emissions from a natural gas-fired unit is accomplished by combustion design, including furnace design and instrumentation, and operational techniques that ensure complete combustion. Effective design of the unit to achieve the lowest possible CO emissions involves the minimization of the three factors cited above. A major issue, however, in the design of an emissions control system is that there exists a tradeoff between NO_x emissions and CO emissions. The mechanisms by which NO_x emissions are minimized tend to result in an increase in the generation of CO emissions.

Fuels require a minimum level of air input to the combustion zone to allow for completion of combustion. Because of the dynamics of the combustion process and the chemical composition of both air and fuel, this minimum level is above the stoichiometric level (i.e., the level at which there is just sufficient oxygen for the elements of the fuel to burn). For natural gas burners, at least 20 percent excess air is typically needed for completion of combustion. The level of excess air is site-specific and can only be established by field tests of the unit. To complete combustion, therefore, the auxiliary boiler must be designed to provide more than 20 percent excess air. LNBs are intended, however, to operate at very low excess air levels (10 percent to 15 percent excess air). Therefore, the system must be designed to maintain excess air within these levels to keep an appropriate balance between control of NO_x and CO. Sufficient time must be provided for the mixing and combustion to take place. A residence time of at least 0.5 seconds in the upper section of the combustion zone is typically required to complete combustion. The system design must take into account both furnace volume and flow mechanics to provide at least this much time. Incomplete combustion can also occur due to the impingement of a flame onto a cold surface. This most often involves the impingement of the flame onto cold furnace walls. Premature quenching of the flame will release CO into the stack gases. The temperature of the gas stream is lowered sufficiently to freeze intermediate combustion products, including CO. The problems with flame impingement are acute with LNBs. Flame lengths with LNBs are longer due to the delayed mixing of air into the flames. It is necessary, therefore, to carefully size the burners to account for the added length of an LNB flame. The control technology alternatives that were considered include combustion control and oxidation catalyst.

Available Control Technologies for CO

Similar to SCR technology, oxidation catalyst technology is not technically feasible for application to small auxiliary package boilers or heaters, especially units that will operate relatively few hours per year, and then primarily as part of GE's RSP technology designed to minimize emissions from the combined-cycle systems during startup. Good combustion control, as achieved with state-of-the-art "California" burners, thus

represents the only technically feasible CO control technology applicable to the VV2 Project's proposed small auxiliary package boiler and HTF heater.

Top-down Ranking of Achievable Control Levels

The most recent listings for gas-fired boilers in this size range provided in Part B of the SCAQMD BACT guidance include:

- Los Angeles County Internal Services, Los Angeles, California, 2004; CO = 100 ppm
- Clayton Industries, Chatsworth, California, 2002; CO = 100 ppm

The proposed auxiliary boiler and HTF heater will each operate for a very limited number of hours per year. No similar sources were identified in EPA's RBLC with emission limits less than 100 ppm.

CO BACT Determination for Operation

The application of 100 ppm "California" ultra LNB technology with limited hours of operation and exclusive use of pipeline quality natural gas represents BACT for CO for the proposed auxiliary boiler and the HTF heater. CO emissions from the auxiliary boiler and HTF heater will be minimized by maintaining sufficient oxygen supply and residence time in the combustion chamber, thus allowing complete combustion of the natural gas fuel. Each unit will emit less than 0.074 lb/MMBtu of CO. BACT will be met through effective equipment design and good combustion practices.

6.3.3.2.3 LAER for VOC

The auxiliary boiler and the HTF heater will be limited to 0.005 lb/MMBtu of VOC at full load as part of the inherent design of the 9 ppm ultra-low NO_x burner design. Both units will burn only natural gas and will achieve BACT using good combustion practices during normal operation as well as during startup and shutdown.

6.3.3.2.4 LAER for PM10

PM10 emissions for both the auxiliary boiler and the HTF heater will be limited through the use of low sulfur pipeline quality natural gas. Neither will emit greater than 0.007 lb/MMBtu of PM10 at full load. LAER will be achieved by the exclusive use of low sulfur pipeline quality natural gas during normal operations.

6.3.3.2.5 BACT for SO_x

Both the auxiliary boiler and HTF heater will be fired by natural gas only. This represents the lowest emission level that can be achieved by this type of emission source. The SCAQMD BACT Guidelines do not contain limits for SO_x from natural gas-fired boilers. The pipeline gas is expected to contain no more than 0.2 grains of sulfur/100 dscf of natural gas for an emission rate of 0.0006 lb/MMBtu of SO_2. Use of pipeline quality natural gas is considered BACT for these emission sources.

6.3.3.3 Emergency Diesel Generator and Fire-Water Pump Engines

The VV2 Project will include an emergency diesel generator sized at approximately 2,000 kW and a diesel fire-water pump rated at approximately 135 kW. These emergency diesel engines will each operate for a maximum of 50 hours per year for testing (or as required by fire safety regulations).

New Source Performance Standards (40 CFR 60 Subpart IIII) were promulgated July 11, 2006 (71 FR 39154) by EPA for stationary diesel engines. The new MACT standard (40 CFR 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutant for Stationary Reciprocating Internal Combustion Engines) would not apply to the VV2 Project since the facility will not be a major source of HAP.

Title 17, CCR Section 93115, which is an air toxics control measure, requires new stationary emergency standby diesel-fueled engines to meet the following standards: $\leq$0.15 g PM/bhp-hr (0.20 g/kW-hr), compliance with the appropriate California off-road engine certification standards for hydrocarbons, NO_x and CO as the same model year and horsepower rating, as specified in 13 CCR Section 2423, and a limit of 50 hours/year for maintenance and testing. New stationary emergency standby engines that operate more than 50 hours/year are required to meet a PM emission limit of 0.01 g/bhp-hr (0.0134 g/kW-hr). Annual emissions from the emergency diesel generator and fire-water pump engines have been calculated based on 50 hours/year for maintenance and testing.

The California emission standards specified in 13 CCR Section 2423 and the PM emission limits specified in 17 CCR Section 93115 are at least as stringent as the Federal New Source Performance Standards in 40 CFR 60 Subpart IIII. Therefore, compliance with the California emission standards and limits constitutes LAER for the emergency diesel generator and fire-water pump engines.

6.3.3.3.1 LAER for NO_x

The emergency diesel generator engine will meet the California Tier 2 limit of 6.4 g/kW-hr of NO_x + NMHC for 2006-2010 model year diesel engines above 560 kW. The fire-water pump engine will meet the California Tier 3 limit of 4.0 g/kW-hr for NO_x + NMHC emissions for 2006-2010 model year diesel engines between 130 and 224 kW. Use of engines that comply with these emission limits plus an enforceable operating restriction of 50 hours per year for maintenance and testing constitutes LAER for NO_x emissions for both the emergency generator and the fire-water pump engines.

6.3.3.3.2 BACT for CO

The emergency diesel generator engine will meet the California Tier 2 limit of 3.5 g/kW-hr of CO for 2006-2010 model year diesel engines above 560 kW. The fire-water pump engine will meet the California Tier 3 limit of 3.5 g/kW-hr for CO emissions for 2006-2010 model year diesel engines between 130 and 224 kW. Use of engines that comply with these emission limits plus an enforceable operating restriction of 50 hours per year for maintenance and testing constitutes LAER for CO emissions for both the emergency generator and the fire-water pump engines.

6.3.3.3.3 LAER for VOC

The emergency diesel generator engine will meet the California Tier 2 limit of 6.4 g/kW-hr of NO_x + NMHC for 2006-2010 model year diesel engines above 560 kW. The fire-water pump engine will meet the California Tier 3 limit of 4.0 g/kW-hr for NO_x + NMHC emissions for 2006-2010 model year diesel engines between 130 and 224 kW. Use of engines that comply with these emission limits plus an enforceable operating restriction of 50 hours per year for maintenance and testing constitutes LAER for VOC emissions for both the emergency generator and the fire-water pump engines.

6.3.3.3.4 LAER for PM10

The California Tier 2 emission limit for the emergency generator engine and the Tier 3 emission limit for the fire-water pump engine are both 0.20 g/kW-hr. Therefore, compliance with an emission limit of 0.20 g/kW-hr plus an enforceable operating restriction of 50 hours per year for maintenance and testing constitutes BACT/LAER for PM10 emissions for both the emergency generator and the fire-water pump engine.

6.3.3.3.5 BACT for SO_x

Only low sulfur diesel fuel (0.0015 percent) will be burned in the emergency generator and fire-water pump engine. No add-on SO_2 controls are available for these sources. Therefore, use of low-sulfur fuel constitutes BACT for SO_2 emissions from these units.

6.3.3.4 Evaporative Mechanical Draft Cooling Tower

The VV2 Project will utilize reclaimed water from the nearby VVWRA wastewater treatment facility for steam turbine condenser cooling and will employ a ten cell evaporative (wet) cooling tower. Cooling towers emit trace amounts of solid particulate matter due to release of the dissolved solids (salts) in small droplets that escape the mist eliminator at the top of the tower, referred to as cooling tower drift. In theory, these small droplets may evaporate (rather than falling back to earth as liquid droplets), thus releasing dissolved salts as solid particulate matter. PM10 is the only pollutant of concern from wet cooling towers.

Section 5 of this AFC discusses alternatives for the VV2 Project, including the use of different cooling technologies such as “dry” cooling. The Alternatives section concludes that dry cooling is not economically feasible for the VV2 Project. Furthermore, other projects have demonstrated that additional emissions would be generated in order to make up the power lost due to the loads that occur in an air cooled plant.

LAER for PM10 from evaporative cooling towers is the use of high efficiency drift eliminators. No other control technology has been identified that could reduce emissions of PM10 from an evaporative cooling tower beyond levels that can be achieved with state-of-the-art drift eliminators. This technology represents LAER for control of PM10 from the proposed evaporative cooling tower.

The Project will install a ten-cell cooling tower with a circulation rate of approximately 123,000 gallons per minute. Drift eliminators will be used to restrict the drift rate to 0.0005 percent. Use of the drift eliminators and a drift rate of 0.0005 percent constitute LAER for PM10 emission from the proposed evaporative cooling tower.

6.3.3.5 Summary of BACT/LAER Emission Rates

A summary of the BACT/LAER emission rates proposed for the VV2 Project based on the above evaluation are provided in Table 6.3-15.

Table 6.3-15
Summary of BACT/LAER Emissions Rates for the VV2 Project

Source	NO_x	CO	VOC	PM10 & SO_x	
Combined-Cycle Units (Gas Turbines and HRSGs) [1]	2.0 ppm, 1-hr avg	3.0 ppm, 1-hr avg	2.0 ppm, 1-hr avg	Pipeline quality natural gas	
Auxiliary Boiler and HTF Heater	0.011 lb/MMBtu	0.074 lb/MMBtu	0.005 lb/MMBtu	0.007 lb/MMBtu	0.0006 lb/MMBtu
Emergency diesel generator	6.4 g/kW-hr NO_x +NMHC	3.5 g/kW-hr	6.4 g/kW-hr NO_x +NMHC	0.20 g/kW-hr	15 ppm fuel S
Emergency fire-water pump	4.0 g/kW-hr NO_x +NMHC	3.5 g/kW-hr	4.0 g/kW-hr NO_x +NMHC	0.20 g/kW-hr	15 ppm fuel S
Cooling Tower	n/a	n/a	n/a	0.0005% drift eliminator	n/a

[1] Emissions rates in ppm are by volume dry (vd) at 15% O_2. Compliance for NO_x and CO determined with CEMS, VOC with source tests.

6.3.4 Environmental Impacts

This Section provides a discussion of air quality impacts from criteria pollutant emissions from the VV2 Project. Section 6.11 provides a discussion of the impacts to public health from potential emissions of hazardous air pollutants.

6.3.4.1 Emissions

This section provides the criteria pollutant emissions calculated for the VV2 Project. Emissions have been estimated for the three phases of the Project: construction, commissioning, and operation, each of which is discussed below.

6.3.4.1.1 Construction

During the construction of the VV2 Project, there will be emissions similar to those associated with any large industrial construction project. On-site emissions will arise primarily from heavy duty vehicles and equipment. On-site fugitive dust emissions will also be generated during site preparation and during construction. Off-site emissions will occur from construction worker vehicles and material delivery trucks. The construction

related emissions are transient in nature and will cause some unavoidable but minor localized short-term impacts.

The VV2 Project will include construction of the combined-cycle facility, the solar array, the 1.5-mile reclaimed water supply pipeline, the 1.25-mile sanitary wastewater sewer line, the natural gas supply pipeline from the connection near the western boundary of the site, the backup water supply pipeline from the connection near the western boundary of the site, and the three segments of the Project's electric transmission line, totaling approximately 21 miles. The reclaimed water supply and sanitary waste sewer lines will be installed in the same trench for the portion of their respective routes (approximately ½ mile) that adjoin each other.

Construction of the combined-cycle facility and the solar array will require approximately 27 months and 24 months, respectively. Construction of the reclaimed water supply and sanitary sewer lines will require approximately nine months, and construction of the natural gas and backup water supply pipelines will require approximately two months. Transmission line construction will occur over a six-month period. Construction of Project elements will occur concurrently.

Table 6.3-16 summarizes maximum daily on-site and off-site emissions, and Table 6.3-17 summarizes maximum annual on-site emissions, during construction of the combined-cycle facility and solar array. Table 6.3-18 summarizes maximum daily emissions during construction of the reclaimed water supply and sanitary sewer lines, the natural gas and backup water supply lines, and each of the three transmission line segments. Details of the construction emission calculations are in Appendix G.3.

Table 6.3-16
Maximum Daily Combined-Cycle and Solar Array Facility Construction Emissions

Project Component	CO (lb/day)	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Combined-Cycle Facility, On-Site	268.5	22.1	112.1	0.1	53.1	16.6
Solar Array, On-Site	343.0	25.2	127.5	0.3	85.9	22.0
Combined-Cycle Facility, Off-Site	304.9	20.8	78.7	0.2	19.4	5.8
Solar Array, Off-Site	405.8	30.8	146.2	0.3	28.9	9.6

Table 6.3-17
Maximum Annual On-Site Combined-Cycle Facility and Solar Array Construction Emissions

Project Component	CO (tpy)	VOC (tpy)	NO_x (tpy)	SO_x (tpy)	PM10 (tpy)	PM2.5 (tpy)
Combined-Cycle Facility	33.9	2.6	13.0	<0.05	6.6	2.0
Solar Array	38.9	2.9	14.9	<0.05	7.4	2.2

Table 6.3-18
Maximum Daily Reclaimed Water, Sanitary Sewer, Natural Gas, Backup Water and Transmission Line Construction Emissions

Project Component	CO (lb/day)	VOC (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Reclaimed Water and Sanitary Sewer	94.8	12.0	55.4	0.1	11.4	4.6
Natural Gas and Backup Water	71.2	8.6	37.7	0.1	7.5	3.2
Transmission Line Segment 1	180.1	29.0	234.9	0.2	83.9	23.4
Transmission Line Segment 2	267.7	22.5	145.3	0.2	140.0	32.6
Transmission Line Segment 3	209.6	31.5	252.8	0.3	308.7	71.7

6.3.4.1.2 Commissioning Emissions

Following construction of the power plant and prior to commercial operation, the combustion turbines, steam turbine, emissions control equipment, heat recovery steam generators, and other plant equipment will be tested and tuned. Further, the heat recovery steam generators, steam piping, condensers, and other equipment handling steam and condensate will be cleaned of dirt, oil, mill scale and debris. This cleaning is usually accomplished with steam blows. According to EPA guidance (EPA, 1980), steam blows can be considered a construction activity.

All of these commissioning operations will require operation of the gas turbines at loads from 0 percent to 100 percent of full load. During much of this period, the emissions from the plant will be higher than the normal operating and startup emissions because the gas turbine burners may not yet be tuned for optimal emissions and the post-combustion emissions control equipment will not yet be in operation.

The emission levels during plant commissioning were estimated by considering the types of tests that would be conducted, gas turbine loads during the tests, and operability of the SCR and CO catalyst systems during the tests. Using this information combined with estimated part load emissions information for the gas turbines obtained from the gas turbine manufacturer, and known SCR and CO catalyst control efficiency, emissions for each test were estimated. Since the gas turbine combustors will not have been tuned prior to of the start of commissioning and SCR and CO catalyst will not be installed until after DLN tuning is complete, a factor was applied to the calculated emissions to account for additional gas turbine emissions above those predicted by the gas turbine manufacturer for normal tuned part-load operation. Since it is not possible to precisely predict the emissions of the gas turbines prior to tuning, and the load conditions required to facilitate tuning of the combustors, the emissions are only estimates. During commissioning, the gas turbines will normally be run intermittently, and initially, one turbine at a time.

Full Speed-No Load Test (No SCR in Operation)

These tests involve starting the gas turbines, ramping them up to design operating specs, and then holding them at that point while not generating electrical power output. This allows testing of the gas turbine ignition system, testing of the synchronizing system for the electric generator, and testing of the turbine over speed safety system. During this test, the heat input into the gas turbine will be approximately 25 percent of the maximum heat input rating. The initial HRSG boilout will be conducted simultaneously with this test in preparation for the steam blows.

Steam Blows (No SCR in Operation)

During this period, the gas turbines and heat recovery steam generators are operated to generate low pressure steam. This steam is released through vents at the ends of each of the branches in the steam piping in order to heat up the piping and create a high velocity motive force to dislodge and remove dirt, mill scale, oil, and other debris from the inside of the piping and the inside of the boiler components. These contaminants must be removed prior to admission of steam into the steam turbine to prevent damage to the steam turbine. The gas turbines will be operated at a load of 7.5 percent to 30 percent during this period, with a heat input of 35 to 40 percent of maximum heat input rating.

Full Load Tests (No SCR in Operation)

These tests will include further tests of the steam turbine, heat recovery steam generator and associated equipment. During these tests, the gas turbines will be started and ramped up to 100 percent output with 100 percent of its maximum heat input rating.

DLN Tuning Part Load Tests (No SCR in Operation)

These tests allow the gas turbine combustors to be tuned to minimize emissions, while also testing the heat recovery steam generator and steam turbine. During these tests the gas turbine will be started and ramped up to various load points from 7.5 percent to 100 percent in 5 MW intervals. The gas turbines will operate with a heat input of 25 percent to 100 percent of maximum heat input rating.

Full Load Tests (SCR Tuning)

These tests will include tuning of the ammonia injection system to minimize stack exhaust NO_x. During these tests, the gas turbines will be started and ramped up to 100 percent output with 100 percent of its maximum heat input rating.

Full and Peak Load Tests (SCR Operational)

These tests will include additional testing of the gas turbines, steam turbine, heat recovery steam generator and associated plant equipment. The duct burner system will also be tested to verify system operation at its full design capacity. During these tests, the gas turbine will be started and ramped up to 100 percent output with 100 percent of its maximum heat input rating. The duct burners will also be started and ramped to 100 percent of their maximum heat input rating. The SCR and CO catalyst systems are expected to be fully operational during these tests.

Worst Case Emissions

As discussed above, it is not possible to precisely predict the emissions of the gas turbines prior to tuning and to predict all the load conditions and hold points for the gas turbines during commissioning of the facility. Due to manufacturing tolerances of the gas turbines and other equipment and variances in plant design and manufacturer's equipment, each plant will operate a little differently until the plant can be fully tuned to attain stable and optimal operation. The gas turbines may need to be held at different load points in different plants to facilitate the tuning. Therefore, determining the maximum hourly emissions rates during commissioning is difficult. The maximum hourly emission rates for each combustion turbine/heat recovery steam generator unit could be as high as 242 lb/hour of NO_x and 1,337 lb/hour of CO during the steam blow, and 197 lb/hour of NO_x and 467 lb/hour of CO while operating with untuned combustors prior to installation of the SCR or CO catalyst systems. The power plant is not expected to be operated at these high emissions rates for sustained periods. However, operation at these high emission rates is possible and may be needed to allow tuning problems to be identified and corrected. Steps will be taken to minimize these short-term emissions.

Table 6.3-19 summarizes the anticipated emissions during the commissioning period. The commissioning period is complete when all plant equipment is operating as intended, all plant systems tuning/checkout is complete, CEMS certification is complete, and plant emissions testing is complete. The commissioning period is expected to be accomplished within 624 hours of first fire for each gas turbine.

Table 6.3-19
Estimated Emissions During Commissioning Period

Emissions	NO_x	CO	VOC
Maximum hourly per gas turbines during steam blows (lb/hr)	242	1,337	55
Maximum hourly per gas turbines during commissioning (lb/hr)	197	467	17
Total for two gas turbines (tons)	32	118	11

6.3.4.1.3 Normal Operation

Combustion Turbines and Duct Burners

Emissions from the VV2 Project combustion turbine units were based on process information provided by Bibb and Associates, Inc., emission guarantees from GE, and a review of source test data for PM10. Annual emissions were calculated for two scenarios: (1) continuous operation of both combustion turbines throughout the year (i.e., no startups, shutdowns or offline periods); and (2) annual operations that include the maximum anticipated number of startups and shutdowns, offline periods prior to each startup, and continuous operation for the rest of the year.

Emissions for continuous operation throughout the year were based on both combustion turbines operating at full load for 8,760 hours per year with 2,000 hours of duct burning at the annual average temperature of 77 °F.

Annual emissions accounting for startups, shutdowns, and offline periods prior to startups were based on:

- Hot Start and Warm Start - 80 minute startup duration with 260 hot/warm startups per unit per year (total of 346.7 hours per year for hot or warm starts). For each hot or warm start the turbines are assumed to be offline for an average of 6 hours prior to the startup (total of 1,560 hours per year offline prior to hot or warm starts).

- Cold Start - 110 minute startup duration with 50 cold startups per unit per year (total of 91.7 hours per year for cold starts). For each cold start, the turbines are assumed to be offline for an average of 48 hours (total of 2,400 hours per year offline prior to cold starts).
- Shutdown - 30 minute shutdown duration with 310 shutdowns per unit per year (total of 155 hours per year for shutdowns).
- Continuous Operation with Duct Burning - 2,000 hours per year.
- Continuous Operation without Duct Burning - 2,207 hours per year.

Emissions for both cases and the higher emissions for the two cases are summarized in Table 6.3-20. Maximum hourly emissions from the two turbines are shown in Table 6.3-21. As seen in the table, maximum emissions for NO_x, PM10 and SO_2 occur when there are continuous operations. This is generally always true for PM10 and SO_2 since emissions of those two pollutants are not higher during startup and shutdown than during normal operations. However, it is unusual that NO_x would not be higher when accounting for startup and shutdown events. The VV2 Project is unusual in this regard because of the GE Rapid Start Process option, which reduces the time needed in startup mode. CO and VOC emissions are greatest when startups and shutdowns are included even with the Rapid Start option since these emissions (especially CO) are so much greater during startup before the oxidation catalyst is fully functional. Details of the operation emission calculations for the turbines and duct burners are in Appendix G.4.

Table 6.3-20
Maximum Annual Emissions from Combustion Turbines

Operating Scenario	NO_x tpy	CO tpy	VOC tpy	PM10 tpy	SO_2 tpy
Continuous Operation all Year	107.4	74.3	29.3	117	8.3
Operation with Startup/Shutdown and Offline Periods	87.6	253	34.2	--	--
Maximum Annual Emissions[1]	**107.4**	**253**	**34.2**	**117**	**8.3**

[1] "Maximum Annual Emissions" is the largest total in either the first or section line of this table.

Table 6.3-21
Maximum Hourly Emissions from Two Combustion Turbines

Operating Mode	NO_x lb/hr	CO lb/hr	VOC lb/hr	PM10 lb/hr	SO_2 lb/hr
Full-Load Operation					
Without duct firing	23.1	15.3	6.1	24.0	1.9
With duct firing	29.2	26.7	10.9	36.0	2.4
Startup	105.0	494	42.0	--	--
Shutdown	228.0	1,348	116.0	--	--

Auxiliary Boiler and HTF Heater

The VV2 Project will include a natural gas-fired auxiliary boiler in order to facilitate rapid startup of the gas turbines. It will operate a maximum of 500 hours per year and will have a heat input of 35 MMBtu/hr. NO_x emissions are based on 9 ppmvd @ 3% O_2 and CO emissions are based on 100 ppmvd @ 3% O_2. SO_2 emissions are based on 0.2 grains of sulfur per 100 dscf of natural gas. PM10 and VOC emissions were calculated using emission factors from AP-42 Chapter 1 External Combustion Sources, Section 4 Natural Gas Combustion, Table 1.4-1 and Table 1.4-2 (7/98). Auxiliary boiler emissions are presented in Table 6.3-22**.** Details of the auxiliary boiler emission calculations are provided in Appendix G.4.

The HTF heater will operate a maximum of 1,000 hours per year and will have a heat input of 40 MMBtu/hr. NO_x emissions are based on 9 ppmvd @ 3% O_2 and CO emissions are based on 100 ppmvd @ 3% O_2. SO_2 emissions are based on 0.2 grains of sulfur per 100 dscf of natural gas. Remaining emissions were calculated using emission factors from AP-42 Chapter 1 External Combustion Sources, Section 4 Natural Gas Combustion, Table 1.4-1 and Table 1.4-2 (7/98). HTF heater emissions are presented in Table 6.3-23. Details of the HTF heater emission calculations are in Appendix G.4.

Table 6.3-22
Maximum Hourly and Annual Auxiliary Boiler Emissions

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	0.011	0.38	0.1
VOC	0.005	0.19	0.05
CO	0.074	2.59	0.65
SO_2	0.0006	0.02	0.01
PM10	0.007	0.26	0.06

Table 6.3-23
Maximum Hourly and Annual HTF Heater Emissions

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	0.011	0.44	0.22
VOC	0.005	0.22	0.11
CO	0.072	2.88	1.44
SO_2	0.0006	0.02	0.01
PM10	0.007	0.30	0.15

Emergency Diesel Generator and Fire-Water Pump Engine

The VV2 Project's emergency diesel generator will operate a maximum of 300 hours per year and will have an output of 2 MW. NO_x, VOC and CO emission factors were set equal to the California Tier 2 emission limits, with the assumption that 95 percent of the emission limit for NO_x + NMHC is NO_x. SO_2 emissions were calculated using a fuel sulfur content of 0.0015 percent. The PM10 emission factor was set equal to the 0.15 g/bhp-hr limit specified in 17 CCR Section 93115. Emergency diesel generator emissions are presented in Table 6.3-24**.**

The emergency diesel firewater pump engine will operate a maximum of 300 hours per year and will have an output of 182 hp. NO_x, VOC and CO emission factors were set equal to the California Tier 3 emission limits, with the assumption that 95 percent of the emission limit for NO_x + NMHC is NO_x. SO_2 emissions were calculated using a fuel sulfur content of 0.0015 percent. The PM10 emission factor was set equal to the 0.15

g/bhp-hr limit specified in 17 CCR Section 93115. Emergency diesel fire-water pump engine emissions are presented in Table 6.3-25**.**

Details of the emergency diesel generator and fire-water pump engine emission calculations are in Appendix G.4.

Table 6.3-24
Maximum Hourly and Annual Emergency Diesel Generator Emissions

Pollutant	Emission Factor (g/hp-hr)	Hourly Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	4.53	26.79	4.02
VOC	0.24	1.41	0.21
CO	2.61	15.42	2.31
SO_2	0.005	0.03	0.004
PM10	0.15	0.89	0.02

Table 6.3-25
Maximum Hourly and Annual
Emergency Diesel Fire-water Pump Emissions

Pollutant	Emission Factor (g/hp-hr)	Hourly Emission Rate (lb/hr)	Annual Emissions (tpy)
NO_x	2.83	1.14	0.17
VOC	0.15	0.06	0.01
CO	2.61	1.05	0.16
SO_2	0.005	0.002	0.0003
PM10	0.15	0.06	0.002

Cooling Tower

The VV2 Project will include a 10-cell cooling tower with drift eliminators. Total Suspended Particulate (TSP) was calculated based on the maximum water circulation rate and the amount of Total Dissolved Solids (TDS)/Total Suspended Solids (TSS) in the water. The reduction due to the drift eliminator was then applied. PM10 was calculated

from TSP by assuming 50 percent of TSP is PM10. Hourly and annual emissions are listed in Table 6.3-26. Details of the cooling tower emission calculations are in Appendix G.4.

Table 6.3-26
Maximum Hourly and Annual Cooling Tower PM10 Emissions

Parameter	Units	Value
Water Circulation Rate	gpm	130,000
Total Liquid Drift	%	0.0005
Expected TDS/TSS of Circulated Water	ppmw	5,000
PM10 Emissions	lb/hr	0.81
	tpy	3.6

Total Project Emissions Summary

Table 6.3-27 shows the annual potential to emit for the VV2 Project. The VV2 Project will be a major source of NO_x, CO, VOC, and PM10. For modeling purposes, PM2.5 was assumed to be equal to PM10 emissions for these sources.

Table 6.3-27
Total Annual Potential Emissions, Normal Operation

Source	NO_x tpy	CO tpy	VOC tpy	PM10 tpy	SO_2 tpy
Gas Turbines/HRSGs	107.4	252.7	34.2	117.1	8.3
Auxiliary Boiler	0.10	0.63	0.05	0.07	0.01
HTF Heater	0.22	1.44	0.11	0.15	0.01
Emergency Generator	4.02	2.31	0.21	0.02	0.004
Fire-Water Pump Engine	0.17	0.16	0.009	0.002	0.0003
Cooling Tower	--	--	--	3.6	--
Total	**111.9**	**257.3**	**34.6**	**120.9**	**8.3**

6.3.4.2 Air Quality Impact Assessment

Under the PSD program, sensitive areas such as national parks and wilderness areas over a certain size have been designated as Class I areas. As such, they receive additional protection of the air quality and air quality related values in these areas. All of the rest of the U.S. has been designated as Class II areas. The air quality impact assessment (AQIA)

for the VV2 Project has been divided into two parts: 1) the Class II area AQIA and 2) the Class I area AQIA. Further, the Class II area discussion covers three phases, construction, commissioning and operation.

6.3.4.2.1 Class II Area Impact Assessment

The detailed methodology for the Class II area AQIA is documented in the modeling protocol, "Class II Area Dispersion Modeling Protocol for the Proposed Victorville 2 Hybrid Power Project". A copy of this protocol was submitted to the CEC, EPA and MDAQMD on January 17, 2007. As of February 2007, no comments have been received on this protocol from these three agencies. The analyses were conducted in accordance with the EPA Guideline on Air Quality Models (GAQM; as incorporated in Appendix W of 40 CFR Part 51; EPA, 2005).

The AERMOD model (version 04300) was applied with a three-year sequential hourly meteorological data set, consistent with Appendix B of the CEC's Guidelines (2000). Three years (2002-2004) of wind speed, wind direction and temperature data from the nearby Victorville Park Avenue meteorological station were obtained from MDAQMD. The meteorological tower has an anemometer height of 16.9 meters. The tower data were supplemented with National Weather Service (NWS) data from General William J. Fox Field in Lancaster, CA to fill in missing data and to provide cloud cover and cloud ceiling height data also required for the modeling. Concurrent upper air data from Mercury Desert Rock Airport in Mercury, NV were also used as required for the dispersion modeling. Note that although 2005 meteorological data were available, this year was not used because of the poor data recovery of the upper air data at Mercury Desert Rock Airport during that year. As discussed in the Class II area modeling protocol, the surface and upper air data were processed with the AERMOD meteorological processor, AERMET (version 04300).

A comprehensive Cartesian receptor grid extending to approximately 20 km from the proposed combustion turbine stacks was used in the AERMOD modeling to assess maximum ground-level pollutant concentrations. The 20-km receptor grid was more than sufficient to resolve the maximum impacts and any significant impact area for PM10.

The Cartesian receptor grid consisted of the following receptor spacing:

- Fenceline to 3,000 meters at 100 meter increments
- Beyond 3,000 meters to 5,000 meters at 200 meter increments
- Beyond 5 kilometers to 10 kilometers at 500 meter increments
- Beyond 10 kilometers to 20 kilometers meters at 1,000 meter increments

Discrete receptors were placed approximately every 50 meters along the plant fenceline for increased resolution of impacts along this boundary. Figures that illustrate the receptors are provided in the modeling protocol. Terrain elevations from Digital Elevation Model (DEM) data acquired from USGS were processed with AERMAP (version 02107) to develop the receptor terrain elevations and corresponding hill height scale required by AERMOD. All of the DEM files were for UTM Zone 11 and are referenced to Datum NAD27. The DEM files are included on the modeling archive CD (Appendix G.5).

The background air quality concentrations used in the National Ambient Air Quality Standards (NAAQS)/California Ambient Air Quality Standards (CAAQS) analysis are given in Table 6.3-28. In all cases except for 24-hour PM2.5 and 1-hour SO_2, the maximum concentrations were monitored in 2003. The maximum 24-hour PM2.5 was monitored in 2004 and the maximum 1-hour SO_2 was monitored in 2005.

Table 6.3-28
Maximum Concentrations From 2003 – 2005

Pollutant	Averaging Period	Yearly Monitored Concentration (µg/m^3)		
		2003	2004	2005
NO_2	1-hour	169	150	145
	Annual	41	40	36
CO	1-hour	4,485	2,760	2,875
	8-hour	2,415	1,955	1,840
PM10	24-hour	66 [1]	49	49
	Annual	33	29	29
PM2.5 [2]	24-hour	25	33	20
	Annual	11	11	10
SO_2	1-hour	29	29	31
	3-hour	26	18	21
	24-hour	16	8	8
	Annual	5	3	3

[1] Note that the PM10 value listed for 2003 is the 2nd highest measured concentration. The highest concentration measured in 2003, 181 µg/m^3, was associated with abnormally high airborne particulate from a major forest fires in October 2003 and therefore was not representative for establishing existing background conditions for the Project area.

[2] Per the form of the PM2.5 standard, the background used will be the average of the 98th percentiles recorded over the 3 year period. The data given in the table is the 98th percentile for the given year. The average over 3 years is 26 µg/m^3.

AERMOD was applied with the EPA recommended default options. Model iterations were conducted for each year of meteorological data to identify the maximum impacts over all 3 years for the pertinent averaging periods.

Impacts from Project Construction

Construction of the VV2 Project is anticipated to take 27 months. Construction-related air emissions include exhaust and fugitive dust from vehicle and construction equipment, and windblown fugitive dust. All criteria pollutants were modeled to determine maximum air quality impacts. The maximum modeled concentrations were added to background concentrations and compared to the applicable standards.

Construction-related emissions were modeled using the AERMOD model (version 04300). Emissions of criteria pollutants for the construction sources were modeled as layered area sources. Buoyancy and mechanical turbulence from the hot exhaust and mobility of the construction equipment was included as an initial vertical dimension in the area source algorithm. Fugitive dust emissions and onsite motor vehicles were modeled as a single low-level area source since these emissions would almost all occur near ground level. Construction activities were assumed to occur for 10 hours beginning with hour 07 (7:00 am) and ending with hour 17 (5:00 pm) and were modeled using the HROFDY option in AERMOD. Emissions were assumed to occur evenly throughout the 10 hours of assumed construction activity each day.

For the emission source associated with the power block construction, an area polygon source with a total area of 60,429 m^2 was used. This area represents the size of the power block and was used to compute the emission flux for the power block area. For the construction sources associated with the solar array construction, a rectangular area source with an area of 100,694 m^2 was used. The modeled solar array area represents the largest area that will be under construction at a given time and the solar array construction emission flux is calculated based on this area. The power block sources were located over the proposed footprint for the power block equipment, while the solar array construction sources were placed just to the north of the power block to allow for potential interaction of plumes from both area sources. Each of these two locations, shown in Figure 6.3-3, had two overlaid area sources, one for the windblown fugitive and on-site vehicle emissions, and a second for the construction equipment with vertical exhaust pipes.

A release height of 2.0 meters was assumed for the fugitive/on-site vehicles sources, with an initial plume height of 15 feet (4.57 m). Following EPA guidance (EPA, 2004), the

initial area source vertical standard deviation for construction combustion emissions was estimated as the plume depth divided by 2.15, or 2.13 m.

The large construction equipment was assumed to have a release height of 3.7 m. The initial vertical depth of the diesel exhaust plume for construction activities was estimated as four times the release (exhaust) height. This height (14.8 m) takes into account the plume rise of the hot diesel exhaust, mechanical mixing on the site introduced by the movement of heavy equipment, and structure wake turbulence introduced by buildings and structures on the Project site. The initial area source vertical standard deviation for the construction equipment is calculated by taking this vertical depth and dividing by 2.15 for an initial sigma-z of 6.88 meters.

The emissions data used in the modeling were summarized in Section 6.3.4.1.

The construction modeling results are summarized in Table 6.3-29 for criteria pollutants. Ambient concentrations are summed with the maxima modeled over the 3-years for comparison to the NAAQS/CAAQS. Initially an assumption of the EPA national default conversion factor of 75 percent (EPA, 1997) was applied to the modeled 1-hour NO_x concentrations to estimate peak 1-hour NO_2 during commissioning. However, the use of the default conversion factor yielded results that were overly conservative. Further refinement of the modeled NO_2 concentrations was necessary and was performed using the ozone limiting method (OLM) option in AERMOD. Hourly background ozone concentrations for input to the AERMOD OLM modeling, concurrent with the three years of meteorological data used in the modeling, were obtained from the ARB for the Victorville Park Avenue monitoring station.

Concentrations of CO and SO_2 were found to be below the NAAQS/CAAQS, but concentrations of 1-hour NO_2, 24-hour and annual PM10, and 24-hour and annual PM2.5 were shown to exceed the standard. 1-hour NO_2 and 24-hour PM10 are over the standards without background, while annual PM10 and 24-hour and annual PM2.5 are only over the standards with the addition of the maximum background values.

Multiple hours were modeled to exceed the CAAQS 1-hour NO_2 concentration of 470 $\mu g/m^3$. The highest modeled value was found to be 817 $\mu g/m^3$ (without background). The area where Project impacts alone were over the standards extends about 700 meters to the south for NO_2. Upon investigation, all the maximum NO_2 construction impacts exceeding the CAAQS were found to occur during the first and second hour of construction (ending hours 07 am and 08 am) when low mechanical mixing heights and low wind speed are computed by AERMET and result in high modeled concentrations using AERMOD.

Table 6.3-29
NAAQS/CAAQS Analysis for Project Construction
(Prior to Application of Start Time Mitigation Strategy)

Pollutant	Averaging Period	Concentrations ($\mu g/m^3$)				
		AERMOD Result	Ambient Background [2]	Total [3]	CAAQS	NAAQS
NO_2 [1]	1-hr	817	169	986 [4]	470	--
	Annual	8	41	49	--	100
CO	1-hr	10,421	4,485	14,906	23,000	40,000
	8-hr	1,523	2,415	3,938	10,000	10,000
PM10	24-hr	106	66	172 [4]	50	150
	Annual	6	33	39 [4]	20	--
PM2.5	24-hr	25	26	51 [4]	--	35
	Annual	2	11	13 [4]	12	15
SO_2	1-hr	6	31	37	665	--
	3-hr	2	26	28	--	1,300
	24-hr	0.18	16	16	105	365
	Annual	0.01	5	5	--	80

[1] Modeled NO_2 concentrations as determined with the Ozone Limiting Method.

[2] From Table 6.3-28, and correspond to the highest monitored values at Victorville from 2003 – 2005, except for PM2.5, which is the 98th percentile value over three years.

[3] Modeled concentration plus ambient background.

[4] Exceeds the CAAQS and/or NAAQS. Mitigation composed of varying the construction start time by month is proposed.

Concentrations of CO and SO_2 were found to be below the NAAQS/CAAQS, but concentrations of 1-hour NO_2, 24-hour and annual PM10, and 24-hour and annual PM2.5 were shown to exceed the standard. 1-hour NO_2 and 24-hour PM10 are over the standards without background, while annual PM10 and 24-hour and annual PM2.5 are only over the standards with the addition of the maximum background values.

Multiple hours were modeled to exceed the CAAQS 1-hour NO_2 concentration of 470 $\mu g/m^3$. The highest modeled value was found to be 817 $\mu g/m^3$ (without background). The area where Project impacts alone were over the standards extends about 700 meters to the south for NO_2. Upon investigation, all the maximum NO_2 construction impacts exceeding the CAAQS were found to occur during the first and second hour of

construction (ending hours 07 am and 08 am) when low mechanical mixing heights and low wind speed are computed by AERMET and result in high modeled concentrations using AERMOD.

As mitigation of these high modeled NO_2 impacts, AERMOD was rerun to identify those months where morning and/or evening hours could potentially produce exceedances of the NO_2 CAAQS. For each of the three years modeled, an AERMOD "maxifile" was created that identified all hours in each year between the hours beginning 06 (6:00 am) and ending with hour 18 (6:00 pm) where the average hourly concentration (without background) exceeded 301 $\mu g/m^3$. This concentration, when added to the highest observed NO_2 concentration (i.e., the background concentration) produces a modeled impact equal to the 1-hour NO_2 CAAQS of 470 $\mu g/m^3$. Once the list of potential problem hours were identified, the hour-specific NO_2 concentration was added to each modeled value to produce an hour-specific modeled plus background concentration. These results were then examined to identify the start and end hour by month that would allow construction activities to occur without producing an exceedance of the CAAQS. It is anticipated that a mitigation measure will be developed to identify when construction can start without causing an exceedance of the 1-hour NO_2 CAAQS. An electronic copy of the files containing the NO_2 construction analysis is included in the modeling archive CD (Appendix G.5).

The high 24-hour average and annual average for PM10 also exceed the CAAQS but would not exceed the NAAQS if an adjusted 98th percentile background value was used. Additionally, the high 24-hour and annual averages for PM2.5 exceed the CAAQS/NAAQS when background is included largely because the background values nearly exceed the CAAQS/NAAQS themselves. As the site location is within a non-attainment area for PM10, mitigation strategies will be put into place during construction to minimize particulate impacts. In addition, the modeling results for PM10 and PM2.5 do not incorporate the start/stop-time analysis presented above for NO_2. It is expected that the same meteorological conditions leading to high early morning and evening NO_2 concentrations will also produce high PM10/PM2.5 concentrations. Thus, the NO_2 mitigation strategy of limiting hours of construction during the winter in order to reduce the NO_2 concentrations will also have a significant positive impact on reducing modeled particulate concentrations.

Impacts from Combustion Turbine Commissioning

Maximum short-term emissions of NO_x and CO during the initial tuning and testing of the combustion turbines at the end of construction of the VV2 Project will be higher than normal operations. As such, worst-case short-term commissioning conditions were

modeled with AERMOD for comparison to the CAAQS and NAAQS for 1-hour NO_2 and 1-hour and 8-hour CO. The stack parameters and emissions data used for this modeling are provided in Table 6.3-30. Note that the emission rates in this table correspond to steam blows, which will only occur for a short period, and hence this analysis is very conservative.

Table 6.3-30
Stack Parameters and Emissions Data for the Combustion Turbine Commissioning Modeling

Parameter		Value
Exit Temperature (^oF) [1]		173.5
Exit Velocity (ft/sec) [1]		31.76
Pollutant Emissions Per Combustion Turbine (lb/hr)	NO_x	242
	CO	1,337
[1] Based on 20 percent load.		

Although the commissioning of the VV2 Project will be conducted over loads varying from zero to 100 percent, stack parameters at loads less than 50 percent will be transient and highly variable. As indicated by manufacturer's data, the worst case emissions for NO_x would most likely occur at about 49 percent load when the combustors are switching pre-mix modes to add another stage of combustors. However, worst case CO emissions will occur at very low loads. Since GE only provides performance data for the turbines down to about 20 percent load, this load was used in the analysis.

The modeling was conducted for the 3-years of meteorological data and assumed simultaneous commissioning of both turbines. Similar to the construction analysis, use of the EPA default conversion factor of 75 percent yielded results that were overly conservative. Hourly ozone limiting was used to more accurately represent the conversion of NO_x to NO_2 for comparison to the California 1-hour NO_2 standard.

The commissioning modeling results are summarized in Table 6.3-31. Ambient background concentrations were summed with the maxima modeled over the 3-years to yield total concentrations for comparison to the NAAQS/CAAQS. All total concentrations from combustion turbine commissioning are below the NAAQS/CAAQS.

Table 6.3-31
Maximum Modeled Concentrations for Project Combustion Turbine Commissioning

Pollutant	Averaging Period	AERMOD Concentration ($\mu g/m^3$)			Overall Maximum ($\mu g/m^3$)	Total Modeled Plus Background	CAAQS/ NAAQS ($\mu g/m^3$)
		2002	2003	2004			
NO_2 [1]	1-hr	274.71	234.52	229.95	274.7	444	470
CO	1-hr	2,468	2,612	2,557	2,612	7,097	23,000 / 40,000
	8-hr	1,137	1,068	887	1,137	3,552	10,000 / 10,000

[1] Modeled NO_2 concentrations as determined with the Ozone Limiting Method.

Impacts From VV2 Project Operation

Air quality modeling during operation was conducted with AERMOD to demonstrate compliance with the NAAQS and CAAQS and PSD increments in the local (Class II) area. The VV2 Project includes the following air emission sources that were included in the modeling analysis:

- Two combined-cycle combustion turbines, each with heat recovery steam generators
- Auxiliary boiler
- Emergency generator engine
- Fire-water pump engine
- Heat transfer fluid heater
- Cooling tower

EPA has established Significant Impact Levels (SILs) for air quality impacts analyses. A SIL for a given pollutant and averaging period is defined as an ambient concentration produced by a source below which the source is assumed to have an insignificant impact. In accordance with standard modeling procedures for ambient air quality standards compliance analyses, if modeling of VV2 Project sources alone (proposed combustion turbines, cooling tower, and ancillary combustion equipment) indicates that the maximum modeled concentrations for a specific pollutant are below the SILs, no further analysis is required for that pollutant. If modeling indicates that the SIL for any pollutant/averaging period is exceeded, then a cumulative modeling study is required to determine the

combined impact of the Project sources plus other major nearby background sources for compliance with the NAAQS/CAAQS and PSD increments. The maximum concentrations determined through cumulative modeling are then summed with representative background concentrations to account for non-modeled source contributions for NAAQS compliance. These criteria for the impact analyses are shown in Table 6.3-32.

Table 6.3-32
Ambient Air Quality Impact Criteria (µg/m^3)

Pollutant	Averaging Period	PSD Class II Significant Impact Levels	PSD Class II Increments	CAAQS	NAAQS	
					Primary	Secondary
NO_2	1-hour	--	--	470	--	--
	Annual	1	25	--	100	100
CO	1-hour	2,000	--	23,000	40,000	--
	8-hour	500	--	10,000	10,000	--
PM10	24-hour	5	30	50	150	150
	Annual	1	17	20	--[1]	--
PM2.5	24-hour	--	--	--	150	150
	Annual	--	--	12	50	50
SO_2	1-hour	--	--	655	--	--
	3-hour	25	512	--	--	1,300
	24-hour	5	91	105	365	--
	Annual	1	20	--	80	--

[1] The annual PM10 NAAQS of 50 µg/m^3 was revoked by EPA on September 21st, 2006. Federal Register Vol. 71 Number 200 10/17/2006.

In addition to addressing air quality impacts associated with normal facility operations, modeling was conducted to assess the maximum air quality impacts during startup/shutdown and commissioning of the combustion turbines. Maximum air quality impacts associated with construction-related air emissions were also assessed for exhaust and fugitive dust from vehicle and construction equipment, and windblown fugitive dust.

AERMOD Application Methodology

Air quality modeling for NAAQS/CAAQS and PSD increment compliance during operation was conducted using the AERMOD model (version 04300). The stack

parameters and emission rates input to AERMOD for the combustion turbines for normal operations are summarized in Table 6.3-33. Turbine emission rates and flue gas characteristics were derived for a range of ambient temperatures for natural gas fuel for three operating load points (100 percent, 75 percent and 50 percent) that included variable operating factors such as duct firing, evaporative cooling and solar energy input (See Appendix G.4). For the dispersion modeling, a worst case composite of emissions and stack data were developed for each of the three load cases to add a measure of conservatism to the analysis. That is, for each load, the highest emission rate and lowest exhaust parameters were identified for the expected range of ambient temperatures and operational cases. Each load was modeled to determine the worst-case for each pollutant to define the turbine stack parameters and emission rates for all Project sources for modeling maximum short-term (≤24-hour) impacts. For modeling annual average impacts for the combustion turbines, stack parameters based on 100 percent load for the representative annual average temperature (77°F) were used as they are most representative of annual average operations.

Table 6.3-33
Stack Parameters and Emissions Data for the Combustion Turbines

Parameter		**Value**		
		Unit 1 (West)	**Unit 2 (East)**	
UTM Coordinate East (meters) [1]		466,040.77	466,080.94	
UTM Coordinate North (meters) [1]		3,832,160.30	3,832,159.92	
Stack Base Elevation (ft)		2,802	2,802	
Stack Height (ft)		145	145	
Stack Diameter (inches)		222	222	
		Load		
		100% [2]	**75%**	**50%**
Exit Temperature (°F)		174.5 / 174.6	180.1	171.8
Exit Velocity (ft/sec)		58.14 / 60.47	45.75	38.65
Pollutant Emissions Per Combustion Turbine (lb/hr)	NO_x	15.6 / 107.4	10.22	8.12
	CO	14.25 / 252.7	6.22	4.95
	PM10/PM2.5	18.0 / 117.1	12	12
	SO_2	1.204 / 8.28	0.788	0.626

[1] Coordinates for UTM Zone 11 referenced to Datum NAD27

[2] Representative data are provided for worst-case short-term and annual average conditions. Emissions listed are lb/hr and tpy.

The stack parameters and emissions data for the ancillary equipment are listed in Table 6.3-34. These stack parameters are based on operation of the ancillary equipment at 100 percent load.

Table 6.3-34
Stack Parameters and Emissions Data for the Ancillary Equipment

Parameter		Auxiliary Boiler	Emergency Generator	Fire-Water Pump	Heater	Cooling Tower [2]
UTM Coordinate East (m) [1]		466,142.21	466,078.50	466,112.98	466,134.72	466,180.70
UTM Coordinate North (m) [1]		3,832,087.48	3,832,041.01	3,832,164.05	3,832,196.84	3,832,142.62
Stack Base Elevation (ft)		2802	2802	2802	2802	2802
Stack Height (ft)		30	30	30	30	62.34
Stack Diameter (inches)		20.76	21.48	5.64	21	46.12
Exit Temperature (^oF)		300	761.7	761.7	300	98
Exit Velocity (ft/sec)		66.6	100	100	74.38	41.37
Pollutant Emissions (lb/hr / tpy)	NO_x	0.385 / 0.096	26.79 / 4.02	1.14 / 0.17	0.44 / 0.22	--
	CO	2.59 / 0.65	15.42 / 2.31	1.05 / 0.16	2.96 / 1.48	--
	PM10 / PM2.5	0.26 / 0.0649	0.89 / 0.02	0.06 / 0.002	0.297 / 0.148	0.81 / 3.56[3]
	SO_2	0.021 / 0.005	0.029 / 0.004	0.002 / 0.0003	0.023 / 0.012	--

[1] Coordinates for UTM Zone 11 referenced to Datum NAD27

[2] The cooling tower has 10 cells and each was modeled as a single stack. Coordinate provided for the center cell.

[3] Cooling tower emissions reflect the entire cooling tower (10 cells).

A Good Engineering Practice (GEP) stack height analysis was conducted to evaluate the potential for building downwash. Stacks with heights below GEP are considered to be subject to building downwash and require building dimensions to be input to AERMOD. The GEP stack height analysis was conducted using the EPA Building Profile Input Program (BPIP) (version 04274) that performs the GEP calculation for a multi-building complex on a stack-by-stack basis. The stack locations and buildings included in the GEP analysis are shown in Figure 6.3-4. A summary of the GEP analysis is provided in Table 6.3-35. The projected combustion turbine stack height of 145 feet (44 m) is less than GEP, but is more than sufficient to demonstrate compliance with air quality

standards as shown below. The stack heights of the ancillary equipment will also be less than their respective GEP formula heights and subject to building downwash. Therefore, building dimensions developed by BPIP for all stacks were input to the dispersion model. The BPIP input and output files are provided on the modeling archive in Appendix G.5.

Table 6.3-35
Summary of GEP Analysis

Emission Source	Stack Height (m)	Controlling Buildings or Structures	Building Height (m)	Projected Width (m)	GEP Formula Height (m)
HRSG Stack (West)	44.2	HRSG's #1 and #2	33.53	33.59	83.82
HRSG Stack (East)	44.2	HRSG's #1 and #2	33.53	33.71	83.82
Auxiliary Boiler	9.14	HRSG's #1 and #2	33.53	45.10	83.82
Fire-Water Pump Module	9.14	HRSG's #1 and #2	33.53	33.71	83.82
Gas-Fired HTF Heater	9.14	HRSG's #1 and #2	33.53	46.17	83.82
Emergency Generator	9.15	HRSG #1	33.53	25.36	71.56
Cooling Tower	19.0	HRSG's #1 and #2	33.53	33.59 and 36.13	83.82

Class II Impacts from Project Normal Operations

The modeling of normal VV2 Project operations using AERMOD was done as a multi-step process. First, the worst-case impacts for the combustion turbines (based on different load and temperatures) were identified. The detailed results for the combustion turbine load analysis are provided in Appendix G.5. The following worst-cases were identified for the pollutants and short-term averaging periods:

- 100% - CO (1-hr and 8hr), SO_2 (1-hr and 24-hr), NO_x (1 hr)
- 50% - SO_2 (3-hr), PM10 (24-hr)

As indicated, modeling of pollutants for annual averages was conducted with the annual average operating scenario for the turbines (100% load / 77°F ambient temperature).

In the next modeling step, the worst-case combustion turbine operating parameters and emissions were combined with normal operations of the facility ancillary sources. The

maximum air quality impacts due to emissions from the Project sources are summarized in Table 6.3-36. Table 6.3-36 lists the maximum modeled concentrations for all Project sources for each year of meteorology. The maxima over the three years modeled is noted and compared to the EPA SILs. Hourly ozone limiting was used to more accurately represent the conversion of NO_x to NO_2 for comparison to the California 1-hour NO_2 standard. As shown in Table 6.3-36, all maximum modeled pollutant concentrations are less than their respective SIL with the exception of 24-hour PM10; the maximum 24-hour PM10 result is 5.87 μg/m^3 versus the SIL of 5.0 μg/m^3. Therefore, no further modeling was required under EPA Guidelines for the other pollutants, but cumulative modeling is required for PM10 to demonstrate compliance with the NAAQS/CAAQS. Please note that a PSD Class II increment analysis is not required for PM10 since the area is classified as non-attainment for PM10.

Table 6.3-36
Maximum Modeled Concentrations for VV2 Project Normal Operations

Pollutant	Averaging Period	Maximum AERMOD Concentration (μg/m^3)			Overall Maximum (μg/m^3)	EPA SIL (μg/m^3)
		2002	2003	2004		
NO_2 [1]	1-hr	239.91	202.79	193.55	239.9	--
	Annual	0.31	0.30	0.31	0.3	1
CO	1-hr	215.74	215.82	212.14	215.8	2,000
	8-hr	30.99	29.59	31.88	31.9	500
PM10	24-hr	4.85	5.87	4.38	5.9	5
	Annual	0.30	0.29	0.29	0.3	1
SO_2	1-hr	1.49	1.53	1.45	1.5	--
	3-hr	0.62	0.59	0.57	0.7	25
	24-hr	0.27	0.30	0.26	0.3	5
	Annual	0.02	0.02	0.02	0.02	1

[1] Modeled NO_2 concentrations as determined with the Ozone Limiting Method.

Because the emergency generator and fire pump will not be operated for more than one-hour at a time it was assumed that these two sources will operated only from 8 am to 9 am in order to model the likely worst case meteorological conditions (morning stable layer).

The 24-hour PM10 significant impacts were very limited and only involved three receptors at the facility fence-line. In order to perform the cumulative analysis, a PM10 background source inventory was requested from the MDAQMD. Based on conversations with Mr. Alan DeSalvio of the MDAQMD (DeSalvio, 2006), the only nearby background source that is undergoing changes is the TXI Oro Grande cement facility, located approximately three miles SE of the VV2 Project site. Mr. DeSalvio confirmed that the TXI Oro Grande facility was undergoing a modernization and that air emissions for the modified facility will be less than or equal to current emissions. The existing monitoring data from Victorville are therefore sufficient to represent air impacts from this source, as well as other non-modeled sources, for the cumulative analysis.

The NAAQS/CAAQS analysis is summarized in Table 6.3-37. The Project maximum modeled concentrations for all pollutants are summed with ambient background concentrations for comparison to the air standards. Note that for pollutant impacts less than the SILs (all but 24-hour PM10), compliance is already demonstrated with the NAAQS. The modeled concentrations are summed with ambient concentrations for informational purposes. However, for pollutants with CAAQS and no SILs (i.e., 1-hour SO_2 and 1-hour NO_2), compliance with the CAAQS is based on the modeled concentrations plus ambient background concentrations.

As shown in Table 6.3-37, the total concentrations comprised of maximum modeled plus maximum background are below the NAAQS and CAAQS, with the exception of the 24-hour PM10 CAAQS. The PM10 total concentration is over the CAAQS because the monitored background concentration is much greater than the CAAQS. The peak modeled impacts for the VV2 Project (5.87 $\mu g/m^3$) is only about 12 percent of the CAAQS. Since the Project is being permitted in a non-attainment area for PM10, and will therefore be required to secure emission offsets that offset the emission increases associated with the Project, the Project will result in a net air quality benefit for PM10 in the region.

Table 6.3-37
NAAQS/CAAQS Analysis for Project Normal Operations

Pollutant	Averaging Period	Concentrations ($\mu g/m^3$)				
		AERMOD Result	Ambient Background [2]	Total [3]	CAAQS	NAAQS
NO_2 [1]	1-hr	239.9	169	409	470	--
	Annual	0.3	41	41.3	--	100
CO	1-hr	215.8	4,485	4,701	23,000	40,000
	8-hr	31.9	2,415	2,447	10,000	10,000
PM10	24-hr	5.9	66	72	50	150
	Annual	0.3	33	33.3	20	--[4]
PM2.5	24-hr	5.9 [5]	26	32	--	35
	Annual	0.3 [5]	11	11	12	15
SO_2	1-hr	1.5	31	32.5	665	--
	3-hr	0.6	26	26.6	--	1,300
	24-hr	0.3	16	16.3	105	365
	Annual	0.02	5	5	--	80

[1] Modeled NO_2 concentrations as determined with the Ozone Limiting Method.

[2] Highest value from Table 6.3-28.

[3] Modeled concentration plus ambient background.

[4] The annual PM10 NAAQS of 50 $\mu g/m^3$ was revoked by EPA on September 21st, 2006. Federal Register Vol. 71 Number 200 10/17/2006.

[5] PM2.5 Project maximum modeled concentration assumed equal to PM10 values.

Impacts from Combustion Turbine Start-up/Shutdown

During startup and shutdown of the combustion turbines, emissions of NO_x and CO will be higher than normal operations. As such, worst-case startup and shutdown conditions were modeled with AERMOD for comparison to the CAAQS and NAAQS for 1-hour NO_2 and 1-hour and 8-hour CO. The stack parameters and emissions data required for modeling short-term startup/shutdown are provided in Table 6.3-38. The stack exhaust parameters correspond to a 20 percent load, assumed to be representative of this operating mode.

Table 6.3-38
Stack Parameters and Emissions Data for the Combustion Turbines Start-up/Shutdown Modeling

Parameter		Value
Exit Temperature (^oF) [1]		173.5
Exit Velocity (ft/sec) [1]		31.76
Pollutant Emissions Per Combustion Turbine (lb/hr)	NO_x	64.8
	CO	344.1
[1] Based on 20% load.		

Worst case startup/shutdown emissions for modeling were derived from the emissions data in Appendix G.4. Cold starts, warm starts, hot starts and shutdowns were considered. Based on this analysis, the worst case or maximum emissions are associated with shutdown events. Because shutdowns only require 0.5 hr, maximum 1 hour emissions are conservatively based on 0.5 hour at the maximum normal emission rate plus 0.5 hour in the shutdown mode as shown below:

- Maximum NO_x emissions = 0.5 x 15.6 lb/hr + 0.5 x 114 lb/hr = 64.8 lb/hr per turbine
- Maximum CO emissions = 0.5 x 14.25 lb/hr + 0.5 x 674 lb/hr = 344.1 lb/hr per turbine

The modeling was conducted for the 3-years of meteorological data and assumed simultaneous operation of all ancillary equipment with the two combustion turbines. Hourly ozone limiting was used to more accurately represent the conversion of NO_x to NO_2 for comparison to the California 1-hour NO_2 standard. The results are summarized in Table 6.3-39. Ambient concentrations are summed with the maxima modeled over the 3 years for comparison to the NAAQS/CAAQS. All total concentrations are below the NAAQS/CAAQS.

The NO_2 results for the startup/shutdown analysis are the same as the normal operations because the maximum concentration is due largely to the operation of the emergency generator, which was assumed to be operating in both scenarios. As in the normal operations modeling, because the emergency generator and fire pump will not be operated for more than one-hour at a time it was assumed that these two sources will operated only from 8 am to 9 am in order to model the likely worst case meteorological conditions (morning stable layer).

Table 6.3-39
Maximum Modeled Concentrations for Project Startup/Shutdown Operations

Pollutant	Averaging Period	AERMOD Concentration ($\mu g/m^3$)			Overall Maximum ($\mu g/m^3$)	Total Modeled Plus Background	CAAQS/ NAAQS ($\mu g/m^3$)
		2002	2003	2004			
NO_2 [1]	1-hr	242.89	211.79	211.32	242.9	412	470
CO	1-hr	635.70	672.45	658.93	672.5	5,157	23,000 / 40,000
	8-hr	300.96	283.67	238.21	301	2,716	10,000 / 10,000

[1] Modeled NO_2 concentrations as determined with the Ozone Limiting Method

6.3.4.2.2 PSD Class I Analysis

PSD regulations require that facilities within 100 kilometers (km) of a PSD Class I area perform a modeling evaluation of the ambient air quality in terms of Class I PSD Increments and Air Quality Related Values (AQRVs). For the VV2 Project, potential air impacts were addressed at the following Class I areas within 100 km:

- Cucamonga Wilderness Area (WA),
- San Gabriel WA,
- San Gorgonio WA,
- San Jacinto WA, and
- Joshua Tree National Park (NP).

The detailed methodology for the Class I area impact assessment is documented in the modeling protocol, "Class I Area Dispersion Modeling Protocol for the Proposed Victorville 2 Hybrid Power Project. A copy of this protocol was submitted to the CEC, EPA and MDAQMD on January 17, 2007. At EPA's request, a copy of the protocol was also provided to the Federal Land Managers (FLMs) for these areas on January 31, 2007. The National Park Service (NPS) is the FLM for Joshua Tree NP and the U.S. Dept. of Agriculture, Forest Service (USFS) is the FLM for the four Wilderness Areas. On February 1, 2007, the NPS replied "based on the information in the protocol we do not believe the emissions from the proposed Victorville facility will significantly impact resources at Joshua Tree National Park (closest NPS air quality Class I area). Therefore, we will not be providing any comments regarding the protocol." (Morse, 2007) The USFS provided a copy of their draft FLM modeling guidance document (Gebhart, 2005).

Figure 6.3-5 shows the location of the VV2 Project relative to the nearest PSD Class I areas. Since Joshua Tree NP is the closest National Park Service (NPS) Class I area and it is just on the edge of the 100-km extent from the VV2 Project, it was also included in the Class I impacts analysis.

Since the VV2 Project is located in a designated non-attainment area for PM10, and is not a significant source for SO_2 or H_2SO_4, a Class I increment analysis was conducted only for NO_2 at the Class I areas. Additionally, since the VV2 Project is not a significant source for SO_2 or H_2SO_4, a deposition analysis was conducted only for nitrogen compounds which consider primary emissions of NO_x and conversion to nitrate and nitric acid. However, gas turbine emissions of SO_2, H_2SO_4, NO_x, and PM10 were all included in the regional haze analysis for the Class I areas noted above.

CALPUFF PSD Class I Increment and Regional Haze Analyses

Refined modeling for assessment of PSD Class I increment consumption was conducted with the CALPUFF model (Version 5.754) and utilized detailed meteorological data prepared with CALMET, the CALPUFF meteorological pre-processor. The modeling approach is based on requirements outlined in the IWAQM Phase II report (EPA Report EPA-454/R-98-019, 1998; found at http://www.epa.gov/scram001) as well as the Federal Land Managers' Air Quality Related Values Workgroup Phase I Report that was published in December 2000. This document can be found at http://www2.nature.nps.gov/ard/flagfree/index.htm). These guidance documents are provided for suggested modeling approaches by EPA and the FLMs.

The Class I increment modeling results for all areas are summarized in Table 6.3-40. The maximum annual NO_2 concentrations for each area are below the Class I SIL and therefore also well below the Class I PSD increments. The Class I regional haze modeling results for all areas are summarized in Table 6.3-41 for the three-years modeled. When a project-related change in extinction is less than five percent of the background extinction, then the project's regional haze impact is defined by EPA to be insignificant and no further modeling is required to demonstrate no adverse impact. As shown in Table 6.3-41, the maximum modeled change in extinction (ΔB_{ext}) for all years is less than five percent. The Class I deposition modeling results for all areas are summarized in Table 6.3-42 for the three-years modeled. The maximum modeled deposition rates for all years modeled are below the NPS Class I Deposition Analysis Thresholds.

Table 6.3-40
Class I Area NO_2 PSD Increment CALPUFF Modeling Results

Class I Area	Averaging Period	Maximum Modeled Concentrations ($\mu g/m^3$)			Class I SIL[1] ($\mu g/m^3$)	PSD Class I Increment ($\mu g/m^3$)
		2001	2002	2003		
Cucamonga WA	Annual	3.29E-03	1.92E-03	2.05E-03	0.1	2.5
Joshua Tree NP	Annual	1.27E-03	9.92E-04	9.32E-04	0.1	2.5
San Gabriel WA	Annual	2.94E-03	9.95E-04	3.12E-03	0.1	2.5
San Gorgonio WA	Annual	8.17E-04	1.23E-04	5.21E-04	0.1	2.5
San Jacinto WA	Annual	3.67E-04	6.85E-05	1.77E-04	0.1	2.5

[1] EPA proposed NSR Reform, FR 7/23/96.

Table 6.3-41
Class I Area Regional Haze CALPUFF Modeling Results

Class I Area	Maximum % ΔB_{ext}			Significance Threshold
	2001	2002	2003	
Cucamonga WA	3.80	2.39	3.14	5%
Joshua Tree NP	1.20	1.16	0.95	5%
San Gabriel WA	2.30	2.48	3.56	5%
San Gorgonio WA	1.05	0.78	1.98	5%
San Jacinto WA	0.58	0.56	0.75	5%

Table 6.3-42
Class I Area Nitrogen Deposition CALPUFF Modeling Results

Class I Area	Averaging Period	Maximum Modeled Deposition Results (kg/ha/yr)			NPS Class I Deposition Analysis Thresholds (kg/ha/yr)
		2001	2002	2003	
Cucamonga WA	Annual	9.96E-04	1.15E-03	6.92E-04	0.005
Joshua Tree NP	Annual	3.23E-04	2.49E-04	2.51E-04	0.005
San Gabriel WA	Annual	1.44E-03	8.57E-04	1.38E-03	0.005
San Gorgonio WA	Annual	3.88E-04	1.99E-04	2.60E-04	0.005
San Jacinto WA	Annual	1.51E-04	7.92E-05	8.60E-05	0.005

VISCREEN Plume Blight Impact Analysis

PSD regulations require an analysis of visibility impairment (i.e., plume blight) at Class I areas within 50 km of a proposed PSD project. Parts of Cucamonga Wilderness Area are located within 50 km of the VV2 Project, therefore in addition to regional haze assessed with CALPUFF, potential VV2 Project visible plume impacts were also addressed for this Class I area.

The plume visibility analysis was conducted with the most current version of EPA's screening model VISCREEN to determine if Project emissions will impair visibility at the Cucamonga WA. VISCREEN was applied with the guidance provided in EPA's Workbook for Plume Visual Impact Screening and Analysis (Revised, 1992) ("Workbook"). As such, the VISCREEN model will be applied to estimate two visual impact parameters, plume perceptibility (ΔE) and plume contrast (Cp). Screening-level guidance indicates that values above 2.0 for ΔE and +/- 0.05 for Cp are considered perceptible. The Workbook offers two levels of analysis. Level 1 screening analysis is the most simplified and conservative approach employing default meteorological data with no site specific conditions. Level 2 analyses takes into account representative meteorological data and site specific conditions such as complex terrain. Initially, the Level 1 analysis was conducted and indicated ΔE and Cp values above the screening thresholds. Therefore, a Level 2 analysis was conducted.

A Level 2 analysis was conducted with the same three-years of meteorological data used in the Class II air quality analysis. The terrain elevation differences between the facility location of more than 600 meters is based on an elevation of the plant site (854 meters

above mean sea level [amsl]) and elevation of the Cucamonga WA (1500 - 2600 meters amsl; from receptor elevations provided by NPS.

The source data required by VISCREEN are total NO_x emissions (31.2 lb/hr) and particulate emissions (36.0 lb/hr) for the combustion turbines. The closest distance from the Project to the Cucamonga WA is 40 kilometers. In addition, the 22.5° wind direction sector that would transport emissions from the Project toward the Cucamonga WA located to the south-southwest of the Project location is 11.25° – 33.75°. Based on this information, and the three years of meteorological data, a table of joint frequency of occurrence of wind speed, wind direction, and stability class was developed as outlined in the Workbook. The dispersion conditions, defined by wind speed and stability class, were ranked by evaluating the product of $\sigma_y\sigma_z u$ where σ_y and σ_z are the Pasquill-Gifford horizontal and vertical diffusion coefficients for the given stability class and downwind distance (i.e., 40 km), and u is the wind speed. The dispersion conditions were then ranked in ascending order according to the value of $\sigma_y\sigma_z u$ as shown in Table 6.3-43.

According to the Workbook, VISCREEN is to be applied with the worst-case meteorological conditions that have a $\sigma_y\sigma_z u$ product with a cumulative probability of 1 percent. That is, the dispersion condition is selected such that the sum of all frequencies of occurrence of conditions worse than this condition totals 1 percent. Note that as is recommended by the Workbook, dispersion conditions that result in greater than 12 hours of plume transport time are discounted from the analysis, since it is unlikely that steady-state plume conditions will persist for more than 12 hours.

According to Table 6.3-44, the worst-case dispersion conditions with cumulative frequency of 1 percent are D stability, 3 m/sec and occur during daytime hours between 12:00 pm and 6:00 pm (i.e., 1200-1800). Therefore, VISCREEN was applied with C stability, 3 m/sec to account for the complex terrain. As recommended by the FLAG guidance, a visual range of 246 kilometers was used.

The VISCREEN results are summarized in Table 6.3-44. VISCREEN provides results of plume perceptibility (ΔE) and plume contrast (C_p) for both sky and terrain backgrounds. The results are below the screening criteria thresholds and therefore indicate that the plume would not be perceptible against a sky or terrain background.

Table 6.3-43
Dispersion Condition Frequency Analysis

Dispersion Condition		$\sigma_y\sigma_z u$	Transport Time	Frequency By Time of Day				Cumulative Frequency By Time of Day			
Stability Class	Wind Speed (m/sec)			0-6	6-12	12-18	18-24	0-6	6-12	12-18	18-24
F	1	68,547	22	0.152	0.000	0.015	0.274	0.000	0.000	0.000	0.000
F	2	137,093	7	0.015	0.000	0.046	0.228	0.015	0.000	0.046	0.228
E	1	196,008	22	0.046	0.015	0.030	0.091	0.015	0.000	0.046	0.228
F	3	205,640	4	0.015	0.015	0.061	0.182	0.030	0.015	0.106	0.411
E	2	392,015	7	0.046	0.030	0.061	0.061	0.076	0.046	0.167	0.471
D	1	536,875	22	0.091	0.228	0.106	0.000	0.076	0.046	0.167	0.471
E	3	588,023	4	0.000	0.000	0.213	0.182	0.076	0.046	0.380	0.654
E	4	784,030	3	0.000	0.015	0.274	0.106	0.076	0.061	0.654	0.760
E	5	980,038	2	0.000	0.000	0.122	0.061	0.076	0.061	0.776	0.821
D	2	1,073,749	7	0.000	0.046	0.122	0.030	0.076	0.106	0.897	0.852
D	3	1,610,624	4	0.000	0.030	0.274	0.015	0.076	0.137	1.171	0.867
D	4	2,147,498	3	0.000	0.061	0.456	0.091	0.076	0.198	1.627	0.958
D	5	2,684,373	2	0.046	0.319	1.414	0.076	0.122	0.517	3.041	1.034
D	6	3,221,247	2	0.015	0.106	0.502	0.030	0.137	0.623	3.543	1.064
D	7	3,758,122	2	0.015	0.152	0.182	0.015	0.152	0.776	3.726	1.080
D	8	4,294,997	1	0.015	0.000	0.030	0.000	0.167	0.776	3.756	1.080

Table 6.3-44
VISCREEN Model Results

Background	Distance	Plume Perceptibility (ΔE)		Plume Contrast (C_p)	
		VISCREEN	Criteria	VISCREEN	Criteria
Sky	40	0.066	2.00	0.001	0.05
Terrain	40	0.168	2.00	0.001	0.05

6.3.4.2.3 Other Related Analyses

Growth Analysis

PSD requires an assessment of the secondary impacts from applicable projects. There will be minimal associated growth expected during VV2 Project construction, due to the relatively short-term (27 months) duration and the existence of a large construction labor force in the southern California region. Additionally, no direct Project related long-term growth (i.e., general commercial, residential, industrial or other secondary growth in the area) is expected during Project operations, due to the small labor force (36 employees) that will be required to operate this hybrid power plant. Therefore, no analysis of secondary impacts from associated growth is needed for this Project.

Although not required by PSD regulations to be reviewed, the CEC has asked about growth inducement from power availability. As noted in Section 6.1, the City of Victorville is proceeding with plans to expand the SCLA. These expansion plans will proceed regardless of whether or not the VV2 Project is built. If the VV2 Project is not built, then the City must rely entirely on the regional grid in the expectation that the power will be available. Therefore, the VV2 Project cannot be said to induce growth, since it will help to satisfy a greater statewide need for additional power resources.

Vegetation and Soils

The VV2 Project site is in an area consisting of desert and desert shrub-land. Criteria for evaluating impacts on soils and vegetation are provided in EPA's A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals (EPA 1980). Table 6.3-45 lists the EPA suggested criteria for the gaseous pollutants emitted directly from the proposed facility. These criteria are established for sensitive vegetation and crops exposed to the effects of the gaseous pollutants through direct exposure. Adverse

impacts on soil systems result more readily from the secondary effects of these pollutants' impacts on the stability of the soil system. These impacts could include increased soil temperature and moisture stress and/or increased runoff and erosion resulting from damage to vegetative cover. In Table 6.3-45, the total modeled air concentrations for the proposed facility plus ambient background concentrations are compared to these criteria to evaluate impacts on both soils and vegetation. All total concentrations are well below all of the criteria. Therefore, the potential for adverse impacts to either soils or vegetation is negligible.

Table 6.3-45
Soils and Vegetation Analysis

Pollutant	Averaging Time	Modeled Project Impacts ($\mu g/m^3$)	Ambient Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Minimum Impact Level for Affects On Sensitive Plants ($\mu g/m^3$)
SO_2	1 hour	1.5	31	32.5	917
	3 hour	0.6	26	26.6	786
	Annual	0.02	5	5.0	18
NO_2	4 hour	239.9	169	409	3760
	8 hour	239.9	169	409	3760
	1 month	239.9	169	409	564
	Annual	0.3	41	41.3	94
CO	1 week	31.9	2,415	2,447	1,800,000

6.3.4.3 Cumulative Impacts

Section 6.1.2 of the AFC discussed cumulative projects that may contribute to adverse impacts on air quality. The impacts of the VV2 Project must be considered together with those of other past, present, and reasonably foreseeable future projects in the area that may produce related or cumulative impacts. The cumulative projects identified in Section 6.1.2 include the SCLA expansion, SCLA Rail Service (also referred to as the "Intermodal" project), and the VVWRA expansion project.

6.3.4.3.1 Cumulative Impacts During Construction

Construction for the SCLA Rail Service/Intermodal project is expected to occur over about a year from October 2007 through September 2008 (Stirling Airports International, 2006). Expansion of the VVWRA facilities is scheduled to be completed during 2008,

and the SCLA expansion is a long-term project expected to be done over the next several years.

As stated in Section 2.0, Project Description, construction of the VV2 Project is expected to begin in the summer of 2008. Therefore, there should be minimal overlap between its construction activities and those of the SCLA Rail Service/Intermodal project.

Construction impacts for these projects, including the VV2 Project, are expected to be localized and temporary. As discussed in Section 6.3.5.1, the VV2 Project will provide mitigation to minimize its impacts during construction. Cumulative impacts from construction are not considered to be significant because of the limited horizontal extent of impacts from construction activities.

6.3.4.3.2 Cumulative Impacts During Operation

During operation, the VV2 Project is modeled to have insignificant impacts for all pollutants except PM10. Modeled 24-hour PM10 impacts above the SILs were very limited and only involved three receptors at the facility fenceline. Potential exceedances of the 24-hour and annual PM10 CAAQS were due to the already high background levels in the area.

Cumulative modeling would consist of the Project modeled maximum impacts, a maximum background concentration, and any other source in the area that had been permitted or was in the permitting process, such that its contribution was not reflected in the measured background concentrations. A background source inventory was requested from the MDAQMD to conduct the cumulative modeling analysis. Based on conversations with Mr. Alan DeSalvio of the MDAQMD (DeSalvio, 2006), no significant sources are in permitting process or have not yet been built that he was aware of. The nearby TXI Oro Grande cement plant located approximately 3 miles SE of the VV2 Project is currently undergoing a modernization. However, air emissions for the modified facility will be less than or equal to current emissions. The existing monitoring data from Victorville are therefore sufficient to represent air impacts from this source, as well as other non-modeled sources, for the cumulative analysis. Therefore, impacts on a cumulative basis along with other stationary sources are considered to be the same as those shown in Table 6.3-37 for the VV2 Project alone.

Criteria pollutant emissions during operation of the VVWRA facility are expected to be minimal (Victor Valley Wastewater Reclamation Authority, 2005). Therefore, operational emissions from the VV2 Project and the VVWRA facility will not cause significant adverse cumulative impacts.

The EIR for the SCLA Rail Service/Intermodal project estimated operational criteria pollutant emissions (City of Victorville, 2004). Operational emissions of the SCLA Rail Service/Intermodal project and SCLA expansion will be primarily from regional mobile sources, including employee commuting trips and truck trips. Because emissions from the VV2 Project that could potentially cause regional impacts (ozone precursors NO_x and VOC) will be completely offset, as discussed in Section 6.3.5.2, emissions during operation of the VV2 Project will not cause cumulative adverse impacts when combined with the regional mobile source emissions from the SCLA Rail Service/Intermodal Project.

Locomotive operations during operation of the SCLA Rail Service/Intermodal project will generate localized emissions. Operational CO and PM10 emissions were estimated be less than CEQA significance thresholds established by the MDAQMD. Therefore, operational CO and PM10 emissions from the VV2 Project are not anticipated to cause significant adverse cumulative impacts when combined with the emissions from locomotive operations. Although NO_x emissions from locomotive operations were estimated to exceed the MDAQMD CEQA significance thresholds, they are not anticipated to cause significant adverse cumulative localized NO_2 impacts when combined with emissions from the VV2 Project because of the distance between the two projects.

6.3.5 Mitigation Measures

6.3.5.1 Construction Mitigation

Modeling of construction emissions produced multiple hours in excess of the 1-hour NO_2 CAAQS of 470 $\mu g/m^3$ and multiple days over the 24-hour PM10 CAAQS of 50 $\mu g/m^3$. The highest modeled NO_2 value was found to be 817 $\mu g/m^3$ (without background) while the highest 24-hour PM10 concentration was 104 $\mu g/m^3$ (without background). As discussed in Section 6.3.4.2.1, the maximum NO_2 construction impacts exceeding the CAAQS were found to occur mainly in the wintertime during the first few hours of construction activities when low mechanical mixing heights and low wind speeds occur.

As mitigation of these high modeled NO_2 and PM10 impacts, the construction start times will be delayed during the winter, spring, and fall months, as needed, to prevent construction activities during the hours where low-dispersion meteorological conditions have the potential to produce high concentrations due to emissions from construction equipment. These construction start times will be determined by month based upon further analysis.

In addition, standard construction practices are proposed for construction activities including the following:

- Use of Tier 3 engines with particulate filters on the scrapers used for grading.
- Frequent watering of haul roads and disturbed surfaces to reduce fugitive dust emissions.
- Use of good engineering practice in the maintenance of all construction equipment.

6.3.5.2 Mitigation Measures During Operation

Mitigation for the VV2 Project emissions during operation will include reducing the emissions to the extent feasible through control technology and good combustion practices. The emissions controls selected for this Project include the installation of SCR systems, oxidation catalysts, GE Rapid Start Option, and the exclusive use of pipeline quality natural gas in the combustion turbines, heat recovery steam generators, auxiliary boiler and HTF heater. The selection of these control strategies are discussed in detail in Section 6.3.3.

In addition to minimizing emissions, the remaining emissions of NO_x, VOC, and PM10 will be offset as required by MDAQMD Rule 1305. While MDAQMD does maintain an emission reduction credit (ERC) bank, efforts to date have not located ERCs that are available to purchase within the MDAQMD.

For ozone precursors, NO_x and VOC, offsets will be obtained through interbasin, interpollutant trading. SCAQMD recently revised it's Rule 1309.1, Priority Reserve, to set aside a certain amount of VOC emission reduction credits that can be used by Electric Generating Facilities outside of the South Coast Air Basin. MDAQMD's Rule 1305(B) allows the use of these credits.

For PM10 ERCs, the VV2 Project Applicant has been working closely with the MDAQMD to develop a rule to allow for the banking of PM10 ERCs from the paving of unpaved roads. MDAQMD has developed a draft Rule 1406 which they have discussed with EPA and have patterned after a similar rule that has been proposed by Maricopa County, Arizona Air Quality Department (MCAQD). The comment period has closed, and MCAQD is currently responding to comments on their proposed Rule 242.

As shown in Table 6.3-27, the VV2 Project has a potential to emit of 111.9 tons per year of NO_x, 34.6 tons per year of VOC, and 121 tons per year of PM10 that must be offset. VOC must be offset at a ratio of 1.3 to 1. NO_x offsets are required at a ratio of 1.3 to 1,

plus an additional ratio for an interpollutant trade. The High Desert Power Project (97-AFC-01) applied an interpollutant, interbasin trade ratio for NO_x of 2.08 to 1, which includes the 1.3 to ratio. Since the ozone air quality has continued to improve in the region, this ratio should still be acceptable. Based on these VOC and NO_x ratios, and a 1 to 1 ratio for PM10, the following offsets will be provided:

- NOx: 111.9 tons per year @ 2.08 ratio => 232.7 tons
- VOC: 34.6 tons per year @ 1.3 ratio => 45.0 tons

For a combined total of 277.7 tons of VOC credits from the SCAQMD Priority Reserve. In addition, 121 tons per year of PM10 ERCs will be obtained prior to licensing of the VV2 Project.

6.3.6 References

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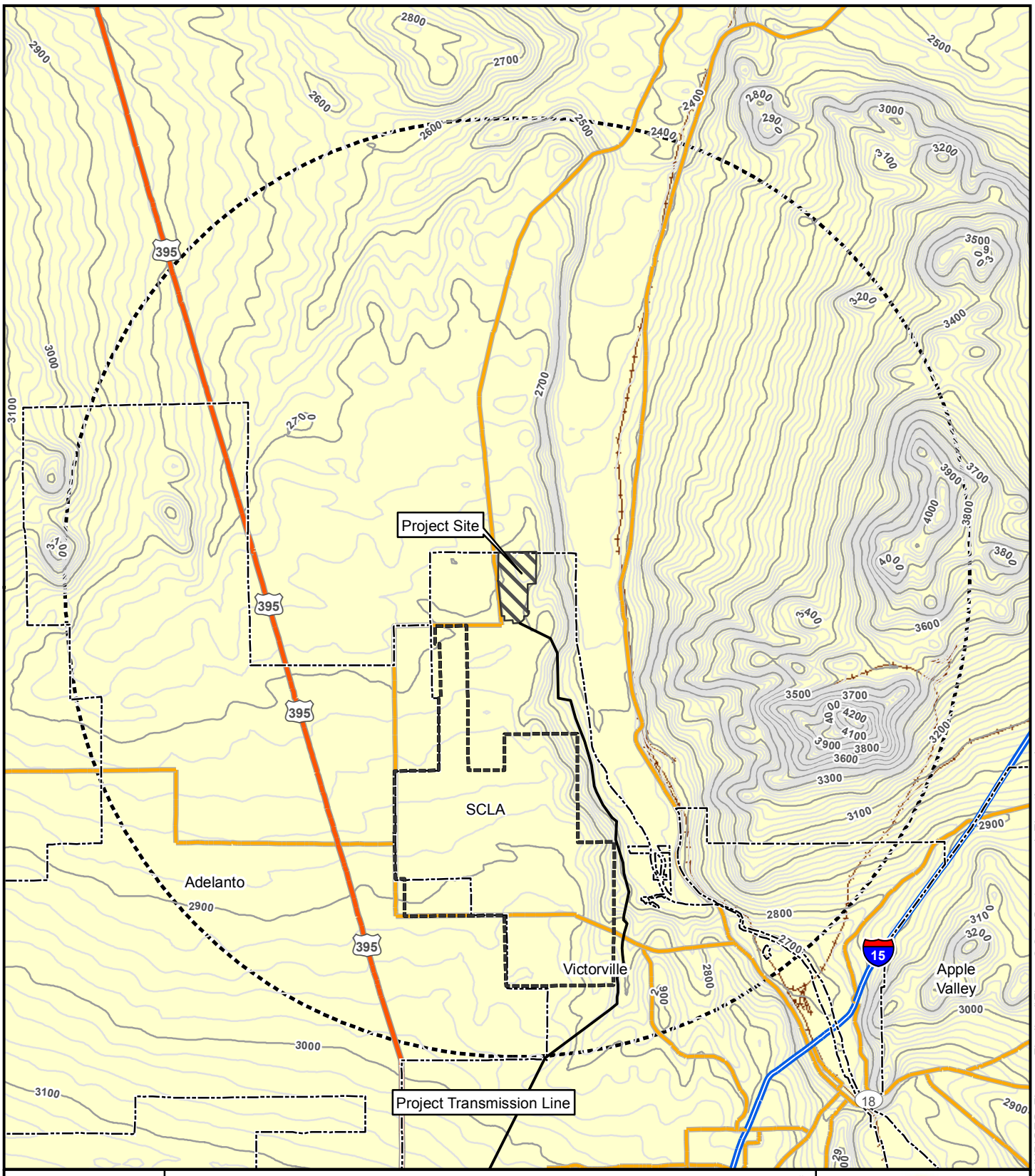

Locus Map

Contours and Elevation within 6 Mile Radius of Project Site
Victorville 2 Hybrid Power Project

Legend

- SCLA Boundary
- Incorporated City Boundary
- Index Contour (100 ft)
- Intermediate Contour (20 ft)

Scale: 1:200,000

0 1 2 4 6 8 Miles

Inland Energy, Inc.

ENSR | AECOM

Figure: 6.3-1

Date: February 2007

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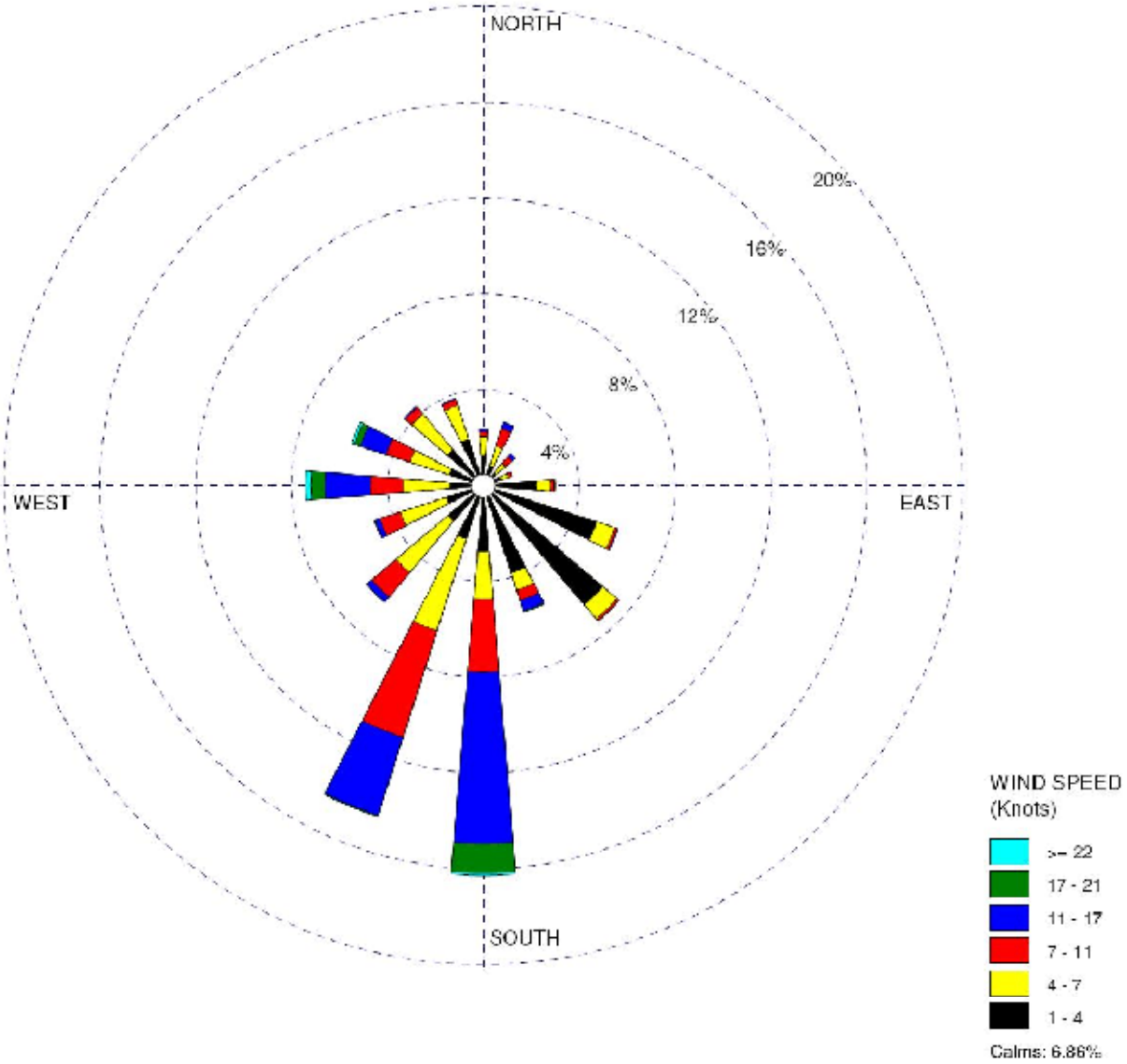

Locus Map

Victorville Wind Rose (2002-2004)
VV2 Hybrid Power Project

Figure not to scale

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Figure: 6.3-2
Date: February 2007

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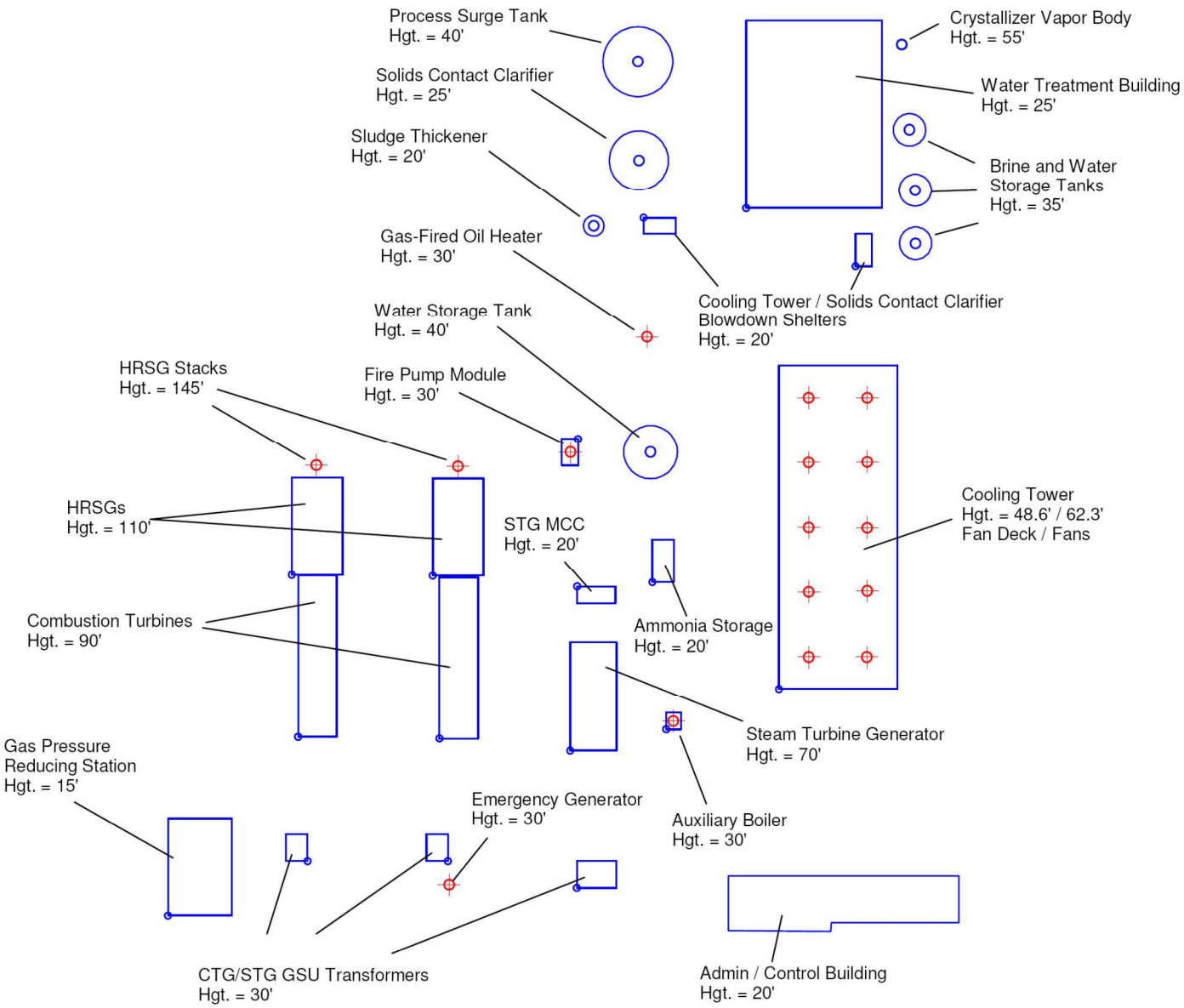

Locus Map

Buildings and Sources Used in the GEP Analysis
VV2 Hybrid Power Project

Figure not to scale

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Date: February 2007

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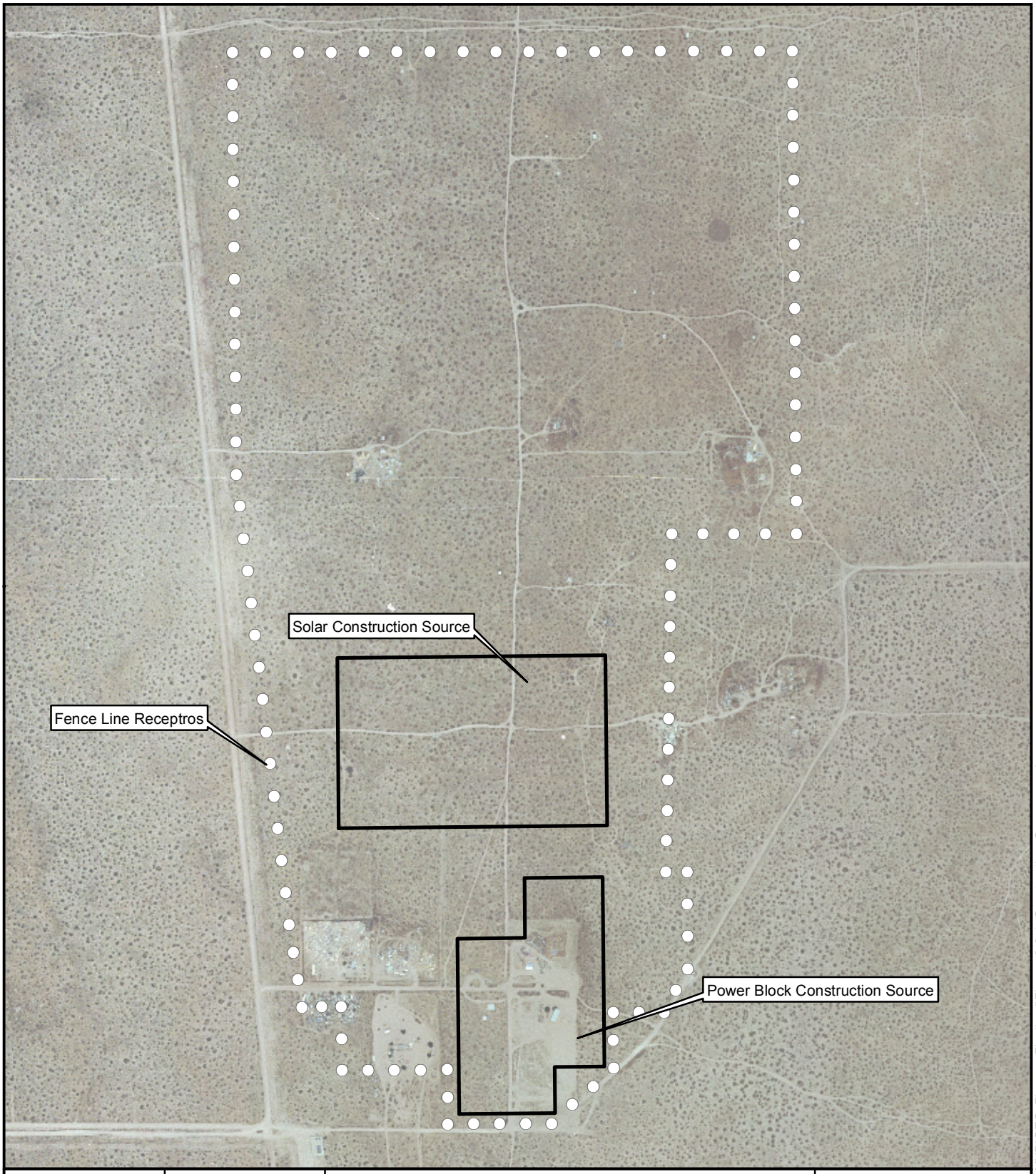
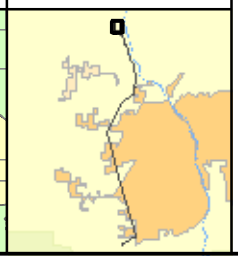


Locus Map

Index Map



Area Sources Used in the AERMOD Analysis of Construction Activities Victorville 2 Hybrid Power Project

Source: MapMart Aerial Imagery .61 Meter Resolution Circa 2004

Scale: 1:8,000

0 500 1,000 1,500 2,000 Feet

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Figure: 6.3-4

Date: February 2007

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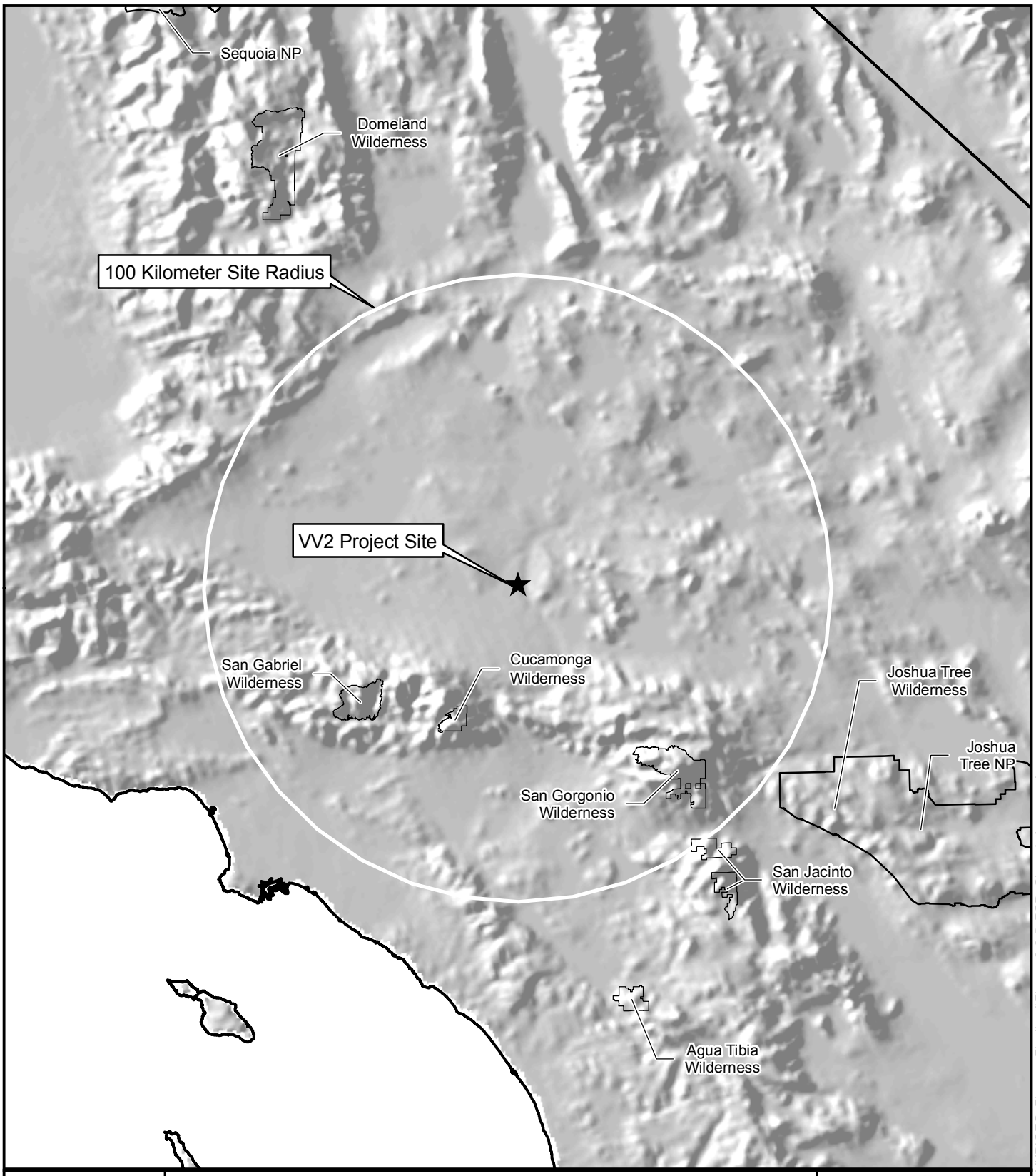

Locus Map

Location of Proposed Project Site in Relation to Nearby PSD Class I Areas
VV2 Hybrid Power Project

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Scale: 1:1,750,000

0 20 40 60 80 100 Miles

Inland Energy, Inc.

ENSR | AECOM

Date: February 2007

Figure: 6.3-5

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