5.2 Air Quality

This section addresses the air quality impacts of construction and operation of the BSEP. The air quality assessment covers the specific air quality information required by the CEC guidelines for an AFC, including:

- A description of 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;
- The potential for cumulative impacts;
- Mitigation measures that will be employed; and
- Information required by the Kern County Air Pollution Control District (KCAPCD) in order to issue a Determination of Compliance for the 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 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 5.10, Public Health.

It is worth noting that as a solar energy generating facility with no other power generation sources, that there are only a few emissions sources and the air emissions during operations of this facility are relatively minor. The emission sources at the BSEP consist of only two auxiliary boilers, which are used to assist startup and provide freeze protection for the Heat Transfer Fluid (HTF); a fire water pump engine; a wet cooling tower; and expansion/ullage tanks for the HTF system, as well as fugitive dust from vehicle use onsite.

5.2.1 LORS Compliance

Construction and operation of the BSEP will be performed in accordance with the applicable LORS. The applicable Federal, State, and local air quality LORS are summarized in Table 5.2-1. In addition to the table, both applicable and some non-applicable LORS are briefly discussed below.

5.2.1.1 Federal LORS

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. Most of these Federal programs have been delegated to the KCAPCD for implementation in the local area.

Table 5.2-1 Federal, State and Local LORS Applicable to Air Quality

LORS	Applicability	Where Discussed in AFC
Federal		
40 CFR Part 60 - New Source Performance Standards (NSPS), Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	Establishes emission standards for compression ignition internal combustion engines, including emergency fire water pump engines.	Section 5.2.3.2
State		
Title 17 California Code of Regulations (CCR), Section 93115, Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines	Establishes emission limits, operating limits, fuel use restrictions, monitoring and recordkeeping requirements on stationary compression ignition engines, including emergency fire water pump engines.	Section 5.2.3.2
Local (KCAPCD)		
Rule 108.2 - Emission Statement	Requires the submittal of an emissions inventory.	Section 5.2.1.3
Rule 111 - Equipment Breakdown	Requires that the Air Pollution Control Officer (APCO) be notified of any occurrence which constitutes a breakdown condition within prescribed timeframes.	Section 5.2.1.3
Rule 201 - Permits Required	Establishes the requirement to obtain a permit to operate for emission sources.	Section 5.2.1.5
Rule 202 - Permit Exemptions	Allows installation and operation of certain low-emitting devices at a facility without having to obtain a permit to operate (PTO).	Section 5.2.1.3
Rule 210.1 - New and Modified Stationary Source Review	Establishes the requirements that must be met to obtain a PTO, including the requirement to comply with best available control technology (BACT), provide emission offsets for emission increase above a specified threshold, provide modeling, an alternatives analysis and a compliance certification.	Section 5.2.1.5
Rule 301 - Permit Fees	Requires the payment of fees upon the submittal of an application for an Authority to Construct (ATC) or PTO.	Section 5.2.1.3
Rule 401 - Visible Emissions	Limits visible emissions.	Section 5.2.4.2

LORS	Applicability	Where Discussed in AFC
Rule 402 - Fugitive Dust	Limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and man-made conditions resulting in wind erosion.	Section 5.2.4.2
Rule 404.1 - Particulate Matter Concentration – Desert Basin	The rule limits particulate matter (PM) emissions to less than 0.1 grains per standard cubic foot of gas at standard conditions.	Section 5.2.1.3
Rule 405 - Particulate Matter – Emission Rate	This rule limits PM emissions in excess of the limits shown in the rule. The PM emission limits are a function of exhaust flow rate from the device.	Section 5.2.1.3
Rule 407 - Sulfur Compounds	Limits discharge into the atmosphere of sulfur compounds exceeding 0.2 percent by volume concentration calculated as SO_2.	Section 5.2.1.3
Rule 409 - Fuel Burning Equipment – Combustion Contaminants	Limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12 percent of carbon dioxide (CO_2) at standard conditions.	Section 5.2.1.3
Rule 410 - Organic Solvents	Limits discharge of more than 15 pounds of heated organic materials (i.e., volatile organic compounds [VOC]) in any one day unless the discharge has been reduced by a least 85 percent. Further, limits discharge into the atmosphere of more than 40 pounds of photochemically reactive organic materials in any one day.	Section 5.2.1.3
Rule 410.1 - Architectural Coatings	This rule limits VOC emissions from architectural coatings.	Section 5.2.1.3
Rule 410.2 - Disposal and Evaporation of Solvents	Limits daily disposal of photochemically reactive solvent into the atmosphere.	Section 5.2.1.3
Rule 419 - Nuisance	Prohibits the discharge of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.	Section 5.2.4.2
Rule 422 - New Source Performance Standards	Incorporates the Federal NSPS (40 CFR 60) rules by reference.	Section 5.2.3.2
Rule 424 - Residential Water Heaters	Establishes NOx emission limits from residential water heaters.	Section 5.2.1.3
Rule 425.2 - Boilers, Steam Generators and Process Boilers (Oxides of Nitrogen)	This rule limits NOx emissions from boilers, steam generators, and process heaters to levels consistent with Reasonably Available Control Technology (RACT).	Section 5.2.1.3

LORS	Applicability	Where Discussed in AFC
Rule 427 - Stationary Piston Engines (Oxides of Nitrogen)	This rule limits NOx and CO emissions from stationary piston engines to levels consistent with RACT.	Section 5.2.1.3
Rule 429.1 - Cooling Towers (Hexavalent Chromium)	Prohibits the use of hexavalent chromium-bearing compounds in cooling towers	Section 5.2.1.3

Federal Major Source Programs

There are several Federal permitting and CAA programs that are applicable primarily to major sources of emissions. These programs include the Prevention of Significant Deterioration (PSD) regulations, the Operating Permits Program under Title V of the CAA Amendments of 1990, National Emission Standards for Hazardous Air Pollutants (NESHAP), which are codified in two parts: 40 CFR 61 and 40 CR 63, and the Risk Management Program under Title III of the CAA Amendments of 1990, codified at 40 CFR 68. As will be shown in Section 5.2.4, the emissions from the BSEP are well below the thresholds for these programs, and hence these LORS are not applicable to this Project. Therefore, neither these Federal regulations, nor the KCAPCD rules that implement these requirements, are included in Table 5.2-1 or are discussed in this AFC section.

New Source Performance Standards

The Project is subject to a specific NSPS. 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 Project are summarized below. Enforcement of the NSPS has been delegated to the KCAPCD.

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 Project is potentially subject to Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 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 IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines: Subpart IIII is applicable to owners and operators of stationary compression ignition (CI) internal combustion engines that commence construction after July 11, 2005. Relevant to the proposed Project, the rule applies to the fire water pump CI engine as follows:

(i) Fire pump engines with less than 30 liters per cylinder manufactured after 2009, or

(ii) Fire pump engines manufactured as a certified National Fire Protection Association (NFPA) fire water pump engine after July 1, 2006.

For the purpose of this rule, "manufactured" means the date the owner places the order for the equipment. Based on the timeline projected for obtaining approval of the Project, the applicant expects that the engine will be ordered (and thus manufactured) in 2009.

Owners and operators of fire water pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards listed for all pollutants. For a model year 2009 or later 300-horsepower (Hp) engines, the limits are 2.6 grams per horsepower-hour for CO, 3.0 grams per horsepower-hour for non-methane hydrocarbons (NMHC) and NOx combined, and 0.15 grams per horsepower-hour for PM. In model years 2009–2011, manufacturers of fire water pump stationary CI engine in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines. The BSEP will install an engine meeting these standards.

Although the BSEP facility is subject to NSPS Subpart IIII, pursuant to §60.4200(c) an owner or operator of an area source (i.e., not a major source) subject to Subpart IIII is exempt from the obligation to obtain a Title V permit under 40 CFR Part 70 or 40 CFR Part 71, provided a Title V permit is not required for another reason. Therefore, a Title V permit is not required for the BSEP facility.

5.2.1.2 State LORS

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). The ARB also implements the ATCM and other air toxics programs, as discussed further in Section 5.10, Public Health.

Airborne Toxic Control Measure for Stationary Compression Ignition Engines

The California ATCM for CI engines specifies operating requirements and exhaust emission standards for stationary CI engines. Although this is an ATCM, it contains emission standards for criteria pollutants. In addition, it requires the use of ARB diesel fuel (15 parts per million [ppm] sulfur [S] by weight).

The Project will install a new stationary CI engine that will meet the Tier 3 emissions standards for offroad engines and will limit the non-emergency hours of operation to the number of hours necessary to comply with the testing requirements of NFPA 25 "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2002 edition as required by the ATCM (CCR §93115.6(a)(4)(A)(1)).

The facility will limit the hours of operation of the fire water pump engine to one hour per week, not to exceed 50 hours per year, as recommended by NFPA 25, and will install a totalizing hour meter to substantiate compliance with the use limitation. The facility will use only ARB diesel fuel in the fire water pump engine and retain purchase records and MSDS to substantiate compliance with the fuel sulfur requirement.

5.2.1.3 Local LORS

The local LORS are administered by the KCAPCD.

KCAPCD Rule 108 Stack Monitoring

The owner or operator shall provide, install, and maintain continuous monitoring systems to measure the specific pollutants from fossil fuel-fired steam generators with heat input of 250 million British thermal units (MMBtu) or more per hour. The boilers proposed for this Project are each rated at 30 MMBtu per hour and, therefore, are not subject to the requirements of this rule.

KCAPCD Rule 108.1 Source Sampling

Upon the request of the APCO and as directed by him, the owner of any source operation which emits or may emit air contaminants, for which emission limits have been established, shall provide the following facilities, constructed in accordance with the general industry safety orders of the State of California:

a. Sampling ports,
b. Sampling platforms,
c. Access to sampling platforms, and
d. Utilities for sampling equipment.

Sampling port locations must be determined according to criteria in the California ARB Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. The Project will comply with the requirements of this rule by providing the specified sampling facilities on Project facilities as needed.

KCAPCD Rule 108.2 Emission Statement

Upon request of the APCO and as directed by him, an owner or operator of any source operation emitting or with the potential to emit NOx or reactive organic gases (ROG) shall provide the District with a written statement, in such form as prescribed, showing actual emissions of NOx and ROG from such source. The Project will comply with the requirements of this rule by providing the specified emission report in a timely manner.

KCAPCD Rule 111 Equipment Breakdown

The owner or operator shall notify the APCO of any occurrence which constitutes a breakdown condition; such notification shall identify the time, specific location, equipment involved, and (to the extent known), the cause(s) of the occurrence and shall be given as soon as reasonably possible, but no later than one (1) hour after its detection unless the owner or operator demonstrates, to the satisfaction of the APCO, that a longer reporting period was necessary. Within 10 days after a breakdown occurrence has been corrected, the owner or operator shall submit a written report to the APCO which includes specific information.

KCAPCD Rule 201 Permits Required

Any person building, altering or replacing any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate or reduce or control the issuance of air contaminants, must first obtain authorization for such construction from the APCO. An ATC shall remain in effect until the PTO for the equipment for which the application was filed is granted, denied, or canceled. A person shall notify the APCO before operating or using equipment granted an ATC. Upon such notification, the ATC shall serve as a temporary PTO for the equipment until the PTO is granted or denied. The equipment shall not be operated contrary to conditions specified in the ATC, and testing requirements must be satisfied. The BSEP will comply with this rule by applying for a permit from the KCAPCD as needed.

KCAPCD Rule 202 Permit Exemptions

The BSEP will employ a number of devices that emit air pollutants but are exempt from permit pursuant to one or more exemptions listed in Rule 202, including a 300-gallon diesel fuel storage tank, water trucks used for mirror washing, HTF piping fugitives, lube oil reservoir(s) (storage tanks), heating ventilation and air conditioning (HVAC) systems, a water heater, water treatment systems, and storage tanks for water treatment chemicals.

KCAPCD Rule 210.1 New and Modified Stationary Source Review

This rule provides for preconstruction review of new and modified stationary sources of affected pollutants to insure emissions will not interfere with attainment of ambient air quality standards; ensures appropriate new and modified sources of affected pollutants are constructed with BACT; and provides for no significant net increase in emissions from new and modified stationary sources for all non-attainment pollutants and their precursors.

***BACT**:* An applicant shall provide BACT for all affected pollutants expected to be emitted from a new emissions unit and for all affected pollutants expected to increase from a modified existing emissions unit. Each of the permitted devices proposed for the Project will employ current BACT. The manner in which the Project will comply with BACT is addressed in more detail in Section 5.2.3.

***Offsets**:* An applicant must provide offsets for new or modified stationary source of particulate matter with an aerodynamic diameter of 10 microns or less (also known as respirable particulate matter) (PM10), SOx, NOx or VOC for the source's potential to emit when the source's potential to emit equals or exceeds the offset trigger levels identified in the rule. If offsets are required, they must be provided at specified ratios. Offsets are not required for the Project because BSEP emissions do not exceed the applicable thresholds.

***Additional Requirements**:*

Alternative siting: For sources requiring an analysis of alternative sites, sizes, and production processes and environmental control techniques, pursuant to Section 173 of the Federal CAA, the applicant must prepare an analysis functionally equivalent to requirements of Division 13, Section 21000 et. seq. of the Public Resources Code. Although not required for the BSEP, an alternatives analysis is contained in Section 4.0 of this AFC.

Visibility Impacts Analysis: Any new major source or major modification shall be subject to review of its impact on visibility in any mandatory Class I area in accordance with 40 CFR 51.307(b)(2). The Project is neither a major source nor a major modification; thus a visibility analysis is not required for the Project.

Modeling: Emissions from a new or modified stationary source shall not make worse an exceedance of an ambient air quality standard. In making this determination, the APCO will take into account increases in cargo carrier and secondary emissions and offsets provided pursuant to this rule. The BSEP emissions do not exceed the offset trigger levels and, therefore, modeling is not required for the Project.

Compliance Certification: The owner or operator of a proposed new major source or major modification shall certify in writing 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, and subject to emission limitations, are in compliance, or on a schedule for compliance, with all applicable emission limitations and standards. Because the facility is not a major source of air pollutants, the compliance certification will not be required for this application.

KCAPCD Rule 301 Permit Fees

Permit application fees will be paid to the KCAPCD with the air permit application.

KCAPCD Rule 401 Visible Emissions

A person shall not discharge into the atmosphere, from any single source of emissions whatsoever, any air contaminant for a period or periods aggregating more than three (3) minutes in any one hour which is as dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke which is as dark or darker in shade as that designated as No. 1 on the Ringelmann Chart. The Project boilers and emergency engine will be equipped with BACT and combust clean fuels, and consequently, compliance with this rule is expected.

KCAPCD Rule 402 Fugitive Dust

The purpose of this rule is to reduce the amount of PM10 emitted from significant man-made fugitive dust sources and in an amount sufficient to maintain NAAQS. The provisions of this rule apply to specified bulk storage, earthmoving, construction and demolition, and man-made conditions resulting in wind erosion. It also applies to unpaved roadways located in the Kern County portion of the Searles Valley Planning Area.

Project construction will involve bulk storage of soils, earthmoving, construction and demolition, and man-made conditions that have the potential for fugitive dust emissions. Beacon Solar, or its contractors, will follow the fugitive dust control strategy outlined in a Construction Dust Control Plan that will be prepared for the Project.

Project operations will involve routine vehicle travel within the solar collector field in order to wash the mirrors and earthmoving during contaminated soil management associated with the bioremediation facility. These operations have the potential for fugitive dust emissions. Beacon Solar, or its contractors, will follow the fugitive dust control strategy outlined in the Operations Dust Control Plan that will be prepared for the Project.

KCAPCD Rule 404.1 Particulate Matter Concentration – Desert Basin

Rule 404.1 applies to any person who discharges PM emissions into the atmosphere from any single source operation. The rule limits PM emissions to less than 0.1 grains per standard cubic foot of gas at standard conditions. The requirements of this rule do not apply to boilers provided they combust only liquid fuels, gaseous fuels, or waste gases, and only emit combustion contaminants. The Project boilers will combust only natural gas and, therefore, the rule limit does not apply to the boilers. The fire water pump engine is subject to and will comply with this rule by using only ultra-low sulfur diesel fuel.

KCAPCD Rule 405 Particulate Matter – Emission Rate

A person shall not discharge into the atmosphere from any source operation, particulate matter in excess of the limits shown in the rule. The particulate matter emission limits are a function of exhaust flow rate from the device. The boilers, fire water pump engine and cooling tower will emit particulate matter, and are subject to and will comply with this rule.

KCAPCD Rule 407 Sulfur Compounds

A person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge of 0.2 percent by volume calculated as SO_2. The use of pipeline natural gas fuel for the boilers and ultra-low sulfur diesel fuel in the fire water pump engine ensures compliance with this rule.

KCAPCD Rule 409 Fuel Burning Equipment – Combustion Contaminants

Fuel burning equipment, the construction or modification of which commenced after August 17, 1971, shall not discharge into the atmosphere PM, SO_2 or NOx in excess of the EPA Standards of Performance (see Rule 422). In addition, a person shall not discharge into the atmosphere from any other fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12 percent of CO_2 at standard conditions. The boilers proposed for the Project will burn pipeline natural gas and use state-of-the-art emission controls, and thus compliance with this rule is expected. Likewise, the emergency engine proposed for the Project will burn ultra-low sulfur diesel fuel in a new Tier 3 compliant engine, and thus compliance with this rule is expected.

KCAPCD Rule 410 Organic Solvents

A person shall not discharge into the atmosphere more than 15 pounds of organic materials (i.e., VOC) in any one day from any article, machine, equipment, or other contrivance in which any organic solvent or any material containing organic solvent comes into contact with flame or is baked, heat-cured, or heat-polymerized in the presence of oxygen, unless said discharge has been reduced by a least 85 percent. Further, a person shall not discharge into the atmosphere more than 40 pounds of organic materials in any one day from any article, machine, equipment or other contrivance used under conditions other than those described above. Normal operations at the facility will not involve the routine use of organic solvents. However, if the BSEP uses organic solvents for maintenance activities such as thinning paint or wipe cleaning, the Project will comply with the rule limits.

KCAPCD Rule 410.1 Architectural Coatings

The purpose of this rule is to limit VOC emissions from architectural coatings. This rule specifies architectural coatings, storage, cleanup and labeling requirements. With limited exceptions, no person shall: 1) manufacture, blend or repackage for sale within the District; 2) supply, sell or offer for sale within the District; or 3) solicit for application or apply within the District any architectural coating with a VOC content in excess of the corresponding limit specified in the Table of Standards (in the rule) after January 1, 2007. The BSEP will comply with the requirements of this rule if architectural coatings are applied at the facility during construction or subsequent maintenance activities.

KCAPCD Rule 410.2 Disposal and Evaporation of Solvents

A person shall not during any one day dispose of a total of more than 1-1/2 gallons of any photochemically reactive solvent, or of any material containing more than 1-1/2 gallons of any such photochemically reactive solvent into the atmosphere. The BSEP will comply with the requirements of this rule if organic solvents are disposed from the facility during construction or subsequent maintenance activities.

KCAPCD Rule 410.3 Organic Solvent Degreasing Operations

Organic solvent degreasing operations are not planned for the Project, and thus this rule will not apply.

KCAPCD Rule 411 Storage of Organic Liquids

This rule applies to equipment used to store organic liquids and petroleum distillates, with a true vapor pressure of greater than 1.5 pounds per square inch-atmospheric (psia). The BSEP will have insulating mineral oil (transformers), hydraulic oil (STG and other equipment), and lubricating oil onsite, all of which have a true vapor pressure less than 1 psia at 68 ^{o}F, as well as diesel fuel stored at the facility. Diesel fuel has a vapor pressure of 0.008 psia (0.40 mm of mercury); therefore, this rule will not apply to the Project.

KCAPCD Rule 414.2 Soil Decontamination (Volatile Organic Compounds)

The purpose of this rule is to limit VOC emissions from excavation and aeration, or treatment of soil that has been contaminated by organic compounds. This rule applies to excavation and aeration, or treatment of VOC-contaminated soil. The requirements of this rule do not apply to:

- Decontamination of less than one cubic yard of contaminated soil;
- Contaminated soil exposed for the sole purpose of sampling;
- Soil contaminated solely by an organic liquid having an initial boiling point of 302°F, or higher, as determined by American Society of Testing Materials (ASTM) D86-78, provided such soil is not heated above ambient temperature and samples of the contaminating liquid can be obtained; or
- Emergency excavation and/or decontamination of soil performed by, under jurisdiction of, or pursuant to requirements of, an authorized health officer, agricultural commissioner, fire protection officer, or other authorized agency officer. The APCO must be notified prior to commencing such excavation.

The soil decontamination planned for the facility is bioremediation of HTF-contaminated soils (due to equipment leaks or spills). HTF has an initial boiling point of 257 degrees centigrade (°C) (495 degrees Fahrenheit [°F]) and, therefore, the BSEP bioremediation unit is exempt from the requirements of this rule.

KCAPCD Rule 419 Nuisance

A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property. Due to the application of BACT on each emission source and the distance from the emission sources to any potential receptors, compliance with this rule is expected.

KCAPCD Rule 422 New Source Performance Standards

Provisions of 40 CFR Part 60, in effect November 7, 2002, are adopted by reference into the KCAPCD rules. Compliance with NSPS is discussed in Section 5.2.1.1.

KCAPCD Rule 424 Residential Water Heaters

A person shall not sell, offer for sale, or install any residential water heater within the KCAPCD emitting NOx in excess of 40 nanograms of NOx (calculated as NO_2) per joule (70 pounds per billion Btu) of heat output, or not certified in accordance with Section V. A residential-type water heater will be installed in the Project's office building to meet domestic (employee) needs. The water heater will comply with the rule requirements.

KCAPCD Rule 425.2 Boilers, Steam Generators and Process Boilers (Oxides of Nitrogen)

The purpose of this rule is to limit NOx emissions from boilers, steam generators, and process heaters to levels consistent with RACT to satisfy California HSC Section 40918(b) and 1990 Federal CAA Amendments, Section 182(f). CO emissions are also limited to insure efficient combustion at reduced NOx levels. This rule applies to any boiler, steam generator or process heater with a rated heat input of five (5) million Btu per hour or more and fired with gaseous and/or liquid fuels, and specifies a NOx limit of 70 parts per million by volume (ppmv) during normal operations with gaseous fuel.

In addition, an owner/operator of any unit subject to this rule must submit to KCAPCD an Emission Control Plan that includes:

1. List of units subject to rule, including rated heat inputs, anticipated annual heat input, applicable NOx or CO emission requirements, and control option chosen, if applicable;
2. Description of actions to be taken to satisfy rule requirements. The plan shall identify actions to be taken to comply, including any type of emissions control to be applied to each unit and construction schedule, or shall include test results to demonstrate that the unit already complies with applicable requirements; and
3. Specification of proposed test methods.

All compliance demonstrations shall be performed using applicable test method(s) specified in the rule and the methods selected to demonstrate compliance shall be specified in the Emission Control Plan. All

emission measurements shall be made with a unit operating at conditions as close as physically possible to maximum firing rate allowed by the KCAPCD PTO. Any unit subject to NOx or CO emission limits shall be tested to determine compliance with applicable requirements not less than once every 12 months. An owner/operator of gaseous fuel-fired units demonstrating compliance for two consecutive years can, if desired, demonstrate compliance once every 36 months.

The expected annual fuel use of the boilers will exceed 90,000 therms and, therefore, this rule will apply. The boilers will burn natural gas exclusively; low-NOx burners will limit NOx emissions to less than 70 ppmv, and good combustion practices will limit CO emissions to less than 400 ppmv. An Emission Control Plan will be prepared that will describe the nature and frequency of NOx and CO emission tests that will be performed to verify compliance with this rule.

KCAPCD Rule 427 Stationary Piston Engines (Oxides of Nitrogen)

The purpose of this rule is to limit NOx emissions from existing stationary piston engines to levels consistent with RACT to satisfy HSC Section 40918 (b) and 1990 Federal CAA Amendments, Section 182(f). CO emissions are also limited to insure maintenance of efficient combustion at reduced NOx levels. This rule applies to all rich-burn, lean-burn, and diesel engines of more than 50 Hp, except for emergency standby, and low use rate engines operating less than 200 hours per year as documented by an elapsed operating time meter and engines used exclusively for firefighting purposes or flood control.

The diesel engine proposed for this Project is a low-use-rate engine which will operate less than 200 hours per year and which will be used for firefighting purposes. The fire water pump engine will operate less than 50 hours per year unless operating for emergency firefighting purposes. The BSEP will install and maintain an elapsed operating time meter on the engine to substantiate compliance.

KCAPCD Rule 429.1 Cooling Towers (Hexavalent Chromium)

This rule applies to any person who owns or operates, or who plans to build, own, or operate, a cooling tower in which the circulating water is exposed to the atmosphere. The rule prohibits the use of hexavalent chromium-containing compounds in cooling tower circulating water. Chromium-containing compounds will not be used in the BSEP cooling tower.

5.2.1.4 Involved Agencies

Under the AFC process, the BSEP must obtain a Determination of Compliance (DOC) from the KCAPCD. Contact information for this agency is provided in Table 5.2-2. Beacon Solar met with Mr. Stephens in 2007 to brief him on the Project.

Table 5.2-2 Agencies and Agency Contacts

Agency Contact	Phone/E-mail	Permits/Issue
Glen Stephens Kern County APCD 2700 "M" Street, Suite 302 Bakersfield, CA 93301-2370	(661) 862-5250 GlenS@co.kern.ca.us	Air permit

5.2.1.5 Required Permits and Permit Schedule

Table 5.2-3 lists the air quality related permits that are required for the Project. As noted above, under the CEC licensing process, the Air District issues a DOC; however, a DOC is basically the same as the ATC issued by the KCAPCD for other sources. Once the project is built, then the KCAPCD will issue a PTO in conjunction with the CEC. This table also provides the schedule for when applications for these permits are needed.

Table 5.2-3 Permits Required and Permit Schedule

Permit/Approval	Schedule
DOC/ATC	An application will be submitted to the KCAPCD at about the same time as the AFC is submitted. The KCAPCD will work within the timeframes of the CEC's AFC process to issue the DOC.
PTO	Once the equipment becomes operational, a PTO must be obtained by the operator.

5.2.2 Affected Environment

The BSEP site is located approximately 17 miles north of Mojave in the Fremont Valley at the western edge of the Mojave Desert at an average elevation of 2,100 feet above mean sea level (amsl). The approximately 2,012-acre site is mostly vacant and significantly disturbed due to intensive agricultural use that ended in the mid-1980s. The site is located immediately east of California State Route 14 (SR-14) and railroad tracks owned and operated by the Union Pacific Railroad. Koehn Lake is approximately five miles to the east-northeast and Red Rock Canyon State Park is located four miles to the north. In the immediate environs of the Project site are the unincorporated community of Cantil to the northeast, the Honda Proving Center (an automotive test track facility) to the east, and widely scattered houses, trailers and ranches south and southeast of the plant site boundary.

5.2.2.1 Climate and Topography

The Project site is located in the Mojave Desert which is classified as a "high desert". It is a transition between the "hot" Sonoran Desert to the south and the "cold" Great Basin Desert to the north. Characteristic of a desert climate, the Mojave Desert has extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies.

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.

The average annual precipitation is less than six inches with over 78 percent of the precipitation occurring between November and March. There is, however, a summer thunderstorm season from July to September with violent heavy precipitation that occasionally produces flash flooding. May and June are usually the driest months.

Large-scale 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, in combination with the rain shadow produced by the coastal ranges and the mountain ranges that border the Mojave Desert to the west and south, keeps the Mojave 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 (Cajon and Soledad Passes) and the San Joaquin Valley (Tehachapi Pass). As will be discussed later in this section, pollutant transport into the Mojave Desert Air Basin (MDAB) is the primary reason for the periods of Federal and California ozone standard violations.

5.2.2.2 Meteorological Data

For air quality impact analyses, hourly meteorological data are needed for modeling purposes. Hourly surface meteorological data that are characteristic of the Project site are available from the Mojave-Poole Street Meteorological and Air Quality Monitoring Site located approximately 17 miles south of the Project site and operated by the KCAPCD. Three years of data for the years 2004-2006 were 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).

Winds

A wind rose based on Mojave - Poole Street monitoring station winds for 2002 to 2004 is presented in Figure 5.2-1 (EPA, 2008). Quarterly wind roses and frequency distributions are provided in Appendix E.1.

The annual wind rose shows a very prominent flow west to northwest occurring approximately 45 percent of the time, and a secondary peak for winds from the southwest and west-southwest that account for approximately 25 percent of winds in the Mojave area. These peaks are the result of large scale circulation patterns, nighttime drainage winds from the Sierra Nevada Mountains to the west, and winds funneling through the Tehachapi Pass from the Central Valley and the Soledad Pass from the Los Angeles Basin. The highest wind speeds experienced at the monitoring site occur during spring afternoons due to increased heating of the land that far exceeds the heating of the ocean surface during that time of year. These high wind speeds are associated with west to northwesterly winds passing through the Tehachapi Pass. On a less frequent basis, during the late fall and winter, the development of the northeasterly Santa Ana winds can be clearly seen in the increased wind speeds for the north to east-northeasterly quadrant from October through December, and to a lesser extent during January through March, are the result of high pressure that develops over the Great Basin in Nevada.

Temperature

As noted earlier, temperatures in the Project area can be very hot during the summer months and quite cold during the winter months. Table 5.2-4 summarizes daily maximum and minimum temperatures and extreme high and low temperatures by month.

Table 5.2-4 Climatic Temperature Data for Mojave, California

Means °F				Extremes °F		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	57.8	33.2	45.5	79	11	0.0	0.0	14.2	0.0
Feb	61.0	36.5	48.9	90	16	0.0	0.0	7.8	0.0
Mar	65.5	41.0	53.3	89	17	0.0	0.0	3.4	0.0
Apr	71.5	46.1	58.9	94	27	0.5	0.0	0.5	0.0
May	80.7	54.9	67.8	104	34	5.5	0.0	0.0	0.0
Jun	90.0	63.4	76.8	112	38	17.1	0.0	0.0	0.0
Jul	97.0	68.9	82.7	111	43	27.5	0.0	0.0	0.0
Aug	96.1	67.3	81.7	110	48	27.0	0.0	0.0	0.0
Sep	89.4	59.9	74.8	107	38	16.9	0.0	0.0	0.0
Oct	78.6	49.8	64.1	100	22	3.3	0.0	0.3	0.0
Nov	65.1	39.7	52.4	86	13	0.0	0.0	5.0	0.0
Dec	57.1	32.7	44.9	79	8	0.0	0.1	15.8	0.0
Year	75.8	49.4	62.7	112	8	97.9	0.1	46.9	0.0
Source: WRCC, 2007a									

Precipitation

Average annual precipitation in the Project area based on the Mojave data record is less than six inches with over 78 percent of the precipitation occurring in the months between November and March. Table 5.2-5 summarizes precipitation data (rainfall and snowfall) for the area.

Table 5.2-5 Climatic Precipitation Data for Mojave, California

Month	Rainfall (Inches)			Mean Number of Days			Snowfall (Inches)	
	Mean	Highest Monthly	Highest Daily	0.10 or more	0.50 or more	1.0 or more	Mean	One-Day Maximum
Jan	1.12	6.46	1.61	2	1	0	0.8	9.5
Feb	1.21	6.85	2.67	2	1	0	0.2	6.0
Mar	0.84	4.43	2.88	2	0	0	0.2	3.5
Apr	0.32	2.08	1.13	1	0	0	0.0	0.5
May	0.11	1.28	1.10	0	0	0	0.0	0.0
Jun	0.04	0.41	0.40	0	0	0	0.0	0.0
Jul	0.13	2.43	1.16	0	0	0	0.0	0.0
Aug	0.19	2.02	1.94	0	0	0	0.0	0.0
Sep	0.23	2.94	1.23	1	0	0	0.0	0.0
Oct	0.24	2.47	1.92	1	0	0	0.0	0.0
Nov	0.60	3.78	1.98	1	0	0	0.0	1.0
Dec	0.75	3.35	2.40	2	0	0	0.1	3.5
Year	5.78	15.51	2.88	13	3	1	1.3	11.0
Source: WRCC, 2007b								

5.2.2.3 Ambient Air Quality Data

As previously noted, the Project site is located in the MDAB and is under the jurisdiction of the KCAPCD. Federal and California ambient air quality standards are shown in Table 5.2-6. The attainment status of the Project area with respect to the Federal and California air quality standards are summarized in Table 5.2-7.

The closest air quality monitoring stations to the Project site are located in Mojave (923 Poole Street), Ridgecrest (178 W. California Ave), Lancaster (43301 Division Street) and Trona (Athol and Telegraph). KCAPCD operates the Mojave and Ridgecrest stations, the Antelope Valley Air Pollution Control District (AVAPCD) operates the Lancaster station, and the Mojave Desert Air Quality Management District (MDAQMD) operates the Trona station. Table 5.2-8 summarizes the pollutants monitored and the approximate distance from the Project site.

Mojave is the closest monitoring station to the Project site. This site is expected to provide data that are most representative of the Project site, although it likely to provide more conservative estimates of existing air quality (i.e., somewhat higher concentrations) compared to the Project site because it is more closely situated to populated areas, emission sources (e.g., SR-58 and SR-14), and pollution transported through the Tehachapi Pass from the Central Valley. Data from Lancaster will also provide conservative estimates of existing air quality because of the more densely populated Lancaster/Palmdale area, and of its proximity to the Soledad pass which is a principle pollution transport corridor between the South Coast Air Basin (Los Angeles Area) into the MDAB. Lancaster is the only site among these four that monitors CO, Ridgecrest only monitors PM10 and PM2.5, and the monitoring station closest to the BSEP site that monitors SO_2 is in Trona.

Table 5.2-6 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 5.2-6 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 tc 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 5.2-7 Summary of Attainment Status of the Project Area

Pollutant	Attainment Status	
	Federal Standards	**California Standards**
Ozone – 1-Hour	Attainment/Maintenance	Moderate Non-attainment
Ozone – 8-Hour	Subpart 1 Non-Attainment	No Designation
CO – 8-Hour	Unclassified / Attainment	Unclassified
NO_2	Unclassified	Attainment
SO_2	Unclassified	Attainment
PM10	Unclassifiable / Attainment	Non-attainment
PM2.5	Unclassifiable / Attainment	Unclassified
Lead Particulates	No Designation	Attainment
Source: KCAPCD, 2008		

Table 5.2-8 Air Quality Monitoring Stations Closest to the Project Site

Monitoring Site	Pollutants Measured at Monitoring Station						Approx. Distance and Direction from Project Site	County
	O_3	NO_2	SO_2	CO	PM10	PM2.5		
Mojave	**X**	**X**			**X**	**X**	**17 miles SW**	**Kern**
Ridgecrest					**X**	**X**	**30 miles NE**	**Kern**
Lancaster	**X**	**X**		**X**	**X**	**X**	**40 miles SSW**	**Los Angeles**
Trona	**X**	**X**	**X**		**X**		**50 miles NE**	**San Bernardino**

Tables 5.2-9 through 5.2-14 provide summaries of air quality data collected by the air quality monitoring stations and the number of times that the NAAQS and CAAQS were exceeded for each parameter for the years 2005-2007. These data were obtained from EPA AirData (http://www.epa.gov/air/data/index.html) (EPA, 2008).

The Mojave area is Attainment/Maintenance and Subpart 1 Non-Attainment for the national 1-hour and 8-hour ozone standards, and Moderate Non-attainment and No Designation for the California 1-hour and 8-hour ozone standards. These attainment statuses are reflected in the ambient monitoring data presented in Table 5.2-9. The Project will be a source of ozone precursor pollutant emissions (i.e., NOx and VOC).

Table 5.2-10 provides PM10 data in the region. The Project area is classified as Attainment for the national 24-hour PM10 standards but Non-Attainment for the California 24-hour PM10 standards. The California standard was exceeded at Mojave on two days and at Lancaster on four days during the 2005 to 2007 period.

Table 5.2-9 Ozone Data for Stations Nearest to the Project Site

Site	# Days > 1-Hr CAAQS	Highest 1-Hr Obs (ppm)	# Days > 8-hr NAAQS	Highest 8-Hr Obs (ppm)
Calendar Year 2007				
Mojave	N/A[1]	0.092	0	0.084
Lancaster	N/A[1]	0.118	14	0.101
Trona	N/A[1]	0.094	1	0.084
Calendar Year 2006				
Mojave	10	0.109	8	0.101
Lancaster	22	0.132	16	0.105
Trona	0	0.091	0	0.084
Calendar Year 2005				
Mojave	8	0.113	9	0.096
Lancaster	42	0.127	31	0.103
Trona	0	0.091	0	0.085

[1] N/A – Data not available to determine number of days above standard
Source: EPA AirData (http://www.epa.gov/air/data/index.html)

Table 5.2-10 PM10 Data for Stations Nearest to the Project Site

Site	# Days > 24-Hr NAAQS	# Days > 24-Hr CAAQS	Annual Average µg/m^3	Highest 24-Hr Average, µg/m^3
Calendar Year 2007				
Mojave	0	N/A[1]	22.0	73.0
Ridgecrest	0	N/A[1]	24.0	72.0
Lancaster	1	N/A[1]	30.0	188.0
Trona	0	N/A[1]	20.0	132.0
Calendar Year 2006				
Mojave	0	2	21.4	65.0
Ridgecrest	0	1	21.3	65.0
Lancaster	0	4	26.9	65.0
Trona	2	12	22.0	184.0
Calendar Year 2005				
Mojave	0	0	18.7	42.0
Ridgecrest	0	1	22.0	55.0
Lancaster	0	0	25.0	55.0
Trona	0	0	22.0	130.

[1] N/A – Data not available to determine number of days above standard
Source: EPA AirData (http://www.epa.gov/air/data/index.html)

Monitoring data for PM2.5 presented in Table 5.2-11 show that the national and California standards were not exceeded during the 2005 to 2007 period, which is consistent with the national Unclassified/Attainment and California Unclassified status for this pollutant.

Table 5.2-11 PM2.5 Data for Stations Nearest to the Project Site

Site	# Days > 24-Hr NAAQS	Annual Average µg/m^3	Highest 24-Hr Average µg/m^3
Calendar Year 2007			
Mojave	0	5.7	17.0
Ridgecrest	0	5.9	16.0
Lancaster	0	8.0	25.0
Calendar Year 2006			
Mojave	0	5.4	21.3
Ridgecrest	0	6.3	14.9
Lancaster	0	7.4	18.0
Calendar Year 2005			
Mojave	0	5.8	18.1
Ridgecrest	0	7.0	26.1
Lancaster	0	8.9	28.0
Source: EPA AirData (http://www.epa.gov/air/data/index.html)			

Available NO_2, CO and SO_2 data are presented in Tables 5.2-12 and 5.2-14; these pollutants are all classified as Attainment for both the applicable California and national standards. Of the four sites, CO is only monitored in Lancaster and SO_2 is only measured at the Trona station.

Table 5.2-12 NO_2 Data for Stations Nearest to the Project Site

Site	Highest 1-Hr Obs ppm	# Days > 1-Hr CAAQS	Annual Average ppm
Calendar Year 2007			
Mojave	PR[1]	PR[1]	PR[1]
Lancaster	0.064	0	0.014
Trona	0.055	0	0.005
Calendar Year 2006			
Mojave	PR[1]	PR[1]	PR[1]
Lancaster	0.066	0	0.015
Trona	0.050	0	0.005

Site	Highest 1-Hr Obs ppm	# Days > 1-Hr CAAQS	Annual Average ppm
Calendar Year 2005			
Mojave	0.044	0	ND[2]
Lancaster	0.074	0	0.015
Trona	0.053	0	0.005

[1] PR – Parameter removed from monitoring site.
[2] ND – Insufficient data to determine valid value, so value not reported by the ARB.
Source: EPA AirData (http://www.epa.gov/air/data/index.html)

Table 5.2-13 CO Data for Stations Nearest to the Project Site

Site	Highest 8-Hr Obs, ppm	# Days > 1- or 8-Hr NAAQS	# Days > 1- or 8-Hr CAAQS
Calendar Year 2007			
Lancaster	1.3	0	N/A[1]
Calendar Year 2006			
Lancaster	1.6	0	0
Calendar Year 2005			
Lancaster	1.54	0	0

[1] N/A – Data not available to determine number of days above standard
Source: EPA AirData (http://www.epa.gov/air/data/index.html)

Table 5.2-14 SO_2 Data for Stations Nearest to the Project Site

Site	# Days > 1-Hr CAAQS	Highest 1-Hr Obs, ppm	# Days > 3-Hr NAAQS	Highest 3-Hr Obs, ppm	# Days > 24-Hr CAAQS	Highest 24-Hr Obs, ppm	Annual Average, ppm
Calendar Year 2007							
Trona	N/A[1]	0.014	N/A[1]	0.009	N/A[1]	0.004	0.001
Calendar Year 2006							
Trona	0	0.033	0	0.017	0	0.005	0.001
Calendar Year 2005							
Trona	0	0.018	0	0.011	0	0.005	0.001

[1] N/A – Data not available to determine number of days above standard
Source: EPA AirData (http://www.epa.gov/air/data/index.html)

5.2.3 Control Technology Assessment

KCAPCD Rule 210.1 requires an applicant for an ATC or PTO to apply BACT to any new or modified source which results in an emission increase of NOx, SOx, PM10, or VOC. BACT is applied on a pollutant-specific basis.

KCAPCD's NSR program establishes pre-construction permit review requirements for equipment or processes subject to permit requirements. Under NSR, applicants are required to incorporate BACT when new equipment is installed, existing stationary permitted equipment is relocated, or existing permitted equipment is modified such that there is an emissions increase. BACT means the most stringent emission limitation or control technique which:

- Has been achieved in practice for such category or class of source; or
- Is contained in any state implementation plan (SIP) approved by the EPA for such category or class of source (unless demonstrated to the satisfaction of the APCO or designee to be not presently achievable); or
- Is any other emission limitation or control technique, found by the APCO or designee to be technologically feasible for such class or category of sources or for a specific source and cost-effective as compared to measures listed in the SIP.

EPA guidance for a "top-down" BACT analysis requires reviewing all possible control options starting with the best control efficiency. In the course of the BACT analysis, one or more options may be eliminated from consideration because they are demonstrated to be technically infeasible or have unacceptable energy, economic, or environmental impacts on a case-by-case (site-specific) basis. The steps recommended for a "top-down" BACT review are:

1. Identify Available Control Technologies;
2. Eliminate Technically Infeasible Options;
3. Rank Remaining Technologies;
4. Evaluate Remaining Technologies (in terms of economic, energy, and environmental impacts); and
5. Select BACT (the most efficient technology that cannot be rejected for economic, energy, or environmental impact reasons is BACT).

Publicly available information on emission control technologies was reviewed for step one of this analysis. The South Coast Air Quality Management District's (SCAQMD) Major Source BACT Guidelines, the SCAQMD's Non-Major Source Guidelines, the Bay Area Air Quality Management District (BAAQMD) BACT Guidelines, the San Joaquin Valley Air Pollution Control District (SJVAPCD) BACT database, the California ARB's BACT database, and EPA's RACT/BACT/LAER Clearinghouse (RBLC) were reviewed to determine BACT for each source. These guidelines are examples of past determinations that help in determining BACT for new permit applications. A summary of the evaluation and findings is provided below.

5.2.3.1 BACT Determination for Boilers

The boilers emit criteria pollutants (NOx, SOx, CO, VOC and PM10) due to the combustion of natural gas. The BACT determination is made through the recommended five-step process to identify available control technologies, eliminate technically infeasible options, rank and evaluate remaining technologies, and BACT selection. This section contains BACT determinations for NOx, SOx, CO, PM10 and VOC. Air pollution reduction efforts within the past several years has resulted in lower emission standards for boilers and, therefore, the database review was focused only on determinations from 2002 and later.

NOx

The technologies employed for NOx emissions control are listed below in descending order of effectiveness:

- Selective Catalytic Reduction (SCR)
- Ultra-low-NOx burners
- Low-NOx burners with flue gas circulation
- Flue gas circulation
- Good combustion practice and natural gas fuel

SCR was mentioned as an alternative control technology for boilers by the BAAQMD in their BACT guidance document. SCR is known to successfully control NOx to very low concentrations in large furnaces and combustion turbines, although there was little evidence that this technology has been applied to boilers in the size range of the proposed units. SCR requires a substantial capital investment for the catalyst bed, requires additional power for operations (additional blower horsepower is required to overcome the pressure drop in the catalyst bed), and requires the use of hazardous aqueous or anhydrous ammonia as the reducing agent. Based on the database review of boilers with similar heat rates, SCR is not used for NOx control on boilers in the size range of the proposed units, as evidenced by the large number of applications cited that use low-NOx or ultra low-NOx burner technologies. Due to the substantially higher cost, additional energy requirements, the need to use a hazardous material (ammonia), and lack of evidence that SCR is used on boilers in the size range of the proposed units, SCR is determined to be infeasible for this application.

The next most effective NOx control option is the use of ultra-low NOx burners. Ultra low-NOx burners with a stack NOx concentration of nine (9) parts per million by volume (ppmv) at three (3) percent excess oxygen is recommended as BACT for the boilers. A one-hour averaging period is recommended based on BACT determinations for similar installations.

CO and VOC

The technologies employed for CO and VOC emissions control in boilers are listed below in descending order of effectiveness:

- Oxidation catalyst
- Good combustion practices

Oxidation catalysts are known to successfully control CO and VOC to very low concentrations in large furnaces and combustion turbines, although there is little evidence that this technology has been applied to boilers in the size range of the proposed units. Oxidation catalysts are mentioned as an alternative control technology by the BAAQMD in their BACT guidance document for larger combustion sources (i.e., >50 MMBtu per hour). Oxidation catalyst requires a substantial capital investment for the catalyst bed, and requires additional power for operations (additional blower horsepower is required to overcome the pressure drop in the catalyst bed). Based on the database review of process heaters and boilers with similar heat rates, it appears that oxidation catalysts are not used for CO and VOC control on boilers in the size range of the proposed units. Due to the substantially higher cost, additional energy requirements, and lack of evidence that oxidation catalysts are used on boilers in this size range, oxidation catalysts are determined to be infeasible for this application.

Good combustion practice is recommended as BACT for this application. Based on several recent BACT determinations from the SCAQMD, 50 ppm at three (3) percent excess oxygen is recommended as BACT for CO emissions. Good combustion practice is recommended as BACT for VOC, with no specific concentration recommended. A one-hour averaging period is recommended.

PM10 and SOx

The technologies employed for PM10 and SOx emissions control for boilers are listed below in descending order of effectiveness:

- Pipeline-quality natural gas fuel
- Low-sulfur fuel
- Good combustion practices

The use of the top-ranked technology, the use of low-sulfur pipeline natural gas in conjunction with good combustion practice is recommended for the control of PM10 and SOx emissions. A specific emission limit or concentration is not recommended.

Summary of Proposed BACT for Boilers

Based on this review, the proposed BACT for the boilers is presented in Table 5.2-15.

Table 5.2-15 Proposed BACT for the Boilers

Pollutant	Emission Limit[1]	Technology	Reference
NOx	9.0 ppm at 3 percent O_2, 1-hr avg.	Ultra low-NOx burner	SCAQMD Part D BACT for Non-major polluting facilities
CO	50 ppm at 3 percent O_2, 1-hr avg.	Ultra low-NOx burner, good combustion practice	SCAQMD Part D BACT for Non-major polluting facilities
VOC	None	Pipeline-quality natural gas	Various
PM10	None	Pipeline-quality natural gas	Various
SOx	None	Pipeline-quality natural gas	Various

[1] The emission limits for NOx and CO would not apply during start up, shutdown or malfunction.

5.2.3.2 BACT Determination for Fire Water Pump Engine

NOx, VOC, and CO

The technologies employed for NOx, VOC and CO emissions control for internal combustion engines are listed below in descending order of effectiveness:

- Catalytic converter
- Oxidation catalyst
- NSPS-compliant engine

Catalytic converters and oxidation catalysts have been proposed and used on a limited number of diesel engines in California; however, neither have been used on emergency engine installations due to the high cost and limited environmental benefit (due to the low number of hours of operation). Catalytic converters and oxidation catalysts are, therefore, determined to be infeasible for this application.

NSPS Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, has been adopted for non-road engines that limit emissions of these pollutants, which varies depending upon the size, intended use and date of manufacture of the engine. A review of the EPA BACT/LAER Clearinghouse indicates that compliance with the NSPS is BACT. Compliance with the applicable NSPS is feasible and has been achieved in practice. This engine fits into the fire water pump engine category for engines constructed 2009 and later, with horsepower greater than or equal to 300 and less than 600. Compliance with the applicable NSPS is determined to be BACT for this application.

PM10

The technologies employed for PM10 emissions control for internal combustion engines are listed below in descending order of effectiveness:

- Diesel particulate trap
- NSPS-compliant engine

Diesel particulate traps have been proposed and used on a limited number of diesel engines; however, they have not been used on emergency engine installations due to the high cost and limited environmental benefit (due to the low number of hours of operation). Diesel particulate traps are, therefore, determined to be infeasible for this application. A NSPS-compliant engine is recommended as BACT for this application.

SOx

Emissions of SOx are dependent upon the amount of sulfur in the fuel. A review of the EPA RBLC indicates that the lowest sulfur content fuel available contains 15 ppm sulfur. Use of diesel fuel with a sulfur content of 15 ppm is recommended as BACT for this application.

Summary of BACT for Emergency Engine

Based on this review, the proposed BACT for the emergency fire water pump engine is presented in Table 5.2-16.

Table 5.2-16 Proposed BACT for the Fire Pump Engine

Description	CO g/bhp-hr	NMHC + NOx g/bhp-hr	PM g/bhp-hr	SOx
Fire Pump (300 ≤ hp < 600)	2.6	3.0	0.15	15 ppm S fuel

5.2.3.3 BACT Determination for Cooling Tower

Emissions and hence the BACT determination are limited to PM10. The technology available for control of PM10 from wet cooling towers is a high-efficiency drift eliminator.

The use of a high-efficiency drift eliminator on a wet cooling tower is BACT. The drift elimination efficiency level that a supplier is willing to guarantee differs depending on the type of cooling tower involved, which in turn is dictated by the specific requirements of the application for which cooling is required. For the cooling tower, drift eliminators with a vendor-guaranteed efficiency of 0.0005 percent represents BACT for PM10 for a vertically-oriented cooling tower proposed for the BSEP facility.

5.2.3.4 BACT Determination for HTF Expansion Tank Emissions

The HTF expansion/ullage tanks emit VOC up to approximately two (2) hours per day; emissions are limited to VOC. VOCs can generally be controlled through the use of the following technologies, depending on a number of factors, including flow rate, VOC concentration, moisture content, and the specific properties of the VOC involved. These technologies are not listed in order of control efficiency.

- Carbon adsorption
- Thermal oxidation
- Catalytic oxidation
- Regenerative thermal oxidation (RTO)
- Refrigerated condenser
- A combination of technologies, such as a carbon adsorber concentrator followed by an oxidation technology

Carbon adsorption is a process where an activated carbon with high surface area is used to capture air pollutants. Single carbon beds typically are designed for 95 percent control, and multiple beds in series can achieve control efficiencies of 99 percent or more. Adsorption of the hydrocarbons proceeds until the carbon is saturated or spent. Then the carbon must either be regenerated or replaced. Carbon adsorption can be an expensive control technology for high concentration and/or high volume vapor streams.

Thermal oxidation uses high temperature combustion (1,200 °F – 2,400 °F) to control air pollutants in vapor streams. Capital equipment costs vary according to system size. Fuel requirements (costs) are generally higher than other oxidation technologies. Thermal oxidation usually works best when operated continuously; intermittent operation is impractical due to long heat up times for the combustion chamber, and frequent thermal cycling stresses the refractory and shortens equipment life. Thermal oxidation is assumed to have a control efficiency of 95 or greater. Thermal oxidation requires the combustion of fuel, so will also be a source of other pollutants. Because the HTF venting is not a continuous process, the thermal oxidation is not well suited to the application and has been eliminated from further consideration.

RTO uses two or more heat exchangers to carry out oxidation and heat recovery. RTOs typically consume less energy than other oxidation processes and can recover 90 to 95 percent of the heat generated by oxidation. RTO control efficiencies are typically greater than 95 percent and can exceed 99 percent in some installations. RTOs are ideal for low- to moderate-VOC concentrations, high gas volume, continuous operations. Because the HTF venting is not a continuous process, the RTO is not well suited to the application and has been eliminated from further consideration.

Catalytic oxidation occurs through a chemical reaction between VOC and a metal catalyst. This process occurs in a lower temperature range (550°F - 650°F) than the thermal oxidation process. Therefore, catalytic oxidation can be more cost-effective for vapor streams with low heat content. Control efficiencies are comparable to thermal oxidation. The catalyst bed is prone to poisoning under certain circumstances.

The combination of carbon adsorption followed by an oxidation technology is ideally suited to a vent stream with very high gas volumes and very low VOC concentrations. In contrast, the HTF vent emissions are expected to have low gas volumes and high VOC concentrations. Thus, the combination of carbon followed by oxidation is rejected as BACT based on the unsuitability of the technology to the process.

A refrigerated or water-cooled condenser is a control option that can be used to condense the VOC vapors leaving the HTF expansion tanks. The control efficiency of a refrigerated or water-cooled condenser depends on the vapor pressure of the VOC and the temperature of the coolant. Control efficiencies are typically lower than other VOC control technologies. Due to the very low vapor pressure of HTF at ambient temperature, the control efficiency of a water-cooled condenser is expected to exceed 99 percent for HTF; however, byproducts of thermal degradation of the HTF may include benzene and other light hydrocarbons. The control efficiency of a water-cooled condenser for benzene will be substantially lower. Because the control efficiency of the water-cooled condenser for benzene is substantially lower than either the carbon adsorption or the oxidation technologies, the water-cooled condenser doesn't satisfy BACT and is rejected for this application.

Depending on the specific circumstances of the application, the remaining technologies (carbon adsorption and catalytic oxidation) can have comparable control efficiencies; thus the technology selection is based on other factors. All of the technologies will have some electrical load for fans/blowers, and while the electrical load may differ between the technologies, the difference is not significant enough to dictate the choice of technology.

The applicant has selected two carbon beds in series as the preferred control technology because the catalytic oxidation technology creates secondary emissions of criteria pollutants from combustion of fuel. Carbon adsorption does not create secondary pollutants, and thus has a lower environmental impact.

5.2.4 Environmental Impacts

This section provides a discussion of air quality impacts from criteria pollutant emissions from the BSEP. Section 5.10, Public Heath, provides a discussion of the impacts to public health from potential Project emissions of toxic and hazardous air pollutants.

5.2.4.1 Significance Criteria

Pursuant to KCAPCD guidance (KCAPCD, 1999), a proposed project is determined to not have significant (as defined by CEQA, Section 21068) air quality impact on the environment, if operation of the project will:

1. Emit (from all project sources subject to KCAPCD Rule 201) less than offsets trigger levels set forth in Subsection III.B.3. of KCAPCD's Rule 210.1 (New and Modified Source Review Rule);
2. Emit less than 137 pounds per day of NOx or ROC from motor vehicle trips (indirect sources only);
3. Not cause or contribute to an exceedance of any CAAQS or NAAQS;
4. Not exceed the District health risk public notification thresholds adopted by the KCAPCD Board; and
5. Be consistent with adopted Federal and State Air Quality Attainment Plans.

5.2.4.2 Emissions

This section provides the criteria pollutant emissions estimates for the proposed BSEP emission sources. Emissions have been estimated for the two phases of the Project: construction and operation, each of which is discussed below. Commissioning of Project emission sources is not expected to cause emissions that are higher than or different than normal operating emissions and, therefore, commissioning is not considered as a separate phase of Project development.

Construction

During the construction of the BSEP, there will be emissions similar to those associated with any large industrial construction project. Onsite emissions will arise primarily from heavy-duty vehicles and equipment. Onsite fugitive dust emissions will also be generated during site preparation and during construction. Offsite 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 BSEP will include construction of the solar facility (power block and solar array, as well as other ancillary facilities such as the administration buildings, evaporation ponds and re-routed drainage channel), the approximately 17.6-mile natural gas supply pipeline, and the approximately 3.5-mile electric transmission line (one of two options).

Construction of the BSEP solar power plant will require approximately 25 months. Construction of the natural gas supply pipeline will require approximately five months. Transmission line construction will occur over a three-month period. Construction of Project elements will occur concurrently.

Table 5.2-17 summarizes maximum daily and annual onsite emissions during construction of the solar facility. These emissions were modeled and the results are provided in Section 5.2.4.4. Table 5.2-18 summarizes maximum daily offsite emissions from vehicles traveling to the site and from equipment used in the construction of the natural gas supply line and the 3.5-mile transmission line. Details of the construction emission calculations are in Appendix E.2.

Table 5.2-17 Maximum Onsite Solar Facility Construction Emissions

Time Period	CO	VOC	NOx	SOx	PM10	PM2.5
Daily (lb/day)	1,027.6	204.7	1,876.6	1.7	446.6	196.5
Annual (tpy)	71.5	10.3	85.9	0.1	24.4	9.8

Table 5.2-18 Maximum Daily Offsite Construction Emissions

Project Component	CO (lb/day)	VOC (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Offsite Vehicle Use	896.6	67.2	133.1	0.1	47.6	10.6
Natural Gas Pipeline	546.3	85.4	529.4	0.5	102.5	44.5
Transmission Line	42.9	8.6	67.1	0.1	81.4	19.1

Operations

Criteria pollutant emissions (i.e., NOx, SOx, CO, VOC and PM10) are expected from the following devices during normal facility operations:

- Two 30 MMBtu per hour natural gas-fired boilers used for start up and for freeze protection;
- One 300-hp diesel-fired emergency fire water pump engine;
- One 11-cell wet cooling tower;
- Six HTF expansion/ullage tanks; and
- Maintenance vehicles.

Emission calculation methodologies and emission estimates are provided in this section. Detailed emission calculations are provided in Appendix E.2.

Boiler Emissions: Combustion of natural gas fuel results in the emissions of NOx, SOx, CO, VOC, PM10 and PM2.5. The assumptions made regarding boiler operation used as the basis for emission calculations include:

- Two 30 MMBtu per hour boilers;
- Natural gas will be the only fuel used by the boilers;
- Boilers to be equipped with ultra-low-NOx burners;
- Operation of the boilers is limited to 14 hours per day and 1,000 hours per year; and
- 100 percent of the PM10 emissions are PM2.5.

The criteria pollutant emission factors used for the NOx, SOx and CO emission estimates are based on the BACT analysis (see Section 5.2.3); the PM10 and VOC emission factors are taken from EPA AP-42 emission factors for Natural Gas Combustion (EPA, 1998). Boiler criteria pollutant emissions for a single boiler are shown in Table 5.2-19. A complete discussion of the methods and assumptions used to estimate boiler emissions, along with calculations, is found in Appendix E.2.

Based on 1,000 hours per year of operation at full load, the boilers will operate at capacity factors of 11.4 percent. The fuel will be pipeline-quality natural gas; the gas properties and heating value are provided in Table 2-2 in Section 2.0, Project Description.

Table 5.2-19 Boiler Criteria Pollutant Emissions (One Boiler)

Pollutant	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
NOx	0.33	4.67	0.17
VOC	0.16	2.20	0.08
CO	1.13	15.78	0.56
SOx	0.008	0.11	0.004
PM10	0.15	2.10	0.075
PM2.5	0.15	2.10	0.075

Emergency Diesel-Fired Engine Emissions: Combustion of diesel fuel results in the emissions of the criteria pollutants. The assumptions made regarding emergency engine operation used as the basis for emission calculations include:

- One John Deere Co. 300-hp diesel-fired engine, Model 6081HF001 (a Tier 3 engine);
- Use of ultra-low sulfur (15 ppm) diesel fuel;
- The diesel fire water pump hours are based upon up to one one-hour test per week, not to exceed 50 hours per year, and do not reflect emergency use; and
- 100 percent of the PM10 emissions are PM2.5.

Emission estimates for NOx, CO, VOC and PM10 are based on emission factors for EPA Tier 3 certified engines, as determined by the BACT analysis (see Section 5.2.3). Note that under Tier 3, the emission standard for non-methane hydrocarbons (NMHC) is combined with NOx. For these emission estimates, the NOx fraction is assumed to be 95 percent of the combined emissions, and the balance NMHC (ARB, 2003). NMHC is assumed to be equivalent to VOC. Emission estimates for SOx are based on estimated fuel use of 15.3 gallons per hour with a heating value of 137,000 Btu per gallon, and fuel sulfur content of 15 ppm. Engine criteria pollutant emissions are shown in Table 5.2-20. A discussion of the methods and assumptions used to estimate fire water pump engine emissions can be found in Appendix E.2.

Table 5.2-20 Fire Pump Engine Criteria Pollutant Emissions

Pollutant	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
NOx	1.88	1.88	0.05
VOC	0.10	0.10	0.15
CO	1.72	1.72	1.34
SOx	0.0033	0.0033	0.0002
PM10	0.10	0.10	0.32
PM2.5	0.10	0.10	0.32

***Cooling Tower PM10 Emissions**:* Because wet cooling towers provide direct contact between the cooling water and the air passing through the tower, some of the liquid water may be entrained in the air stream and be carried out of the tower as "drift" droplets. PM10 is generated when the drift droplets evaporate and leave fine particulate matter formed by precipitation/crystallization of dissolved solids. Dissolved solids found in cooling tower drift can consist of mineral matter, chemicals used for corrosion inhibition, etc. The assumptions made regarding cooling tower operation that are used as the basis for the emission calculations include:

- Circulation rate of 149,000 gallons per minute;
- Cooling tower blowdown will contain a maximum of 1,600 milligrams per liter (mg/L) Total Dissolved Solids (TDS) assuming fifteen cycles of concentration;
- The cooling tower will be equipped with a drift eliminator with drift losses of less than or equal to 0.0005 percent by weight based on circulation flow rate;
- The cooling tower maximum run time will be 16 hours per day; and
- 100 percent of the TDS is PM10/PM2.5 emissions.

Particulate matter emissions are calculated according to the method described in EPA's Compilation of Air Pollutant Emission Factors (AP-42), Section 13.4 Wet Cooling Towers (EPA, 1995). Cooling tower PM10 emissions are shown in Table 5.2-21. A discussion of the methods and assumptions used to estimate cooling tower emissions can be found in Appendix E.2.

Table 5.2-21 Cooling Tower PM10 Emissions

Pollutant	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	0.60	9.55	1.74
PM10	0.60	9.55	1.74
PM2.5	0.60	9.55	1.74

HTF Expansion Tank Emissions: The total uncontrolled VOC emissions from the HTF expansion/ullage tank vent were estimated based on data provided by an existing solar plant (Kramer Junction Solar Energy Generating System [SEGS] facility), extrapolated to account for HTF system size. Controlled emissions were calculated based on the use of two carbon adsorption canisters in series, each with a control efficiency of 95 percent, for an overall control efficiency of 99.5 percent. The emissions from waste loadout were calculated using the EPA software *Tanks 4.09* for an assumed twelve waste hauls per year. HTF vent tank and waste disposal emissions are shown in Table 5.2-22.

Table 5.2-22 HTF VOC Emissions

Source	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
HTF Vent	0.23	0.47	0.09
Waste Loadout	7.07	14.15	0.08

Maintenance Vehicle Emissions: The facility will require periodic vehicle travel over the unpaved portions of the solar field to perform routine maintenance including mirror washing, maintenance inspections and repairs of the piping network, herbicide application and dust suppressant application. Criteria pollutant emissions are expected from the combustion of fuels in the vehicles and fugitive PM emissions are expected from vehicle traffic in the solar fields. PM emissions are minimized through the implementation of an Operations Dust Control Plan, including the periodic application of a polymer-type dust suppressant.

Vehicle criteria pollutant emissions are calculated as the anticipated miles traveled multiplied by an emission factor. The emission factors, except fugitive emissions from entrained road dust, were compiled by running the California ARB's EMFAC2007 (version 2.3) Burden Model and dividing calculated daily emissions by daily vehicle-miles-traveled. All vehicles are assumed to be heavy-duty diesel vehicles. All the emission factors account for the emissions from start, running and idling exhaust. The VOC emission factors take into account diurnal, hot soak, running and resting emissions, and fugitive PM10 and PM2.5 emission factors take into account tire and brake wear and entrained unpaved road dust. Vehicle emissions are shown in Table 5.2-23.

VOC Emissions from Bioremediation: As discussed in Section 2.0, Project Description, the facility will use bioremediation in an onsite landfarm to remediate HTF-contaminated soils. Bioremediation will be conducted at ambient temperatures. At ambient temperatures, the vapor pressure of the HTF is negligible and, therefore, the expected VOC emissions are negligible and have not been estimated for this application.

Fugitive VOC Emissions: Fugitive VOC emissions may occur in the HTF piping in the solar field from fugitive components such as pumps, seals, flanges and valves. The fugitive VOC emissions are expected to be negligible due to the very low vapor pressure of the HTF. If a leak were to occur, the leaked materials are expected to be liquids, not vapors. Therefore, fugitive emissions from the HTF loop are not estimated.

Similarly, the facility will have a natural gas pipeline to supply fuel to the boilers. The pipeline will have fugitive components such as seals, flanges and valves. The fugitive emissions are expected to be negligible due to the low concentration of VOC in natural gas and the quality of the seals in the components. Therefore, fugitive emissions from the pipeline are not estimated.

Table 5.2-23 Maintenance Vehicle Emissions

Vehicle	CO	VOC	NOx	SOx	Exhaust PM10	Fugitive PM10	Diesel PM	Exhaust PM2.5	Fugitive PM2.5
	Lb/hr								
Mirror Wash Truck	0.06	0.01	0.19	2.08E-04	0.008	0.74	0.008	0.007	0.16
Maintenance Vehicles	0.23	0.02	0.03	0.000	0.001	2.95	0.000	0.001	0.63
Weed Abatement	0.06	0.01	0.19	2.08E-04	0.008	0.74	0.008	0.007	0.16
Soil Stabilizer Application	0.06	0.01	0.19	2.08E-04	0.008	0.74	0.008	0.007	0.16
Total	**0.42**	**0.06**	**0.62**	**6.24E-04**	**0.02**	**5.17**	**0.02**	**0.02**	**1.10**
	lb/day								
Mirror Wash Truck	0.29	0.07	0.93	9.98E-04	0.037	3.55	0.037	0.034	0.75
Maintenance Vehicles	4.51	0.33	0.66	0.000	0.024	56.71	0.000	0.023	12.02
Weed Abatement	0.49	0.12	1.56	1.66E-03	0.062	5.91	0.062	0.057	1.25
Soil Stabilizer Application	0.49	0.12	1.56	1.66E-03	0.062	5.91	0.062	0.057	1.25
Total	**5.77**	**0.64**	**4.70**	**4.32E-03**	**0.18**	**72.07**	**0.16**	**0.17**	**15.28**
	Tpy								
Mirror Wash Truck	0.018	0.004	0.058	0.0001	0.002	0.222	0.002	0.002	0.047
Maintenance Vehicles	0.583	0.142	1.867	0.002	0.074	7.090	0.074	0.068	1.503
Weed Abatement	0.002	0.0005	0.007	0.0000	0.0003	0.025	0.0003	0.0002	0.005
Soil Stabilizer Application	0.002	0.0005	0.007	0.0000	0.0003	0.126	0.0003	0.0002	0.027
Total	**0.61**	**0.15**	**1.94**	**0.002**	**0.08**	**7.46**	**0.08**	**0.07**	**1.58**

Summary of Criteria Pollutant Emissions:

Criteria pollutant emissions for the Project are summarized in Table 5.2-24; detailed breakdowns are provided in Appendix E.2.

Although new PM10 emissions are estimated due to this Project, the BSEP will likely reduce overall PM10 emissions in this region. Discussions with personnel (Pawling, 2007) at the Honda Proving Center facility, a test track immediately to the east of the BSEP site, indicate that the exposed open fields on this formerly farmed property are currently a large source of wind blown dust. By its nature, a solar energy project must keep dust to a minimum through the use of dust control measures, as a film on the mirrors will reduce their efficiency for power production. Experience at the existing SEGS facilities at Kramer Junction and Harper Lake has been that PM10 emissions from driving in the solar field are (as it must be) negligible. Dust control is achieved by a combination of soil stabilizers, water from the mirror washing, and compaction of the driving surface over time. These mitigation measures will be utilized by the proposed Project. Therefore, the emission estimates and impact analyses for PM10 and PM2.5 should be considered very conservative.

5.2.4.3 Greenhouse Gas Emissions

The BSEP boilers and emergency fire water pump engine may emit greenhouse gases (GHG). The methodology used to calculate GHG emissions from each of these sources is explained below. Total GHG emissions from the Project are summarized in Table 5.2-25. Additional details of the calculations are provided in Appendix E.2.

Auxiliary Boilers

GHG emissions from operation of the 30 MMBtu per hour boilers are based on the permitted maximum usage of the units by the Project (1,000 hours/year) and the emission factors listed in Tables C.5 and C.6 of the California Climate Action Registry General Reporting Protocol, Version 2.2 (GRP) (March 2007).

CO_2 Equivalents

CO_2 equivalents are calculated using the global warming potential (GWP) provided in Appendix C of the GRP (March 2007) in the column labeled GWP, as these are the values used by the California Climate Registry. The GWP of methane is 21 times that of CO_2 and the GWP of nitrous oxide is 310 times that of CO_2.

As a comparison, a new 250 MW gas-fired combustion turbine power plant would have the potential to emit on the order of one million metric tons of CO_2e. Hence, the development of new renewable energy projects will assist the State of California to meet the GHG reduction goals provided in AB 32 while still providing the power needs of all Californians.

Table 5.2-24 Summary of Project Criteria Pollutant Emissions

Source	NOx	SOx	CO	VOC	PM10	PM2.5
	Hourly Emissions (lb/hr)					
Boiler No. 1	0.33	0.01	1.13	0.16	0.15	0.15
Boiler No. 2	0.33	0.01	1.13	0.16	0.15	0.15
Cooling Tower	0.00	0.00	0.00	0.00	0.60	0.60
Emergency Fire Pump Engine	1.88	0.00	1.72	0.10	0.10	0.10
HTF Vent	0.00	0.00	0.00	0.23	0.00	0.00
Waste Loadout	0.00	0.00	0.00	7.07	0.00	0.00
Maintenance Vehicles	0.62	0.00	0.42	0.06	5.19	1.12
Total	**3.17**	**0.02**	**4.39**	**7.78**	**6.19**	**2.12**
	Daily Emissions (lb/day)					
Boiler No. 1	4.67	0.11	15.78	2.20	2.10	2.10
Boiler No. 2	4.67	0.11	15.78	2.20	2.10	2.10
Cooling Tower	0.00	0.00	0.00	0.00	9.54	9.54
Emergency Fire Pump Engine	1.88	0.00	1.72	0.10	0.10	0.10
HTF Vent	0.00	0.00	0.00	0.47	0.00	0.00
Waste Loadout	0.00	0.00	0.00	14.15	0.00	0.00
Maintenance Vehicles	4.70	0.00	5.77	0.64	72.26	15.45
Total	**15.92**	**0.24**	**39.05**	**19.75**	**86.10**	**29.29**
	Annual Emissions (tpy)					
Boiler No. 1	0.17	0.00	0.56	0.08	0.08	0.08
Boiler No. 2	0.17	0.00	0.56	0.08	0.08	0.08
Cooling Tower	0.00	0.00	0.00	0.00	1.74	1.74
Emergency Fire Pump Engine	0.05	0.00	0.04	0.00	0.00	0.00
HTF Vent	0.00	0.00	0.00	0.09	0.00	0.00
Waste Loadout	0.00	0.00	0.00	0.08	0.00	0.00
Maintenance Vehicles	1.94	0.00	0.61	0.15	7.54	1.65
Total	**2.32**	**0.01**	**1.78**	**0.48**	**9.43**	**3.55**

Table 5.2-25 Summary of Project GHG Emissions

Source	Metric Tons CO_2e
Boilers	3,176
Emergency IC Engine	7.81
Project Total	**3,184**

5.2.4.4 Air Quality Impacts Analysis

The air quality impacts analyses were conducted in accordance with the EPA Guideline on Air Quality Models (GAQM; as incorporated in Appendix W of 40 CFR Part 51). An overview of the modeling methodology is provided below. The detailed methodology for the air quality impact assessment is documented in the modeling protocol, "Air Quality Dispersion Modeling Protocol for the Proposed Beacon Solar Energy Project", provided in Appendix E.3. KCAPCD does not require modeling for minor sources such as those proposed for the BSEP, nor is there any EPA requirement for modeling for this Project.

Air quality modeling was conducted with the EPA's AERMOD dispersion model (Version 07026) to demonstrate compliance with the NAAQS and CAAQS in the local (Class II) area. In addition to addressing air quality impacts associated with normal facility operations, maximum air quality impacts associated with construction-related air emissions of the solar facility were also assessed for exhaust and fugitive dust from vehicles and construction equipment, and windblown fugitive dust.

Application of AERMOD

Meteorological Input Data: AERMOD was applied with a 3-year sequential hourly meteorological data set, consistent with Appendix B of the CEC's Rules of Practice and Procedure & Power Plant Site Certification Regulations (2000). Three years (2002-2004) of wind speed, wind direction and temperature data from the nearby Mojave Poole Street meteorological site were obtained from EPA Air Quality System (AQS) (http://www.epa.gov/ttn/airs/airsaqs/aqsweb/). The meteorological tower has an anemometer height of 10.0 meters. The tower data were supplemented with National Weather Service (NWS) data from General William J. Fox Field in Lancaster, California 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, Nevada were also used as required for the dispersion modeling. Note that although 2005 and 2006 data were available, it 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 modeling protocol (Appendix E.3), the surface and upper air data were processed with the AERMOD meteorological processor, AERMET (06341).

Receptor Grids: A comprehensive Cartesian receptor grid extending to approximately 10 kilometers (km) from the proposed emission sources was used in the AERMOD modeling to assess maximum ground-level pollutant concentrations. The 10-km receptor grid was more than sufficient to resolve the maximum impacts of all modeled pollutants. The Cartesian receptor grid consisted of the following receptor spacing:

- Fenceline to 3,000 meters (m) at 100 m increments;
- Beyond 3,000 m to 5,000 m at 200 m increments; and
- Beyond 5 km to 10 km at 500 m increments.

Discrete receptors were placed approximately every 50 m along the plant fenceline for increased resolution of impacts along this boundary. Figures that illustrate the receptors are provided in the modeling protocol (Appendix E.3). Terrain elevations from Digital Elevation Model (DEM) data acquired from United States Geological Service (USGS) were processed with AERMAP (the AERMOD receptor processor) to develop the receptor terrain elevations and corresponding hill height scale required by AERMOD. All of the DEM files were from Universal Transverse Mercator (UTM) Zone 11 and referenced to North American Datum (NAD) 27. The DEM files are included on the modeling archive CD which is provided in Appendix E.4.

Model Options: 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 three years for the pertinent averaging periods.

Air Quality Impacts for Project Construction

Construction of the BSEP is anticipated to take 25 months. Construction-related air emissions include exhaust and fugitive dust from vehicle and construction equipment, and windblown fugitive dust from grading and other soil disturbing activities. The activities were overlaid (see Appendix E.2) to determine the worst case emissions, i.e., the times when the most emissions would occur from the types and numbers of equipment expected to occur in each month. The criteria pollutant emission rates shown in Table 5.2-26 were modeled to determine maximum air quality impacts. The maximum modeled concentrations were added to background concentrations and compared to the applicable standards.

Table 5.2-26 Emissions Data for Construction Impacts Modeling

Pollutant	Averaging Period	Emission Rate (lb/hr)		
		Construction Equipment	Onsite Motor Vehicles	Fugitive Emissions
CO	1-hour	9.01E+01	1.00E+00	N/A
	8-hour	9.01E+01	1.00E+00	N/A
NO_2	1-hour	1.18E+02	5.40E-01	N/A
	Annual	5.87E+01	2.50E-01	N/A
SO_2	1-hour	1.08E-01	4.16E-04	N/A
	3-hour	1.08E-01	4.16E-04	N/A
	24-hour	1.16E-01	1.30E-04	N/A
	Annual	5.32E-02	2.10E-04	N/A
PM10	24-hour	5.79E+00	4.87E-03	2.12E+01
	Annual	2.72E+00	7.85E-03	1.18E+01
PM2.5	24-hour	5.26E+00	4.48E-03	7.58E+00
	Annual	2.46E+00	7.22E-03	3.78E+00

Emissions of criteria pollutants from 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.

For the emission sources associated with construction activities, a rectangular area polygon source with a total area of 60,701 square meters (m^2) was used. The modeled area represents the largest area that will be under construction at a given time (e.g., day), and the construction emission flux is calculated based on this area. The emission source for construction had two overlaid area sources, one for the windblown fugitive dust and onsite vehicle emissions, and a second for the construction equipment with vertical exhaust releases.

A release height of 2.0 m was assumed for the fugitive and onsite 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 construction modeling results for criteria pollutants are summarized in Table 5.2-27. Ambient background concentrations are summed with the maxima modeled over the three-year period for comparison to the NAAQS and CAAQS. In order to convert the modeled NOx concentrations to NO_2, the Ozone Limiting Method (OLM) option in AERMOD was used. 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 EPA air quality station data for the Mojave monitoring station.

In order to determine the maximum 1-hour NO_2 concentration in comparison to the CAAQS of 338[1] µg/m^3, AERMOD with the OLM option was run for a typical construction day. The resultant concentration of 216.7 µg/m^3, when added to the highest observed NO_2 concentration (i.e., the background concentration), produces a modeled impact of 355.8 µg/m^3, which exceeds the 1-hour NO_2 CAAQS of 338 µg/m^3. However, this impact is an extremely conservative estimate, because it assumes that the maximum modeled impact from the construction activities (where the maximum amount of simultaneous activity was calculated) would occur at the same time as the maximum background concentration that was measured over a three-year period. It is very unlikely that this alignment would happen. Furthermore, the second-highest modeled impact during construction was 198.5 µg/m^3, which, when added to the highest observed concentration, produces a total impact of 337.6 µg/m^3, which is under the new 1-hour NO_2 CAAQS that is scheduled to take effect in the near term. Thus, only one of the more than 8,000 hours modeled yielded an impact above the CAAQS when added to the highest observed concentration. Therefore, the probability that the 1-hour NO_2 CAAQS will be exceeded during construction is negligible. An electronic copy of the files containing the NO_2 construction analysis, including the hourly ozone and background NO_2 values, is included in the modeling archive CD provided in Appendix E.4.

[1] The California Office of Administrative Law (OAL) approved the rulemaking to enact this new 1-hour NO_2 CAAQS on February 19, 2008, and the revised standard will become effective March 20, 2008.

Table 5.2-27 NAAQS and CAAQS Analysis for Project Construction

Pollutant	Averaging Period	Concentrations ($\mu g/m^3$)				
		AERMOD	Ambient Background[2]	Total[3]	CAAQS	NAAQS
NO_2[1]	1-hr	216.7	139.1	355.8	338	--
	Annual	1.1	28.2	28.3	--	100
CO	1-hr	1,371	3,664	5,035	23000	40000
	8-hr	173.8	1,832	2,006	10000	10000
PM10	24-hr	36.9	73.0	109.9	50	150
	Annual	0.29	22.0	22.3	20	--
PM2.5	24-hr	15.2	15.3	30.5	--	35
	Annual	0.13	5.8	5.9	12	15
SO_2	1-hr	1.6	88.5	90.1	665	--
	3-hr	0.54	44.5	45.0	--	1300
	24-hr	0.07	13.1	13.2	105	365
	Annual	0.001	2.6	2.6	--	80

[1] Modeled NO_2 concentrations as determined with the AERMOD OLM.

[2] Short-term values are highest over 3-years for all pollutants, annual values are highest over 3-years.

[3] Modeled concentration plus ambient background.

The other pollutants and averaging times were similarly analyzed, but without the OLM option that only applies to NO_2. In this area, the CAAQS for 24-hour PM10 is exceeded due to the background data alone. The maximum modeled 24-hour PM10 and PM2.5 impacts, when added to the background values, are in compliance with the NAAQS. As the site location is within a state non-attainment area for PM10, mitigation strategies will be put into place during construction to minimize impacts from PM10 emissions. The maximum concentrations of CO and SO_2 during construction were found to be below their respective CAAQS and NAAQS.

Air Quality Impacts for Project Normal Operations

Normal operation of the Project includes the following air emission sources that were evaluated in the modeling analysis (modeling is not typically performed for VOC emissions):

- Two auxiliary boilers,
- One fire water pump engine, and
- One 11-cell cooling tower.

The stack parameters and emission rates input to AERMOD for the boilers, engine and cooling tower for normal operations are summarized in Table 5.2-28.

Table 5.2-28 Stack Parameters for the Ancillary Equipment

Parameter	Auxiliary Boiler #1	Auxiliary Boiler #2	Fire Water Pump	Cooling Tower[1]
UTM Coordinate East (meters)	407794.05	407800.78	407913.29	407822.97
UTM Coordinate North (meters)	3902263.63	3902263.63	3902390.56	3902222.91
Stack Base Elevation (feet)	2106.3	2106.3	2106.3	2106.3
Stack Height (feet)	40	40	10	44.34
Stack Diameter (inches)	30	30	6	336
Exit Temperature (^{o}F)	300	300	770	84.32
Exit Velocity (feet/second)	60	60	150	30.03

[1] The cooling tower has 11 cells and each was modeled as a single stack. Coordinate provided for a central cell.

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 required building dimensions to be input to AERMOD. The GEP stack height analysis was conducted using the EPA Building Profile Input Program (BPIP) that performs the GEP calculation for a multi-building complex on a stack-by-stack basis.

The stack and building locations included in the GEP analysis are shown in Figure 5.2-2 and a summary of the GEP analysis is provided in Table 5.2-29. The stack heights of the Project equipment will be less than their respective GEP formula heights and thus 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 CD provided in Appendix E.4.

The two auxiliary boilers, the fire water pump diesel engine and the cooling tower were modeled together to determine the worst case impacts for each pollutant. The maximum air quality impacts due to emissions from the Project sources for each of the three years modeled are summarized in Table 5.2-30. In order to convert the modeled NOx concentrations to NO_2, the OLM option in AERMOD was used. 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 EPA air quality database for the Mojave monitoring station. Table 5.2-30 lists the maximum modeled concentrations for the Project sources combined for each year of meteorology. The maxima over the three years modeled are noted and compared to the EPA Significant Impact Levels (SILs). As shown in Table 5.2-30, the maximum modeled pollutant concentrations are less than their respective SILs.

Table 5.2-29 Summary of GEP Analysis

Emission Source	Stack Height (m)	Controlling Buildings / Structures	Building Height (m)	Projected Width (m)	GEP Formula Height (m)
Auxiliary Boiler #1	12.19	Steam Turbine/Generator	16.76	31.69	65.0
Auxiliary Boiler #2	12.19	Steam Turbine/Generator	16.76	29.85	65.0
Fire Pump Module	3.05	Fire Water Storage Tank	10.36	38.30	65.0
Cooling Tower[1]	13.52	Steam Turbine/Generator	16.76	23.28	65.0
[1] GEP data for cell #5 of 11 cells					

Table 5.2-30 Maximum Modeled Concentrations for Project Normal Operations

Pollutant	Averaging Period	AERMOD Concentration ($\mu g/m^3$)			Overall Maximum ($\mu g/m^3$)	EPA SIL ($\mu g/m^3$)
		2002	2003	2004		
NO_2[1]	1-hr	78.4	79.7	79.3	79.7	--
	Annual	0.01	0.01	0.01	0.01	1
CO	1-hr	72.7	75.4	73.1	75.4	2,000
	8-hr	16.3	11.0	11.9	16.3	500
PM10	24-hr	0.4	0.4	0.4	0.4	5
	Annual	0.04	0.04	0.04	0.04	1
PM2.5	24-hr	0.4	0.4	0.4	0.4	N/A[2]
	Annual	0.04	0.04	0.04	0.04	N/A[2]
SO_2	1-hr	0.16	0.16	0.15	0.16	--
	3-hr	0.08	0.06	0.07	0.08	25
	24-hr	0.01	0.01	0.01	0.01	5
	Annual	0.0002	0.0002	0.0002	0.0002	1

[1] Modeled NO_2 concentrations as determined with the AERMOD OLM.
[2] EPA has not established SILs for PM2.5.

In accordance with standard modeling procedures for ambient air quality standards compliance analyses, if modeling of the Project sources alone (cooling tower, boilers and engine) indicates that the maximum modeled concentrations for a specific pollutant are below the EPA SILs, no further analysis is needed for that pollutant. If modeling indicates that the SIL for any pollutant/averaging period is exceeded, then a cumulative modeling study is done to determine the combined impact of the Project sources plus other major nearby background sources for compliance with the NAAQS and CAAQS. The maximum concentrations determined through cumulative modeling are then summed with representative background concentrations to account for non-modeled source contributions for NAAQS compliance. As shown below, maximum Project modeled concentrations are below the SILs. Therefore, the Project impacts can be considered insignificant.

The comparison of Project impacts to NAAQS and CAAQS is provided in Table 5.2-31. The Project maximum modeled concentrations for pollutants are summed with ambient background concentrations for comparison to the air quality standards. The short-term ambient background values are the highest values (for comparison to the CAAQS) over the three year period (2005-2007) for all pollutants except 24-hour PM2.5. The 24-hour PM2.5 background value is based on the three-year average of the 98th percentile values consistent with the final revisions of the PM2.5 standards (40 CFR Part 50, December 17, 2006). That is, "[T]o attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3". All annual background values are highest over the three-year period.

Table 5.2-31 NAAQS and CAAQS Analysis for Project Normal Operations

Pollutant	Averaging Period	Concentrations (µg/m^3)				
		AERMOD	Ambient Background[2]	Total[3]	CAAQS	NAAQS
NO_2[1]	1-hr	79.7	139.1	218.8	338	--
	Annual	0.01	28.20	28.2	56	100
CO	1-hr	75.4	3,664	3,739	23000	40000
	8-hr	16.3	1,832	1,848	10000	10000
PM10	24-hr	0.44	73.0	73.4	50	150
	Annual	0.04	22.0	22.0	20	--
PM2.5	24-hr[4]	0.44	15.3	15.8	--	35
	Annual	0.04	5.8	5.8	12	15
SO_2	1-hr	0.16	88.46	88.6	665	--
	3-hr	0.08	44.5	44.6	--	1300
	24-hr	0.01	13.1	13.1	105	365
	Annual	0.0002	2.6	2.6	--	80

[1] Modeled NO_2 concentrations as determined with the AERMOD OLM.
[2] Short-term values are the highest over 3-years; annual values are highest over 3-years.
[3] Modeled concentration plus ambient background.
[4] To be conservative, the maximum PM2.5 impact was used for comparison to the NAAQS.

Note that for pollutant impacts less than the SILs, compliance is already demonstrated with NAAQS. They are summed with ambient concentrations for informational purposes only. However, for pollutants with CAAQS (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 5.2-31, all total concentrations, modeled plus ambient background, are below the NAAQS and CAAQS with the exception of 24-hour PM10. This exceedance occurs because the monitored background concentration by itself is greater than the CAAQS. The modeled 24-hour PM10 impacts for the Project are less than one percent of the CAAQS.

5.2.4.5 Cumulative Impacts

Section 5.1 of the AFC discussed cumulative projects that may contribute to adverse impacts on air quality. The impacts of the BSEP 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 5.1.2 include the Pine Tree Wind Development Project and the Barren Ridge-Castaic Transmission Project.

Cumulative Impacts During Construction

Construction for the Pine Tree Wind Development Project is currently underway and is expected to be completed in 2009. The Barren Ridge-Castaic Transmission Project is designed to be built in multiple phases; the environmental review process for this Project is in its early stages as of the beginning of 2008.

As stated in Section 2.0, Project Description, construction of the BSEP is expected to begin in the third quarter of 2009. Therefore, there should be minimal overlap between its construction activities and those of the Pine Tree Wind Development Project. The schedule for construction of the Barren Ridge-Castaic Transmission Project is not known at this time, so it is difficult to assess the extent of overlap between its construction and that of the BSEP. However, the Barren Ridge-Castaic Transmission Project involves the installation of utility poles with minimal ground disturbance expected.

Construction impacts for these projects, including the BSEP, are expected to be localized and temporary. As discussed in Section 5.2.7, the BSEP will provide mitigation to minimize its impacts during construction. Cumulative impacts from construction are not considered to be significant because of the limited extent of impacts from construction activities and the short-term nature of the activities.

Cumulative Impacts During Operation

During operation, the BSEP is modeled to have insignificant impacts for all criteria pollutants. Modeled 24-hour PM10 impacts above the CAAQS are due to the background concentration of PM10 exceeding the standard. Project impacts are less than one percent of the CAAQS for PM10.

The Pine Tree Wind Development Project and the Barren Ridge-Castaic Transmission Project are not expected to have operational emissions. The Pine Tree Wind Development Project consists of wind turbines, with no operational emission source. The Barren Ridge-Castaic Transmission Project is a transmission system upgrade project, also with no emission sources. Because the BSEP impacts will be insignificant, and the cumulative projects have no emissions, cumulatively, the projects are insignificant.

5.2.5 Mitigation Measures

Recommended mitigation measures for the Project are described below.

5.2.5.1 Mitigation Measures During Construction

Beacon Solar proposes dust control and other mitigation measures to ensure there are no significant effects during construction. For instance, the construction mitigation measures taken together are expected to reduce fugitive dust emissions by approximately 50 percent from soil storage pile wind erosion, and 68 percent from vehicle travel over unpaved surfaces. Although no specific reduction is included in the construction emissions calculations to account for the efficiency of the mitigation measures on reducing fugitive dust emissions from grading, scraping, bulldozing, and soil spreading operations, watering was assumed to maintain moist soil conditions during these operations, and the emission calculations included a moisture content for the soil. The following conditions of certification are proposed to incorporate these measures for the Project:

AQ-C1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with AQ-SC3, AQ-SC4 and AQ-SC5 for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

AQ-C2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with AQ-C3, AQ-C4 and AQ-C5.

AQ-C3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report (MCR) that demonstrates compliance with the following mitigation measures for the purposes of preventing fugitive dust plumes from impacting nearby residents. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

A. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of AQ-C4. The frequency of watering can be reduced or eliminated during periods of precipitation.

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

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

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

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

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

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

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

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

J. If dirt or runoff from the construction site is visible on the public roadways, then project owner will work develop additional measures such as street sweeping to remove the trackout.

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

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

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

AQ-C4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor (at least once per hour) all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) to public roadways, (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

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

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if step 1 specified above fails to eliminate visible dust plumes at any location 200 feet or more off the project site within 30 minutes of the original determination.

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

AQ-C5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for the purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

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

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

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

1. There is no available soot filter that has been certified by either the California Air Resources Board (ARB) or U.S. Environmental Protection Agency (EPA) for the engine in question; or
2. The construction equipment is intended to be onsite for ten (10) days or less.
3. The CPM may grant relief from this requirement if the AQCMM can demonstrate that they have made a good faith effort to comply with this requirement and that compliance is not possible.

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

1. The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.
2. The soot filter is causing or is reasonably expected to cause significant engine damage.
3. The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.
4. Any other seriously detrimental cause which has the approval of the CPM prior to the termination being implemented.

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

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

5.2.5.2 Mitigation Measures During Operations

The Project impact analysis shows that the BSEP contributions to existing air quality will be minimal, and are well below the significant impact levels defined by the EPA. The KCAPCD does not require emissions offsets for minor emission sources. The background values from the closest air quality monitoring site in Mojave show that background PM10 already exceeds both the 24-hour and annual CAAQS. However, as discussed in Section 5.2.4.2 (Summary of Criteria Pollutant Emissions), the BSEP can reasonably be assumed to reduce PM10 emissions in the region by implementing an effective dust control plan for the solar field where there currently is a large open field subject to disturbance from off-road vehicles and wind erosion. Therefore, no further mitigation for PM10 or other Project emissions is considered necessary.

5.2.6 References

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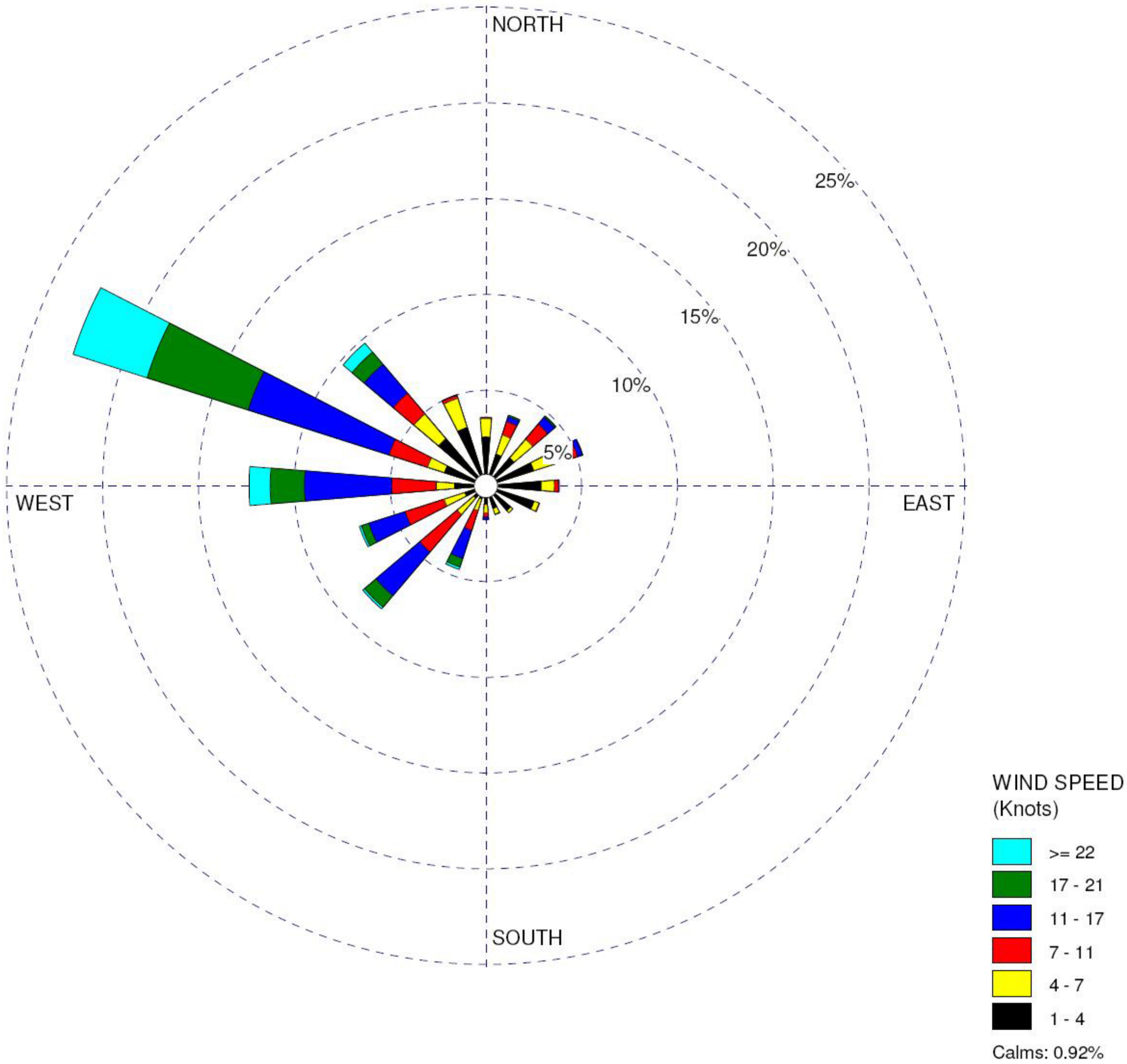
WIND ROSE PLOT:

Mojave ARB Monitoring Station, Mojave, CA
2002-2004 Wind Rose

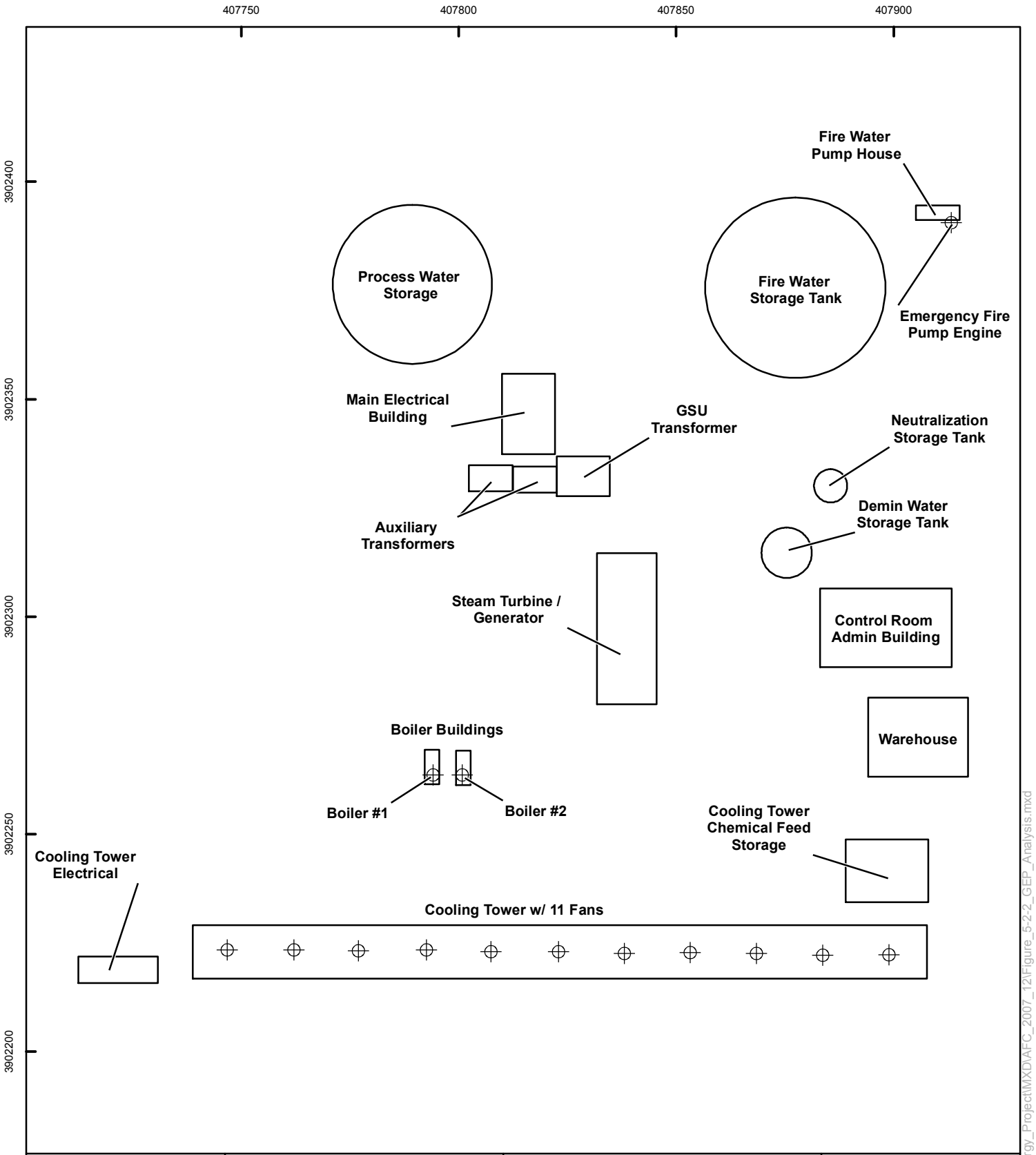
DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Figure 5.2-1	**2002 2003 2004** **Jan 1 - Dec 31** **00:00 - 23:00**	MODELER:	Beacon Solar
	CALM WINDS: **0.92%**	TOTAL COUNT: **26304 hrs.**	
	AVG. WIND SPEED: **9.77 Knots**	DATE: **1/2/2008**	PROJECT NO.: **10056-014-030**

WRPLOT View - Lakes Environmental Software



Map Location

N
W E
S

Beacon Solar Energy Project

Figure 5.2-2
Buildings considered in GEP analysis for power block modeling

1:1,200

0 100 200 Feet

Beacon Solar

ENSR | AECOM

Project: 10056-014
Date: March 2008

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