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November 24, 2010

Mr. Craig Hoffman
Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

Re: Mariposa Energy Project
BAAQMD Application 20737

Dear Mr. Hoffman:

The District has prepared a Preliminary Determination of Compliance for the proposed Mariposa Energy Project.

The proposed Mariposa Energy Project consists of four GE LM 6000 PC-Sprint simple-cycle gas turbines and one diesel-fired fire pump. The facility would be located at 4887 Bruns Road in unincorporated Alameda County, between Byron and Livermore. The geographic coordinates are 37.789400 N, and 121.601880 W.

The enclosed revised FDOC summarizes how the facility will comply with applicable air quality regulations, including BACT and emission offset requirements. The FDOC has satisfied the public notice and 30-day public comment requirements of District Regulations 2-2-405 and 406.

If you have any questions regarding this matter, please contact Brenda Cabral, Supervising Air Quality Engineer, at (415) 749-4686 (bcabral@baaqmd.gov).

Sincerely,

Jack P. Broadbent
Executive Officer/APCO

Enclosure
JPB:bfc

Final Determination of Compliance

Mariposa Energy Project

Unincorporated Alameda County between Livermore and Byron
Address: 4887 Bruns Road, Livermore, California 94550

Bay Area Air Quality Management District
Application 20737

November 2010

Brenda Cabral, Supervising Air Quality Engineer
Madhav Patil, Air Quality Engineer

Table of Contents

Tables

1 Introduction

The Bay Area Air Quality Management District (District) is issuing a Final Determination of Compliance (FDOC) Permit for the Mariposa Energy Project (MEP), a proposed 200-megawatt (nominal) natural gas fired electric power generation facility.

The Final Determination of Compliance sets forth the District's analysis as to how the facility would comply with applicable air quality regulatory requirements, as well as proposed permit conditions to ensure compliance. The District has previously published a Preliminary Determination of Compliance for public review and comment on August 18, 2010, and reviewed and considered all comments received from the public before deciding whether to issue a Final Determination of Compliance (FDOC) for the proposed project.

The proposed Mariposa Energy Project would be a simple-cycle power plant that would be used to meet demand for electrical power during short-term peaks in demand. The proposed power plant would operate as a load-following power plant, providing a power output from a low of 25 MW to a high of a 200 nominal (194 MW net at 59 F) MW. [1] The proposed MEP consists of four GE LM 6000 PC-Sprint simple-cycle gas turbines and associated support equipment. These simple-cycle turbines have a high degree of unit turndown, which means a low minimum generation rate relative to the maximum generation rate. Their minimum generation rate is 25 MW and the maximum rate is 48.5 MW. Simple-cycle turbines are well suited for a peaking power plant that may not run for an extended period of time, since this type of unit does not have a steam turbine that would need to be kept warm to avoid equipment damage.

The proposed project would be located in Alameda County, California, approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron, and approximately 2.5 miles west of the community of Mountain House. The facility would be located southeast of the intersection of Bruns Road and Kelso Road on a 10-acre portion of a 158-acre parcel immediately south of the Pacific Gas and Electric Company, Bethany Compressor Station, and the 230-kilovolt Kelso Substation on the southern portion of the Lee Property, between two small hills. The Mariposa Energy Project will be constructed, owned, and operated by Mariposa Energy LLC, which is owned by Diamond Generating Corporation, a wholly owned subsidiary of Mitsubishi Corporation.
This FDOC describes how the proposed Mariposa Energy Project would comply with applicable federal, state, and District regulations. These regulations include the Best Available Control Technology and emission offset requirements of the District New Source Review (NSR) requirements contained in District Regulation 2, Rule 2. This document also includes proposed permit conditions necessary to ensure compliance with applicable rules and regulations, air pollutant emission calculations, and a health risk assessment that estimates the impact of emissions of toxic air contaminants from the project on public health.

The FDOC has been prepared in accordance with District Regulations 2-2-404 through 2-2-406, which set forth the procedural requirements for the issuance of NSR permits, and District Regulation 2-3-403 and 2-3-404, which apply the requirements specifically to power plant permits. The purpose of the

[1] Application for Certification, Volume 1, Page 2-2, June 28, 2009

FDOC is to set forth the reasons and analysis that lead to the District's preliminary determination that the project would comply with all applicable regulatory requirements relating to air quality.

The remainder of this document is organized in the following manner. Section 2 provides an overview of the legal framework for power plant permitting in California and describes how members of the public can learn about the project and provide input to the District and the California Energy Commission. Section 3 describes the proposed Mariposa Energy Project, its location, and the turbine selection process. Section 4 describes the project's emissions. Section 5 describes the "Best Available Control Technology" to minimize air pollution and explains how the BACT requirements will apply to the facility. Section 6 describes the emissions offset requirements for the project and how the proposed facility would comply with them. Section 7 presents the results of the Health Risk Screening Analysis for the project. Section 8 addresses other applicable legal requirements. Section 9 sets forth the proposed permit conditions for the project. Section 10 concludes with the preliminary determination of compliance for Mariposa Energy Project.

2 Power Plant Permitting Process and Opportunities for Public Participation

The California Energy Commission (CEC) is the primary permitting authority for new power plants in California. The California Legislature has granted the Energy Commission exclusive licensing authority for all thermal power plants in California of 50 megawatts or more. (*See* Warren-Alquist State Energy Resources Conservation and Development Act, Cal. Public Resources Code §§ 25000 *et seq*.) This licensing authority supersedes all other local and state permitting authority. The intent behind this system is to streamline the licensing process for new power plants while at the same time provide a comprehensive review of potential environmental and other impacts.

As the lead permitting agency, the California Energy Commission (CEC) conducts an in-depth review of environmental and other issues posed by the proposed power plant. This comprehensive environmental review is the equivalent of the review required for major projects under the California Environmental Quality Act (CEQA), and the Energy Commission's license satisfies the requirements of CEQA for these projects. This CEQA-equivalent review encompasses air quality issues within the purview of the District, and also includes all other types of environmental and other issues, including water quality issues, endangered species issues, and land use issues, among others.

The District collaborates with the Energy Commission regarding the air quality portion of its environmental analysis and prepares a "Determination of Compliance" that outlines whether and how the proposed project will comply with applicable air quality regulatory requirements. The Determination of Compliance is used by the Energy Commission to assess air quality issues of the proposed power plant. This document presents the District's Final Determination of Compliance (FDOC). The District solicited and considered public input on the Preliminary Determination of Compliance in order to issue the Final Determination of Compliance for use by the Energy Commission in its CEQA-equivalent environmental review. The CEC will then conduct its environmental review,

and at the end of that process, it will decide whether to issue a license for the project and under what conditions.

Both the Energy Commission's licensing process and District's Determination of Compliance process relating to air quality issues provide opportunities for public participation. For the District's Determination of Compliance, the District publishes its preliminary determination – the PDOC – and invites interested members of the public to review and comment on it. This public process allows members of the public to review the District's analysis of whether and how the facility will comply with applicable regulatory requirements and to bring to the District's attention any area in which members of the public believe the District may have erred in its analysis. This process helps improve the District's final determination by bringing to the District's attention any areas where interested members of the public disagree with the District's proposal at an early enough stage that the District can correct any deficiencies before making the final determination. The Energy Commission provides similar opportunities for public participation, and publishes its proposed actions for public review and comment before taking any final actions.

The District published the PDOC on August 18, 2010. The public comment period for the PDOC was noticed in the Tracy Press, Tri-Valley Herald, Stockton Record, and West County Times on August 25, 2010. The comment period ended on September 27, 2010. Numerous comments were received. The comments are attached in Appendix C of this document.

At this time, the Air District is publishing its Final Determination of Compliance (FDOC) for the project. The District has considered comments received on the PDOC from the public in determining whether to issue a Final Determination of Compliance (FDOC) and on what basis. All comments received during the comment period were considered by the District and addressed as necessary in the Final Determination of Compliance.

A formal Response to Comments document has been prepared and is attached in Appendix D of this document. The District has made some changes in response to comments. In particular, the permit conditions have been amended to:

- limit the commissioning of the turbines to one turbine at a time
- replace the hourly particulate limit for each turbine with an annual particulate limit for the facility, while lowering the annual emission limit by 2.53 tons/yr
- delete references to ongoing tuning
- allow any turbine to be operated up to 5,200 hours/yr while limiting the annual hours of operation for all four turbines to the original number of hours used in the calculations

Corrections to the permit conditions include:

- lowering the daily commissioning emissions
- lowering the maximum hourly emissions of CO and POC during startup and shutdown periods
- lowering the maximum daily emissions of NOx, CO, POC, and SO2
- lowering the annual emissions of CO and POC

The power plant approval process also provides opportunities for members of the public to participate in person in public hearings regarding this project. Members of the public will be afforded an opportunity to participate in public hearings regarding the project at the Energy Commission as part of the Commission's environmental review process. The public hearings before the Energy Commission will encompass all aspects of the project, including air quality issues and all other environmental issues.

Interested members of the public are invited to learn more about the project as part of the public review and comment process. Detailed information about the project and how it will comply with applicable regulatory requirements are set forth in the subsequent sections of this document. All supporting documentation, including the permit application and data submitted by the applicant and all other information the District has relied on in its analysis, are available for public inspection at the Communication and Outreach Division Office located on the 5th Floor of District Headquarters, 939 Ellis Street, San Francisco, CA, 94109. This FDOC and the supporting documentation are also available on the District's website at http://www.baaqmd.gov/. The public may also contact Ms. Cabral for further information at (415) 749-4686, bcabral@baaqmd.gov. **Para obtener información en español, comuníquese con Brenda Cabral en la sede del Distrito, (415) 749-4686,** bcabral@baaqmd.gov.

In addition to the District's permitting process involving air quality issues, interested members of the public are also invited to participate in the Energy Commission's licensing proceeding, which addresses other environmental concerns including those that are not related to air quality. For more information, go to the following CEC website: http://www.energy.ca.gov/sitingcases/mariposa/index.html. The public may also contact the Energy Commission's Public Adviser's office at:

Public Adviser
California Energy Commission
1516 Ninth Street, MS-12
Sacramento, CA 95814
Phone: (916) 654-4489
Toll-Free in California: 1-800-822-6228
E-mail: PublicAdviser@energy.state.ca.us

3 Project Description

The Mariposa Energy Project (MEP) is a proposed 200-megawatt "peaking" power plant to be located in unincorporated Alameda County between Livermore and Byron, California. The MEP would consist of four GE simple-cycle LM 6000 PC-Sprint natural gas fired combustion turbine generators with a total nominal capacity of 200 megawatts. This section describes the proposed project's function as a simple-cycle "peaker" power plant. It also describes the project location, how it would be operated, provides details about project ownership, and the specific equipment being proposed for the project.

3.1 Mariposa Energy Project: A Simple-Cycle Power Plant

The proposed Mariposa Energy Project would be a simple-cycle "peaker" plant, designed to start up and respond quickly to grid demand, and to operate at a wide range of generation rates, in order to provide electricity to the grid at times of peak demand. Peaking power plants generally run during periods of high demand for electricity, most often during the summertime when air conditioning use is highest and typically in the late afternoon when people are returning from work and many businesses remain open. The proposed power plant would operate depending on the demand for electricity in the region. The applicant states that the Pacific Gas and Electric Company (PG&E), through dispatch orders from the California Independent System Operator (CAISO), would be responsible for dispatching the plant to meet electrical demand."

The proposed project uses a "simple-cycle" design, meaning that it uses natural gas combustion turbines only, without additional generating equipment, to make electricity. This design is different than a "combined-cycle" design, in which waste heat in the turbine exhaust is used to create steam in a heat-recovery steam generator, which powers a steam turbine to generate additional electricity. The simple-cycle design is especially well suited for power plants operating to meet peak demand because the turbines can be started up very quickly when required by demand. With combined-cycle turbines, startups take longer because the heat recovery boilers and steam turbines take additional time to come up to operating temperature. Simple-cycle turbines are also well suited to peaking applications because such plants, by their nature, are not called upon to run for extended periods of time. This is an important consideration because simple-cycle turbines are inherently less efficient than combined-cycle turbines, which recover some of the heat from the turbine exhaust that would otherwise be wasted. Since such plants are operated for a relatively small number of hours per year, this energy penalty – which translates into additional fuel used to generate the same amount of power – is not as much of a concern.

The facility will also help to ensure a reliable supply of power as California transitions to a greater supply of renewable power sources such as solar and wind power. The project will help provide on-demand standby power capacity for grid stability. The simple-cycle turbines have a very short startup time and can come on-line very quickly to fill in during times when solar energy sources or wind power are not available. As the California Energy Commission has recognized, "some efficient, dispatchable, natural-gas-fired generation will be necessary to integrate renewables into California's electricity system and meet the state's [Renewable

Portfolio Standard] and [Greenhouse Gas] goals." Simple-cycle aero-derivative turbine plants fired by clean burning natural gas are well suited to filling this need.

The facility will have approximately a 0.7-mile-long, 230-kV transmission line to deliver the plant output to the electrical grid via the existing 230-kV Kelso Substation located north of the project site. The new 4-inch-diameter 580-foot long natural gas pipeline will run directly northeast from the project site to interconnect with PG&E's existing high-pressure natural gas pipeline (Line 2). Service water will be provided from a new connection to the Byron Bethany Irrigation District (BBID) via a new pump station and a 6-inch-diameter, 1.8-mile-long pipeline placed in or along the east side of Bruns Road, from existing Canal 45 south to the MEP site.

3.2 Gas Turbine Selection Process

Two types of gas turbines are commonly used in the power generation industry: the large frame heavy-duty design and the aero-derivative gas turbines based on turbine designs typically found in the aircraft industry. Both gas turbines have been widely used and the selection of the turbine is determined by the amount of energy needed and the anticipated cycling duty and load profile.

Mariposa Energy Project considered the use of heavy-duty (i.e., industrial) turbines for MEP. However, industrial gas turbines, such as the General Electric (GE) Frame 7 or Siemens SGT6-5000 units, typically have electrical-generation capacities in the 80 to 190 MW range and are not capable of operating at less than 60% capacity. In contrast, the aero-derivative turbine technology offers efficient operation over the 25 MW and above operating range and varies in size from 14.3 to 50 MW (GE, 2010). One of the requirements that MEP has to meet is a high degree of unit turndown (a low minimum operating rate relative to the maximum output) with the minimum generation rate of 25 MW. The facility is also intended to be a load-following plant, so the plant may be required to supply as low as 25 MW and as high as a nominal 200 MW (194 MW net at 59 F) , depending on the demand.[2]

In order to meet the minimum dispatch requirements of 25 MW, Mariposa Energy LLC selected the aero-derivative turbine technology. The GE LM6000 turbine is a common aero-derivative turbine widely used at peaking facilities in California, with an operating range from approximately 25 to a nominal 50 MW at 50 percent load and full load, respectively. Mariposa Energy Project considered three LM6000 models available at the time of the release of the Request for Offers (RFO). The three LM6000 models included the LM6000PC (water injected), the LM6000PD (dry low-NOx or DLE), and the LM6000PF (DLE). The LM6000 turbines also have a SPRINT (Spray Inter-cooled Turbine) technology option. The GE SPRINT technology is GE patented technology that reduces compressor discharge temperature by injecting atomized water into the low- and high-pressure compressors.

According to GE product materials, the SPRINT power augmentation feature results in an increased generating output of approximately 15 percent and 11 percent at ISO (International

[2] Application for Certification, Volume 1, Pages 1-9 and 2-32, June 28, 2009

Standards Organization)[3] condition for the water-injected and DLE models, respectively (GE, 2010). As part of the turbine selection process, the turbine vendor provided performance data for both the water-injected and DLE LM6000 SPRINT gas turbines (see Table 1). As presented in Table 1, the water-injected LM6000 gas turbine (LM6000PC) would result in a higher electrical production rate compared to the DLE models. Although the LM6000PF turbine would have a lower NOx emission rate than the PC or PD models, the DLE models would have higher hydrocarbon and CO emission rates (except at the 17°F temperature case) compared to the water-injected PC turbine.

Therefore, the LM6000PC turbine was selected by Mariposa Energy in order to meet the electrical output and reliability requirements outlined in the Mariposa Energy Project PPA with PG&E.

[3] Definition for ISO Condition (International Standards Organization): In order to compare the performance of turbines that can operate in a wide range of atmospheric conditions, the gas turbine output and performance is specified at standard conditions called the ISO ratings.

The three standard conditions specified in the ISO ratings are Ambient Temperature @ 15 deg C, Relative Humidity @ 60 % and Ambient Pressure at Sea Level. The turbines are operated under these conditions and tested to allow comparisons to be made between different sets of test data.

TABLE 1. COMPARISON OF GE LM6000 SPRINT WATER-INJECTED AND DLE COMBUSTION TECHNOLOGIES

Combustion Technology	**PC**	**PD**	**PF**	**PC**	**PD**	**PF**	**PC**	**PD**	**PF**	**PC**	**PD**	**PF**
Ambient Temperature, °F	17.0	17.0	17	46	46	46	59	59	59	93	93	93
Inlet Conditioning	HEAT	HEAT	HEAT	NONE	NONE	NONE	EVAP	EVAP	EVAP	EVAP	EVAP	EVAP
Load Rate, Percent	100	100	100	100	100	100	100	100	100	100	100	100
Electrical Production, MW	50.2	48.3	47.9	50.7	47.8	47.7	49.7	46.9	46.8	46.3	43.8	43.7
Heat Rate*, Btu/kW-hr, LHV	8461	8115	8128	8548	8238	8248	8566	8276	8283	8647	8407	8414
NOx Control	Water	DLE	DLE	Water	DLE	DLE	Water	DLE	DLE	Water	DLE	DLE
Emissions Rates												
NOx ppmvd Ref 15% O_2	25	25	15	25	25	15	25	25	15	25	25	15
CO ppmvd Ref 15% O_2	53.2	25	25	20.9	25	25	15	25	25	7.6	25	25
HC ppmvd Ref 15% O_2	8.2	15	15	2.2	15	15	2.1	15	15	2.1	15	15

PC = GE LM6000PC SPRINT Turbine
PD = GE LM6000PD SPRINT Turbine
PF = GE LM6000PF SPRINT Turbine
Water = water injected
DLE = dry low NOx
ppmvd Ref 15% O_2 = parts per million by volume dry corrected to 15% oxygen
HC = precursor organic compounds
* estimated

3.3 Project Location

The proposed Mariposa Energy Project is located in northeastern Alameda County, California, approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron, and approximately 2.5 miles west of the community of Mountain House. The facility would be located southeast of Bruns Road and Kelso Road on a 10-acre portion of a 158-acre parcel immediately south of the Pacific Gas and Electric Company, Bethany Compressor Station, and 230-kilovolt Kelso Substation on the southern portion of the Lee Property, between two small hills.

The proposed project site is in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The Assessor's parcel number is 099B-7050-001-10. The site is located in Township 2S, Range 3E, Section 1 (Mount Diablo Base and Meridian). The 6.5-MW Byron Power Cogen Plant currently occupies 2 acres of the 158-acre parcel. The remainder of the parcel is non-irrigated grazing land.

Mariposa Energy Project Site Location:

FIGURE 1
PROJECT SITE LOCATION

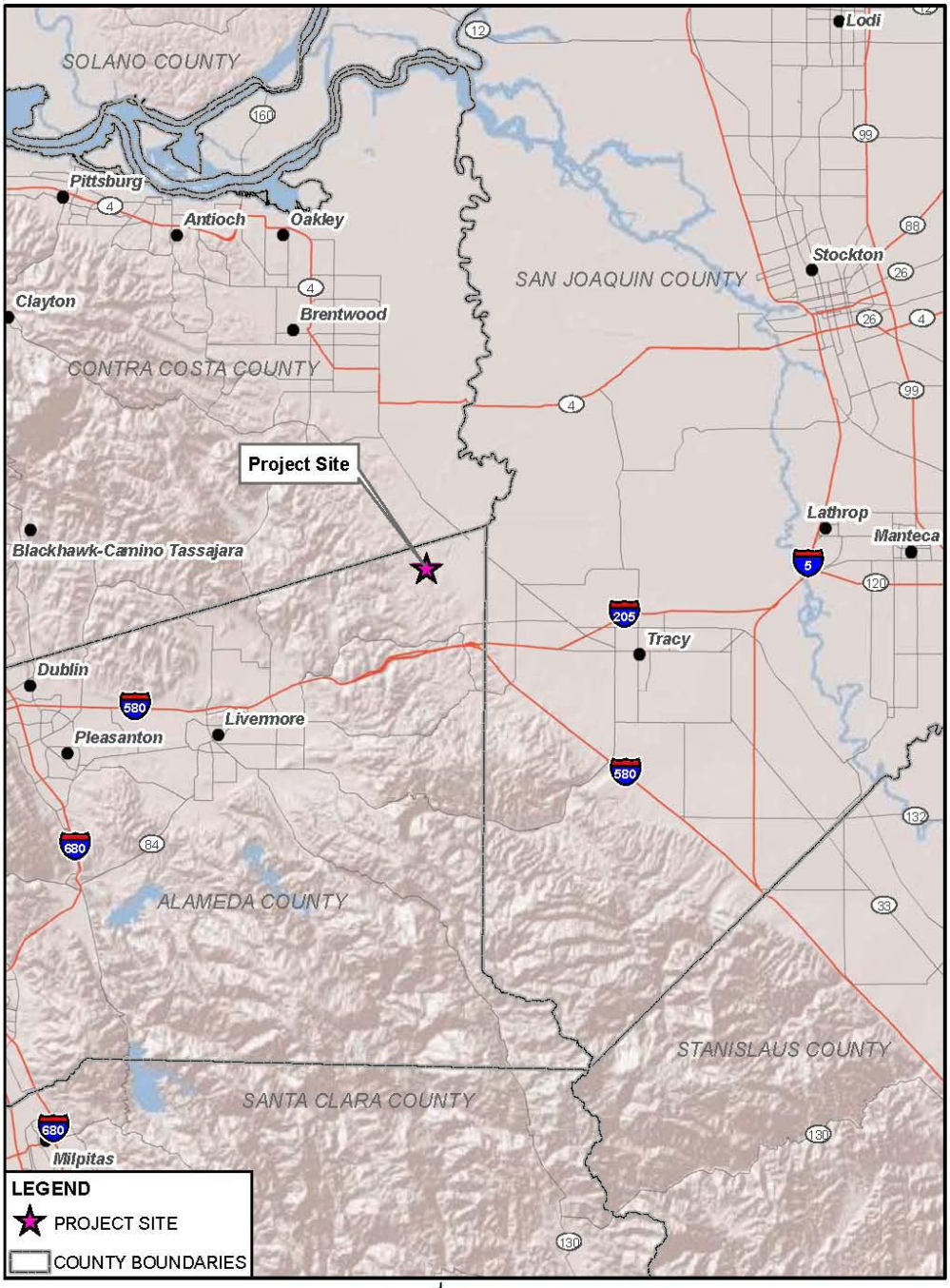

FIGURE 1.1-2
PROJECT VICINITY
MARIPOSA ENERGY PROJECT
ALAMEDA COUNTY, CALIFORNIA

CH2MHILL

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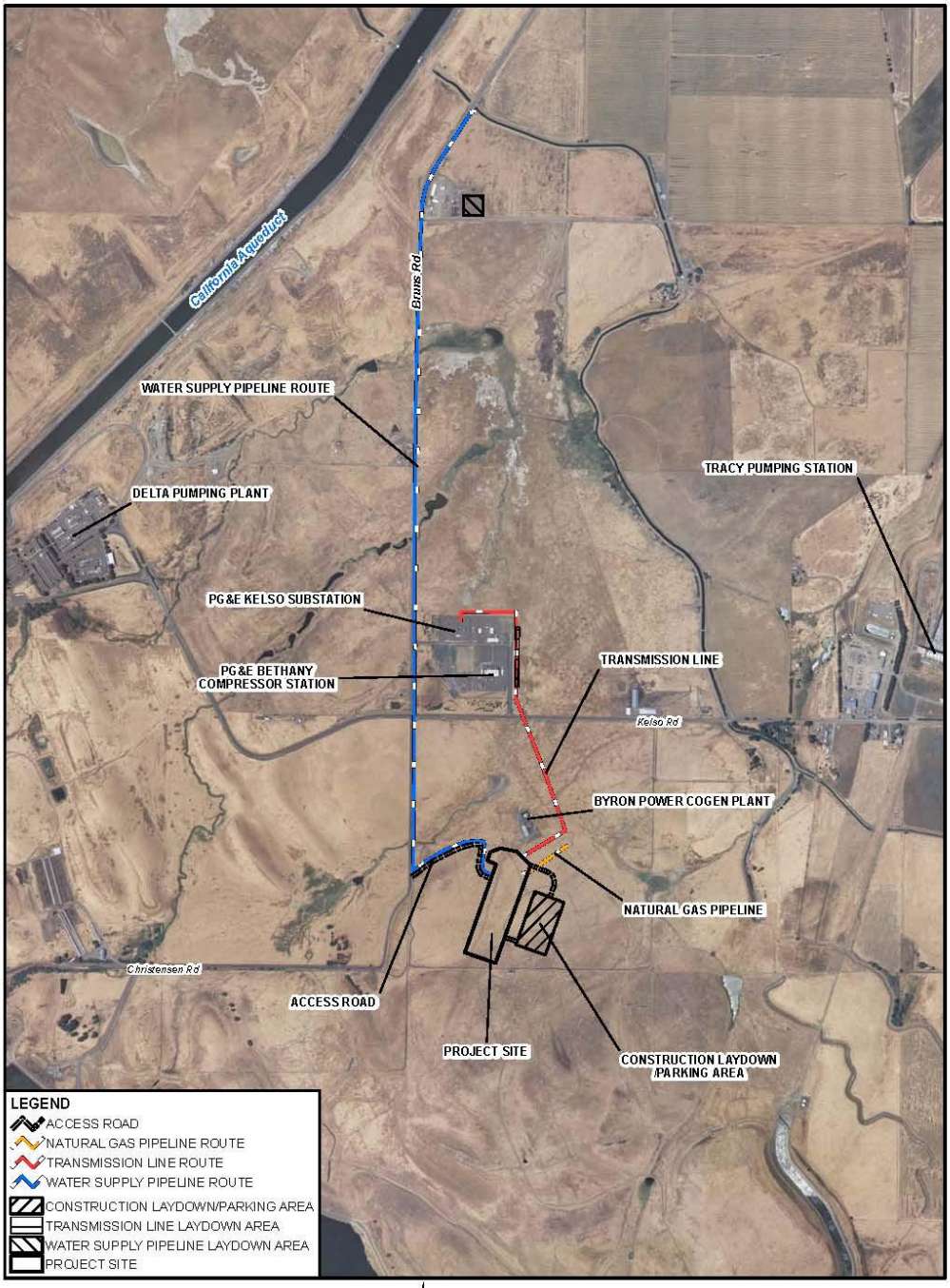


FIGURE 1.1-3
SITE LOCATION
MARIPOSA ENERGY PROJECT
ALAMEDA COUNTY, CALIFORNIA

3.4 How The Project Will Operate:

The proposed facility will generate electric power for the grid using simple-cycle combustion turbines. The combustion turbines generate power by burning natural gas, which expands as it burns and turns the turbine blades that rotate an electrical generator to generate electricity. The main components of the system consist of a compressor, combustor, and turbine. The compressor compresses combustion air to the combustor where the fuel is mixed with the combustion air and burned. Hot exhaust gases then enter the power turbine where the gases expand across the turbine blades, rotating a shaft to power the electric generator.

After exiting the combustion turbines, the hot exhaust gases are then sent through the post-combustion emissions controls prior to being exhausted at the stack. The proposed post-combustion emissions controls consist of a Selective Catalytic Reduction (SCR) unit to reduce oxides of nitrogen in the exhaust and an oxidation catalyst to reduce organic compounds and carbon monoxide in the exhaust.

SCR injects ammonia into the exhaust stream, which reacts with the NO_x and oxygen in the presence of a catalyst to form nitrogen and water. A small amount of ammonia is not consumed in the reaction and is emitted in the exhaust stream as what is commonly called "ammonia slip".

An oxidation catalyst oxidizes the carbon monoxide and unburned hydrocarbons in the exhaust gases to form CO_2.

The general operating scenario for each turbine is as follows:

- Operating hours per day – up to 24 hours
- Number of startups and shut downs per day – up to 12
- Operating hours per year – up to 5,200
- Number of startups and shut downs per year - up to 300

The total hours of operation allowed for all four turbines combined will be 16,900.

Including the allowance for startup and shutdown, each turbine at this plant will be allowed to run up to 5,200 hours per year. California Code of Regulations, title 20, sections 2900, et seq., considers base-loaded generation to be "electricity generation from a powerplant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60 percent." Annualized plant capacity factor is the ratio of electricity that is produced over the electricity that could be produced. Since each turbine will be limited to 5,200 hours of operation per year, this plant will not be a base-loaded plant.

In most years, this plant is likely to run for many fewer hours than the permit would allow. A CEC analysis shows that the actual average run time for peakers is about 600 hours per year with 200 stop and start cycles.[4,5] The plant would likely run for longer periods in the case of

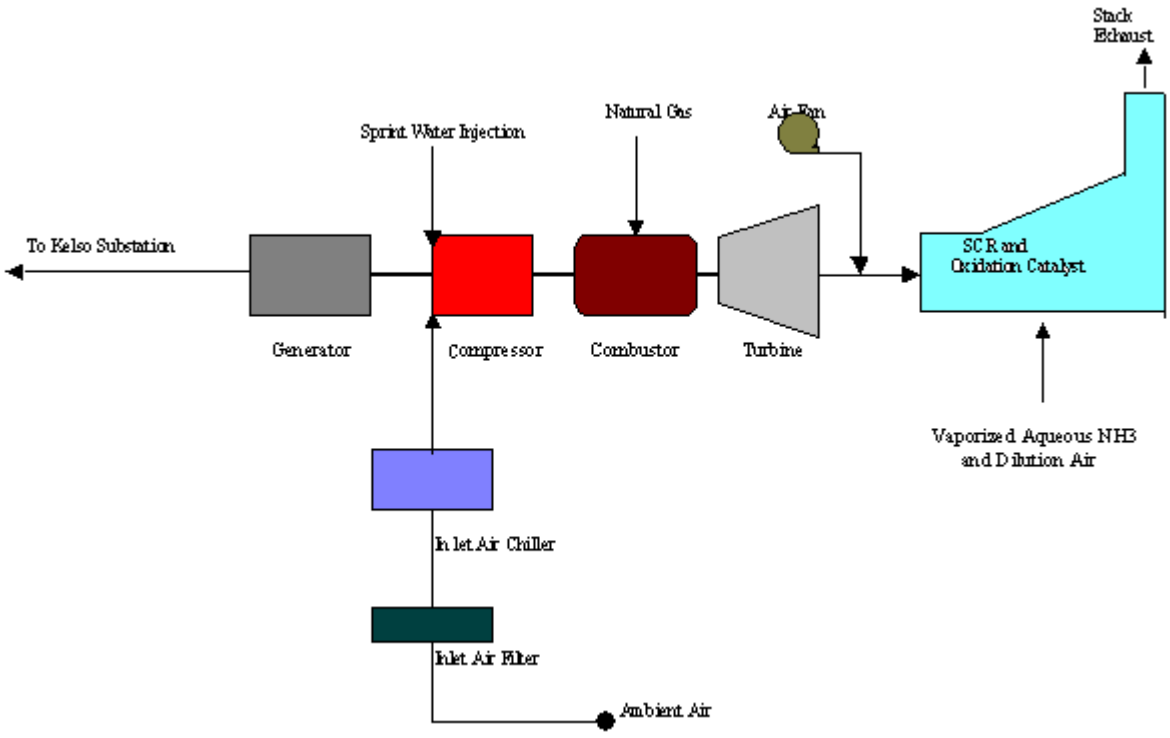
[4] Application for Certification, Volume 1, Page 2-9, June 28, 2009

[5] Errata to the Presiding Member's Proposed Decision, Application for Certification for the Pastoria Energy Facility

sustained failure of a base-loaded plant or some other emergency. The schematic diagram below illustrates how a simple-cycle gas turbine power plant such as the proposed Mariposa Energy Project works.

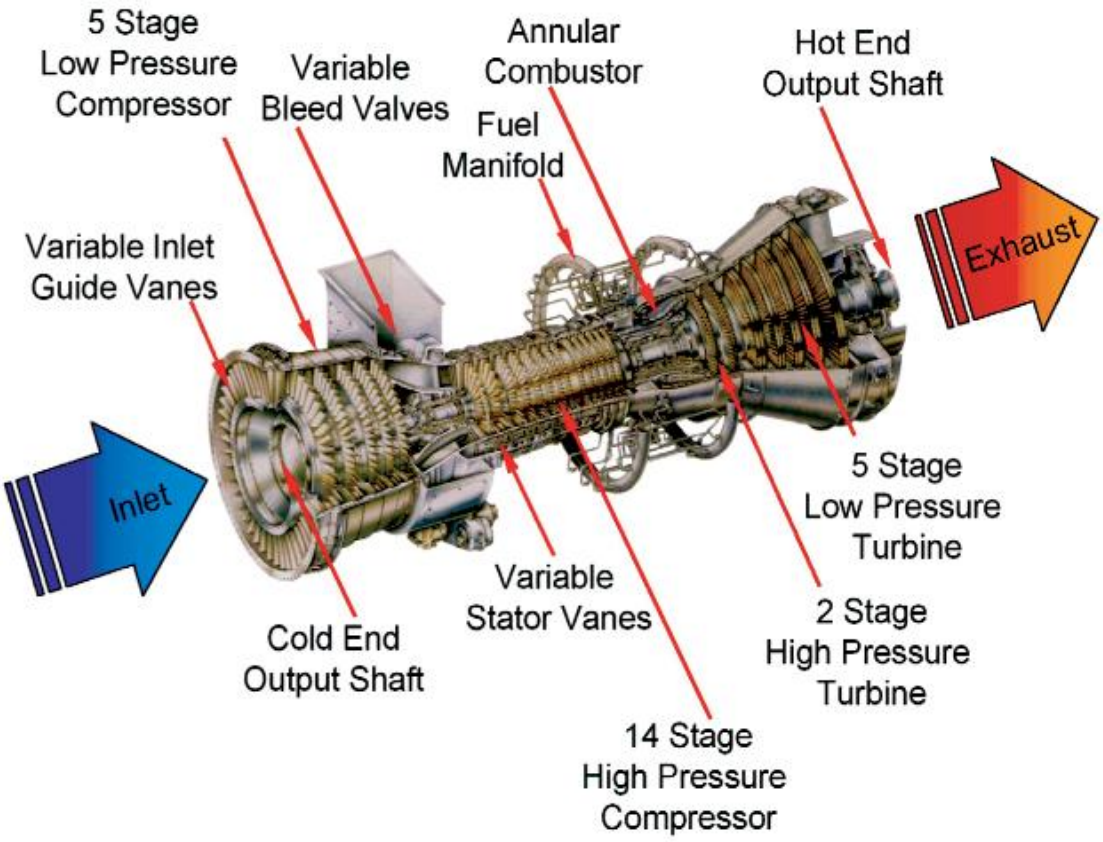
Simple-Cycle Turbine Flow Diagram:

Figure 2



Simple Cycle Turbine 3D Diagram

Figure 3



3.5 **Project Ownership:**

Mariposa Energy, LLC, will construct, own, and operate MEP. Mariposa Energy, LLC, is owned by Diamond Generating Corporation (DGC), a wholly owned subsidiary of Mitsubishi Corporation.

3.6 **Equipment Specifications**

The Mariposa Energy Project will consist of the following permitted equipment:

S-1 Combustion Turbine Generator (CTG) #1, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-1 Oxidation Catalyst and A-2 Selective Catalytic Reduction System (SCR).

S-2 Combustion Turbine Generator (CTG) #2, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-3 Oxidation Catalyst and A-4 Selective Catalytic Reduction System (SCR).

S-3 Combustion Turbine Generator (CTG) #3, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-5 Oxidation Catalyst and A-6 Selective Catalytic Reduction System (SCR).

S-4 Combustion Turbine Generator (CTG) #4, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-7 Oxidation Catalyst and A-8 Selective Catalytic Reduction System (SCR).

S-5 Diesel Fire Pump: Make: Cummins; Model: CFP7E-F40; Model Year: TBD (2009 or later); Rated bhp: 220

4 Facility Emissions

This section describes the air pollutant emissions that the Mariposa Energy Project will have the potential to emit, as well as the principal regulatory requirements to which the equipment will be subject. Detailed emission calculations and the emission factors are presented in the appendices.

4.1 Facility Criteria Pollutant Emissions

A "criteria" air pollutant is an air pollutant that has had a National Ambient Air Quality Standard (NAAQS) established for it by the U.S. EPA. There are currently 7 criteria pollutants: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Precursor organic compounds (POC) are compounds that are precursor to ozone.

4.1.1 Hourly Emissions from Gas Turbines

The Mariposa Energy Project generating equipment will have the potential to emit up to the following amounts of criteria pollutants and precursor organic compounds per hour, as set forth in Table 2a. These are the maximum emission rates for these air pollutants from each turbine during normal steady-state operations, and will be limited by enforceable permit conditions.

TABLE 2a. STEADY-STATE EMISSION RATES

Pollutant	One Turbine Emission Rates (lbs/hr)
NO_x (as NO_2)	4.4
CO	2.14
POC (as CH_4)	0.61
SO_x (as SO_2) Maximum[a]	1.35
SOx (as SO_2) Average[b]	0.34

[a] Maximum SOx emissions based on 1 grain sulfur per 100 scf of natural gas

[b] Average SOx emissions based on 0.25 grains sulfur per 100 scf of natural gas and an average annual firing rate of 481 MMbtu/hour.

The Mariposa Energy Project generating equipment will have the potential to emit the following amount of $PM_{10}/PM_{2.5}$ per hour on an average basis. The maximum emission rate from each turbine during normal steady-state operations may be higher. $PM_{10}/PM_{2.5}$ will be limited by an annual limit in permit conditions.

TABLE 2b. STEADY-STATE EMISSION RATES OF PARTICULATE	
Pollutant	**Emission Rate for One Turbine (lbs/hr)**
$PM_{10}/PM_{2.5}$	2.2 (average)

Note that particulate matter from natural gas combustion sources normally has a diameter less than one micron.[6] The particulate matter will therefore be both PM_{10} (particulate matter with a diameter of less than 10 microns) and $PM_{2.5}$ (particulate matter with a diameter of less than 2.5 microns). $PM_{2.5}$ is a subset of particulate matter that has recently come under heightened regulatory scrutiny, and the District is in the process of developing regulations specifically directed to controlling $PM_{2.5}$. Those regulations are not in place yet, but for this facility the District's existing PM_{10} regulations will be equally effective in controlling $PM_{2.5}$ as well because all of the PM emissions from this facility will be both $PM_{2.5}$ and PM_{10}.

4.1.2 Emissions during Gas Turbine Startup and Shutdown

Maximum emissions during turbine startup operations, when the turbines are at low load where they are not as efficient and when emissions control equipment may not be fully operational, are summarized in Table 3. (These operating scenarios are discussed in more detail in Section 5.7, below.) Table 3 shows the startup emission limits for each turbine.

TABLE 3. GAS TURBINE EMISSIONS DURING STARTUP		
Pollutant	**Turbine Emission Rates for Single 30 Minutes Startup (lb/event)[a]**	**Maximum emissions for any hour containing a startup or shutdown**
NO_x (as NO_2)	14.2	18.5
CO	14.1	17.3
POC (as CH_4)	1.1	1.4
$PM_{10}/PM_{2.5}$	1.1[b] (average)	2.2 (average)
SO_x (as SO_2)	0.675[c]	1.35[d]

[a] Startups not to exceed 30 minutes

[b] Pounds per event for PM_{10} are half of the PM_{10} emissions per hour

c Pounds per event for SO_2 are half of the maximum SO_2 emissions per hour

[d] Based on maximum SO2 emissions per hour

Maximum emissions during gas turbine shutdowns (also discussed in detail in Section 5.7) are summarized in Table 4.

[6] *See* AP-42, Table 1.4-2, footnote c, 7/98 available at: http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf

TABLE 4. MAXIMUM EMISSIONS PER SHUTDOWN

Pollutant	Turbine Shutdown Emission Rates (lb/event)[a]
NO_x (as NO_2)	3.2
CO	2.7
POC (as CH_4)	0.12
PM_{10}	0.55[b] (average)
SO_x (as SO_2)	0.338[c]

[a] Shutdowns not to exceed 15 minutes

[b] Pounds per event for PM_{10} is 1/4 of the PM_{10} emissions per hour due to 15-minute shutdown

c Pounds per event for SO_2 are 1/4 of the SO_2 emissions per hour due to 15-minute shutdown

4.1.3 Commissioning Emissions

Commissioning emissions from one simple cycle gas turbine are as shown in table 5. The turbines go through 3 phases of testing: (1) initial load testing and engine checkout, (2) pre-catalyst initial tuning, and (3) post-catalyst tuning. The following commissioning emission estimates are based on the daily maximum of 8 hours of pre-catalyst initial tuning at 100% load.

TABLE 5. COMMISSIONING PERIOD EMISSION LIMITS FOR ONE GAS TURBINE

Air Pollutant	Proposed Commissioning Period Emissions Limits for One Gas Turbine	
	lb/hr	lb/day
NO_2	51	408
CO	45	360
POC		36
PM_{10}		17.6 (average)
SO_2		10.8

Note: Please check the appendix A for the detailed calculations

Table 5 does not have lb/hr limits for POC, PM_{10} and SO_2 because these pollutants are not continuously monitored for those pollutants.

The Air District is also proposing to cap the total amount of time that each turbine can operate partially abated and/or without the SCR systems and oxidation catalysts at 200 hours. This limit represents the shortest amount of time in which the facility can reasonably complete the required commissioning activities without jeopardizing safety and equipment warranties. The proposed 200-hour limit is based on the following estimates from General Electric of the time it will take for each specific commissioning activity.

The original estimates of daily emissions were about double the emissions in Table 5. The applicant has agreed to commission only one turbine at a time.

TABLE 6. COMMISSIONING SCHEDULE FOR A SINGLE GAS TURBINE[1]								
Activity	**Duration (hours/ Day)**	**Days**	**Load Range (%)**	**Total Emissions**				
				NO_X (lbs/hr)	**CO (lb/hr)**	**POC (lb/hr)**	**SO_x[2] (lb/hr)**	**PM_{10}[2] (lb/hr)**
Initial Load Testing and Engine Checkout[3]	4	2	10%	51	45	4.48	1.35	2.2 (avg)
Pre-Catalyst Initial tuning[4]	8	9	50-100%	51	45	4.48	1.35	2.2 (avg)
Post-Catalyst tuning[4]	8	15	50-100%	34	6.2	1.2	1.35	2.2 (avg)

Notes:
[1] Assumes SCR and oxidation catalyst will limit emissions to BACT levels during the final tuning period, which includes performance test.
[2] Steady state controlled emission rates for SOx and PM10 are 1.35, and 2.2 lbs/hr (average), respectively. These rates have been used to conservatively estimate hourly and total emissions during commissioning.
[3] In synchronized operation followed by low load engine check.
[4] Includes the period both before and after SCR and CO catalyst loading. Post-catalyst period includes NOx and CO catalyst use.

TABLE 7. COMMISSIONING SCHEDULE FOR FOUR GAS TURBINES								
Activity	**Duration (hours/Day)**	**Days**	**Number of Turbines**	**Total Emissions**				
				NO_X Total lbs	**CO Total lb**	**POC Total lb**	**SO_x[2] Total lb**	**PM_{10} Total lb**
Initial Load Testing and Engine Checkout[3]	4	2	4	1632	1440	143	43	70
Pre-Catalyst Initial tuning[4]	8	9	4	14688	12960	1290	389	634
Post-Catalyst tuning[4]	8	15	4	16320	2976	576	648	1056
Total in lbs				32640	17376	2010	1080	1760
Total in tons				16.3	8.7	1.0	0.54	0.9
Total Hours for 4 turbines	800							

Notes:
[1] Assumes SCR and oxidation catalyst will limit emissions to BACT levels during the final tuning period, which includes performance test.
[2] Steady state controlled emission rates for SOx and PM10 are 1.35, and 2.2 lbs/hr (average), respectively. These rates have been used to conservatively estimate hourly and total emissions during commissioning.
[3] In synchronized operation followed by low load engine check.
[4] Includes the period both before and after SCR and CO catalyst loading. Post-catalyst period includes NOx and CO catalyst use.

Compliance with the commissioning period will be monitored by continuous emissions monitors that the applicant will be required to install before any commissioning work begins, and through a written commissioning plan laying out all commissioning activities in advance, which the applicant will be required to submit to the Air District for review and approval.

4.1.4 Fire Pump Emissions

The facility will have a fire pump with a Cummins 220-hp engine. The CARB certification that was submitted with the application is based on Executive Order U-R-002-0476 for Model Year 2009, Engine Family 9CEXL0409AAB.

The emission factors in the CARB Certification are shown in table 8 below:

TABLE 8. CARB CERTIFIED EMISSION FACTORS	
Pollutant	Emission Factors g/kw-hr
NOx + POC	3.7
CO	1.6
PM_{10}	0.17

The emission factors are converted to g/bhp-hr by multiplying by the following conversion factor: 0.746. 95% of the combined NMHC and NOx emissions are assumed to be NOx; the remainder is NMHC, which is equivalent to POC in this case. Therefore, the emission factors in g/bhp-hr are shown in table 9 below:

TABLE 9. EMISSION FACTORS IN G/BHP-HR	
Pollutant	Emissions Factors g/bhp-hr
NOx	2.62
CO	1.19
POC	0.138
PM_{10}	0.127
SO_2*	0.0055

Note:
* SO_2 is calculated based on the sulfur in the fuel. The sulfur content of diesel fuel is limited to 0.0015% by weight. The weight of SO_2 is about double the weight of the sulfur in the fuel. The engine will use 11.3 gal diesel fuel/hr. The density of the fuel is about 6.88 lb/gal. (Based on No. 2 fuel oil spec in attachment 3-4: Typical analyses and properties of fuel oils, APTI Course 427, Combustion Evaluation, EPA 450/2-80-063.).
SO_2: 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.0015% S) (453.6 g/lb) = 0.0055 g/hp-hr

For the purposes of the risk screen analysis, the District includes only the emissions during testing and maintenance in accordance with BAAQMD Regulation 2-5-111. The hypothetical emissions during a fire are not considered. The District will allow 50 hours/yr for testing and maintenance in accordance with Section 93115.6(a)(3)(A)(1) of the CARB ATCM "Airborne Toxic Control Measure for Stationary Compression Ignition (CI) Engines" because the engine emits less than 0.15 g of PM/bhp-hr.

For the purposes of the annual potential to emit, the maximum usage is estimated at 500 hours/yr, in accordance with EPA's memorandum of September 6, 1995, by Lydia Wegman entitled "Calculating Potential to Emit (PTE) for Emergency Generators." This policy considers that in a year containing an emergency, an engine could run for a maximum of 500 hours.

TABLE 10. MAXIMUM DAILY AND ANNUAL REGULATED CRITERIA AIR POLLUTANT EMISSIONS FOR ENGINE					
	Nitrogen Oxides	**Carbon Monoxide**	**Precursor Organic Compounds**	**Particulate Matter (PM_{10})**	**Sulfur Dioxide**
	(as NO_2)	**CO**	**POC**		**SO_2**
lb/hr	1.27	0.58	0.07	0.06	0.0027
lb/day	30.48	13.89	1.68	1.44	0.06
lb/yr (50 hr/yr)*	63.50	28.95	3.50	3.00	0.14
lb/yr (500 hr/yr)**	635.00	289.45	35.00	30.0	1.35

* 50 hours per year are the hours of operation allowed for maintenance.
* * 500 hours per year are the maximum hours assumed for emergencies.

4.1.5 Daily Facility Emissions

Maximum daily emissions of regulated air pollutants emissions for the Mariposa Energy Project are set forth in Table 11 below. Table 11 shows emissions from the diesel engine and the gas turbines without startup and shutdown. Table 12 has the total daily emissions from the facility including startups and shutdowns.

These daily emission rates are used to determine what sources at the facility are subject to the requirement to use "Best Available Control Technology" pursuant to District New Source Review regulation (29Regulation 2, Rule 2). Pursuant to District Regulation 2-2-301.1, any new source that has the potential to emit 10 pounds or more per highest day of POC, NO_x, SO_2, PM_{10}, or CO is subject to the BACT requirement for that pollutant.

TABLE 11. MAXIMUM DAILY STEADY STATE REGULATED CRITERIA AIR POLLUTANT EMISSIONS FOR FACILITY WITHOUT STARTUP/SHUTDOWN					
	Pollutant (lb/day)				
Source	**Nitrogen Oxides (as NO_2)**	**Carbon Monoxide CO**	**Precursor Organic Compounds POC**	**Particulate Matter (PM_{10})**	**Sulfur Dioxide SO_2**
One Unit (No Tuning)	105.6	51.4	14.7	53 (avg)	32.4
Four Units (No Tuning)	422.4	205.4	58.8	212 (avg)	129.6
Diesel Engine Fire Pump	30.5	13.9	1.7	1.4	0.06
Total subject to District Regulations (without Combustor Tuning)	452.9	219.3	60.5	213 (avg)	130

TABLE 12. MAXIMUM DAILY STEADY STATE REGULATED CRITERIA AIR POLLUTANT EMISSIONS FOR FACILITY INCLUDING TWELVE 30-MINUTE STARTUPS AND TWELVE 15-MINUTE SHUTDOWNS

	Pollutant (lb/day)				
Source	**Nitrogen Oxides (as NO_2)**	**Carbon Monoxide CO**	**Precursor Organic Compounds POC**	**Particulate Matter (PM_{10})**	**Sulfur Dioxide SO_2 [d]**
One Unit (No Tuning)	66.0[a]	32.1[a]	9.2[a]	33[a] (avg)	20.25[a]
Four Units (No Tuning)	264	128.4	36.72	132 (avg)	129.6
Diesel Engine Fire Pump	30.5	13.9	1.7	1.44	0.06
Startup (4 units)	681.6[b]	677[b]	52.8[b]	53[b] (avg)	32.4[b]
Shutdown (4 units)	153.6[c]	130[c]	5.8[c]	26[c] (avg)	16.2[c]
Total subject to District Regulations (without Combustor Tuning)	1130	949	97	212 (avg)	130

Note: Please check appendix A for detail calculations.

[a] Total hours for steady state operation: 15 hrs

[b] Total hours for startup operation: 6 hrs for twelve 30-minute startups

[c] Total hours for shutdown: 3 hrs for twelve 15-minute shutdowns

[d] Daily SO2 emissions based on maximum fuel sulfur content

As Table 12 shows, each gas turbine will emit over 10 pounds per day of NO_x, CO, POC, PM_{10}, and SO_2. The Fire Pump Engine will also emit over 10 pounds per day of NO_x and CO. Therefore the facility will be required to use Best Available Control Technology per Regulation 2-2-301 to limit emissions of these pollutants.

The District's analysis of the Best Available Control Technology emission limits for this equipment is described in Section 5 below.

4.1.6 Annual Facility Emissions

The maximum annual emissions of regulated air pollutants for the proposed Mariposa Energy Project are set forth in Table 13 below without startups and shutdowns. Table 14 shows the annual emissions from the facility including startups and shutdowns. Annual facility emissions are used to determine whether the facility will need to offset its emissions with Emissions Reduction Credits under District Regulations 2-2-202 and 2-2-203. Offsets are required for NO_x and POC emissions over 10 tons per year, and for PM_{10} and SO_2 emissions over 100 tons per year.

TABLE 13. MAXIMUM ANNUAL STEADY STATE CRITERIA AIR POLLUTANT EMISSIONS FROM THE TURBINES AND DIESEL ENGINE WITHOUT STARTUP/SHUTDOWN

	NO_2 (ton/yr)	CO (ton/yr)	POC (ton/yr)	PM_{10} (ton/yr)	SO_2[a] (ton/yr)
One Gas Turbine[b]	8.8	4.28	1.22	4.4	0.68
Four Gas Turbines	35.2	17.12	4.90	17.6	2.72
Diesel Engine Fire Pump[c]	0.3	0.1	0.02	0.02	0.0
Total subject to District Regulations	35.5	17.2	4.9	17.6	2.7

Note: See appendices for emission calculations.

[a] Annual SO2 emissions based on average fuel sulfur content

[b] Based on 4000 hours of steady-state operation per year

[c] Based on 500 hours of emergency operation per year

TABLE 14. MAXIMUM ANNUAL STEADY STATE CRITERIA AIR POLLUTANT EMISSIONS FOR THE FACILITY INCLUDING STARTUP AND SHUTDOWN

	NO_2 (ton/yr)	CO (ton/yr)	POC (ton/yr)	PM_{10} (ton/yr)	SO_2[e] (ton/yr)
One Gas Turbine	8.8	4.28	1.22	4.4	0.68
Four Gas Turbines	35.2	17.12	4.88	17.6	2.72
Diesel Engine Fire Pump[f]	0.3	0.1	0.02	0.02	0.0
Startup (4 units)	8.5	8.5	0.66	0.66[a]	0.102[c]
Shutdown (4 units)	1.9	1.6	0.02	0.33[b]	0.051[d]
Total subject to District Regulations	45.9	27.3	5.6	18.6	2.9

[a] PM_{10} = 2.2 lb/hr/turbine. For 300 30-minute startups per year = (2.2/2)*300 = 330 lb/year *4 turbines = 1320 lb/year = 0.66 tpy for four turbines

[b] PM_{10} = 2.2 lb/hr/turbine. For 15 minutes per shutdown and for 300 shutdowns per year = 2.2/4 = 0.55 lb/shutdown = 0.55 * 300 = 165 lb/year * 4 turbines = 660 lb/year = 0.33 tpy for four turbines

[c] SO_2 = 0.34 lb/hr/turbine. For 300 30-minute startups per year = (0.34/2)*300 = 51 lb/year *4 turbines = 204 lb/yr = 0.102 tpy for four turbines

[d] SO_2 = 0.34 lb/hr/turbine. For 15 minutes per shutdown and for 300 shutdowns per year = (0.034/4)*300 = 2.55 lb/year * 4 turbines = 10.2 lb/year =0.051 tpy for four turbines

[e] Annual SO2 emissions based on average fuel sulfur content

[f] Based on 500 hours of emergency operation per year

These annual emissions rates show that the facility will be required to offset its NO_x emissions under District Regulation 2-2-302. NO_x credits, at a ratio of 1.15 tons of credits per 1 ton of emissions, are required because emissions will be over 35 tons per year. The facility will not be required to offset its POC emissions under District Regulation 2-2-302 because emissions will be less than 10 tons per year. The facility will not be required to offset its PM_{10} and SO_2 emissions under District Regulation 2-2-303 because emissions will be less than 100 tons per year of each pollutant.

4.2 **Toxic Air Contaminants**

Toxic Air Contaminants (TACs) are a subset of air pollutants that can be harmful to health and the environment even in small amounts. Table 15 and Table 16 provide a summary of the maximum annual facility toxic air contaminant (TAC) emissions from the project.

TABLE 15. MAXIMUM FACILITY TOXIC AIR CONTAMINANT (TAC) EMISSIONS

	EF	Per Turbine	Per Turbine	Total for 4 Turbines	Total for 4 Turbines	Acute Risk Screening Trigger Level	Chronic Risk Screening Trigger Level
Toxic Air Contaminant	**lb/MMbtu**	**lb/hour**	**lb/year**	**lb/hour**	**lb/year**	**(lb/hr)**	**(lb/yr)**
1,3-Butadiene	0.00000012	0.000060	0.258	0.00024	1.0307	None	0.63
Acetaldehyde	0.00013431	0.064645	277.974	0.25858	1111.8974	1	38
Acrolein	0.00001853	0.008918	38.348	0.03567	153.3931	0.0055	14
Ammonia	0.00680000	3.272840	14073.212	13.09136	56292.8480	7.1	7700
Benzene	0.00001304	0.006276	26.986	0.02510	107.9433	2.9	3.8
Benzo(a)anthracene	0.00000002	0.000011	0.046	0.00004	0.1834	None	None
Benzo(a)pyrene	0.00000001	0.000007	0.028	0.00003	0.1128	None	0.0069
Benzo(b)fluoranthene	0.00000001	0.000005	0.023	0.00002	0.0917	None	None
Benzo(k)fluoranthene	0.00000001	0.000005	0.022	0.00002	0.0893	None	None
Chrysene	0.00000002	0.000012	0.051	0.00005	0.2045	None	None
Dibenz(a,h)anthracene	0.00000002	0.000011	0.048	0.00004	0.1907	None	None
Ethylbenzene	0.00001755	0.008446	36.319	0.03379	145.2771	None	43
Formaldehyde	0.00045000	0.216585	931.316	0.86634	3725.2620	0.21	18
Hexane	0.00025392	0.122212	525.514	0.48885	2102.0542	None	270000
Indeno(1,2,3-cd)pyrene	0.00000002	0.000011	0.048	0.00004	0.1907	None	None
Naphthalene	0.00000163	0.000783	3.368	0.00313	13.4726	None	None
Propylene	0.00075588	0.363806	1564.367	1.45522	6257.4662	None	120000
Propylene Oxide	0.00004686	0.022555	96.987	0.09022	387.9467	6.8	29
Toluene	0.00006961	0.033502	144.060	0.13401	576.2388	82	12000
Xylene (Total)	0.00002559	0.012316	52.957	0.04926	211.8286	49	27000
Sulfuric Acid Mist (H2SO4)	0.00058950	0.283550	1197.997	1.1342	4791.9866	0.26	39
Benzo(a)pyrene equivalents	0.0000000448	0.000022	0.093	0.00009	0.3706	None	0.0069
PAH	0.001132	0.000062	0.266	0.00025	1.0632	None	None

Notes: PAH impacts are evaluated as Benzo (a) pyrene equivalents.
Based on total fuel input of 481 MMbtu/hr

Equivalency PAHs	Factor
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1.0
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenz(a,h)anthracene	1.05
Indeno(1,2,3-cd)pyrene	0.1

TABLE 16. DIESEL ENGINE TOXIC AIR CONTAMINANT (TAC) EMISSIONS						
Source	PM_{10} in g/bhp-hr	BHP	For 50 hours PM_{10} in lb/yr	For 500 hours PM_{10} in lb/yr	Acute Rick Screening Trigger Level lb/hr	Chronic Risk Screening Trigger Level lb/hr
S-5	0.127	220	3.07	30.07	None	0.63

Table 15 and Table 16 are also used as input data for air pollutant dispersion models used to assess the increased health risk to the public resulting from the project. The ammonia emissions shown are based upon a worst-case ammonia emission concentration of 5 ppmvd @ 15% O_2 from the gas turbine SCR systems. The chronic and acute screening trigger levels shown are per Table 2-5.1 of Regulation 2, Rule 5.

If emissions are above certain established screening levels prescribed in Table 2-5-1 of Regulation 2, Rule 5, a health risk assessment is required. Where no acute trigger level is listed for a TAC, none has been established for that TAC. Based on the information contained in Table 12 a health risk assessment is required by District Regulation 2, Rule 5. The health risk assessment is conducted to determine the potential impact on public health resulting from the worst-case TAC emissions from the project.

The results of the health risk assessment are discussed in full in Section 8 of this document. Briefly, the health risk assessment found a maximum increased cancer risk of 0.3 in one million for the maximally exposed resident near the facility and 1.3 in one million for the maximally exposed worker near the facility. These cancer risks are less than significant under District Regulation 2, Rule 5, because they are less than 10.0 in a million for the project.

The highest chronic non-cancer hazard index for the project is 0.015 and the highest acute non-cancer hazard index for the project is 0.026. These non-cancer risks are less than significant under District Regulation 2, Rule 5, because they are less than 1.0.

4.3 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are hazardous pollutants that are listed in Section 112(b) of the Federal Clean Air Act. Not all of the pollutants that are designated as toxic air contaminants by BAAQMD Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants, are considered to be "112(b)" pollutants by Federal EPA. Three notable pollutants that are TACs and not HAPs are ammonia, hydrogen sulfide, and sulfuric acid mist.

TABLE 17. MAXIMUM FACILITY HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS

Hazardous Air Pollutant	Project lb/year	Project ton/year
1,3-Butadiene	1.0307	< 1.0
Acetaldehyde	1111.8900	< 1.0
Acrolein	153.3930	< 1.0
Benzene	107.9430	< 1.0
Benzo(a)anthracene	0.1834	< 1.0
Benzo(a)pyrene	0.1128	< 1.0
Benzo(b)fluoranthene	0.0917	< 1.0
Benzo(k)fluoranthene	0.0893	< 1.0
Chrysene	0.2045	< 1.0
Dibenz(a,h)anthracene	0.1907	< 1.0
Ethylbenzene	145.2770	< 1.0
Formaldehyde	3725.2600	1.86
Hexane	2102.0500	1.05
Indeno(1,2,3-cd)pyrene	0.1907	< 1.0
Naphthalene	13.4726	< 1.0
Propylene Oxide	387.9460	< 1.0
Toluene	576.2380	< 1.0
Xylene (Total)	211.8280	< 1.0
Benzo(a)pyrene equivalents	0.3706	< 1.0
Total: lb/yr	8537.7622	
Total: ton/yr	4.27	

The purpose for summing the hazardous air pollutants is to determine whether a facility is major for hazardous air pollutants as defined by BAAQMD Regulation 2, Rule 6, which states that a facility is major if it emits more than 10 tons/year of any hazardous air pollutant and more than 25 tons/year of a combination of hazardous air pollutants.

4.4 **Greenhouse Gas Emissions**

The greenhouse gases have been estimated on the following basis:

- Fuel usage of 481 MMbtu/hr of natural gas/turbine/hr
- 4225 hours of operation/turbine/yr
- Fuel usage of 11.3 gal of diesel fuel/hr for engine
- 500 hours of operation/yr for engine
- SF6: 150 lbs in one circuit breaker; 0.1% leak rate

TABLE 18. ESTIMATED ANNUAL GHG EMISSIONS FROM MEP

	Fuel Usage, MMbtu/yr	Emission Factor, (kg CO2/MMbtu)	Emission Factor, (g CH4/MMbtu)	Emission Factor, (g N2O/MMbtu)	GHG (metric tons/yr)	Global Warming Potential	CO2 Equivalents (Metric tons/yr)
GHG							
Gas Turbines							
CO2	8,128,900	52.87			429775	1	429775
CH4	8,128,900		0.9		7	21	154
N2O	8,128,900			0.1	1	310	252
Engine	Fuel Usage, gal/yr, @ 500 hr/yr	Emission Factor, (kg CO2/gal)					
CO2	5,650	10.14			57	1	57
CH4	5,650		3		0.02	21	0
N2O	5,650			0.6	0.00	310	1
Circuit Breakers							
SF6					0.001160	23,900	28
Total							430267

Note:
Emission Factors from the REGULATION FOR THE MANDATORY REPORTING OF GREENHOUSE GAS EMISSIONS, Appendix A, Title 17, California Code of Regulations, Subchapter 10, Article 2, Sections 95100 to 95133

CO2 Emission Factor from Table 4 Appendix A-6 for Natural Gas with a heat content between 1000 Btu/scf and 1025 Btu/scf
CH4 Emission Factor from Table 6 Appendix A-9
N2O Emission Factor from Table 6 Appendix A-9
Global Warming Potentials from Table 2 Appendix A-4
Applicant estimates SF6 emissions for 1 circuit breaker at 0.15 lb/yr per unit (based on 0.1% leak rate for 150 lb SF6 per unit). Circuit breaker is hermetically sealed per applicant.[7]

[7] Email of July 13th, 2010 from Keith McGregor to Brenda Cabral

5 Best Available Control Technology (BACT)

The District's New Source Review regulations require the proposed Mariposa Energy Project to utilize the "Best Available Control Technology" ("BACT") to minimize air emissions, as discussed in more detail below. This section describes how the BACT requirements will apply to the facility.

5.1 Introduction

District Regulation 2-2-301 requires that the Mariposa Energy Project use the Best Available Control Technology to control NO_x, CO, POC, PM_{10}, and SO_x emissions from sources that will have the potential to emit over 10 pounds per highest day of each of those pollutants. Pursuant to Regulation 2-2-206, BACT is defined as the more stringent of:

(a) "The most effective control device or technique which has been successfully utilized for the type of equipment comprising such a source; or

(b) The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source: or

(c) Any emission control device or technique determined to be technologically feasible and cost-effective by the APCO, or

(d) The most effective emission control limitation for the type of equipment comprising such a source which the EPA states, prior to or during the public comment period, is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitations are not achievable. Under no circumstances shall the emission control required be less stringent than the emission control required by any applicable provision of federal, state or District laws, rules or regulations."

The type of BACT described in definitions (a) and (b) must have been demonstrated in practice and is referred to as "BACT 2". This type of BACT is termed "achieved in practice". The BACT category described in definition (c) is referred to as "technologically feasible/cost-effective" and it must be commercially available, demonstrated to be effective and reliable on a full-scale unit, and shown to be cost-effective on the basis of dollars per ton of pollutant abated. This is referred to as "BACT 1". BACT specifications (for both the "achieved in practice" and "technologically feasible/cost-effective" categories) for various source categories have been compiled in the BAAQMD BACT Guideline.

The simple-cycle turbines are subject to BACT under the District's New Source Review regulations (Regulation 2, Rule 2, Section 301) for NO_x, CO, POC, PM_{10}, and SO_x because each unit will have the potential to emit more than 10 pounds per highest day of those pollutants.

The fire pump engine, S5, is subject to BACT under the District's New Source Review regulations (Regulation 2, Rule 2, Section 301) for NO_x and CO because the engine will have the potential to emit more than 10 pounds per highest day of those pollutants.

The following sections provide the basis for the District BACT analyses for this equipment.

5.2 Best Available Control Technology for Oxides of Nitrogen (NO_x) for Turbines

Oxides of Nitrogen (NO_x) are a byproduct of the combustion of an air-and-fuel mixture in a high-temperature environment. NO_x is formed when the heat of combustion causes the nitrogen molecules in the combustion air to dissociate into individual nitrogen atoms, which then combine with oxygen atoms to form nitric oxide (NO) and nitrogen dioxide (NO_2). This reaction primarily forms NO (95% to 98%) and only a small amount of NO_2 (2% to 5%), but the NO eventually oxidizes and converts to NO_2 in the atmosphere. NO_2 is a reddish-brown gas with a detectable odor at very low concentrations. NO and NO_2 are generally referred to collectively as "NO_x".[8] NO_x is a precursor to the formation of ground-level ozone, the principal ingredient in smog.

The District has examined technologies that may be effective to control NO_x emissions in two general areas: combustion controls that will minimize the amount of NO_x created during combustion; and post-combustion controls that can remove NO_x from the exhaust stream after combustion has occurred.

Combustion Controls

The formation of NO_x during combustion is highly dependent on the primary combustion zone temperature, as the formation of NO_x increases exponentially with temperature. There are therefore three basic strategies to reduce thermal NO_x in the combustion process:

- Reduce the peak combustion temperature
- Reduce the amount of time the air/fuel mixture spends exposed to the high combustion temperature
- Reduce the oxygen level in the primary combustion zone

It should be noted, however, that techniques that control NO_x by reducing combustion temperatures might involve a trade-off with the formation of other pollutants. Reducing combustion temperatures to limit NO_x formation can decrease combustion efficiency, resulting in increased byproducts of incomplete combustion such as carbon monoxide and unburned hydrocarbons. (Unburned hydrocarbons from natural gas combustion consist of methane, ethane and precursor organic compounds.)

The District prioritizes NO_x reductions over carbon monoxide, however, because the Bay Area is not in compliance with applicable ozone standards, but does comply with carbon monoxide standards. The District therefore requires applicants to minimize NO_x emissions to the greatest

[8] NOx can also be formed when a nitrogen-bound hydrocarbon fuel is combusted, resulting in the release of nitrogen atoms from the fuel (fuel NOx) and NOx can be formed by organic free radicals and nitrogen in the earliest stages of combustion (prompt NOx). Natural gas does not contain significant amounts of fuel-bound nitrogen, therefore thermal NOx is the primary formation mechanism for natural gas fired gas turbines. References to NOx formation during combustion in this analysis refer to "thermal NOx", NOx formed from nitrogen in the combustion air.

extent feasible, and then to optimize CO and POC emissions for that level of NO_x control. This is a trade-off that must be kept in mind when selecting appropriate emissions control technologies for these pollutants.

The District has identified the following available combustion control technologies for reducing NO_x emissions from the combustion turbines.

Steam/Water Injection: Steam or water injection was one of the first NO_x control techniques utilized on gas turbines. Water or steam is injected into the combustion zone to act as a heat sink, lowering the peak flame temperature and thus lowering the quantity of thermal NO_x formed. The injected water or steam exits the turbine as part of the exhaust. The lower peak flame temperature can also reduce combustion efficiency and prevent complete combustion, however, and so carbon monoxide and POC emissions can increase as water/steam-to-fuel ratios increase. In addition, the injected steam or water may cause flame instability and can cause the flame to quench (go out). Water/steam injection in the combustion turbines can achieve NO_x emissions as low as 25 ppm @ 15% O_2.

Dry Low-NO_x Combustors (DLE): Another technology that can control NO_x without water/steam injection is Dry Low-NO_x combustion technology. Dry Low-NO_x Combustors reduce the formation of thermal NO_x through (1) "lean combustion" that uses excess air to reduce the primary combustion temperature; (2) reduced combustor residence time to limit exposure in a high temperature environment; (3) "lean premixed combustion" that reduces the peak flame temperature by mixing fuel and air in an initial stage to produce a lean and uniform fuel/air mixture that is delivered to a secondary stage where combustion takes place; and/or (4) two-stage rich/lean combustion using a primary fuel-rich combustion stage to limit the amount of oxygen available to combine with nitrogen and then a secondary lean burn-stage to complete combustion in a cooler environment. Dry Low-NO_x combustors can achieve NO_x emissions as low as 9 ppm.

Catalytic Combustors: Catalytic combustors, marketed under trade names such as XONON™, use a catalyst to allow the combustion reaction to take place with a lower peak flame temperature in order to reduce thermal NO_x formation. XONON™ uses a flameless catalytic combustion module followed by completion of combustion (at lower temperatures) downstream of the catalyst. Catalytic combustors such as XONON™ have not been demonstrated on Aero-derivative simple-cycle gas turbines such as the GE LM 6000 PC Sprint or Siemens F Class. The technology has been successfully demonstrated in a 1.5-megawatt simple-cycle pilot facility, and it is commercially available for turbines rated up to 10 megawatts, but it is not currently available for turbines of the size proposed for the Mariposa Energy Project.

Post-Combustion Controls

The District has identified the following post-combustion controls that can remove NO_x from the emissions stream after it has been formed.

Selective Catalytic Reduction (SCR): Selective catalytic reduction injects ammonia into the exhaust stream, which reacts with the NO_x and oxygen in the presence of a catalyst to form nitrogen and water. NO_x conversion is sensitive to exhaust gas temperature, and performance can be limited by contaminants in the exhaust gas that may mask or poison the catalyst. A small

amount of ammonia is not consumed in the reaction and is emitted in the exhaust stream as what is commonly called "ammonia slip". The SCR catalyst requires replacement periodically. SCR is a widely used post-combustion NO_x control technique on gas turbines, usually in conjunction with combustion controls.

Selective non-catalytic reduction (SNCR): Selective non-catalytic reduction involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1400° to 2100° F[9] and is most commonly used in boilers because combustion turbines do not have exhaust temperatures in that range. Selective non-catalytic reduction (SNCR) requires a temperature window that is higher than the exhaust temperatures from utility combustion turbine installations.

EMx™: EMx™ (formerly SCONOx™) is a catalytic oxidation and absorption technology that uses a two-stage catalyst/absorber system for the control of NO_x, CO, POC and optionally SO_x emissions for gas turbine applications. A coated catalyst oxidizes NO to NO_2, CO to CO_2, and POCs to CO_2 and water, and the NO_2 is then absorbed onto the catalyst surface where it is chemically converted to and stored as potassium nitrates and nitrites. A proprietary regenerative gas is periodically passed through the catalyst to desorb the NO_2 from the catalyst and reduce it to elemental nitrogen (N_2). The EMx™ process uses no ammonia. The EMx™ catalyst requires replacement periodically. EMx™ has been successfully demonstrated on several small combined-cycle combustion turbine projects up to 45 megawatts. The District is not aware of any EMx™ installations for simple-cycle gas turbines or peaking units.

Proposed BACT for NO_x for Simple-Cycle Gas Turbines

Combustion Controls

Based on the preceding discussion, water-injection and dry low-NO_x combustion are both technically feasible simple-cycle combustion turbine control technologies that are available to control NOx emissions. As part of the turbine selection process, the turbine vendor provided performance data for water-injected LM 6000 PC Sprint, dry-low NOx LM 6000 PD Sprint gas turbines and dry-low NOx LM 6000PF Sprint gas turbines (See Table 1). Although the LM 6000 PD turbine would have a similar NOx emission rate and the PF turbine would have a lower NOx emission rate than the PC turbine, the DLE models would have higher hydrocarbon and CO emission rates generally (except at the 17°F temperature case) when compared to the water-injected PC turbine. The applicant considered this tradeoff in the selection of the PC turbine, taking into account that any turbine selected would have to meet a 2.5-ppm NOx BACT limit utilizing post combustion technology.

The applicant has proposed the use of water-injection as BACT for the simple-cycle gas turbines. Water-injection is technologically feasible and commonly used at facilities of this type. This emissions control technology therefore satisfies the District's BACT requirement for combustion controls.

[9] NSCR discussion is from Institute of Clean Air Companies website: www.icac.com/i4a/pages/index.cfm?pageID=3399

Post-Combustion Controls

The applicant has proposed the use of Selective Catalytic Reduction (SCR) as BACT for the simple-cycle gas turbines.

Selective Catalytic Reduction (SCR) and EMx can achieve NO_x emissions of 2.5 ppm for simple-cycle turbines. These are the most effective level of controls that can be achieved by post combustion controls. EMx™ technology was first installed at the Redding Power Plant Unit #5, a 45-MW combined-cycle facility in Shasta County, California. The Shasta County Air Quality Management District evaluated EMx™ at that facility under a demonstration NO_x limit of 2.0 ppm (equivalent to what SCR can achieve for a combined-cycle unit).

After three years of operation, the Shasta County AQMD evaluated whether the facility was meeting this demonstration limit with EMx™, and concluded that "Redding Power is not able to reliably and continuously operate while maintaining the NO_x demonstration limit of 2.0 ppmvd @ 15% O_2." Based on Shasta County's negative experience with Redding Power, the District decided to accept SCR as a NOx control technology.

In addition to NO_x, the District also compared the potential ancillary environmental impacts inherent in SCR and EMx™ to determine whether EMx™ should be considered more "effective" for purposes of the BACT analysis. In particular, the District evaluated the potential impacts from ammonia emissions that would occur from using SCR. The use of SCR will result in ammonia emissions because some of the ammonia used in the reaction to convert NO_x to nitrogen and water does not get reacted and remains in the exhaust stream. The excess or unreacted ammonia emissions are known as "ammonia slip". Ammonia is a toxic chemical that can irritate or burn the skin, eyes, nose, and throat, and it also has the potential for reacting with nitric acid under certain atmospheric conditions to form particulate matter (Secondary PM).

With respect to the potential toxic impacts from ammonia slip emissions, the District has conducted a health risk assessment using air dispersion modeling to evaluate the potential health impacts of all toxics emissions from the facility, including ammonia slip. This assessment showed an acute hazard index of 0.026 and a chronic hazard index of 0.015. (*See* Health Risk Assessment in the Appendices.) A hazard index under 1.0 is considered less than significant. This minimal additional toxic impact of the ammonia slip resulting from the use of SCR is not significant and is not a sufficient reason to eliminate SCR as a control alternative.

The District also considered the potential environmental impact that may result from the use of SCR involves ammonia transportation and storage. The proposed facility will utilize aqueous ammonia in a 19% (by weight) solution for SCR ammonia injection, which will be transported to the facility and stored on-site in tanks. The transportation and storage of ammonia presents a risk of an ammonia release in the event of a major accident. However, this risk is much smaller for aqueous ammonia than it would be for gaseous (anhydrous) ammonia. These risks will be addressed in a number of ways under safety regulations and sound industry safety codes and standards. These safety measures include the Risk Management Plan requirement pursuant to the California Accidental Release Prevention Program, which must include an off-site consequences analysis and appropriate mitigation measures; a requirement to implement a Safety

Management Plan (SMP) for delivery of ammonia and other liquid hazardous materials; a requirement to instruct vendors delivering hazardous chemicals, including aqueous ammonia, to travel certain routes; a requirement to install ammonia sensors to detect the occurrence of any potential migration of ammonia vapors offsite; a requirement to use an ammonia tank that meets specific standards to reduce the potential for a release event; and a requirement to conduct a "Vulnerability Assessment" to address the potential security risk associated with storage and use of aqueous ammonia onsite. With these safeguards in place, the risks from catastrophic ammonia releases from SCR systems can be mitigated to a less than significant level. The Energy Commission will also be evaluating these risks further through its CEQA-equivalent environmental review process and will impose mitigating conditions as necessary to ensure that the risks are less than significant. For all of these reasons, the potential environmental impact from aqueous ammonia transportation and storage does not justify the elimination of SCR as a control alternative.

Finally, the District also evaluated the potential for ammonia slip to have ancillary impacts on secondary particulate matter. Secondary particulate matter in the Bay Area is mostly ammonium nitrate.[10] The District has historically believed that ammonia was not a significant contributor to secondary particulate matter because the Bay Area is "nitric-acid limited". This means that the formation of ammonium nitrate is constrained by the amount of nitric acid in the atmosphere and not driven by the amount of ammonia in the atmosphere. Where an area is nitric acid limited, emissions of additional ammonia will not contribute to secondary particulate matter formation because there is not enough nitric acid for it to react with.

The District has recently started reconsidering the extent to which this situation is correct, however. This further evaluation has generally confirmed (preliminarily at least) that the Bay Area is in fact nitric acid limited, although it has shown that secondary particulate formation mechanisms are highly complex and that the District's historical assumptions that ammonia emissions play no role whatsoever in secondary PM formation may, in hindsight, have been overly simplistic. The focus of the District further evaluation has been a computer modeling exercise designed to predict what $PM_{2.5}$ levels will be around the Bay Area, given certain assumptions about emissions of $PM_{2.5}$ and its precursors, about regional atmospheric chemistry, and about prevailing meteorological conditions. This information was used to create a computer model of regional $PM_{2.5}$ formation in the Bay Area from which predictions can be drawn about how emissions of $PM_{2.5}$ precursors will impact regional ambient $PM_{2.5}$ concentrations. The District's report on its computer modeling exercise has not been finalized, but the draft report concludes that regional ammonium nitrate buildup is limited by nitric acid, not by ammonia.[11] The draft report does find that the amount of available nitric acid is not uniform but varies in different locations around the Bay Area, and consequently the potential for ammonia emissions to impact $PM_{2.5}$ formation varies around the Bay Area. Specifically, according to the draft report, the model predicts that a reduction of 20% in total ammonia emissions throughout the Bay Area would result in changes in ambient $PM_{2.5}$ levels of between 0% and 4%, depending on the availability of nitric acid, leaving open the potential that ammonia restrictions could form a

[10] *See* BAAQMD, Draft Report, *Fine Particulate Matter Data Analysis and Modeling in the Bay Area* (Draft, Oct. 1, 2009), at p. 8 (Draft PM2.5 Modeling Report). The Air District anticipates issuing a final report in the near future.

[11] Draft PM2.5 Modeling Report at p. E-3 & p. 30

useful part of a regional strategy to reduce $PM_{2.5}$.[12] The draft report therefore restates the general conclusion that the Bay Area is nitric acid limited, although it finds that reductions in the region's ammonia inventory could potentially achieve reductions in $PM_{2.5}$ concentrations in areas that may have sufficient available nitric acid.[13] (The draft report cautions that its assumptions regarding the availability of nitric acid may be misleading, however, because of the preliminary nature of the ammonia emissions inventory used for modeling.) Notably, the model also predicts that the Byron area where the facility would be located has low levels of available nitric acid, in the vicinity of 0.30 ppb.[14]

The District does not believe that these indications from its draft $PM_{2.5}$ data and modeling analysis provide a sufficient basis to disqualify SCR as a BACT technology at Mariposa based on its potential for ammonia slip emissions. As the report itself notes, the District's work in this area is still at a preliminary stage and it is difficult to draw any firm conclusion about secondary PM formation from it at this time. Moreover, secondary particulate formation is a highly complex atmospheric process, making it especially difficult to estimate how a specific facility's ammonia slip emissions might impact ambient PM levels. The District therefore notes the results of its recent work on secondary particulate matter and will be conducting additional work in this area going forward, but has concluded that there is not enough conclusive evidence at this stage that this facility could have a significant particulate matter impacts because of ammonia slip emissions from the SCR system.

In addition, the District notes that secondary PM formation from ammonia slip is a cold weather phenomenon that occurs only in the winter. This is because ammonium nitrate volatilizes at higher temperatures and only exists in a particulate phase in cold weather[15]. Moreover, the times when the Bay Area experiences problems with high ambient PM levels in the air are during the winter months (primarily November through February). The Mariposa Energy Project will be a peaker plant, however, which operates during periods of peak demand, which normally occur during the hot summer months, when air conditioning use is heavy.

The District therefore concludes that potential secondary PM formation from ammonia slip would not be a significant concern at Mariposa Energy Project because the facility will operate primarily in weather conditions where ammonium nitrate secondary PM cannot form, and at times of the year when PM pollution is less of a concern.

Finally, the District also notes that although the manufacturer claims that EMx™ can be effectively scaled up from the smaller turbines on which it has demonstrated to the larger turbines at the proposed Mariposa Energy Project, earlier attempts to demonstrate the technology in practice have not been without problems. For example, the first attempt to scale the technology up from very small turbines (~5 MW) to the 50-MW range was at the Redding Power Plant Unit #5, a 45-MW combined-cycle facility in Shasta County, CA. The Shasta County Air

[12] Draft PM2.5 Modeling Report at pp. E-3 – E-4

[13] Draft PM2.5 Modeling Report at p. 30

[14] Draft PM2.5 Modeling Report, Figure 17, p. 31

[15] Draft PM2.5 Modeling Report at p. 10 (For all of the above notes, please check following link.) http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/18404/Footnotes/PM-data-analysis-and-modeling-report_DRAFT.ashx

Quality Management District evaluated EMx™ at that facility under a demonstration NO_x limit of 2.0 ppm (equivalent to what SCR can achieve for a combined-cycle unit).

After three years of operation, the Shasta County AQMD evaluated whether the facility was meeting this demonstration limit with EMx™, and concluded that "Redding Power is not able to reliably and continuously operate while maintaining the NO_x demonstration limit of 2.0 ppmvd @ 15% O_2."[16].

These concerns would be further compounded by the fact that Mariposa Energy Project will be a simple-cycle peaker plant, not a combined-cycle or cogeneration facility like other facilities where EMx™ has been installed. The EMx™ requires steam as part of the catalyst regeneration process. Unlike combined-cycle and cogeneration facilities, simple-cycle facilities like Mariposa Energy Project do not have any steam production. And there is an additional concern involving the damper systems that would be required with EMx™ to ensure proper regeneration gas distribution. Peaker plants require more rapid startups and more frequent load changes than combined-cycle and cogeneration plants, and to the District's knowledge the effectiveness and longevity of these damper systems has not been demonstrated under these conditions.

Given the uncertainties that still remain in understanding how secondary PM formation is impacted by ammonia slip, the significant additional cost that would be necessary to implement EMx™, and the concern that scaling EMx™ up to fit this facility could involve significant implementation problems, the District has concluded that EMx™ should not be required here as a BACT technology.

Based on this review, the District has concluded that SCR meets the District's BACT requirement. The proposed project would therefore comply with BACT for NO_x.

Determination of BACT emissions limit for NO_x for Simple-Cycle Gas Turbines

The District is also proposing to establish a BACT emissions limit in the permit of 2.5 ppm (averaged over one hour), which is the most stringent limit that has been achieved in practice at any other similar facility and is the most stringent limit that would be technologically feasible.

To determine the most stringent emissions limit that has been achieved in practice, the District evaluated other similar simple-cycle natural gas fired turbines. Common simple-cycle gas turbine units proposed for use for intermediate peaking and peaking power in California are General Electric LMS-100 gas turbines (100 MW), and LM6000 (nominal 50 MW) gas turbines. LMS-100 gas turbines operate in a similar fashion and are appropriate for comparison with this facility. Numerous projects have been permitted with the LMS-100 gas turbines. The LM6000 gas turbines have also been installed at numerous sites across the state to provide peaking power.

The District reviewed the NO_x emission limits of power plants using large turbines in a simple-cycle mode abated by SCR systems. The District also reviewed BACT determinations at the EPA RACT/BACT/LAER Clearinghouse, ARB BACT Clearinghouse and recent projects

[16] Letter from R. Bell, Air Quality District Manager, Shasta County Air Quality Management District, to R. Bennett, Safety & Environmental Coordinator, Redding Electric Utility, June 23, 2005

undergoing CEC licensing. Some of the LMS100 simple-cycle gas turbine permits and LM6000 simple-cycle gas turbine permits with NO_x limits are shown in the Table 19 below.

TABLE 19. NO_x EMISSION LIMITS FOR LARGE SIMPLE-CYCLE POWER PLANTS USING SCR

Facility	NO_x (ppmvd @ 15% O_2)
Los Esteros Critical Energy Center, BAAQMD GE LM6000 Gas Turbines, 48.5 MW each	5.0 (3-hr)
Panoche Energy Center, SJVAPCD GE LMS100 Gas Turbines, 100 MW each	2.5 (1-hr)
Walnut Creek Energy Park, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2.5 (1-hr)
Sun Valley Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2.5 (1-hr)
CPV Sentinel Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2.5 (1-hr)
Lambie Energy Center, BAAQMD GE LM6000 Gas Turbines, 48.5 MW each	2.5 (1-hr)
Riverview Energy Center, BAAQMD GE LM6000 Gas Turbines, 48.5 MW each	2.5 (1-hr)
Wolfskill Energy Center, BAAQMD GE LM6000 Gas Turbines, 48.5 MW each	2.5 (1-hr)
Goosehaven Energy Center, BAAQMD GE LM6000 Gas Turbines, 48.5 MW each	2.5 (1-hr)

As the Table 19 shows, emissions of 2.5 ppm NO_x averaged over 1-hour is the most stringent emission limitation that has been determined to be achievable at any similar facility using SCR for NO_x control.

The District examined only simple-cycle turbines in this review because simple-cycle turbines operate differently than combined-cycle turbines and cannot achieve the same NO_x emissions performance as combined-cycle turbines, which are typically capable of meeting a 2.0-ppm limit. Simple-cycle turbines have higher exhaust gas temperatures than combined-cycle turbines because they do not use a heat recovery steam boiler, which removes some of the heat from the exhaust and reduces the exhaust gas temperature. For this facility, the turbine exhaust temperatures from the simple-cycle turbines will exceed 863 degrees F, according to the permit application. These high exhaust temperatures can damage a standard SCR catalyst. As a result, simple-cycle turbines must use less-efficient high-temperature SCR catalysts, or must introduce a large amount of dilution air to cool the exhaust if they use a standard SCR catalyst. Both of these approaches lead to less efficient SCR performance as compared to a combined-cycle operation. High-temperature catalysts typically have a lower NO_x conversion efficiency as compared to conventional SCR catalysts operating at a lower operating temperature. These catalysts have NO_x conversion efficiency below 90% at elevated temperatures above 800ºF,[17] whereas standard catalysts have NO_x conversion efficiencies of greater than 90% at 600 to

[17] BASF, High Temperature SCR for simple-cycle gas turbine applications, 2007

700ºF.[18] Dilution air fans can be used to cool the exhaust prior to entering the SCR system, but this approach has its own drawbacks. The introduction of dilution air may cool the exhaust into the appropriate temperature window, but there may be exhaust hot spots that lower catalyst NO_x conversion rates. Optimum SCR performance requires uniform temperature profile, flow profile, and NO_x concentration profile across the SCR catalyst face, and introducing large amounts of dilution air disrupts this uniformity. Changing turbine loads also tends to disrupt this uniformity, which makes controlling NO_x more difficult with the simple-cycle peaking turbines proposed for the Mariposa Energy Project. The facility will operate in a load-following mode some of the time and this would mean non-steady-state operation where the exhaust temperature, flowrate, and NO_x concentration all vary as the turbine load is changing. For all of these reasons, the District has concluded that the NO_x emissions performance that can be achieved with combined-cycle turbines would not be achievable for simple-cycle turbines. The District has therefore reviewed only simple-cycle turbines in evaluating what emissions limits have been achieved in practice by other facilities. As shown in Table 19, 2.5 ppm is the most stringent emissions limitation that has been achieved by such facilities.

The District has therefore determined that 2.5 ppm, averaged over 1-hour, is the BACT emission limit for NO_x for the simple-cycle gas turbines. The District is also proposing corresponding hourly, daily and annual mass emissions limits. Compliance with the NO_x permit limits will be demonstrated on a continuous basis using a Continuous Emissions Monitor (CEM).

This proposed BACT emissions limit is consistent with the District's BACT Guidelines for this type of equipment. District BACT Guideline 89.1.3 does not specify BACT 1 (technologically feasible and cost-effective) for NO_x for a simple-cycle gas turbine with a rated output > 40 MW. District BACT Guideline 89.1.3 does specify BACT 2 (achieved in practice) as 2.5 ppmvd @ 15% O_2 averaged over one hour, typically achieved through the use of High Temperature Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with steam or water injection.

5.3 **Best Available Control Technology for Carbon Monoxide (CO) for Turbines**

Carbon monoxide is a colorless odorless gas that is a product of incomplete combustion. The District is proposing a BACT permit limit of 2.0 ppm CO (averaged over three hours). A 2.0-ppm BACT limit for this facility would be lower than what has been achieved in practice with other similar simple-cycle turbines, and would be the lowest emissions limit that would be technologically feasible and cost-effective. This emissions rate will be achieved through the use of good combustion practice and an oxidation catalyst, which are the most stringent available controls.

The District began its BACT analysis by evaluating the most effective control device and/or technique that has been achieved in practice at similar facilities, or is technologically feasible and cost-effective, pursuant to the District's definition of BACT in Regulation 2-2-206. As with NO_x, the District has examined both combustion controls to reduce the amount of carbon

[18] BASF, NOx Cat™ VNX SCR Catalyst for natural gas turbines and stationary engines, 2009

monoxide generated and post-combustion controls to remove carbon monoxide from the exhaust stream.

Combustion Controls

Carbon monoxide is formed by incomplete combustion. Incomplete combustion occurs when there is not enough air to fully combust the fuel, and when the air and fuel are not properly mixed due to poor combustor tuning. Maximizing complete combustion by ensuring an adequate air/fuel mixture with good mixing will reduce carbon monoxide emissions by preventing its formation in the first place.

Increasing combustion temperatures can also promote complete combustion, but doing so will increase NO_x emissions due to thermal NO_x formation as described in the previous section. The District prioritizes NO_x control over carbon monoxide control because the Bay Area is not in compliance with the federal standards for ozone, which is formed by NO_x emissions reacting with other pollutants in the atmosphere. The District therefore does not favor increasing combustion temperatures to control carbon monoxide. Instead, the District favors approaches that reduce NO_x to the lowest achievable rate and then optimize carbon monoxide emissions for that level of NO_x emissions.

Good Combustion Practice: The District has identified good combustion practice as an available combustion control technology for minimizing carbon monoxide formation during combustion. Good combustion practice utilize "lean combustion" – large amount of excess air – to produce a cooler flame temperature to minimize NO_x formation, while still ensuring good air/fuel mixing with excess air to achieve complete combustion, thus minimizing CO emissions. This good combustion practice can be used with the water injection technology selected for minimizing NO_x emissions.

Post-Combustion Controls

The District has also identified two post-combustion technologies to remove carbon monoxide from the exhaust stream.

Oxidation Catalysts: An oxidation catalyst oxidizes the carbon monoxide in the exhaust gases to form CO_2. Oxidation catalysts are a proven post-combustion control technology widely in use on large gas turbines to abate CO and POC emissions.

EMx™: EMx™, described above in the NO_2 discussion, is a multimedia control technology that abates CO and POC emissions as well as NO_x. EMx™ technology uses a catalyst to oxidize carbon monoxide emissions to form CO_2, and is therefore also an oxidation catalyst. However, it is not a stand-alone oxidation catalyst since the EMx™ is also a NO_x reduction device. Hence, it is identified as a device separate from the oxidation catalyst. EMx™ has been demonstrated on a 45 MW Alstom GTX 100 combined-cycle gas turbine at the Redding Electric Municipal Plant in Redding, CA, and the manufacturer has indicated that it could feasibly be scaled up to larger size gas turbines as discussed above in the NO_x BACT analysis. The District is not aware of any EMx™ installations on simple-cycle peaker units.

Oxidation catalysts are capable of maintaining carbon monoxide below 2 ppmvd @ 15% O_2 (3-hour average), depending on load and combustor tuning (as emissions from the gas turbines vary greatly depending on these factors). This is the most effective level of control that can be achieved by post combustion controls. There is no CO emissions data for EMx™ installation on a gas turbine of this size and in peaking service. Therefore, the District has determined that the use of good combustion practice and an oxidation catalyst is BACT for simple-cycle gas turbines.

Based on the foregoing analysis, the District has determined that the proposed combination of good combustion practice to reduce the formation of carbon monoxide during combustion and an oxidation catalyst to remove carbon monoxide from the gas turbines exhaust satisfies the BACT requirement.

Determination of BACT Emissions Limit for Carbon Monoxide (CO) for Simple-Cycle Gas Turbines

The District is also proposing a CO BACT limit of 2.0 ppm, which is more stringent than what has been achieved in practice at other similar simple-cycle facilities and is the most stringent limit that is technologically feasible and cost-effective.

To establish what level of emissions performance has been achieved in practice for this type of facility, the District reviewed the CO emission limits of other large simple-cycle power plants using oxidation catalyst systems. As with the NO_x comparison set forth in Table 18 above, the District reviewed BACT determinations for CO at the EPA RACT/BACT/LAER Clearinghouse, ARB BACT Clearinghouse and recent projects undergoing CEC licensing.

TABLE 20. CO EMISSION LIMITS FOR LARGE SIMPLE-CYCLE POWER PLANTS USING OXIDATION CATALYSTS	
Facility	**CO (ppmvd @ 15% O_2)**
Panoche Energy Center, SJVAPCD GE LMS100 Gas Turbines, 100 MW each	6 (3-hr)
Walnut Creek Energy Park, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6 (1-hr)
Sun Valley Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6 (1-hr)
CPV Sentinel Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6 (1-hr)
Lambie Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	6 (3-hr)
Riverview Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	6 (3-hr)
Wolfskill Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	6 (3-hr)
Goosehaven Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	6 (3-hr)
Los Esteros Critical Energy Facility, BAAQMD GE LM6000 Gas Turbines, 49 MW each	4 (3-hr)

A CO permit limit of 4 ppm was the lowest for a simple-cycle gas turbine abated by an oxidation catalyst. The District therefore determined that 4-ppm (3-hour average) is the most stringent emission limitation that has been achieved in practice for this type of facility.

These BACT emission rates are consistent with the District's BACT Guidelines for this type of equipment. District BACT Guideline 89.1.3 specifies BACT 2 (achieved in practice) for CO for simple-cycle gas turbines with a rated output of $\geq$ 40 MW as a CO emission concentration of $\leq$ 6.0 ppmvd @ 15% O_2 and the use of an oxidation catalyst. This BACT specification is based upon several GE LM6000 gas turbine permits in the Bay Area. BACT 1 (technologically feasible/cost-effective) is currently not specified.

The District also considered whether it would be technically feasible and cost-effective to require the proposed facility to meet an emission limit below the 4.0-ppm that has been achieved by other similar facilities. The District has concluded that the facility should be able to achieve a limit of 2.0 ppm (averaged over three hour), which is consistent with what combined-cycle facilities can typically achieve. As previously discussed, the simple-cycle gas turbines utilize water injection and are very similar to many combined cycle gas turbine projects. The primary difference is the lack of a heat recovery steam generator and the higher stack exhaust temperatures. The higher exhaust temperatures may negatively impact the SCR performance, but the higher exhaust temperatures will not adversely impact the oxidation catalyst performance.

The District then considered whether it would be technically feasible and cost-effective to require the proposed facility to meet an emission limit of 2.0-ppm for one hour. The District found that although it may be technically feasible to do so, it would not be cost-effective under the District's BACT cost-effectiveness guidelines given the large costs involved. Additionally, a large catalyst capable of meeting a CO permit limits as 2.0 ppm for one hour may have other implementation problems such as a high back pressure which could adversely impact turbine operating performance and efficiency.

Following is the information that was submitted by the applicant to determine whether the reduction of CO from 2 ppm, 3-hr average to 2 ppm, 1-hr average was cost effective. Table 20 has the necessary capital costs and Table 21 has the operating costs.

TABLE 21. CAPITAL COSTS TO REDUCE CO EMISSIONS FROM 2 PPM FOR 3-HOURS TO 2 PPM FOR 1-HOUR

DIRECT CAPITAL COSTS (2009 $)		**Explanation of Cost Estimates Per Turbine**
1. Purchase Equipment		Base Cost
A) Pollution Control Equipment	$100,000	EIT Proposal C10-109 (2 ppm 3-hr average to 2 ppm for 1-hr average CO emission levels)
B) Instrumentation & Controls (No CEMS)	$0	EPA1998 10% of Base Cost (assumed $0 for incremental assessment)
C) Freight & Taxes	$13,000	8% Taxes; 5% Freight; on 1A & 1B
Total Purchased Equip. Costs (TEC):	$113,000	Sum 1A, 1B, 1C
2. Installation Costs:		
A) Foundation & Supports	$0	EPA1998 8% of TEC
B) Erection and Handling	$0	EPA1998 14% of TEC
C) Electrical	$0	EPA1998 4% of TEC
D) Piping	$0	EPA1998 2% of TEC
E) Insulation	$0	1% of TEC
F) Painting	$0	EPA1998 1% of TEC
G) Site Preparation	$0	0% of TEC
Total Installation Costs (TINC):	$0	Sum 2A, 2B, 2C, 2D, 2E, 2F, 2G
Total Direct Capital Costs (TDCC):	$113,000	Sum TEC, TINC
INDIRECT CAPITAL COSTS		
1. Engineering & Supervision	$11,300	EPA1998 10% of TEC
2. Construction and Field Exp.	$5,650	OAQPS 5% of TEC
3. Contractor Fees	$11,300	OAQPS 10% of TEC
4. Start-up	$2,260	OAQPS 2% of TEC
5. Performance Testing	$1,130	OAQPS 1% of TEC
Total Indirect Capital Costs (TICC):	$31,640	Sum 1, 2, 3, 4, 5
Total Direct & Indirect Capital Costs (TDICC):	$144,640	Sum TDCC, TICC
Contingency (@12%):	$17,357	12% TDICC (std engineering accuracy)
TOTAL CAPITAL COSTS (TCC):	$161,997	Sum TDICC, Contingency

TABLE 22. ANNUAL OPERATING COSTS TO REDUCE CO EMISSIONS FROM 2 PPM FOR 3-HOURS TO 2 PPM FOR 1-HOUR		
DIRECT OPERATING COSTS (2003 $)	Cost in $	Explanation of Cost Estimates per Turbine
1. Operating Labor	$0	EPA1998 3 hr/day, @ 41.50 hr
2. Supervisory Labor	$0	OAQPS 15% Operating Labor
3. Maintenance Labor & Materials	$7,574	0.5 hr/day, $41.50/hr, + 100% materials (estimated at $0)
4. Electricity Expense ($0.0527/kWh)	$0	
5. Catalyst Cost (replace)	$0	
6. Fuel Penalty ($0.0041/scf gas)	$7,850	0.15% fuel increase/inch wc (0.7 EIT Proposal)
7. Annual Catalyst Cost	$0	Initial Catalyst will last 15 year period
Total Direct Operating Costs (TDOC):	$15424	Sum 1 through 7
INDIRECT OPERATING COSTS		
1. Overhead	$4,544	OAQPS 60% Total Labor
Total Indirect Operating Costs (TIOC):	$4,544	Sum 1
CAPITAL CHARGES COSTS		
1. Property Tax	$1,620	OAQPS 1% TCC
2. Insurance	$1,620	OAQPS 1% TCC
3. General Administrative	$3,240	OAQPS 2% TCC
4. Capital Recovery Cost (7%, 15 years)	$17,787	10.98%, TCC
Total Capital Charges Costs (TCCC):	$24,267	Sum 1, 2, 3, 4
TOTAL ANNUALIZED OPERATING COSTS:	$44,235	Sum TDOC, TIOC, TCCC
		Per Turbine
Base Uncontrolled Case	2.0	ppm - 3 hour - assumed CO concentration of 2 ppm
Annual Emission Rate	4.2	tpy (100.8 TPY @ 48 ppm * 2/48) Startup/Shutdown Excluded
Controlled Case Emissions		
CO Concentration	1.5	ppm (1-hr) assumed CO concentration of 1.5 ppm
Annual Emission Rate:	3.1	tpy (4.2 TPY @ 2 ppm * 1.5/2) Startup/Shutdown Excluded
CO Reduction from Uncontrolled Case:	1.0	tpy
Control Cost Effectiveness:	**$42,500**	per ton CO per turbine

The Air District evaluated information from the applicant on the costs and emissions reduction benefits of installing a larger oxidation catalyst capable of consistently maintaining emissions at 2 ppm for 1-hour. Based on these analyses, the cost of achieving a 2-ppm for 1-hour permit limit would be an additional $42,500 per year per ton of CO for each turbine (above what it would cost to achieve a 2.0 ppm 1-hour limit).

Based on these high costs (on a per-ton basis) and the relatively little additional CO emissions benefit to be achieved (on a per-dollar basis), requiring a 2 ppm for 1-hour CO permit limit cannot reasonably be justified. The Air District has not adopted its own cost-effectiveness. A review of other districts in California found none that consider additional CO controls appropriate as BACT where the total (average) cost-effectiveness will be greater than $400 per ton.

The District has therefore determined that BACT for CO for this facility is the use of good combustion practice with abatement by an oxidation catalyst, and a permit limit of 2 ppmvd @ 15% O_2 averaged over 3 hours. This proposed BACT limit for CO is based on a review of the feasible BACT CO control technologies, a review of comparable permit limits for simple-cycle gas turbines, and the fact that CO emissions from a simple-cycle gas turbine equipped with water injection should be equivalent to a similar combined-cycle gas turbine. The proposed 2 ppmvd @ 15% O_2 averaged over 3-hours permit limit for CO is the lowest that the District is aware of for a simple-cycle gas turbine. CO exhaust gas concentrations will be continuously monitored by a continuous emissions monitor while the turbines are in operation.

Good combustion practice is maximizing complete combustion by ensuring an adequate air-to-fuel mixture with good mixing. This mixing would be difficult to monitor, but low CO levels, measured by the CO CEM, are an indication of good combustion practice.

5.4 Best Available Control Technology for Precursor Organic Compounds (POC) for Turbines

The Precursor Organic Compound (POC) emissions from the simple-cycle gas turbines are subject to District BACT requirements since the potential to emit exceeds 10 pounds of POC per highest day. The emissions of POC from combustion sources are products of incomplete combustion like CO emissions. Emissions control techniques for CO are also applicable to POC emissions from combustions sources. The appropriate BACT control device or technique for CO is therefore also the BACT control device or technique for POC.

The District has reviewed the available control technologies in the BACT analysis for CO (equally applicable to POC) and determined that good combustion practice and abatement using an oxidation catalyst are the BACT technologies for controlling POC from the proposed simple-cycle combustion turbines at Mariposa Energy Project.

There currently is no BACT 1 (technologically feasible/cost-effective) specification for POC for the simple-cycle turbines in the District BACT guidelines. Currently, District BACT Guideline 89.1.3 specifies BACT 2 (achieved in practice) for POC for simple-cycle gas turbines with an output rating $\geq$ 40 MW as 2.0 ppmv, dry @ 15% O_2, which is typically achieved through the use of an oxidation catalyst. This is based upon several LM6000 gas turbine permits which were originally permitted with a POC emission limits in pound per hour or pounds per million Btu equivalents to 2.0 ppmvd @ 15% O_2.

The District then evaluated what the appropriate BACT emission limit should be for POC. The District reviewed permit limits from similar facilities, as summarized in Table 22.

TABLE 23. POC EMISSION LIMITS FOR LARGE SIMPLE-CYCLE GAS TURBINES	
Facility	**POC (ppmvd @ 15% O_2)**
Panoche Energy Center, SJVAPCD GE LMS100 Gas Turbines, 100 MW each	2 (3-hr)
Walnut Creek Energy Park, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2 (1-hr)
Sun Valley Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2 (1-hr)
CPV Sentinel Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	2 (1-hr)
Lambie Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2 (1-hr)
Riverview Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2 (1-hr)
Wolfskill Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2 (1-hr)
Goosehaven Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2 (1-hr)
Los Esteros Critical Energy Facility, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2 (1-hr)

The District has reviewed the POC permit emissions limits for similar facilities shown in Table 23 and determined that 2.0 ppm is the lowest emissions limit that has been achieved in practice for a simple-cycle gas turbine abated by an oxidation catalyst.

Then District considered whether it would be technically feasible and cost-effective to require the proposed facility to meet an emission limit below the proposed 2.0 ppm POC limit. The Air District evaluated information from the applicant, below, on the costs and emissions reduction benefits of installing a larger oxidation catalyst capable of consistently maintaining emissions at 1 ppm for 1 hour. Based on these analyses, the cost of achieving 1 ppm would be an additional $8,822 per year per ton of POC for each turbine.

Based on these costs (on a per-ton basis) and the additional POC emissions benefit to be achieved (on a per-dollar basis), requiring a 1-ppm @ 1 hour POC permit limit is reasonable. (See the applicant quote below in Table 23 and Table 24 supplied on May 26, 2010). The guidelines for POC and a review of other districts in California found that additional POC controls are appropriate as BACT where the total (average) cost-effectiveness will be less than $17,500 per ton.

TABLE 24. CAPITAL COSTS TO REDUCE POC EMISSIONS FROM 2 PPM TO 1 PPM FOR 1-HOUR

DIRECT CAPITAL COSTS (2009 $)		**Explanation of Cost Estimates Per Turbine**
1. Purchase Equipment		Base Cost
A) Pollution Control Equipment	$50,000	EIT Email dated May 18, 2010.
B) Instrumentation & Controls (No CEMS)	$0	EPA1998 10% of Base Cost (assumed $0 for incremental assessment)
C) Freight & Taxes	$0	8% Taxes; 5% Freight; on 1A & 1B
Total Purchased Equip. Costs (TEC):	$50,000	Sum 1A, 1B, 1C
2. Installation Costs:		
A) Foundation & Supports	$0	EPA1998 8% of TEC
B) Erection and Handling	$0	EPA1998 14% of TEC
C) Electrical	$0	EPA1998 4% of TEC
D) Piping	$0	EPA1998 2% of TEC
E) Insulation	$0	1% of TEC
F) Painting	$0	EPA1998 1% of TEC
G) Site Preparation	$0	0% of TEC
Total Installation Costs (TINC):	$0	Sum 2A, 2B, 2C, 2D, 2E, 2F, 2G
Total Direct Capital Costs (TDCC):	$50,000	Sum TEC, TINC
INDIRECT CAPITAL COSTS		
1. Engineering & Supervision	$5,000	EPA1998 10% of TEC
2. Construction and Field Exp.	$2,500	OAQPS 5% of TEC
3. Contractor Fees	$5,000	OAQPS 10% of TEC
4. Start-up	$1,000	OAQPS 2% of TEC
5. Performance Testing	$500	OAQPS 1% of TEC
Total Indirect Capital Costs (TICC):	$14,000	Sum 1, 2, 3, 4, 5
Total Direct & Indirect Capital Costs (TDICC):	$64,000	Sum TDCC, TICC
Contingency (@12%):	$7,680	12% TDICC (std engineering accuracy)
TOTAL CAPITAL COSTS (TCC):	$71,680	Sum TDICC, Contingency

DIRECT OPERATING COSTS (2003 $)	**Cost in $**	**Explanation of Cost Estimates per Turbine**
1. Operating Labor	$0	EPA1998 1 hr/day, @ 80.50 hr
2. Supervisory Labor	$0	OAQPS 15% Operating Labor
3. Maintenance Labor & Materials	$11470	140 hr/year, $80.50/hr, + $200 materials (estimated at $0)
4. Electricity Expense ($0.0527/kWh)	$0	
5. Catalyst Cost (replace)	$0	NA

TABLE 24. CAPITAL COSTS TO REDUCE POC EMISSIONS FROM 2 PPM TO 1 PPM FOR 1-HOUR		
6. Fuel Penalty ($0.0041/scf gas)	$2,243	0.15% fuel increase/inch wc (0.7 EIT Proposal)
7. Annual Catalyst Cost	$0	Initial Catalyst will last 15 year period
Total Direct Operating Costs (TDOC):	$13713	Sum 1 through 7
INDIRECT OPERATING COSTS		
1. Overhead	$6762	OAQPS 60% Total Labor
Total Indirect Operating Costs (TIOC):	$6762	Sum 1
CAPITAL CHARGES COSTS		
1. Property Tax	$717	OAQPS 1% TCC
2. Insurance	$717	OAQPS 1% TCC
3. General Administrative	$1,434	OAQPS 2% TCC
4. Capital Recovery Cost (7%, 15 years)	$7,870	10.98%, TCC
Total Capital Charges Costs (TCCC):	$10,738	Sum 1, 2, 3, 4
TOTAL ANNUALIZED OPERATING COSTS:	$20555	Sum TDOC, TIOC, TCCC
		Per Turbine
Base Uncontrolled Case	3.0	ppm (GE Guarantee)
Annual Emission Rate	3.5	TPY (3.74 Lb POC/hr * 3.0 ppm POC/6.4 ppm POC * 4000 hr/yr * 2000 lb/ton)
Controlled Case Emissions		
POC Concentration	1.0	ppm (3 hour)
Annual Emission Rate:	1.2	TPY (3.5 TPY * 1 ppm POC /3 ppm POC)
POC Reduction from Uncontrolled Case:	2.34	tpy
Control Cost Effectiveness:	**$13,339**	per ton of POC per turbine
References: OAQPS - OAQPS Cost Control Manual, 5th ED., February 1996. EPA1998 - Cost Effectiveness for Oxidation Catalyst Control of HAP Emissions from Stationary Combustion Turbines, * EPA memo dated 12-30-99, Emissions Standards Division, Docket A-95-51, and May 14, 1999 memo on Stationary CT control cost options.		

The District has therefore determined that BACT for the simple-cycle gas turbines for POC is the use of good combustion practice and abatement with an oxidation catalyst to achieve a permit limit for each gas turbine of 0.616 lb per hour or 0.00127 lb/MMbtu, which is equivalent to 1 ppm POC, 1-hr average.

5.5 Best Available Control Technology for Particulate Matter (PM) for Turbines

For emissions of particulate matter (PM), the District is proposing to require the use of PUC-quality low-sulfur natural gas, high efficiency inlet air filtration, and good combustion practice as BACT control technologies. The District is not proposing an hourly PM emission limit as BACT. The District's proposed BACT determination is explained below.[19]

Control Technology Review:

Control technologies for PM can be grouped into two categories: (1) combustion controls, and (2) post-combustion controls.

Pre-Combustion Controls

- Inlet Air Filter: An inlet air filter is commonly used to protect the turbine from contaminants in the air, which can damage the turbine. There are two main types of filters, static filters and self-cleaning filters. Self-cleaning filters are cleaned periodically by a pulse of backflow air that dislodges the layer of dust collected on the outside surface of the filter. Self-cleaning filters require less maintenance than static filters and can be used in harsher environments. Both filter types can utilize high-efficiency filters capable of filtering particles less than 10 μm in diameter.

Combustion Controls

- **Good Combustion Practice:** The District has identified good combustion practice as an available combustion control technology for minimizing unburned hydrocarbon formation during combustion. Good combustion will ensure proper air/fuel mixing to achieve complete combustion, thus minimizing emissions of unburned hydrocarbons that can lead to formation of PM at the stack.

- **Clean-burning fuels:** The use of clean-burning fuels, such as natural gas that has only trace amounts of sulfur that can form particulates, will result in minimal formation of PM during combustion. The use of natural gas is commercially available and demonstrated for the Mariposa Energy Project gas turbines.

Post-Combustion Controls

[19] This facility is subject to BACT requirements for PM_{10} only. $PM_{2.5}$, a subset of PM_{10}, is regulated under federal requirements in 40 C.F.R. Section 52.21 (PSD) and 40 C.F.R. Part 51, Appendix S (Non-Attainment NSR). The facility is not subject to PSD or $PM_{2.5}$ Non-Attainment NSR permit requirements under Section 52.21 or Appendix S because the facility is not a "major facility" for the purposes of these regulations. The District is therefore not conducting a PSD permitting analysis or an Appendix S permitting analysis for $PM_{2.5}$. The District notes, however, that for combustion turbines essentially all of the PM emissions are less than one micron in diameter, so it is both PM_{10} and $PM_{2.5}$. (*See* AP-42, Table 1.4-2, footnote c, 7/98 (available at http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf). Moreover, the same emissions control technologies that will be effective for PM_{10} for this facility will also be similarly effective for $PM_{2.5}$. The District's BACT analysis and emissions limit for PM_{10} will also therefore effectively be a BACT limit on $PM_{2.5}$ emissions as well, even though the facility is not subject to the federal $PM_{2.5}$ BACT requirements.

- **Electrostatic precipitators:** Electrostatic precipitators are used on solid fuel boilers and incinerators to remove PM from the exhaust. Electrostatic precipitators use a high-voltage direct-current corona to electrically charge particles in the gas stream. The suspended particles are attracted to collecting electrodes and deposited on collection plates. Particles are collected and disposed of by mechanically rapping the electrodes and plates and dislodging the particles into collection hoppers.

- **Baghouses:** Baghouses are used to collect PM by drawing the exhaust gases through a fabric filter. Particulates collect on the outside of filter bags that are periodically shaken to release the particulates into hoppers.

Inlet filtration, good combustion practice and clean-burning fuels are common control devices/techniques that are technically feasible for simple-cycle natural gas fired combustion turbines and are often used to control emissions from sources of this type. The District has therefore determined that these technologies are achieved-in-practice and are technically feasible and cost-effective for the Mariposa Energy Project.

With respect to the add-on controls – electrostatic precipitators and baghouses – these control devices are not achieved-in-practice for natural gas fired combustion turbines and are not technically feasible here. These devices are normally used on solid-fuel fired sources or others with high PM emissions, and are not used in natural gas fired applications, which have inherently low PM emissions. The District is not aware of any natural gas fired combustion turbine that has ever been required to use add-on controls such as these. The District also reviewed the EPA BACT/LAER Clearinghouse and confirmed that EPA has no record of any post-combustion particulate controls that have been required for natural gas fired gas turbines. The District has therefore determined that these control devices are not achieved-in-practice for purposes of the BACT analysis.

The District has also determined that these devices would not be technologically feasible here. If add-on control equipment were installed it would create significant backpressure that would significantly reduce the efficiency of the plant and would cause more emissions per unit power produced. Moreover, these devices are designed to be applied to emissions streams with far higher particulate emissions, and they would have very little effect on the low-PM emissions streams from this facility in further reducing PM emissions.[20] It takes an emissions stream with a much higher grain loading for these types of abatement devices to operate efficiently. This low level of abatement efficiency (if any) also means that these types of control devices would not be cost-effective, even if they could feasibly be applied to this type of source. For all of these reasons, post-combustion particulate control equipment is not technologically feasible for the proposed Mariposa Energy Project.

[20] For example, if a baghouse were installed on the turbines, the turbine exhaust at the *inlet* to the baghouse would contain less PM than is normally seen in baghouse *output*, after abatement. PM emissions from a baghouse are normally in the range 0.0013 to 0.01 grains per standard cubic foot (*see BAAQMD BACT/TBACT Workbook*, Section 11: Miscellaneous Sources), whereas PM emissions from the proposed Mariposa Energy Project turbines would be 0.00118 gr/dscf (@ 15% O_2).

The District has therefore determined that low-sulfur natural gas, inlet filtration, and good combustion practice are the BACT control technologies for the proposed Mariposa Energy Project. For low-sulfur fuel, the highest quality commercially available natural gas is natural gas that meets the PG&E Gas Rule 21, Section C standard of less than 1.0 grains of sulfur per 100 scf. This PG&E standard is the maximum sulfur content at any point in time. [21] The District is therefore proposing a BACT limit for fuel sulfur content of 1.0 grains of sulfur per 100 scf for maximum daily emissions.

This proposed BACT determination is consistent with guidance from the California Air Resources Board in setting BACT for natural gas fired gas turbines. This proposed BACT determination is also consistent with District BACT Guideline 89.1.3, which specifies BACT for PM_{10} for simple-cycle gas turbines with rated output of $\geq$ 40 MW as the exclusive use of clean-burning natural gas with a maximum sulfur content of $\leq$ 1.0 grains per 100 scf.

Tables 25 and 26, and the graphical representation of the data in Table 26 below are presented for comparison. Table 25 below presents PM permit limits for projects similar to the simple-cycle gas turbines proposed for the Mariposa Energy Project in descending order by emission rate in lb/MMbtu.

TABLE 25. RECENT BACT PM_{10} PERMIT LIMITS FOR LARGE SIMPLE-CYCLE GAS TURBINES

Facility	PM_{10} (lb/hr)	Size (MMbtu/hr)	PM_{10} (lb/MMbtu)
CPV Sentinel Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6.0	875.7	0.0069
Panoche Energy Center, SJVAPCD GE LMS100 Gas Turbines, 100 MW each	6.0	909.7	0.0066
Walnut Creek Energy Park, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6.0	904	0.0066
Sun Valley Energy Project, SCAQMD GE LMS100 Gas Turbines, 100 MW each	6.0	904	0.0066
Lambie Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	3.0	500	0.0060
Riverview Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	3.0	500	0.0060
Wolfskill Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	3.0	500	0.0060
Goosehaven Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	3.0	500	0.0060
Gilroy Energy Center, BAAQMD GE LM6000 Gas Turbines, 49 MW each	2.5	467.6	0.0053
Los Esteros Critical Energy Facility,	2.5	472.6	0.0053

[21] The 1.0-grain per 100 scf PUC standard is the maximum sulfur content of the gas at any point in time. The actual average content is expected to be less than 0.25 grains per 100 scf. The District has based its calculations of annual emissions on this 0.25-grain per 100 scf average sulfur content. Note that a portion of the sulfur contained in natural gas is intentionally added as an odorant to allow for the detection of leaks, which would be a safety concern.

TABLE 25. RECENT BACT PM_{10} PERMIT LIMITS FOR LARGE SIMPLE-CYCLE GAS TURBINES			
Facility	**PM_{10} (lb/hr)**	**Size (MMbtu/hr)**	**PM_{10} (lb/MMbtu)**
BAAQMD GE LM6000 Gas Turbines, 49 MW each			

Notes: 1. Please note the lb/MMbtu values are not the permit limits and simply allow comparison of limits for different sized units.

The District also reviewed PM source test data for a number of comparable facilities. The data set below is for GE LM6000 simple-cycle gas turbines abated by an oxidation catalyst and SCR and is shown in Table 26 below.

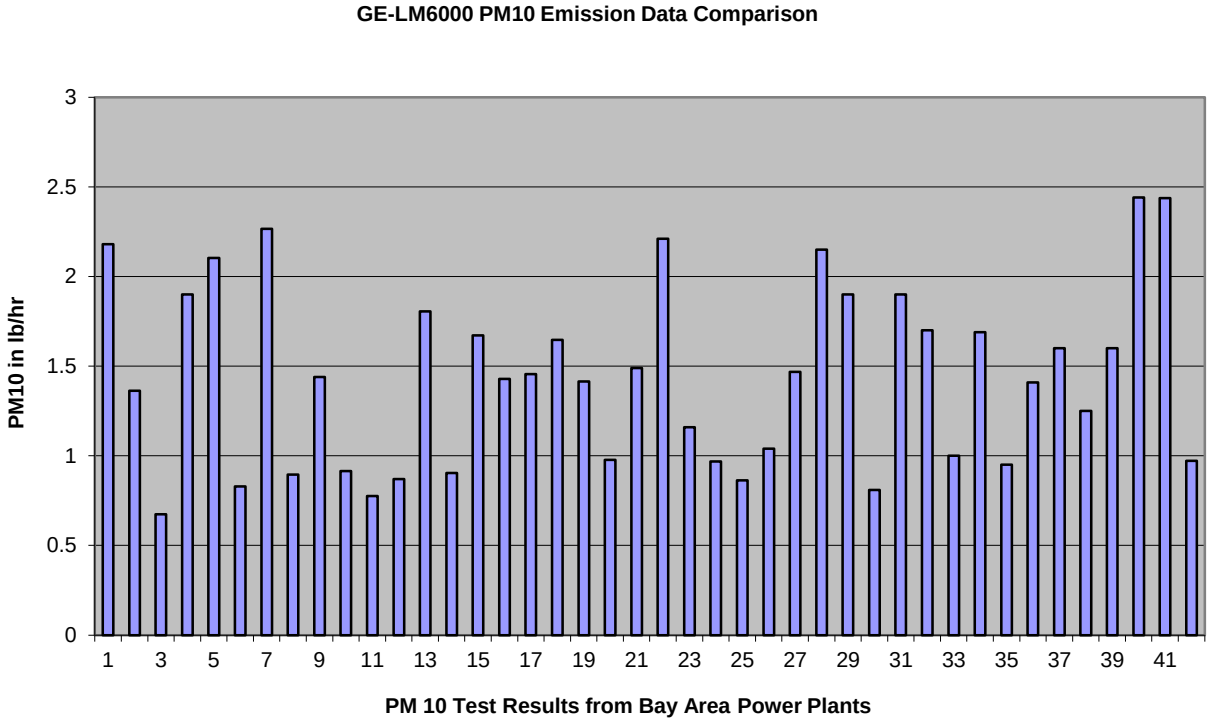
TABLE 26. SUMMARY OF GENERAL ELECTRIC LM-6000 SIMPLE-CYCLE GAS TURBINE PARTICULATE EMISSIONS DATA

Facility	Test Date	Source	PM lb/hour	PM FH lb/hour	PM BH lb/hour	Front %	Back %	Reported PM lb/MMBtu
Creed Energy Center	1/31/2003	S-1	2.18	1.05	1.13	48.2	51.8	0.0047
Creed Energy Center	7/6/2006	S-1	1.363	0.553	0.81	40.6	59.4	0.0028
Creed Energy Center	5/7/2009	S-1	0.6746	0.1948	0.4798	28.9	71.1	0.0012
Lambie Energy Center	1/16/2003	S-1	1.9	0.56	1.34	29.5	70.5	0.0042
Lambie Energy Center	5/5/2006	S-1	2.104	1.429	0.674	67.9	32.0	0.0039
Lambie Energy Center	5/11/2009	S-1	0.83	0.3488	0.4807	42.0	57.9	0.0016
Los Esteros Energy	7/26-7/27/05	S-1	2.266	1.016	1.25	44.8	55.2	0.0042
Los Esteros Energy	7/26-7/27/05	S-2	0.896	0.363	0.533	40.5	59.5	0.0016
Los Esteros Energy	7/28/2005	S-3	1.44	0.578	0.862	40.1	59.9	0.0025
Los Esteros Energy	7/27-7/29/05	S-4	0.915	0.326	0.589	35.6	64.4	0.0016
Los Esteros Energy	9/8/2006	S-1	0.775	0.307	0.468	39.6	60.4	0.0015
Los Esteros Energy	9/8/2006	S-2	0.871	0.331	0.54	38.0	62.0	0.0015
Los Esteros Energy	9/6-9/7/06	S-3	1.805	0.398	1.407	22.0	78.0	0.0033
Los Esteros Energy	9/6-9/7/06	S-4	0.904	0.318	0.586	35.2	64.8	0.0017
Los Esteros Energy	7/25-7/26/07	S-1	1.672	0.967	0.705	57.8	42.2	0.0030
Los Esteros Energy	7/25-7/26/07	S-2	1.429	0.541	0.888	37.9	62.1	0.0025
Los Esteros Energy	7/24-7/25/07	S-3	1.456	0.666	0.79	45.7	54.3	0.0025
Los Esteros Energy	7/24-7/25/07	S-4	1.646	0.973	0.673	59.1	40.9	0.0027
Los Esteros Energy	5/29-5/30/07	S-1	1.4145	0.6957	0.7189	49.2	50.8	0.0026
Los Esteros Energy	5/28-5/29/07	S-2	0.9769	0.3191	0.6578	32.7	67.3	0.0018
Los Esteros Energy	5/28-5/29/07	S-3	1.49	0.4393	1.0555	29.5	70.8	0.0027
Los Esteros Energy	5/29-5/30/07	S-4	2.21	1.345	0.8629	60.9	39.0	0.0041
Los Esteros Energy	5/13/2009	S-1	1.16	0.4811	0.68	41.5	58.6	0.0020
Los Esteros Energy	5/14-5/15/09	S-2	0.969	0.4702	0.4983	48.5	51.4	0.0018
Los Esteros Energy	5/14-5/15/09	S-3	0.864	0.4082	0.4561	47.2	52.8	0.0016
Los Esteros Energy	5/13-5/14/09	S-4	1.04	0.3226	0.7186	31.0	69.1	0.0019
Riverview	5/8/2009	S-1	1.469	0.789	0.68	53.7	46.3	0.0030
Wolfskill	6/2/2004	S-1	2.15	1.3	0.85	60.5	39.5	0.0047
Wolfskill	7/5/2006	S-1	1.9	0.582	1.319	30.6	69.4	0.0034
Wolfskill	5/4/2009	S-1	0.81	0.29	0.52	35.8	64.2	0.0010
Gilroy Energy Center	7/19/2005	S-3	1.9					0.0029
Gilroy Energy Center	7/21/2005	S-4	1.7					0.0022
Gilroy Energy Center	7/21/2005	S-5	1					0.0016
Gilroy Energy Center	5/23/2006	S-3	1.69					0.0020
Gilroy Energy Center	5/24/2006	S-4	0.95					0.0010
Gilroy Energy Center	5/22/2006	S-5	1.41					0.0020
Gilroy Energy Center	5/23/2007	S-3	1.6	0.6132	0.9856	38.3	61.6	0.0030
Gilroy Energy Center	5/24/2007	S-4	1.25	0.5443	0.7016	43.5	56.1	0.0019
Gilroy Energy Center	5/25/2007	S-5	1.6	0.6769	0.9193	42.3	57.5	0.0027
Goosehaven	1/23/2003	S-1	2.44					0.0047
Goosehaven	7/6/2006	S-1	2.438	1.327	1.112	54.4	45.6	0.0040
Goosehaven	5/6/2009	S-1	0.9716	0.1481	0.8235	15.2	84.8	0.0017
							Average	0.0026
							Maximum	0.0047

Notes: All of these facilities use an oxidation catalyst to reduce CO emissions and an SCR system to reduce NO_x emissions, as the proposed Mariposa Energy Project will.

Following is a graphical representation of the data in Table 26:

General Electric LM-6000 simple-cycle gas turbine particulate emissions data comparison



It can be seen that there is significant variation in the data. The main sources of variation are as follows: a) ambient air quality conditions, b) fuel quality, c) water quality, and d) measurement uncertainty.

The data from these facilities shows that PM emissions from sources of this type can be highly variable. Although at most times, turbines of this type will emit less than 0.0052 lb/MMbtu PM, the data shows that it not reasonable to impose a hourly not-to-exceed limit below 2.5 lb/hr for the Mariposa Energy Project (corresponding to 0.0052 lb/MMbtu).

The District has also concluded that simple-cycle turbines of the type that will be used at the proposed Mariposa Energy Project cannot achieve PM emissions as low as combined-cycle turbines (2 lb/hr). Simple-cycle turbines have a higher exhaust temperature than combined-cycle turbines, which use a heat recovery boiler to recover some of the waste heat in the turbine exhaust in order to generate additional power.

The higher exhaust temperatures seen by the oxidation catalyst and SCR system in simple-cycle facilities cause more PM to be formed in the abatement equipment compared with lower-temperature combined-cycle facilities. The increased catalyst temperatures may cause the conversion of SO_2 to SO_3 in the exhaust stream. This additional SO_3 will then convert to H_2SO_4 or ammonium sulfate salts, which add to the mass of particulate matter contained in the facility's

exhaust stream. For these reasons, PM emissions from simple-cycle turbines equipped with oxidation catalysts and SCR systems for NO_x and CO control will inherently have higher PM emissions than combined-cycle turbines.

In summary, the District has determined that the use of inlet air filtration, low sulfur natural gas and with good combustion practice is BACT for PM.

The high level of control of CO (discussed in Section 5.3) indicates unburned hydrocarbons are also well controlled, thereby minimizing PM emissions. Compliance with the stringent CO emission limits will ensure that good combustion practice is being maintained.

The District is not proposing to impose a numerical emissions limit in addition to the BACT requirement to use low-sulfur natural gas and good combustion practice. The District's BACT regulations require the District to implement BACT either as a control device or technique (Regulation 2-2-206.1 and 2-2-206.3) or as an emission limitation (Regulation 2-2-206.2 and 2-2-206.4), and do not require both types of BACT limits. The District is therefore proposing the control techniques described above to fulfill the BACT requirement for PM in accordance with Regulations 2-2-206.1 and 2-2-206.3. The District considered whether to require a numerical emissions limit as well, but has concluded that doing so would not be warranted here, given that there are no add-on control devices that the facility can use to control PM emissions. In a facility using good combustion practice, PM emissions will be determined by the amount of sulfur in the fuel and the way that the combustion equipment functions, which are factors that are not within the control of the operator. PM therefore presents a different situation than other pollutants such as NOx or CO where the project owner can design its add-on control systems to achieve the required level of emissions and ensure that it will comply with its emission limits by operating the add-on control systems properly.

This proposed BACT determination is consistent with guidance from the California Air Resources Board in setting BACT for natural gas-fired gas turbines. This proposed BACT determination is also consistent with District BACT Guideline 89.1.6, which specifies BACT for PM10 for combined-cycle gas turbines with rated output of > 40 MW as the exclusive use of clean-burning natural gas with a maximum sulfur content of < 1.0 grains per 100 scf. These guidance documents do not suggest that a numerical emissions limit should be required as a BACT permit condition.

5.6 **Best Available Control Technology for Sulfur Dioxide (SO_2) for Turbines**

The potential emissions of SO_2 from the simple-cycle gas turbines exceed 10 lb per highest day for each turbine. These sources are therefore subject to District BACT requirements for SO_2.

There are two primary mechanisms used to reduce SO_2 emissions from combustion sources: (i) reduce the amount of sulfur in the fuel, and (ii) remove the sulfur from the combustion exhaust gases.

Limiting the amount of sulfur in the fuel is a common practice for natural gas fired power plants. Such plants in California are typically required to combust only California PUC grade natural

gas with a sulfur content of less than 1 grain per 100 standard cubic feet (scf). This control technique has been achieved in practice at other facilities, and it is technologically feasible and cost-effective. The District is therefore proposing to require the use of PUC-grade natural gas with a sulfur content of less than 1 grain/100 scf as a BACT control technique for SO_2.

Add-on controls that remove sulfur from the combustion exhaust, such as flue gas desulfurization, are not feasible for natural gas fired power plants and have not been used at such facilities. These types of control devices are typically installed on coal fired power plants that burn fuels with much higher sulfur contents. There are two main types of SO_2 post-combustion control technologies: wet scrubbing and dry scrubbing. Wet scrubbers use an alkaline solution to remove the SO_2 from the exhaust gases and may remove up to 90% of the SO_2 from the exhaust stream. Dry scrubbers use an SO_2 sorbent injected as a powder or slurry to remove the SO_2 and the SO_2 and sorbent are removed by a particulate control device. The abatement efficiencies vary with different types of dry scrubbing technologies, but are generally lower than efficiencies for wet scrubbing technologies. These technologies are not feasible for combustion sources burning low sulfur content natural gas. The SO_x concentrations in the natural gas combustion exhaust gases are too low (less than 1 ppm) for the scrubbing technologies to work effectively or be technologically feasible and cost effective. These control technologies require much higher sulfur concentrations in the combustion exhaust gases to become feasible as a control technology. For this reason, they have not been used at natural gas fired power plants such as the proposed Mariposa Energy Project. As these control technologies have not been achieved in practice at other similar facilities and are not technologically feasible here, the District is not proposing to require them as BACT for this facility.

Fuel sulfur limits are therefore the only feasible SO_2 control technology for natural gas combustion sources, and the District is proposing to require this technology as BACT. The District is proposing BACT permit limits based on a natural gas specification of a maximum of 1 grain of sulfur per 100 scf of natural gas. As stated in Section 5.5 of this document, the highest quality commercially available natural gas is natural gas that meets the PG&E Gas Rule 21, Section C standard of less than 1.0 grains of sulfur per 100 scf. This PG&E standard is the maximum sulfur content at any point in time. The permit limits are based on maximum sulfur content of the fuel and are expressed in units of pounds per hour and pounds per day of SO_2. The emission calculations are shown in Appendix A.

This proposed BACT determination is consistent with the District's BACT Guidelines for SO_2. District BACT Guideline 89.1.3 specifies BACT 2 ("achieved in practice") for SO_2 for simple-cycle gas turbines with an output rating of $\geq$ 40 MW as the exclusive use of clean-burning natural gas with a sulfur content of $\leq$ 1.0 grains per 100 scf.

5.7 Best Available Control Technology For Startup and Shutdown Conditions for Turbines

Startup and shutdown periods are a normal part of the operation of natural gas-fired power plants. They involve emission rates that are greater than emissions during steady-state operation and that are highly variable. Emissions are greater during startup and shutdown for several reasons. One reason is that during startup and shutdown, the turbines are not operating at full

load where they are most efficient. Another reason is that the exhaust temperatures are lower than during steady-state operations. Post-combustion emissions control systems such as the SCR catalyst and oxidation catalyst do not function optimally at lower temperatures, and so there may be partial or no abatement for NO_x, carbon monoxide and precursor organic compounds for a portion of the startup period.[22] Thus, emissions can be minimized by reducing the duration of the startup sequence and by reducing emissions during the startup.

Simple-cycle turbines have inherently low startup emissions because they can quickly come up to full load. This is one reason that they are used to provide peaking load duty with the capability to rapidly accelerate to synchronous speed, synchronize with the grid, ramp up to 100 percent load, and then down to zero load. Simple-cycle turbines are different in this respect than combined-cycle turbines, which incorporate a heat-recovery steam boiler that recovers some of the waste heat in the turbine exhaust to create steam to generate additional power. The combined-cycle system requires additional steam-generating components, and it takes additional time for this equipment to come up to full operating temperature. Nevertheless, simple-cycle turbines still have startup and shutdown periods in which they are not capable of complying with their steady-state emissions limits.

Finally, the Mariposa Energy Project turbines are designed for quick starts and also rapidly changing loads to meet electrical system needs. The simple-cycle gas turbines will have the ability to change loads at rates exceeding 12 MW per minute. It is difficult for the NO_x control system to respond to these rapid changes in load.

Because emissions are greater during startup and shutdown periods than during steady-state operation, the BACT limits established in the previous sections for steady-state operations are not technically feasible during these periods. The District is therefore establishing separate BACT limits representing the most stringent emissions limits that have are achieved-in-practice or technologically feasible/cost-effective for this type of facility. To do so, the District has conducted an additional BACT analysis specifically for startup and shutdown periods.

Control Devices and Techniques to Limits Startup and Shutdown Emissions:

The only available approach to reducing startup and shutdown emissions from simple-cycle turbines is to use best work practices. By following the plant equipment manufacturers' recommendations, power plant operators can limit the duration of each startup and shutdown to the minimum duration achievable. Plant operators also use their own operational experience with their particular turbines and ancillary equipment to optimize startup and shutdown emissions. There is no other available control technology or technique beyond implementing best work practices that can further reduce startup and shutdown emissions from simple-cycle turbines.[23]

[22] Note that emission rates of particulate matter and sulfur oxides are not affected by startups and shutdowns and will be the same as for full load operation as during startup and shutdown periods (2.2 lb/hour for particulate matter, average, 1.35 lb/hour for SO_x maximum, 0.34 lb/hour SO_x annual average).

[23] The lack of additional control technologies for simple-cycle turbines is different than with combined-cycle turbines. For combined-cycle turbines, there have been several technological advances that have recently been developed, or are currently under development, that will allow those types of turbines to start up more quickly and

Determination of BACT Emissions Limit for Startup and Shutdown Conditions:

The District is proposing time limits and numerical emissions limits for startups and shutdowns, periods to implement the BACT requirement here. The proposed limits for each operating scenario are outlined below.

Startups

Using best work practices, the facility should be able to complete a typical startup in 10 minutes, based on information provided by the gas turbine manufacturer. Emissions during a typical startup are expected to be 3.5 pounds of NOx, 3.0 pounds of CO, and 0.058 pounds of POC.

Typical startup emissions are summarized in Table 27.

TABLE 26. TYPICAL STARTUP EMISSION ESTIMATES FOR FIRST 10 MINUTES

	Typical Startup - Estimated Emissions (Pounds Per Period Per Turbine per Startup)
Pollutant	**(lb/event)**
NO_x as (NO_2)	3.5
CO	3.0
POC	0.058

Note: Please check appendix A for details

Although in a typical startup the turbine will begin producing power within 10 minutes, it will typically take longer for the abatement devices to become fully operational. This is because the control devices do not control NOx and CO until the catalysts reach the proper operating temperature. In the case of the SCR catalyst, ammonia is not injected until the catalyst reaches a minimum temperature of 600^{o}F. Nonetheless, typical startup emissions are minimal due to the short duration of the typical start time and due to the quick turbine ramp rate that minimizes low-load operation during startup. But these emission estimates are not guaranteed emission rates for every startup. Moreover, startup emissions are highly variable, and it is expected that some startups will take longer than 10 minutes. A number of factors influence startup duration and can lead to longer startup times, including: allowance for the CEM system lag of several minutes to relay compliant NOx and CO CEM readings, allowance for the ammonia injection rate to stabilize with NOx concentration, allowance for the oxidation and SCR catalysts time to reach normal operating temperature, and allowance for the adjustment of dilution air required to maintain optimum catalyst temperatures. The District estimates over the life of the facility that a given startup may take as long as 30 minutes to allow the gas turbine and post combustion

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with fewer emissions. These include startup procedures that heat up the additional steam-generating equipment used in combined-cycle turbines more quickly, allowing them to reach their optimal operating temperature more quickly; and advances that reduce emissions at lower loads where combined-cycle turbines must operate for extended periods while waiting for the equipment to heat up. These types of advances are not applicable to simple-cycle turbines. Simple-cycle turbines do not have any additional steam generating equipment that needs to be warmed up; and they ramp up very quickly to full load at rates as high as 25 MW per minute and do not spend any significant time operating at lower loads during startups.

controls to reach steady-state operation. The District is therefore proposing to establish the not-to-exceed BACT limit for startups at 30 minutes to provide an adequate compliance margin that allows the operators to make appropriate adjustments to system controls in response to system operational conditions. This is the shortest time limit that the turbines can reasonably be expected to meet under all operating conditions over the life of the equipment. Individual startups may be shorter than this proposed 30-minute limit, but an enforceable BACT permit limit must provide 30 minutes to allow an adequate margin of compliance to ensure that the equipment can consistently meet the limit.

In addition, the District has conservatively estimated the emissions that would result from a 30-minute startup at 14.2 pounds of NOx, 17.3 pounds of CO, and 1.4 pounds of POC, which the District is proposing as BACT limits on the emissions for startups. The District calculated these emission rates by taking the emissions performance that the manufacturer estimates the turbines could achieve for the first 10 minutes in a typical startup as summarized in Table 27, and then assuming that emissions are at the maximum uncontrolled rate for 14 minutes, and then at the maximum controlled rate for 6 minutes. In other words, the emissions would be uncontrolled for the initial 24 minutes. This is a conservative limit because if a startup takes longer than the manufacturer's estimate of 10 minutes, emissions will still have to reach the controlled level within 24 minutes. Using this conservative approach, the District calculated maximum emission rates for startups as set forth in Table 28 below:

TABLE 27. PROPOSED STARTUP EMISSION LIMITS FOR A 30-MINUTE STARTUP	
Pollutant	**Typical Startup - Estimated Emissions (Pounds Per Event Per Turbine Per Startup)**
NO_x as (NO_2)	14.2
CO	14.1
POC	1.1

Note: Please check appendix A for detail calculations for pounds per event

In addition, in order to protect hourly air quality standards, the District is also proposing additional hourly limits for operating hours during which startups occur.

TABLE 28. MAXIMUM HOURLY PERMIT LIMITS FOR STARTUPS	
Pollutant	**Maximum Startup Emissions (lb/hour)**
NO_x as (NO_2)	18.5
CO	17.3
POC	1.4

The Air District has concluded that using best work practices, the proposed simple-cycle gas turbines will be able to meet the startup permit limits shown above. The basis for these limits is emissions information provided by the gas turbine supplier General Electric.

Shutdowns

General Electric, the gas turbine manufacturer, supplied the following emission estimates for a typical shutdown occurring over 8 minutes.

TABLE 29. SIMPLE-CYCLE GAS TURBINES SHUTDOWN EMISSION ESTIMATES FOR FINAL 8 MINUTES	
	Typical Shutdown - Estimated Emissions (Pounds Per Period Per Turbine Per Shutdown)
Pollutant	**(lb/event)**
NO_x as (NO_2)	3.2
CO	2.7
POC	0.12

The Air District proposes to have maximum pound-per-event limits for shutdowns. The District estimates over the life of the facility that a given shutdown may take as long as 15 minutes to allow the gas turbine time to ramp down from full load operation and allow time for the turbine to decelerate after fuel flow stops. Each shutdown would be limited to a maximum of 15 minutes for a worst-case shutdown.

The District then conservatively estimated the emissions during a 15-minute shutdown using an approach similar to the approach for estimating maximum startup emissions above. The District conservatively assumed that emissions that the typical shutdown emissions as summarized in Table 31 occur over the first 8 minutes of the shutdown, and that the rest of the 7-minute shutdown period had emissions at normal steady-state emissions rates. These are the worst-case pound-per-event values for the simple-cycle gas turbines during a shutdown.

TABLE 30. PROPOSED SHUTDOWN EMISSION LIMITS FOR A 15 MINUTE SHUTDOWN	
	Typical Shutdown - Estimated Emissions (Pounds Per Event Per Turbine Per Shutdown)
Pollutant	**(lb/event)**
NO_x as (NO_2)	3.2
CO	2.7
POC	0.12

Thus, the Air District has concluded that using best work practices, the proposed simple-cycle gas turbines will be able to meet the permit limits shown above in Table 28, Table 29 and Table 31.

Conclusion

The Air District is proposing stringent emission limits for startups and shutdowns conditions that can reasonably be achieved by the proposed Mariposa Energy Project, based on a review of the gas turbine supplier's emission estimates.
Emissions from specific startup and shutdown events may be significantly less than the proposed not-to-exceed permit limits, given the great variability of such events. The District is proposing

to require the limits described above as the enforceable BACT limits to ensure that emissions are minimized to the greatest extent feasible while ensuring that the limits are achievable under all operating circumstances.

5.8 Best Available Control Technology During Commissioning of Gas Turbines

The simple-cycle gas turbines and associated equipment are highly complex and have to be carefully tested, adjusted, tuned and calibrated after the facility is constructed. These activities are generally referred to as "commissioning" of the facility. During the commissioning period, each of the combustion turbine generators needs to be fine-tuned at zero load, partial load, and full load to optimize its performance. The water injection system also needs to be tuned to ensure that the turbines run efficiently while meeting both the performance guarantees and emission guarantees. In addition, the selective catalytic reduction (SCR) systems and oxidation catalysts need to be installed and tuned.

The simple-cycle gas turbines will not be able to meet the stringent BACT limits for normal operations during the commissioning period for a number of reasons. First, the SCR systems and oxidation catalysts cannot be installed immediately when the turbines are initially started up. There may be oils or lubricants in the equipment from the manufacture and installation of the equipment, which would damage the catalysts if they were installed immediately. Instead, the turbines need to be operated without the SCR systems and oxidation catalysts for a period of time to burn off any impurities that may be left in the equipment. In addition, once all of the pollution control equipment is installed, it needs to be tuned in order to achieve optimum emissions performance. Until the equipment is tuned, it will not be able to achieve the very high levels of emissions reductions reflected in the stringent BACT limits for normal operations.

Because the BACT limits established for normal operations are not technically feasible during the commissioning period, these limits are not BACT for this phase of the facility's operation. Alternate BACT limits must therefore be specified for this mode of operation. To do so, the Air District has conducted an additional BACT analysis specifically for the required commissioning activities.

The only control technology available for limiting emissions during commissioning is to use best work practices to minimize emissions as much as possible during commissioning, and to expedite the commissioning process so that compliance with the stringent BACT limits for normal operations can be achieved as quickly as possible. There are no add-on control devices or other technologies that can be installed for commissioning activities.

To implement best work practices as an enforceable BACT requirement, the Air District is proposing conditions that will require the simple-cycle gas turbines to minimize emissions to the maximum extent possible during commissioning. The Air District is also proposing numerical emissions limits based upon the equipment manufacturer's best estimates of uncontrolled emissions at the operating loads that the simple-cycle gas turbines will experience during

commissioning. The proposed permit conditions will limit emissions to below the following levels:[24]

TABLE 31. COMMISSIONING PERIOD EMISSIONS LIMITS FOR ONE SIMPLE-CYCLE GAS TURBINE

Air Pollutant	Proposed Commissioning Period Emissions Limits for One Simple-Cycle Gas Turbine	
	lb/hr	lb/day
NO_2	51	408
CO	45	360
POC		36
PM_{10}		17.6 (average)
SO_2		(10.8)

Notes: Please see Appendix A for detail lb/hr and lb/day commissioning emission estimates. NO2 daily maximum assumes 8 hours of gas turbine testing at 10% load, 8 hours of Pre-Catalyst Initial tuning at 50-100% load and 8 hours of Post-Catalyst tuning at 50-100% load

Table 32 does not have lb/hr limits for of emissions POC, PM_{10} and SO_2 because these pollutants are not continuously monitored for those pollutants.

The original estimates of daily emissions were about double the emissions in Table 31. The applicant has agreed to commission only one turbine at a time.

Commissioning emissions will also be subject to the annual emissions limits applicable to normal operations. All emissions from commissioning activities will be counted towards the facility's annual limits. Because commissioning is a relatively short-term period, the facility should be able to stay within those limits over the course of the entire year. Counting commissioning emissions towards the annual limits will also provide an additional incentive for the facility operator to minimize emissions as much as possible.

The Air District is also proposing permit conditions to minimize the duration of commissioning activities. The proposed conditions require the facility to tune the combustion turbine to minimize emissions at the earliest feasible opportunity; and to install, adjust and operate the SCR systems and oxidation catalysts at the earliest feasible opportunity. The Air District is also proposing to cap the total amount of time that each turbine can operate partially abated and/or without the SCR systems and oxidation catalysts at 200 hours. This limit represents the shortest amount of time in which the facility can reasonably complete the required commissioning activities without jeopardizing safety and equipment warranties. The proposed 200-hour limit is based on the following estimates from General Electric of the time it will take for each specific commissioning activity.

[24] See Appendix A for Commissioning Emissions.

TABLE 32. COMMISSIONING SCHEDULE FOR A SINGLE SIMPLE-CYCLE GAS TURBINE[1]								
Activity	**Duration (hours/Day)**	**Days**	**Load Range (%)**	**Total Emissions**				
				NO_X (lbs/hr)	**CO (lb/hr)**	**POC (lb/hr)**	**SO_x[2] (lb/hr)**	**PM_{10}[2] (lb/hr)**
Initial Load Testing and Engine Checkout[3]	4	2	10%	51	45	4.48	10.8	2.2 (avg)
Pre-Catalyst Initial tuning[4]	8	9	50-100%	51	45	4.48	10.8	2.2 (avg)
Post-Catalyst tuning[4]	8	15	50-100%	34	6.2	1.2	10.8	2.2 (avg)

Notes:
[1] Assumes SCR and oxidation catalyst will limit emissions to BACT levels during the final tuning period, which includes performance test.
[2] Steady state controlled emission rates for SOx and PM10 are 0.91, and 2.5 lbs/hr respectively. These rates have been used to conservatively estimate hourly and total emissions during commissioning.
[3] In synchronized operation followed by low load engine check.
[4] Includes the period both before and after SCR and CO catalyst loading. Post-catalyst period includes NOx and CO catalyst use.

TABLE 33. COMMISSIONING SCHEDULE FOR FOUR SIMPLE-CYCLE GAS TURBINES								
Activity	**Duration (hours/Day)**	**Days**	**Number of Turbines**	**Total Emissions**				
				NO_X Total lbs	**CO Total lb**	**POC Total lb**	**SO_x[2] Total lb**	**PM_{10} Total lb**
Initial Load Testing and Engine Checkout[3]	4	2	4	1632	1440	143	43	70
Pre-Catalyst Initial tuning[4]	8	9	4	14688	12960	1290	389	634
Post-Catalyst tuning[4]	8	15	4	16320	2976	576	648	1056
Total in lbs				32640	17376	2010	1080	2000
Total in tons				16.3	8.7	1.0	0.54	0.9
Total Hours for 4-turbines	800							

Notes:
[1] Assumes SCR and oxidation catalyst will limit emissions to BACT levels during the final tuning period, which includes performance test.
[2] Steady state controlled emission rates for SOx and PM10 are 1.35 and 2.2 lbs/hr (average), respectively. These rates have been used to conservatively estimate hourly and total emissions during commissioning.
[3] In synchronized operation followed by low load engine check.
[4] Includes the period both before and after SCR and CO catalyst loading. Post-catalyst period includes NOx and CO catalyst use.

Compliance with these proposed conditions for the commissioning period will be monitored by continuous emissions monitors that the applicant will be required to install before any commissioning work begins, and through a written commissioning plan laying out all commissioning activities in advance, which the applicant will be required to submit to the Air District for review and approval.

5.9 Best Available Control Technology for Fire Pump Engine

The fire pump engine is subject to Best Available Control Technology for NOx and CO because the engine will emit more than 10 lb/highest day of both NOx and CO. BACT for emergency engines has been determined and published in the District's BACT/TBACT Workbook because the District issues permits to many emergency engines every year.

The District's BACT limit for NOx is equivalent to the current EPA standard in 40 CFR 89. At this time, for a 220-hp engine, the limit for NOx + NMHC combined is 3.0 g/bhp-hr.

The District's BACT limit for CO is the lower of 2.75 g/bhp-hr or the current EPA standard in 40 CFR 89. At this time, for a 220-hp engine, the limit for CO in 40 CFR 98 is 2.6 g/bhp-hr.

As shown in Section 4.1.4 of this FDOC, the engine complies with the BACT NOx and CO limits.

6 Offsets Required by Pollutant

District regulations require that new facilities must provide Emission Reduction Credits (ERCs) to offset the increases in air emissions that they will cause. ERCs are generated when old facilities sources are shut down, or when sources are controlled below regulatory limits. The emissions reductions granted by the District are used to offset the increases from new facilities, so that there will be no overall increase in emissions from facilities subject to this offset program.

Pursuant to Regulation 2-2-302, federally enforceable emission offsets are required for POC and NO_x emission increases from permitted sources at facilities that will emit 10 tons per year or more on a pollutant-specific basis. For facilities that will emit more than 35 tons per year of NO_x offsets must be provided by the applicant at a ratio of 1.15 to 1.0. Pursuant to Regulation 2-2-302.2, POC offsets may be used to offset emission increases of NO_x.

The applicable offset ratios and the quantity of offsets required are summarized in Table 27.

6.1 NO_x Offsets

Because the proposed Mariposa Energy Project will emit greater than 35 tons per year of NO_x) from permitted sources, the NO_x emissions must be offset at a ratio of 1.15 to 1.0 pursuant to District Regulation 2-2-302. The facility will emit up to 45.9 tons/yr of NO_x, and will therefore be required to provide offsets for 52.8 tons per year of NO_x emissions. The applicant has identified ERCs available for it to use sufficient to offset this level of NO_x emissions.

6.2 POC Offsets

Because the total POC emissions from permitted sources will not exceed 10 tons per year, the proposed Mariposa Energy Project is not required to offset its POC emissions under Regulation 2-2-302.

6.3 PM_{10} Offsets

Because the total PM_{10} emissions from permitted sources will not exceed 100 tons per year, the proposed Mariposa Energy Project is not required to offset its PM_{10} emissions under District Regulation 2-2-303.

6.4 SO_2 Offsets

Pursuant to Regulation 2-2-303, emission reduction credits are not required for the SO_2 emission increases associated with this project since the facility's SO_2 emissions will not exceed 100 tons per year. Regulation 2-2-303 allows for the voluntary offsetting of SO_2 emission increases of less than 100 tons per year. The applicant has opted not to provide such emission offsets.

6.5 **Offset Package**

Table 35 summarizes the offset obligation of the proposed Mariposa Energy Project. The emission reduction credits presented in Table 35 exist as federally-enforceable, banked emission reduction credits that have been reviewed for compliance with District Regulation 2, Rule 4, "Emissions Banking", and were subsequently issued as banking certificates by the District under the certificates cited in the Tables below. If the quantity of offsets issued under any certificate exceeded 35 tons per year for any pollutant, the application was required to fulfill the public notice and public comment requirements of District Regulation 2-4-405. Accordingly, such applications were reviewed by the California Air Resources Board, U.S. EPA, and adjacent air pollution control districts to insure that all applicable federal, state, and local regulations were satisfied.

As indicated below, Mariposa Energy Project is in possession of valid emission reduction credits to offset the emission increase of NOx from the sources for the Mariposa Energy Project. These credits were generated by Owens Corning Insulating Systems, LLC, in Santa Clara.

TABLE 34. EMISSION REDUCTION CREDITS IDENTIFIED BY MARIPOSA ENERGY PROJECT (TON/YR)

Emissions	NO_x[b]
Valid Emission Reduction Credits[a]	55.9
Permitted Source Emission Limits	45.9
Offsets Required	52.8

[a] From Banking Certificates 1182

[b] Reflects applicable offset ratio of 1.15:1.0 pursuant to Regulation 2-2-302

TABLE 35. CERTIFICATE DETAILS

Current Certificate	Original Certificate	Company	Location	Original Issue Dates
1182	**564**	**Owens Corning Insulating Systems, LLC**	**Santa Clara**	**12/29/03**

Note: The numbers of each certificate change with each transaction in the emissions bank. The certificate number below is the original certificate number issued when the emission reduction was generated.

Certificate 564 was generated by modifying the M-Electric and O-Electric Furnaces.

7 Health Risk Screening Analysis

Pursuant to the BAAQMD Risk Management Regulation 2, Rule 5, a health risk screening must be conducted to determine the potential impact on public health resulting from the worst-case emissions of toxic air contaminants (TACs) from the proposed Mariposa Energy Project. The potential TAC emissions (both carcinogenic and non-carcinogenic) from the Mariposa Energy Project are summarized in Table 15 in Section 4.0. Table 36 presents the Health Risk Assessment Results for the Mariposa Energy Project. In accordance with the requirements of District Regulation 2, Rule 5 and California Office of Health Hazard Assessment (OEHHA) guidelines, the impact on public health due to the emission of these compounds was assessed utilizing EPA approved air pollutant dispersion models.

TABLE 36. HEALTH RISK ASSESSMENT RESULTS

Receptor	Cancer Risk	Non-cancer Hazard Index (HI)	Max. Acute Non-cancer HI
Resident	0.3 in a million	0.015	N/A
Worker	1.3 in a million	0.001	N/A
Any	N/A	N/A	0.026

The health risk assessment has been prepared by the District Toxics Evaluation Section pursuant to BAAQMD Regulation 2, Rule 5. The increased carcinogenic risk attributed to this project is 1.3 in one million. Almost all of the worker cancer risk is due to S5, Fire Pump. This risk is considered acceptable in accordance with Section 2-5-301, because S5, Fire Pump, complies with the requirement for Best Available Control Technology for Toxics (TBACT). For an emergency engine, TBACT is a particulate emission rate lower than 0.15 gr/bhp.

The chronic hazard index and the acute hazard index attributed to the emission of non-carcinogenic air contaminants are not significant since they are less than 1.0.

Therefore, the proposed Mariposa energy Project will be in compliance with District Regulation 2, Rule 5. Please see Appendix B (Memo dated August 11, 2010 prepared by Ted Hull, Air Toxics Section) for further discussion.

8 Other Applicable Requirements

8.1 Applicable District Rules and Regulations

Regulation 1, Section 301: Public Nuisance

None of the project's sources of air contaminants are expected to cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public with respect to any impacts resulting from the emission of air contaminants regulated by the District.

Regulation 2, Rule 1, Sections 301 and 302: Authority to Construct and Permit to Operate

Pursuant to Sections 2-1-301 and 2-1-302, the applicant has submitted an application to the District to obtain an Authority to Construct and Permit to Operate for all regulated sources at the proposed Mariposa Energy Project. Those permits will be issued after the CEC completes its licensing process.

Regulation 2, Rule 1, Section 412: Public Notice, Schools

The facility is not within 1000 feet of a school and therefore is not subject to Section 2-1-412.

Regulation 2, Rule 2: New Source Review

The primary requirements of New Source Review that apply to the proposed Mariposa Energy Project are Section 2-2-301; "Best Available Control Technology Requirement", Section 2-2-302; "Offset Requirements, Precursor Organic Compounds and Nitrogen Oxides, NSR", Section 2-2-303, "Offset Requirement, PM_{10} and Sulfur Dioxide, NSR".

Regulation 2, Rule 2, Section 301: BACT

The District has performed a BACT analysis for NO_x, CO, POC, $PM_{10}/PM_{2.5}$ and SO_x as shown in Section 5. The proposed Mariposa Energy Project meets the BACT requirements under Section 2-2-301.

Regulation 2, Rule 2: Sections 302 and 303

The District has presented the offsets for the project for NO_x, POC, and PM_{10} as shown in Section 6. The proposed Mariposa Energy Project meets the offset requirements under Sections 2-2-302 and 2-2-303.

Regulation 2, Rule 2: Sections 304, 305, 306, and 414

The proposed Mariposa Energy Project will not be subject to these requirements because it will not emit more than 100 tons per year of any air pollutant and because it will not exceed the thresholds for non-criteria pollutants in Section 306.

Regulation 2, Rule 3: Power Plants

Pursuant to Section 2-3-304, the Preliminary Determination of Compliance was subject to the public notice, public comment, and public inspection requirements contained in Sections 2-2-406 and 407. This document presents the Final Determination of Compliance (FDOC) for the project. The District has considered all of the comments received during the comment period prior to issuing the Final Determination of Compliance for the project. The comments and the Response to Comments document are attached to FDOC. The Final Determination of Compliance will be relied upon by the CEC in their licensing amendment proceeding. If the CEC grants a license to the project, then the District may issue an Authority to Construct.

Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants

A risk screening analysis was performed to estimate the health risk resulting from the toxic air contaminant (TAC) emissions from the proposed Mariposa Energy Project. The analysis is attached in Appendix B. It is also discussed in Section 7 of this FDOC. Results from this analysis indicate that the maximally exposed individual cancer risk is estimated at 1.3 in a million, the chronic non-cancer hazard index at 0.015 in a million, and the acute non-cancer hazard index at 0.026 in million. Therefore, the proposed Mariposa Energy Project will be in compliance with the requirements of Section 2-5-301.

Regulation 2, Rule 6: Major Facility Review

After construction, the facility will be subject to Regulation 2, Rule 6, which implements the Title V program of the Federal Clean Air Act and 40 CFR 70, State Operating Permit Programs.

Pursuant to Section 404.1, the owner/operator of the Mariposa Energy Project shall submit an application to the District for a major facility review permit within 12 months after the facility becomes subject to Regulation 2, Rule 6. Pursuant to Sections 2-6-212.1 and 2-6-218, the Mariposa will become subject to Regulation 2, Rule 6, upon completion of construction as demonstrated by first firing of the gas turbines.

Regulation 2, Rule 7: Acid Rain

District Regulation 2, Rule 7 incorporates the provisions of 40 CFR Part 72 by reference. 40 CFR 72 through 78 implements Title IV, Acid Rain, of the Federal Clean Air Act. These requirements are discussed in more detail in Section 8.3 of this FDOC, Federal Requirements.

Regulation 6, Rule 1: Particulate Matter – General Requirements

Through the use of proper combustion practice, the combustion of natural gas at the gas turbines is not expected to result in visible emissions. Specifically, the facility's combustion sources are expected to comply with Sections 301 (Ringelmann No. 1 Limitation), and 310 (Particulate Weight Limitation) with particulate matter emissions of less than 0.15 grains per dry standard cubic foot of exhaust gas volume. As calculated in accordance with Section 310, the grain loading resulting from the operation of each gas turbine is 0.0012 gr/dscf @ 15% O_2. See Appendix A for the grain loading calculations.

Particulate matter emissions associated with the construction of the facility are exempt from District permit requirements, but are subject to Regulation 6, Rule 1. However, the California Energy Commission will impose requirements for construction activities including the use of water and/or chemical dust suppressants to minimize PM_{10} emissions and prevent visible particulate emissions.

Regulation 7: Odorous Substances

Section 302 prohibits the discharge of odorous substances, which remain odorous beyond the facility property line after dilution with four parts odor-free air. Section 303 limits ammonia emissions to 5000 ppm. Because the ammonia slip emissions from the turbines will be limited by permit condition to 5 ppmvd @ 15% O_2 respectively, the facility is expected to comply with the requirements of Regulation 7.

Regulation 8: Organic Compounds

The gas turbines are exempt from Regulation 8, Rule 2, "Miscellaneous Operations" Section 110 since natural gas will be fired exclusively at those sources.

The use of solvents for cleaning and maintenance at the Mariposa Energy Project is expected to be at a level that is exempt from permitting in accordance with Regulation 2, Rule 1, Section 118. The facility may utilize less than 20 gallons per year of solvent for wipe cleaning per Section 118.9 and remain exempt from permitting requirements. The facility may also utilize a cold cleaner for maintenance cleaning as long as the unit meets the exemption set forth in Section 118.4. The facility may also perform solvent cleaning and preparation-using aerosol cans meeting the exemption set forth in Section 118.10. Any solvent usage exceeding the amounts in Section 118 would require a permit. In addition, any solvent usage in excess of a toxic air contaminant trigger level contained in Regulation 2, Rule 5 would require a permit.

Regulation 9: Inorganic Gaseous Pollutants

Regulation 9, Rule 1, Sulfur Dioxide

This regulation establishes emission limits for sulfur dioxide from all sources and applies to the combustion sources at this facility. Section 301 (Limitations on Ground Level Concentrations) prohibits emissions, which would result in ground level SO_2 concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Section 302 (General Emission Limitation) prohibits SO_2 emissions in excess of 300 ppm (dry). With maximum projected SO_2 emissions of < 1 ppm, the gas turbines are not expected to cause ground level SO_2 concentrations in excess of the limits specified in Section 301 and will easily comply with Section 302.

Regulation 9, Rule 7, Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters

The simple-cycle gas turbines are not subject to Regulation 9, Rule 7 requirements.

Regulation 9, Rule 9, Nitrogen Oxides from Stationary Gas Turbines

Because each of the combustion gas turbines will be limited by permit condition to NO_x emissions of 2.5 ppmvd @ 15% O_2, they will comply with the NO_x limitation in Section 301.2 of 9 ppmvd @ 15% O_2 or 0.43 lb/MW-hr.

Regulation 10: Standards of Performance for New Stationary Sources

Generally Regulation 10 incorporates by reference the provisions of Title 40 CFR Part 60. However, the District has not sought delegation of the New Source Performance Standard (NSPS) contained in Subparts IIII or KKKK.

Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" applies to the fire pump engine. The engine will comply with all applicable standards and limits required by these regulations. The applicable emission limitations are summarized in Section 9.3.

Subpart KKKK, "Standards of Performance for Stationary Gas Turbines" applies to this facility. The gas turbines will comply with all applicable standards and limits required by these regulations. The applicable emission limitations are summarized in Section 9.3.

8.2 State Requirements

The proposed Mariposa Energy Project will be subject to the Air Toxic "Hot Spots" Program contained in the California Health and Safety Code Section 44300 et seq. The facility will be required to prepare inventory plans and reports as required.

The fire pump engine, S5, will be subject to the Stationary Diesel Engine ATCM contained in Title 17, Public Health, California Code of Regulations section 93115 et seq. The engine family (9CEXL0409AAB) has been certified by CARB and the engine will comply with the emission requirements for new emergency standby diesel-fueled compression ignition engines in Section 93115(a)(3)(A), which are:.

- NMHC + NOx < 3 g/bhp-hr
- CO < 2.6 g/bhp-hr
- PM < 0.15 g/bhp-hr

The engine will be subject to BAAQMD Standard Condition 22850, which has a limit of 50 hours/yr operation for maintenance and testing and other ATCM requirements.

The facility will be subject to the California Accidental Release regulations because the facility will inject a solution containing 19% ammonia into the selection catalytic reductions systems for NOx control. These regulations are contained in California Code of Regulations, title 19, section 2735, *et seq.*

The turbines will not be subject to the requirements in California Code of Regulations, title 20, sections 2900, *et seq.*, because they are not base-loaded turbines. The definition of "baseload generation" in Section 2901(b) states that " 'Baseload generation' means electricity generation from a powerplant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60 percent", which is equivalent to 5,256 hours/any consecutive 12 months. A permit condition limiting operation of any single turbine for more than 5,200 hours/any consecutive 12 months has been added to part 15a of the condition.

The facility will be subject to the mandatory greenhouse gas reporting requirements contained in Title 17, California Code of Regulations section 95100, *et seq.*, and is expected to comply with these requirements.

8.3 Federal Requirements

40 CFR Part 52.21, Prevention of Significant Deterioration of Air Quality

The facility will not be subject to these requirements because it will not be a "major stationary source" as defined in Section 52.21(b)(1)(i)(a). The facility would be a major stationary source for the purposes of this requirement if its potential to emit were over 250 tons per year of any regulated air pollutant.

On June 3, 2010, EPA promulgated the "Tailoring Rule," which contains amendments to 40 CFR Part 52.21. On July 1, 2011, greenhouse gases will become subject to regulation if a facility has the potential to emit more than 100,000 tons per year of carbon dioxide equivalents as defined by 40 CFR 52.21(b)(49)(i)-(v). MEP will emit more than the threshold, but will not be subject to 40 CFR 52.21 if construction commences before July 1, 2011.

40 CFR Part 60 Subpart KKKK

Subpart KKKK "Standards of Performance for Stationary Gas Turbines" applies to this facility. The gas turbines will comply with all applicable standards and limits required by these regulations. The applicable emission limitations are summarized below:

TABLE 37. NEW SOURCE PERFORMANCE STANDARDS FOR SIMPLE-CYCLE GAS TURBINES

Source	Requirement	Emission Limitation	Compliance Demonstration
Gas Turbines	Subpart GG	Not Applicable	
	Subpart KKKK	1.2 lb NO_x/MW-hr, or 25 ppm NO_x as NO_2 @ 15%O_2; 0.9 lb SO_2/MW-hr, or 0.06 lb SO_2/MMbtu maximum No CO limit in Subpart KKKK No PM limit in Subpart KKKK	2.5 ppm NO_x as NO_2 @ 15%O_2 Permit Limit; 0.0028 lb/MMbtu of SO_2 Permit Limit

Section 60.4375 requires submittal of reports of excess emissions and monitoring of downtime for all periods of unit operation, including startup, shutdown, and malfunction. The applicant is expected to maintain adequate records for Subpart KKKK reporting requirements. The gas turbines will be equipped with continuous emissions monitors for NO_x. An annual NO_x emission test will not be required for Subpart KKKK as long as a compliant CEM is used to monitor emissions.

No sulfur content monitoring of the natural gas is required by Subpart KKKK if the facility demonstrates the fuel meets the sulfur content requirements contained in Section 60.4365 using the information required by Section 60.4365(a).

40 CFR Part 60, Subpart IIII

The fire pump engine is subject to the requirements of Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. It is expected to comply because the engine family (9CEXL0409AAB) has been certified by CARB to meet the emission limits in Table 4 of the standard, which are:

- NMHC + NOx < 3 g/bhp-hr
- CO < 2.6 g/bhp-hr
- PM < 0.15 g/bhp-hr

40 CFR Part 63 Subpart YYYY

Subpart YYYY contains the National Emission Standards for Hazardous Air Pollutants (NESHAPS) for Stationary Combustion Turbines. This regulation does not apply to the Mariposa Energy Project because it will not emit more than 10 tons per year of a hazardous air pollutant (HAP) or more than 25 tons per year of a combination of hazardous air pollutants. Note that the Federal Clean Act does not define ammonia and sulfuric acid as HAPs.

The detail of the estimated HAP emissions is found in Section 4.3 of this FDOC.

40 CFR 64, Compliance Assurance Monitoring (CAM)
Requirements for enhanced monitoring may apply to facilities that are required to obtain Part 70 (Title V or Major Facility Review) permits. If applicable, the requirements would apply at the time of issuance of the Major Facility Review permit. Although these requirements would not apply at the completion of construction, it is prudent to determine at this time if they will apply so that it can be determined whether the monitoring strategy would comply with CAM.

In general, the requirement applies if an emission unit, as defined in Section 64.1, is subject to a federally-enforceable emission limit for a pollutant, has emissions of the pollutant that are greater than the major source thresholds (100 tpy of any regulated air pollutant or 10 tpy of a HAP) and the emissions of that pollutant are abated by a control device. There are several exemptions.

In this case, NOx and CO are controlled by SCR and a CO catalyst.

Monitoring for the NOx limits is exempt in accordance with 40 CFR 64.2(b)(iii) because the monitoring is subject to the Acid Rain monitoring requirements in 40 CFR 75.

Monitoring for the CO limits is required if the potential to emit of CO before control for any turbine is more than 100 tons/yr.

The potential to emit is calculated using the following parameters:
Hours of steady state operation: up to 5,200 hr/yr
CO concentrations at steady state operation depending on the ambient temperature:[25]

17F 53.2 ppmv CO before control
46F 20.9 ppmv CO before control
59F 15 ppmv CO before control
93F 7.6 ppmv CO before control

An average concentration of 24.2 ppmv CO before control will be assumed.

Fuel input: 481 MMbtu/hr
lb-mol CO = 28 lb CO
8710 scf flue gas/MMbtu @ 0% O2
30,668 scf flue gas/MMbtu @ 15% O2
385.3 dscf/lbmol
14.1 lb/startup
2.9 lb/shutdown
300 startups and shutdowns per year
Commissioning emissions: 0.18 tons CO/yr

(481 MMbtu/hr) (30,668 dscf/MMbtu) (lbmol/385.3 dscf) (24.2 ppm/10^6) (28 lb CO/lbmol)
= 25.9 lb CO/hr

[25] Check Table 1 for CO ppmv before control.

At 5,200 hr/yr:

= 67.34 tpy CO/turbine for steady state operations

Including startup, shutdown, and commissioning:

67.34 tpy + ((14.1 lb/event + 2.7 lb/event) x 300 events/yr) x (ton/2000 lb)
+ 0.18 tpy CO = 70.05 tpy CO before control

Because the CO emissions for each turbine will be less than 100 ton/year before control, the turbines are not subject to the requirements of 40 CFR 64.

40 CFR Part 68

This part regulates the unanticipated emission of an extremely hazardous substance into the ambient air from a stationary source. The ammonia used by Mariposa Energy Project is below the Federal thresholds, therefore the facility will not be subject to these requirements.

40 CFR Part 70, State Operating Permit Programs

These requirements are discussed in Section 8.2 under Regulation 2, Rule 6: Major Facility Review, which implements Part 70.

40 CFR Parts 72 Through 78, Acid Rain

The Mariposa gas turbine units will be subject to the requirements of Title IV of the federal Clean Air Act. The requirements of the Acid Rain Program are outlined in 40 CFR Part 72. The specifications for the type and operation of continuous emission monitors (CEMs) for pollutants that contribute to the formation of acid rain are given in 40 CFR Part 75.

40 CFR Part 72, Subpart A - Acid Rain Program

Part 72, Subpart A, establishes general provisions and operating permit program requirements for sources and affected units under the Acid Rain program, pursuant to Title IV of the Clean Air Act. The gas turbines are affected units subject to the program in accordance with 40 CFR Part 72, Subpart A, Section 72.6(a).

40 CFR Part 72, Subpart C – Acid Rain Permit Applications

Part 72, Subpart C, requires that the applicant submit a complete Acid Rain Permit application 24 months prior to first firing of the gas turbines.

40 CFR Part 73 – Sulfur Dioxide Allowance System

Part 73 establishes the sulfur dioxide allowance system for tracking, holding, and transferring allowances. The applicant will be required to obtain sufficient SO2 allowances for each operating year on March 1st (or February 29th in a leap year) of the following year.

40 CFR Part 75 – Continuous Emission Monitoring

Part 75 contains the continuous emission monitoring requirements for units subject to the Acid Rain program. The applicant will be required to meet the Part 75 requirements for monitoring, recordkeeping and reporting of SO_2, NO_x, and CO_2 emissions.

40 CFR Part 98

This part establishes mandatory greenhouse gas (GHG) reporting requirements for owners and operators of certain facilities that directly emit GHG. The applicant will be required to meet Part 98 requirements for reporting recordkeeping and monitoring the CO_2 emissions year-round through 40 CFR Part 75.

8.4 Greenhouse Gases

Climate change poses a significant risk to the Bay Area with such impacts such as rising sea levels, reduced runoff from snow pack in the Sierra Nevada, increased air pollution, impacts to agriculture, increased energy consumption, and adverse changes to sensitive ecosystems. The generation of electricity from burning natural gas produces air emissions known as greenhouse gases (GHGs) in addition to the criteria air pollutants. GHGs are known to contribute to the warming of the earth's atmosphere. These include primarily carbon dioxide, nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NO_x or oxides of nitrogen), and methane (unburned natural gas). Also included are sulfur hexafluoride (SF6) from transformers, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chillers.

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

The ARB is expected to adopt early action GHG reduction measures in the near future to reduce greenhouse gas emissions by 2020. ARB has adopted regulations requiring mandatory GHG emissions reporting. The facility is expected to report all GHG emissions to meet ARB requirements.

The facility will also be required to report GHG emissions to CARB, the District, and US EPA. In 2008, the District placed a fee on GHG emissions from large stationary sources of GHGs.

The GHG emissions estimates for Mariposa Energy Project are shown below.

Mariposa Energy Project has the potential to emit 430,240 metric tons/year of CO_2 equivalents using the ARB Mandatory Reporting Rule calculation methodology.

The Mariposa simple-cycle gas turbines will have a gross electrical efficiency of 40% at 59ºF and a relative humidity of 60% (Efficiency estimate provided by Applicant).

The Mariposa simple-cycle gas turbines will have a heat rate of 8591 (LHV) Btu/Kw-hr at 59ºF and a relative humidity of 60%.

The EPA Administrator has recently stated that by April of 2010, the Administrator will take actions to ensure that no stationary sources will be required to get a Clean Air Act permit to cover GHG emissions in calendar year 2010.[26] In addition, in the first half of 2011, only sources required by non-GHG emissions to obtain a permit under the Clean Air Act will need to address their GHG emission in their permit applications. Therefore, the Mariposa Energy Project is not required to address GHG emissions under the Clean Air Act at this time.

The California Energy Commission (CEC) is the primary permitting authority for new power plants in California. The California Legislature has granted the Energy Commission exclusive licensing authority for all thermal power plants in California of 50 megawatts or more. (See Warren-Alquist State Energy Resources Conservation and Development Act, Cal. Public Resources Code §§ 25000 et seq.) As the lead permitting agency, the CEC conducts an in-depth review of environmental and other issues posed by the proposed power plant. This comprehensive environmental review is the equivalent of the review required for major projects under the California Environmental Quality Act (CEQA), and the Energy Commission's license satisfies the requirements of CEQA for these projects. This CEQA-equivalent review encompasses air quality issues within the purview of the Air District, and also includes all other types of environmental and other issues, including water quality issues, endangered species issues, land use issues and Green House Gas issues, among others.

As the lead agency under the CEQA-equivalent process, the CEC will be required to quantify and assess GHG emissions from the Mariposa Energy Project to evaluate the facility's compliance with applicable laws, ordinances, regulations and standards, and the potential impacts and benefits associated with adding Mariposa Energy Project to the electricity system.

The GHG emissions estimates for the Mariposa Energy Project are shown below.

[26] Letter dated February 22, 2010 from Lisa Jackson to Senator Rockefeller, Letter summarizing EPA proposals on regulating green house gases

TABLE 38. ESTIMATED ANNUAL GHG EMISSIONS FROM MEP

	Fuel Usage, MMbtu/yr	Emission Factor, (kg CO2/MMbtu)	Emission Factor, (g CH4/MMbtu)	Emission Factor, (g N2O/MMbtu)	GHG (metric tons/yr)	Global Warming Potential	CO2 Equivalents (Metric tons/yr)
GHG							
Gas Turbines							
CO2	8,128,900	52.87			429775	1	429775
CH4	8,128,900		0.9		7	21	154
N2O	8,128,900			0.1	1	310	252
Engine	Fuel Usage, gal/yr, @ 500 hr/yr	Emission Factor, (kg CO2/gal)					
CO2	5,650	10.14			57	1	57
CH4	5,650		3		0.02	21	0
N2O	5,650			0.6	0.0000	310	1
Circuit Breakers							
SF6					0.001160	23,900	28
Total							430267

Note:
Emission Factors from the REGULATION FOR THE MANDATORY REPORTING OF GREENHOUSE GAS EMISSIONS, Appendix A, Title 17, California Code of Regulations, Subchapter 10, Article 2, Sections 95100 to 95133

CO2 Emission Factor from Table 4 Appendix A-6 for Natural Gas with a heat content between 1000 Btu/scf and 1025 Btu/scf
CH4 Emission Factor from Table 6 Appendix A-9
N2O Emission Factor from Table 6 Appendix A-9
Global Warming Potentials from Table 2 Appendix A-4
Applicant estimates SF6 emissions for 1 circuit breaker at 0.15 lb/yr per unit (based on 0.1% leak rate for 150 lb SF6 per unit)

8.5 Environmental Justice

The District is committed to implementing its permit programs in a manner that is fair and equitable to all Bay Area residents regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location in order to protect against the health effects of air pollution. The District has worked to fulfill this commitment in the current permitting action.

The emissions from the proposed project will not cause or contribute to any significant public health impacts in the community. As described in detail above, the District has undertaken a detailed review of the potential public health impacts of the emissions authorized under the proposed permitting action, and has found that they will involve no significant public health risks. The District has found that the maximum lifetime cancer risk associated with the facility is 1.3 in one million, and that the maximum chronic Hazard Index would be 0.015 and the maximum acute Hazard Index would be 0.026. These risk levels are far below what the District, EPA, or any other public health agency considers to be significant. The District anticipates that there will be no significant impacts due to air emissions related to the Mariposa project after all of the mitigations required by District Rules and the California Energy Commission are implemented. District Rules require offsets for NO_x emissions from this facility. The CEC will require numerous mitigation measures as part of the CEC licensing proceeding for the facility. The District does not anticipate an adverse impact on any community due to air emissions from the Mariposa project and therefore there is no disparate adverse impact on any Environmental Justice community located near the facility.

9 Permit Conditions

The District is proposing the following permit conditions to ensure that the project complies with all applicable District, state, and federal Regulations. The proposed conditions would limit operational parameters such as fuel use, stack gas emission concentrations, and mass emission rates. The permit conditions specify abatement device operation and performance levels. To aid enforcement efforts, conditions specifying emission monitoring, source testing, and record keeping requirements are included. Furthermore, pollutant mass emission limits (in units of lb/hr) will insure that daily and annual emission rate limitations are not exceeded.

To provide maximum operational flexibility, no limitations are being proposed on the type or quantity of gas turbine start-ups or shutdowns. Instead, the facility would be required to comply with daily and annual (consecutive twelve-month) mass emission limits at all times. Compliance with CO and NO_x limitations would be verified by continuous emission monitors (CEMs) that will be in operation during all turbine operating modes, including start-up, shutdown, commissioning, and transient conditions. Compliance with POC, SO_2, and PM_{10} mass emission limits would be verified by annual source testing.

In addition to permit conditions that apply to steady-state operation of each gas turbine power train, the District is proposing conditions that govern equipment operation during the initial commissioning period when the gas turbine power trains will operate without their SCR systems and/or oxidation catalysts in place. Commissioning activities include, but are not limited to, the testing of the gas turbines, and adjustment of control systems. Parts 1 through 10 of the proposed permit conditions for the simple-cycle gas turbines apply to this commissioning period and are intended to minimize emissions during the commissioning period.

Following are the proposed Mariposa Energy Project combustion equipment and the abatement devices regulated by the District.

Proposed Mariposa Energy Project Combustion Equipment and Abatement Devices

S-1 Combustion Turbine Generator (CTG) #1, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-1 Oxidation Catalyst and A-2 Selective Catalytic Reduction System (SCR).

S-2 Combustion Turbine Generator (CTG) #2, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-3 Oxidation Catalyst and A-4 Selective Catalytic Reduction System (SCR).

S-3 Combustion Turbine Generator (CTG) #3, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-5 Oxidation Catalyst and A-6 Selective Catalytic Reduction System (SCR).

S-4 Combustion Turbine Generator (CTG) #4, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-7 Oxidation Catalyst and A-8 Selective Catalytic Reduction System (SCR).

S-5 Diesel Fire Pump: Make: Cummins; Model: CFP7E-F40; Model Year: TBD (2009 or later); Rated bhp: 220

Proposed Mariposa Energy Project Permit Conditions

Definitions:

Hour:	Any continuous 60-minute period
Clock Hour:	Any continuous 60-minute period beginning on the hour
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Rolling 3-hour period:	Any consecutive three hour period, not including start-up or shutdown periods
Rolling 3-hour period for CO:	Any consecutive three-hour period, not including commissioning, start-up or shutdown periods. Rolling 3-hour periods shall be calculated for normal steady state operation. The minutes shall be summed across normal operating periods and days until 180 minutes have accrued. Compliance with the CO limit shall be based on this 3-hour period. After each 3-hour period has elapsed, a new 3-hour period begins every 60 minutes after the beginning of the previous 3-hour period.
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf
Firing Hours:	Period of time during which fuel is flowing to a unit, measured in minutes
MMbtu:	million British thermal units
Gas Turbine Start-up Mode:	The lesser of the first 30 minutes of continuous fuel flow to the Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of conditions 17(b) and 17(d).
Gas Turbine Shutdown Mode:	The lesser of the 15 minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in Conditions 17(b) and 17(d) until termination of fuel flow to the Gas Turbine

Gas Turbine Combustor Specified PAHs:	The polycyclic aromatic hydrocarbons listed below shall be considered to be Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene
Corrected Concentration:	The concentration of any pollutant (generally NO_x, CO, or NH_3) corrected to a standard stack gas oxygen concentration. For emission points P-1 (exhaust of S-1 Gas Turbine), P-2 (exhaust of S-2 Gas Turbine) P-3 (exhaust of S-3 Gas Turbine), P-4 (exhaust of S-4 Gas Turbine), the standard stack gas oxygen concentration is 15% O_2 by volume on a dry basis
Commissioning Activities:	All testing, adjustment, initial tuning, and calibration activities recommended by the equipment manufacturers and the MEP construction contractor to insure safe and reliable steady-state operation of the gas turbines, and associated electrical delivery systems during the commissioning period
Commissioning Period:	For each turbine, the period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when the gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing for the turbine, the turbine is available for commercial operation, and the owner/operator has initiated sales to the power exchange from that turbine.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CEC CPM:	California Energy Commission Compliance Program Manager
MEP:	Mariposa Energy Project
Total Particulate Matter:	The sum of all filterable and all condensable particulate matter.

Applicability:

Parts 1 through 10 of this condition shall only apply during the commissioning period as defined above. Unless otherwise indicated, Parts 11 through 38 of this condition shall apply after the commissioning period has ended.

Conditions for the Commissioning Period for GE LM 6000 PC Sprint Gas Turbines

1. The owner/operator of the MEP shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3 and S-4 Gas Turbines to the maximum extent possible during the commissioning period. (Basis: BACT, Regulation 2, Rule 2, Section 409)

2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune the S-1, S-2, S-3 and S-4 Gas Turbines combustors to minimize the emissions of carbon monoxide and nitrogen oxides. (Basis: BACT, Regulation 2, Rule 2, Section 409)

3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust, and operate the A-1, A-3, A-5 and A-7 Oxidation Catalysts and A-2, A-4, A-6 and A-8 SCR Systems to minimize the emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3, and S-4 Gas Turbines. (Basis: BACT, Regulation 2, Rule 2, Section 409)

4. The owner/operator of the MEP shall submit a plan to the District Engineering Division and the CEC CPM at least four weeks prior to first firing of S-1, S-2, S-3, and S-4 Gas Turbines describing the procedures to be followed during the commissioning of the gas turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the initial tuning of the combustors, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-2, S-3 & S-4) without abatement by their respective oxidation catalysts and/or SCR Systems. The owner/operator shall not fire any of the Gas Turbines (S-1, S-2, S-3 or S-4) sooner than 28 days after the District receives the commissioning plan. (Basis: Regulation 2, Rule 2, Section 419)

5. During the commissioning period, the owner/operator of the MEP shall demonstrate compliance with Parts 7, 8, 9, and 10 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters and emission concentrations:
   - firing hours
   - fuel flow rates
   - stack gas nitrogen oxide emission concentrations,
   - stack gas carbon monoxide emission concentrations

stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-1, S-2, S-3, and S-4). The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. The owner/operator shall retain records on site for at least 5 years from the date of entry and make such records available to District personnel upon request. (Basis: Regulation 2, Rule 2, Section 419)

6. The owner/operator shall install, calibrate, and operate the District-approved continuous monitors specified in Part 5 prior to first firing of the Gas Turbines (S-1, S-2, S-3 and S-4). After first firing of the turbines, the owner/operator shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NOx emission concentrations. The instruments shall operate at all times of operation of S-1, S-2, S-3, and S-4 including start-up, shutdown, upset, and malfunction, except as allowed by BAAQMD Regulation 1-522, BAAQMD Manual of Procedures, Volume V. If necessary to comply with this requirement, the owner/operator shall install dual-span monitors. The type, specifications, and location of these monitors shall be subject to District review and approval. (Basis: Regulation 2, Rule 2, Section 419)

7. The owner/operator shall not fire S-1, S-2, S-3, or S-4 Gas Turbine without abatement of nitrogen oxide emissions by the corresponding SCR System A-2, A-4, A-6, or A-8 and/or abatement of carbon monoxide emissions by the corresponding Oxidation Catalyst A-1, A-3, A-5, or A-7 for more than 200 hours each during the commissioning period. Such operation of any Gas Turbine (S-1, S-2, S-3, S-4) without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Engineering and Enforcement Divisions and the unused balance of the 200 firing hours for each turbine without abatement shall expire. (Basis: BACT, Regulation 2, Rule 2, Section 409)

8. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM_{10}, and sulfur dioxide that are emitted by the Gas Turbines (S-1, S-2, S-3, and S-4) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in Part 20. (Basis: Regulation 2, Rule 2, Section 409)

9. The owner/ operator shall not operate the Gas Turbines (S-1, S-2, S-3, and S-4) in a manner such that the combined pollutant emissions from the gas turbines will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-2, S-3, S-4). In addition, commissioning activities will be conducted on no more than one turbine/day. (Basis: BACT, Regulation 2, Rule 2, Section 409)

   NO_x (as NO_2): 16.3 tons per year

CO:	8.7 tons per year
POC (as CH_4):	1.0 ton per year
PM_{10}:	1.0 ton per year
SO_2:	0.54 ton per year

9a. The owner/ operator shall not operate the Gas Turbines (S-1, S-2, S-3, and S-4) in a manner such that the pollutant emissions from each gas turbine will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-2, S-3, S-4). In addition, commissioning activities will be conducted on no more than one turbine/day. (Basis: BACT, Regulation 2, Rule 2, Section 409)

NO_x (as NO_2):	408 pounds per calendar day
	51 pounds per hour
CO:	360 pounds per calendar day
	45 pounds per hour
POC (as CH_4):	36 pounds per calendar day
PM_{10}:	20 pounds per calendar day
SO_2:	10.8 pounds per calendar day

10. Within 90 days after start-up of each turbine, the owner/operator shall conduct District and CEC approved source tests on that turbine to determine compliance with the emission limitations specified in Part 17 on that turbine. The source tests shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty working days before the execution of the source tests, the owner/operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this Part. The District and the CEC CPM will notify the owner/operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The owner/operator shall incorporate the District and CEC CPM comments into the test plan. The owner/operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. The owner/operator shall submit the source test results for each turbine to the District and the CEC CPM within 60 days of the source testing date of that turbine. (Basis: Regulation 2, Rule 2, Section 419)

Conditions for the GE LM 6000 PC Sprint Simple-Cycle Gas Turbines (S-1, S-2, S-3, and S-4)

11. The owner/operator shall fire the Gas Turbines (S-1, S-2, S-3, and S-4) exclusively on PUC-regulated natural gas with a maximum sulfur content of 1 grain per 100 standard cubic feet. To demonstrate compliance with this limit, the operator of S-1, S-2, S-3 and S-4 shall sample and analyze the gas from each supply source at least monthly to determine the sulfur content of the gas. PG&E monthly sulfur data may be used provided

that such data can be demonstrated to be representative of the gas delivered to the MEP. (Basis: BACT for SO2 and PM10)

12. The owner/operator shall not operate the units such that the heat input rate to each Gas Turbine (S-1, S-2, S-3, and S-4) exceeds 481 MMbtu (HHV) per hour. (Basis: 2-2-409)

13. The owner/operator shall not operate the units such that the heat input rate to each Gas Turbine (S-1, S-2, S-3, and S-4) exceeds 11,544 MMbtu (HHV) per day. (Basis: 2-2-409, Cumulative Increase for PM_{10})

14. The owner/operator shall not operate the units such that the combined cumulative heat input rate for the Gas Turbines (S-1, S-2, S-3, and S-4) exceeds 8,128,900 MMbtu (HHV) per year. (Basis: 2-2-409, Offsets)

15a. The owner operator shall not operate any turbine S-1, S-2, S-3, or S-4 such that the hours of operation for any of the four units exceeds 5,200 hours per year. (Basis: 2-2-409)

15b. The owner operator shall not operate the turbines S-1, S-2, S-3, or S-4 such that the hours of operation for the four units combined exceeds 16,900 hours per year. (Basis: Offsets, Cumulative Increase)

16. The owner/operator shall ensure that each Gas Turbine (S-1, S-2, S-3, S-4) is abated by the properly operated and properly maintained Selective Catalytic Reduction (SCR) System A-2, A-4, A-6 or A-8 and Oxidation Catalyst System A-1, A-3, A-5, or A-7 whenever fuel is combusted at those sources and the corresponding SCR catalyst bed (A-2, A-4, A-6 or A-8) has reached minimum operating temperature. (Basis: BACT for NO_x, POC and CO)

17. The owner/operator shall ensure that the Gas Turbines (S-1, S-2, S-3, S-4) comply with requirements (a) through (i). Requirements (a) through (f) do not apply during a gas turbine start-up, and shutdown. (Basis: BACT and Regulation 2, Rule 5)
    a) Nitrogen oxide mass emissions (calculated as NO_2) at each exhaust point P-1, P-2, P-3, and P-4 (exhaust point for S-1, S-2, S-3 and S-4 Gas Turbine after abatement by A-2, A-4, A-6 and A-8 SCR System) shall not exceed 4.4 pounds per hour. (Basis: BACT for NO_x).
    b) The nitrogen oxide emission concentration at each exhaust point P-1, P-2, P-3 and P-4 shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for NO_x)
    c) Carbon monoxide mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.14 pounds per hour. (Basis: BACT for CO)
    d) The carbon monoxide emission concentration at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% O_2 averaged over any rolling 3-hour period. (Basis: BACT for CO)
    e) Ammonia (NH_3) emission concentrations at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over

any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to each SCR System A-2, A-4, A-6, and A-8. The correlation between the gas turbine heat input rates, A-2, A-4, A-6, and A-8 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1, P-2, P-3 and P-4 shall be determined in accordance with Part 25 or a District approved alternative method. (Basis: Regulation 2, Rule 5)

f) Precursor organic compound (POC) mass emissions (as CH_4) at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 0.61 pounds per hour. (Basis: BACT for POC)

g) Sulfur dioxide (SO_2) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 1.35 pounds per hour. (Basis: BACT for SO_2)

(Basis: Regulation 2, Rule 2, Section 419)

18. The owner/operator shall ensure that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-2, S-3, and S-4) during a start-up or shutdown does not exceed the limits established below. Startups shall not exceed 30 minutes. Shutdowns shall not exceed 15 minutes. (Basis: BACT Limit for startup and shutdown operation)

TABLE 39. STARTUP AND SHUTDOWN

Pollutant	Maximum Emissions Per Startup (lb/startup)	Maximum Emissions During Hour with Startup and/or Shutdown(lb/hr)	Maximum Emissions Per Shutdown (lb/shutdown)
NO_x (as NO_2)	14.2	18.5	3.2
CO	14.1	17.3	2.7
POC (as CH_4)	1.1	1.4	0.12

19. The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, and shutdowns to exceed the following limits during any calendar day:
    (a) 1100 pounds of NO_x (as NO_2) per day (Basis: Cumulative Increase)
    (b) 934 pounds of CO per day (Basis: Cumulative Increase)
    (c) 95 pounds of POC (as CH_4) per day (Basis: Cumulative Increase)
    (d) 130 pounds of SO_2 per day (Basis: Cumulative Increase)

20. The owner/operator shall not allow cumulative combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, shutdowns, and malfunctions to exceed the following limits during any consecutive twelve-month period:
    (a) 45.6 tons of NO_x (as NO_2) per year (Basis: Offsets)
    (b) 27.2 tons of CO per year (Basis: Cumulative Increase)

(c) 5.6 tons of POC (as CH_4) per year (Basis: Cumulative Increase)
(d) 18.6 tons of PM_{10} per year (Basis: Cumulative Increase)
(e) 2.9 tons of SO_2 per year (Basis: Cumulative Increase)

Emissions of PM_{10} from each gas turbine shall be calculated by multiplying turbine fuel usage times an emission factor determined by source testing of the turbine conducted in accordance with Part 26. The emission factor for each turbine shall be based on the average of the emissions rates observed during the 4 most recent source tests on that turbine (or, prior to the completion of 4 source tests on a turbine, on the average of the emission rates observed during all source tests on the turbine).

21. The owner/operator shall not allow the maximum projected annual toxic air contaminant emissions (per Part 26) from the Gas Turbines (S-1, S-2, S-3, S-4) combined to exceed the following limits:

formaldehyde	3725.26 pounds per year
benzene	107.94 pounds per year
Specified polycyclic aromatic hydrocarbons (PAHs)	1.063 pounds per year

unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The owner/operator shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

22. The owner/operator shall demonstrate compliance with Parts 12 through 15, 17(a) through 17(e), 18 (NO_x and CO limits), 19(a), 19(b), 20(a) and 20(b) by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, and shutdown periods). The owner/operator shall monitor for all of the following parameters:
    (a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1, S-2, S-3, and S-4
    (b) Oxygen (O_2) concentration, Nitrogen Oxides (NO_x) concentration, and carbon monoxide (CO) concentration at exhaust points P-1, P-2, P-3 and P-4.
    (c) Ammonia injection rate at A-2, A-4, A-6 and A-8 SCR Systems

The owner/operator shall record all of the above parameters at least every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the owner/operator shall calculate and record

the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(d) Heat Input Rate for each of the following sources: S-1, S-2, S-3, and S-4

(e) Corrected NO_x concentration, NO_x mass emission rate (as NO_2), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1, P-2, P-3 and P-4.

For each source and exhaust point, the owner/operator shall record the parameters specified in Parts 22(d) and 22(e) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

(f) total heat input rate for every clock hour and the average hourly heat input rate for every rolling 3-hour period.

(g) on an hourly basis, the cumulative total heat input rate for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3 and S-4 combined.

(h) the average NO_x mass emission rate (as NO_2), CO mass emission rate, and corrected NO_x and CO emission concentrations for every clock hour.

(i) on an hourly basis, the cumulative total NO_x mass emissions (as NO_2) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3 and S-4 combined.

(j) For each calendar day, the average hourly heat input rates, corrected NO_x emission concentration, NO_x mass emission rate (as NO_2), corrected CO emission concentration, and CO mass emission rate for each gas turbine.

(k) on a monthly basis, the cumulative total NO_x mass emissions (as NO_2) and cumulative total CO mass emissions, for the previous consecutive twelve-month period for sources S-1, S-2, S-3, and S-4 combined. (Basis: 1-520.1, 9-9-501, BACT, Offsets, NSPS, Cumulative Increase)

23. To demonstrate compliance with Parts 17(f), 17(g), , 19(c), 19(d), 20(c), 20(d), 20(e), the owner/operator shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions, fine particulate matter (PM_{10}) mass emissions (including condensable particulate matter), and sulfur dioxide (SO_2) mass emissions from each power train. The owner/operator shall use the actual heat input rates measured pursuant to Part 22, actual gas turbine start-up times, actual gas turbine shutdown times, and CEC and District-approved emission factors developed pursuant to source testing under Part 26 to calculate these emissions. The owner/operator shall present the calculated emissions in the following format:

(a) For each calendar day, POC, PM_{10}, and SO_2 emissions, summarized for each power train (gas turbine) and S-1, S-2, S-3, and S-4 combined

(b) on a monthly basis, the cumulative total POC, PM_{10}, and SO_2 mass emissions, for each year for S-1, S-2, S-3, and S-4 combined.

(Basis: Offsets, Cumulative Increase)

24. To demonstrate compliance with Part 21, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: formaldehyde, benzene, and specified PAH's. The owner/operator shall calculate the maximum projected annual emissions using the maximum annual heat input rate of 8,128,900 MMbtu/year for S-1, S-2, S-3, and S-4 combined and the highest emission factor (pounds of pollutant per MMbtu of heat input) determined by the most recent of any source test of the S-1, S-2, S-3, or S-4 Gas Turbines. If the highest emission factor for a given pollutant occurs during minimum-load turbine operation, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions to reflect the reduced heat input rates during gas turbine start-up and minimum-load operation. The reduced annual heat input rate shall be subject to District review and approval. (Basis: Regulation 2, Rule 5)

25. Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint units, the owner/operator shall conduct a District-approved source test on exhaust point P-1, P-2, P-3, or P-4 to determine the corrected ammonia (NH_3) emission concentration to determine compliance with Part 17(e). The source test shall determine the correlation between the heat input rates of the gas turbine, A-2, A-4, A-6, or A-8 SCR System ammonia injection rate, and the corresponding NH_3 emission concentration at emission point P-1, P-2, P-3, or P-4. The source test shall be conducted over the expected operating range of the turbine (including, but not limited to, minimum and full load modes) to establish the range of ammonia injection rates necessary to achieve NO_x emission reductions while maintaining ammonia slip levels. The owner/operator shall repeat the source testing on an annual basis thereafter. Ongoing compliance with Part 17(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: Regulation 2, Rule 5)

26. Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint units and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-1, P-2, P-3 and P-4 while each Gas Turbine is operating at maximum load to determine compliance with Parts 17(a), 17(b), 17(c), 17(d), 17(f), 17(g), and to determine a total particulate matter including condensable particulate matter emission factor, and while each Gas Turbine is operating at minimum load to determine compliance with Parts 17(c), and 17(d) and to verify the accuracy of the continuous emission monitors required in Part 22. The owner/operator shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO_2), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and total particulate matter emissions including condensable particulate matter. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. The owner/operator may conduct up to four tests per year for total particulate matter including condensable particulate matter. (Basis: BACT, Offsets)

27. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CEC CPM prior to conducting any tests. The

owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the owner/operator shall measure the contribution of condensable PM (back half) to any measurement of the total particulate matter or PM_{10} emissions. However, the owner/operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: BACT, Regulation 2, Rule 2, Section 419)

28. Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint gas turbines and on a biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on one of the following exhaust points P-1, P-2, P-3 or P-4 while the Gas Turbine is operating at maximum allowable operating rates to demonstrate compliance with Part 21. The owner/operator shall also test the gas turbine while it is operating at minimum load. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to Part 24 for any of the compounds listed below are less than the BAAQMD trigger levels, pursuant to Regulation 2, Rule 5, shown, then the owner/operator may discontinue future testing for that pollutant:

Benzene	≤	3.8 pounds/year and 2.9 pounds/hour
Formaldehyde	<	18 pounds/year and 0.12 pounds/hour
Specified PAHs	≤	0.0069 pounds/year

(Basis: Regulation 2, Rule 5)

29. The owner/operator shall calculate the sulfuric acid mist (SAM) emission rate using the total heat input for the sources and the highest results of any source testing conducted pursuant to Part 30. If this SAM mass emission limit of Part 31 is exceeded, the owner/operator must utilize air dispersion modeling to determine the impact (in micrograms/cubic meter) of the sulfuric acid mist emissions pursuant to Regulation 2, Rule 2, Section 306. (Basis: Regulation 2, Rule 2, Section 306)

30. Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint gas turbines and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on two of the four exhaust points P-1, P-2, P-3 and P-4 while each gas turbine is operating at maximum heat input rates to demonstrate compliance with the SAM emission rates specified in Part 31. The owner/operator shall test for (as a minimum) SO_2, SO_3, and H_2SO_4. The owner/operator shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: Regulation 2, Rule 2, Section 306, and Regulation 2, Rule 2, Section 419)

31. The owner/operator shall not allow sulfuric acid emissions (SAM) from stacks P-1, P-2, P-3, P-4 combined to exceed 7 tons in any consecutive 12 month period. (Basis: Regulation 2, Rule 2, Section 306, and Regulation 2, Rule 2, Section 419)

32. The owner/operator shall ensure that the stack heights of emission points P-1, P-2, P-3 and P-4 are each at least 79.5 feet above grade level at the stack base. (Basis: Regulation 2, Rule 5)

33. The owner/operator of the MEP shall submit all reports to the District (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Basis: Regulation 2, Rule 1, Section 403)

34. The owner/operator of the MEP shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Basis: Regulation 2, Rule 1, Section 403, Regulation 2, Rule 6, Section 501)

35. The owner/operator of the MEP shall notify the District and the CEC CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Basis: Regulation 2, Rule 1, Section 403)

36. The owner/operator of MEP shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall comply with the District Manual of Procedures, Volume IV, Source Test Policy and Procedures, and shall be subject to BAAQMD review and approval, except that the facility shall provide four sampling ports that are at least 6 inches in diameter in the same plane of each gas turbine stack (P-1, P-2, P-3, P-4). (Basis: Regulation 1, Section 501)

37. Within 180 days of the issuance of the Authority to Construct for the MEP, the owner/operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous emission monitors, sampling ports, platforms, and source tests required by Parts 10, 25, 26, 28 and 30. The owner/operator shall conduct all source testing and monitoring in accordance with the District approved procedures. (Basis: Regulation 1, Section 501)

38. The owner/operator shall ensure that the MEP complies with the requirement to hold SO2 allowances in 40 CFR 72.9(c)(1) and the continuous emission monitoring requirements of 40 CFR Part 75. (Basis: Regulation 2, Rule 7)

Condition 22850
For S-5, Diesel Fire Pump

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

2. The owner/operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.
   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. [Basis: "Stationary Diesel Engine ATCM" section 93115,title 17, CA Code of Regulations, subsection (e)(4)(G)(1)]

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
   a. Hours of operation for reliability-related activities (maintenance and testing).
   b. Hours of operation for emission testing to show compliance with emission limits.
   c. Hours of operation (emergency).
   d. For each emergency, the nature of the emergency condition.
   e. Fuel usage for each engine(s).

   [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or, Regulation 2-6-501)]

5. At School and Near-School Operation:
   If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:
   The owner/operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:
   a. Whenever there is a school-sponsored activity (if the engine is located on school grounds)
   b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.

"School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, athletic field, or other areas of school property but does not include unimproved school property.
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

10 Final Determination

The APCO has made a final determination that the proposed Mariposa Energy Project, which is composed of the sources listed below, complies with all applicable District, state and federal air quality rules and regulations. The following sources will be subject to the permit conditions and BACT and offset requirements discussed previously.

S-1 Combustion Turbine Generator (CTG) #1, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-1 Oxidation Catalyst and A-2 Selective Catalytic Reduction System (SCR).

S-2 Combustion Turbine Generator (CTG) #2, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-3 Oxidation Catalyst and A-4 Selective Catalytic Reduction System (SCR).

S-3 Combustion Turbine Generator (CTG) #3, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-5 Oxidation Catalyst and A-6 Selective Catalytic Reduction System (SCR).

S-4 Combustion Turbine Generator (CTG) #4, GE LM 6000 PC-Sprint, Natural Gas Fired, with high efficiency inlet air filtration, 50 MW (nominal), 481 MMbtu/hr maximum rated capacity (HHV); abated by A-7 Oxidation Catalyst and A-8 Selective Catalytic Reduction System (SCR).

S-5 Diesel Fire Pump: Make: Cummins; Model: CFP7E-F40; Model Year: TBD (2009 or later); Rated bhp: 220

11. Glossary of Acronyms

AAQS	Ambient Air Quality Standard
ARB	Air Resource Board
BTU	British Thermal Unit
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
Cal ISO	California Independent System Operator
CAISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CEM	Continuous Emission Monitor
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPUC	California Public Utilities Commission
CTG	Combustion Turbine Generator
EO/APCO	Executive Officer/Air Pollution Control Officer
EPA	Environmental Protection Agency
ERC	Emission Reduction Credit
FDOC	Final Determination of Compliance
GE	General Electric Company
GHG	Greenhouse Gases
GT	Gas Turbine
MW	Megawatt
NH_3	Ammonia
N_2	Nitrogen
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NSR	New Source Review
O_2	Oxygen
LAER	Lowest Achievable Emissions Rate
LLC	Limited Liability Company
MEP	Mariposa Energy Project
MMbtu	Million Btu
NAAQS	National Ambient Air Quality Standard
PAH	Polycyclic Aromatic Hydrocarbon
PDOC	Preliminary Determination of Compliance
PG&E	Pacific Gas & Electric Company
PM_{10}	Particulate Matter less than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter less than 2.5 Microns in Diameter
POC	Precursor Organic Compounds

ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSD	Prevention of Significant Deterioration
PUC	Public Utilities Commission
RACT	Reasonably Available Control Technology
RATA	Relative Accuracy Test Audit
SCAQMD	South Coast Air Quality Management District
SNCR	Selective Non-catalytic Reduction
SCR	Selective Catalytic Reduction
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
TAC	Toxic Air Contaminant
TBACT	Toxics Best Available Control Technology
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Appendix A
Emission Calculations

Emission Calculation Standards:

The following physical constants and standard conditions were utilized to derive the criteria-pollutant emission factors used to estimate and verify criteria pollutant and toxic air contaminant emissions submitted with the permit application. The criteria emission calculations were prepared by the applicant's consultant and are based on a combustion model. The District has verified these values using the calculations shown below. For the toxic air contaminants the District revised the calculation submitted by the applicant.

standard temperature:	68°F
standard pressure:	14.7 psia
molar volume:	385.54 dscf/lbmol
ambient oxygen concentration:	20.95%
dry flue gas factor[b]:	8710 dscf/MMbtu
natural gas higher heating value:	1020 btu/dscf

[b] F-factor is based upon the assumption of complete stoichiometric combustion of natural gas. In effect, it is assumed that all excess air present before combustion is emitted in the exhaust gas stream. Value shown is the standard value given by EPA in Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates.

Table A-1 summarizes the regulated air pollutant emission factors that were used to calculate mass emission rates for each source. All units are pounds per million Btu of natural gas fired based upon the high heating value (HHV). All emission factors are after abatement by applicable control equipment.

Table A-1: Mariposa Energy Project Turbine Criteria Pollutant Emission Estimates

Pollutant	lb/MMbtu	One Simple-Cycle Turbine Emission Rate (lbs/hr)
NO_x (as NO_2) [a]	0.00915	4.40
CO[b]	0.004456	2.14
POC (as CH_4)	0.00127	0.612
$PM_{10}/PM_{2.5}$	0.0046 (average)	2.2 (average)
SO_x (as SO_2) Maximum[d]	0.0028	1.35
SOx (as SO_2) Annual Average[c]	0.0007	0.34

[a] Based upon stack concentration of 2.5 ppmvd NOx @ 15% O2 that reflects the use of dry low-NOx combustors at the CTG and abatement by the Selective Catalytic Reduction Systems with ammonia injection.

[b] Based upon the permit condition emission limit of 2 ppmvd CO @ 15% O2 that reflects abatement by oxidation catalysts.

[c] Average SOx emissions based on 0.25 grains sulfur per 100 scf of natural gas and an average annual firing rate of 481 MMbtu/hour.

[d] Maximum SOx emissions based on 1 grain sulfur per 100 scf of natural gas.

REGULATED AIR POLLUTANTS

NITROGEN OXIDE EMISSIONS

The combined NOx emissions from the simple-cycle gas turbines will be 2.5 ppmv, dry @ 15% O2. This concentration is converted to a mass emission factor as follows:

(2.5 ppmv)(20.95 - 0)/(20.95 - 15) = 8.80 ppmv of NO_x, dry @ 0% O_2

(8.80 E-6)(1 lbmol/385.54 dscf)(46 lb of NO_2/lbmol)(8710 dscf/MMbtu)

= 0.00915 lb of NO_2/MMbtu

(0.00915 lb of NO_2/MMbtu) (481 MMbtu/hr) = 4.40 lb of NO_x (as NO_2)/hr

CARBON MONOXIDE EMISSIONS

The CO emissions from the simple-cycle gas turbines will be conditioned to a maximum controlled CO emission limit of 2 ppmv, dry @ 15% O_2 during all operating modes except gas turbine start-up, and shutdown. The emission factor corresponding to this emission concentration is calculated as follows:

(2 ppmv)(20.95 - 0)/(20.95 - 15) = 7.04 ppmv, dry @ 0% O_2

(7.04 E-6)(1 lbmol/385.54 dscf)(28 lb of NO_2/lbmol)(8710 dscf/MMbtu))

= 0.00445 lb of CO/MMbtu

(0.00445 lb of NO_2/MMbtu) (481 MMbtu/hr) = 2.14 lb of CO/hr

PRECURSOR ORGANIC COMPOUND (POC) EMISSIONS

The POC emissions from the simple-cycle gas turbines will be conditioned to a maximum controlled emission limit of 1 ppmv, dry @ 15% O_2 during all operating modes except gas turbine start-up and shutdown. The POC emission factor corresponding to this emission concentration is calculated as follows:

(1 ppmv)(20.95 - 0)/(20.95 - 15) = 3.52 ppmv, dry @ 0% O_2

(3.52 E-6)(lbmol/385.54 dscf)(16 lb CH_4/lbmol)(8710 dscf/MMbtu)

= 0.00127 lb of POC/MMbtu

(0.00127 lb of POC/MMbtu) (481 MMbtu/hr) = 0.612 lb of POC/hr

The amount of fuel that the turbine can burn varies with the ambient temperature. The emissions are conservatively calculated as if the ambient temperature is 46°F, because at that temperature, the turbines can burn the maximum amount of fuel. The daily emissions are based on maximum daily operation of 24 hours/day. The annual emissions are based on maximum annual operation for 4000 hours/year. These are the steady-state controlled emissions. Emissions equivalent to 150 hours in startup mode and 75 hours in shutdown mode will be added to the annual emission limits.

Table A-2
NO_x = 2.5 ppm @ 15% O_2 for 1-hour

Normal Operating Scenario			NOx Emissions (Per Turbine)				For all 4 turbines
Ambient Temp F	Load %	Fuel Input Per Turbine MMbtu/hr (HHV)	lb/hr	lb/day	lb/yr	tons/yr	tons/yr
17	100	465					
46	100	481	4.4	105.6	17,600	8.8	35.2
59	100	465					
59	50	282					
93	100	391					
93	50	270					
112	100	338					

Table A-3
CO = 2.0 ppm @ 15% O_2 for 3-hour rolling

Normal Operating Scenario			CO Emissions (Per Turbine)				For all 4 turbines
Ambient Temp F	Load %	Fuel Input Per Turbine MMbtu/hr (HHV)	lb/hr	lb/day	lb/yr	tons/yr	tons/yr
17	100	465					
46	100	481	2.14	51.36	8,560	4.28	17.12
59	100	465					
59	50	282					
93	100	391					
93	50	270					
112	100	338					

Table A-4 POC = 1.0 ppm @ 15% O_2 for 1-hour							
Normal Operating Scenario			POC Emissions (Per Turbine)				For all 4 turbines
Ambient Temp F	Load %	Fuel Input Per T MMbtu/hr (HHV)	lb/hr	lb/day	lb/yr	tons/yr	tons/yr
17	100	465					
46	100	481	0.612	14.688	2,448	1.224	4.896
59	100	465					
59	50	282					
93	100	391					
93	50	270					
112	100	338					

PARTICULATE MATTER (PM_{10}) EMISSIONS

The District has determined that the turbines will emit an average of 2.2 lb PM_{10}/hr. This emission rate is approximately 0.0046 lb per MMbtu on average.

SULFUR DIOXIDE EMISSIONS

The SO_2 emission factor is based upon annual average natural gas sulfur content of 0.25 grains per 100 scf and a higher heating value of 1020 Btu/scf.

The sulfur emission factor is calculated as follows:

Natural Gas: 1 grain of S/100 scf maximum

SO_2 = (1 gr/100 scf)(lb/7000 gr)(1/1020 BTU/scf)(1 x 10E6 Btu/MMbtu)(64 lb SO_2/32 lb S)
= 0.002801 lb/MMbtu

Natural Gas: 0.25 grain of S/100 scf for Annual Average

SO_2 = (0.25 gr/100 scf)(lb/7000 gr)(1/1020 BTU/scf)(1 x 10E6 Btu/MMbtu)(64 lb SO_2/32 lb S)

= 0.0007 lb/MMbtu

Maximum Hourly SO_2

The corresponding SO_2 emission rate for one gas turbine:

0.0028 lb SO_2/MMbtu)(481 MMbtu/hr) = 1.347 lb/hr
= 1.35 lb/hr

Annual Average SO_2

The corresponding SO_2 emission rate for one gas turbine:

(0.0007 lb SO_2/MMbtu)(481 MMbtu/hr) = 0.337 lb/hr
= 0.34 lb/hr

Mariposa Energy Project
Startup and Shutdown Emission Estimates

Mode	Value	Units	Notes
Total Start Up Duration	30	minutes	Based on client data from existing LM6000 plant.
Total Shutdown Duration	15	minutes	Based on client data from existing LM6000 plant.
SCR/Ox Cat Start Up Duration	20	minutes	SCR/Ox Cat warm up period after turbine start of 10 minutes.
SCR/Ox Cat Shutdown Duration	7		Additional SCR/Ox cat shutdown period in addition to the 8 minutes GE shutdown curve.
Starts/Shutdowns/Day	12	each	
Starts/CTG/Year	300	each	
Shutdown/CTG/Year	300	each	

	Emission Rate (pound per period)			
Initial Startup/Shutdown	**NOx**	**CO**	**POC**	**Reference**
Startup Emission Data	3.5	3.0	0.058	Initial 10 minutes - GE LM6000 Start Curve at ISO Conditions
Shutdown Emission Data	2.7	2.4	0.047	Final 8 minutes - GE LM6000 Shutdown Curve at ISO Conditions

Maximum Hourly Emission Rate (Steady State)

Mode	NOx (lb/hr)	CO (lb/hr)	POC (lb/hr)	NOx (lb/min)	CO (lb/min)	POC (lb/min)
without SCR/Ox Cat control	43.950	66.800	6.370	0.733	1.113	0.106
with SCR/Ox Cat control	4.395	2.14	0.61	0.073	0.030	0.010

Table A-5
Startup/Shutdown Emission Estimates Per CTG

Pollutant	Start-up lb/Events	Shutdown lb/Events	Highest hour lb/hour	For 12 Startup Emissions lb/day	For 12 Shutdown Emissions lb/day	For 300 Startup Emissions lb/year	For 300 Shutdown Emissions lb/year
NOx	14.2	3.2	18.5	170.4	38.4	4260	960
CO	14.1	2.7	17.3	169.2	32.4	4,230	810
POC	1.1	0.12	1.4	13.2	1.5	330	36
PM10	1.1 (average)	0.55 (average)	2.2 (average)	13.2 (average)	6.6 (average)	330	165
SO2[a]	0.17/0.675 [a]	0.085/0.338 [a]	1.35	2.04/8.1 [a]	1.0/4.1 [a]	51.0 [a]	25.5 [a]

[a]Lower SO2 values assume average sulfur content in fuel. Higher SO2 values assume maximum sulfur in fuel. The maximum sulfur content has been used for daily calculations and limits. The average sulfur content has been used for annual calculations and limits.

Table A-6 Startup/Shutdown Emission Estimates for 4 CTG								
Pollutant	Highest hour lb/hour	Startup lb/day	Shutdown lb/day	Startup lb/year	Shutdown lb/year	Startup TPY	Shutdown TPY	Combine Start/Stop TPY
NOx	74	682	153.6	17,040	3,840	8.52	1.92	10.44
CO	72.4 69.2	677	130	16,920	3,240	8.46	1.62	10.1
POC	5.6	52.8	6.0	1,320	144	0.66	0.072	0.73
PM10	8.8 (avg)	53	26	1320	660	0.66	0.33	0.99
SO2	5.4	32.4[a]	16.4[a]	204[a]	102[a]	0.10[a]	0.05[a]	0.15[a]

[a]Lower SO2 values assume average sulfur content in fuel. Higher SO2 values assume maximum sulfur in fuel. The maximum sulfur content has been used for daily calculations and limits. The average sulfur content has been used for annual calculations and limits.

Mariposa Energy Project
Startup and Shutdown Emission Estimates

The startup and shutdown emissions have been estimated using a combination of manufacturer's data and the District's BACT determination, which is presented on an hourly and minute basis below.

Steady state one-hour emissions without SCR/Oxidation catalyst control (Data provided by manufacturer)

NOx	43.950 lb/hr	0.733 lb/min
CO	66.800 lb/hr	1.113 lb/min
POC	6.370 lb/hr	0.106 lb/min

Steady state one-hour emissions with SCR/Oxidation Catalyst control (Based on BACT determination)

NOx	4.395 lb/hr	0.073 lb/min
CO	2.14 lb/hr	0.036 lb/min
POC	0.612 lb/hr	0.010 lb/min

Initial period startup emissions from turbine for first 10 minutes (Data provided by manufacturer)

NOx 3.5 lb/period for first 10 minutes
CO 3.0 lb/period for first 10 minutes
POC 0.058 lb/period for first 10 minutes

Shutdown emissions from turbine for final 8 minutes (Data provided by manufacturer)

NOx 2.7 lb/period for final 8 minutes
CO 2.4 lb/period for final 8 minutes

POC 0.047 lb/period for final 8 minutes

The maximum emissions in lb/event for each pollutant for a startup event lasting 30 minutes have been calculated as shown below. In some cases, the applicant has proposed lower emissions because there is some degree of control during the "uncontrolled" periods. The manufacturer has provided the emissions during the initial 10-minute period. During this period, the turbines ramp up to the maximum firing rate. After the initial 10 minutes, the turbines are considered to be uncontrolled for up to 14 minutes. During this time, the catalyst heats up. The ammonia injection systems are started when the SCR catalyst is at the proper temperature. After the ammonia injection starts, there will be some lag time before the NOx CEM measures reduced NOx emissions. After the 14 minutes of uncontrolled operation, the turbines are considered to be controlled.

lb/event = Emissions in pounds during initial 10-minute period + 14 minutes uncontrolled emissions + 6 minutes controlled emissions

For NOx:
lb/event = 3.5 lbs during initial 10-minute period + 14 min uncontrolled NOx emission rate + 6 min controlled NOx emission rate

lb/event = 3.5 lb/initial 10 minutes + (14 min x 0.733 lb/min uncontrolled) + (6 min x 0.073 lb/min controlled)
lb/event = 14.2 lb/30 min event

For CO:
lb/event = 3.0 lbs during initial 10-minute period + 14 minutes uncontrolled CO emission rate + 6 minutes controlled CO emission rate

lb/event = 3.0 lb/initial 10 minutes + (14 minutes x 1.113 lb/min uncontrolled) + (6 minutes x 0.036 lb/min controlled)
lb/event = 18.79 lb/30 min event
Proposed emissions: 14.1 lb per 30 min event

For POC:
lb/event = 0.058 lbs during initial 10-minute period + 14 minutes uncontrolled CO emission rate + 6 minutes controlled CO emission rate

lb/event = 0.058 lb/initial 10 minutes + (14 minutes x 0.106 lb/min uncontrolled) + (6 minutes x 0.010 lb/min controlled)
lb/event = 1.60 lb/30 min event
Proposed emissions: 1.1 lb per 30 min event

SO2 and PM10 are calculated by assuming that the hourly rate in unchanged from the steady state, so the emissions of SO2 and PM10 during a half-hour startup are assumed to be 0.17 and 1.1 lb/hr, respectively.

The emissions in lb/event for each pollutant for a shutdown event lasting 15 minutes are calculated as follows:
The manufacturer has provided the emissions during the final 8 minutes of shutdown. During the beginning of the 15-minute shutdown period, the turbines are considered to be controlled.

lb/event = 7 minutes controlled emissions + emissions in pounds during final 8 minutes

For NOx:
lb/event = (7 min x 0.073 lb/min controlled) + 2.7 lb during final 8 minutes = 3.21 lb/15 minute event

For CO:
lb/event = (7 min x 0.036 lb/min controlled) + 2.4 lb during final 8 minutes = 2.65 lb/15 minute event
Proposed emissions: 2.7 lb per 15-minute event

For POC:
lb/event = (7 min x 0.010 lb/min controlled) + 0.047 lb during final 8 minutes = 0.117 lb/15 minute event
Proposed emissions: 0.12 lb per 15-minute event

Following is a calculation of the maximum hourly emissions assuming that the hour has one startup and one shutdown.

Hour containing one startup and one shutdown:
It takes 30 minutes to start up the turbine. The emissions for an hour that includes a 30-minute startup, 15 minutes of steady state operation, and a 15-minute shutdown would be:

NOx: 14.2 lb in 30 minutes + (15 min x 0.073 lb/min) + 3.2 lb in 15 minutes = 18.49 lb NOx/hr

CO: 14.1 lb in 30 minutes x (15 min + 0.036 lb/min) + 2.7 lb in 15 minutes = 17.3 lb CO/hr

POC: 1.1 lb in 30 minutes + (15 min x 0.010 lb/min) + 0.2 lb in 15 minutes = 1.5 lb POC/hr

Prior to the publication of the PDOC, the applicant proposed the following maximum hourly emissions:

NOx: 18.5 lb/hr
CO: 18.1 lb/hr
POC: 1.7 lb/hr

In comments after the publication of the PDOC, the applicant has proposed the following maximum hourly emissions:

NOx: 18.5 lb/hr
CO: 17.3 lb/hr
POC: 1.4 lb/hr

It is assumed that the emissions of PM10 and SO2 do not change during startup.

Mariposa Energy Project
Grain Loading calculation

Grain Loading Calculation for GE LM-6000 PC Sprint Simple Cycle Gas Turbines

PM-10/PM2.5 Maximum Emission Rate 2.5 lb/hr

Firing Rate 481 MMbtu/hr

F-factor 8743 dscf/MMbtu

lb = 7000 grains

Corrected O2 Concentration 15% for gas turbine

Ambient Air O2 Concentration 20.9%

At 15% O2

grains/dscf = (2.2 lb/hr x 7000 grains/lb)/(481 MMbtu/hr x (8743 dscf/MMbtu x 20.9/(20.9 - 15))

grains/dscf = 0.0011

Mariposa Energy Project
Commissioning Emissions

Table A-7
Expected Commissioning Phase NOx Emissions for a Single GE LM 6000 Turbine

Phase (Each Turbine)	Hours/Day Operation	Days operation	Load Range	NOx lbs/hr	NOx lbs/day	NOx for 4 turbines lbs/year	NOx in tons per Turbine	NOx in tons for 4 Turbines
Initial Load Testing and Engine Checkout	<=4	<=2	<=10%	51	204	1632	0.204	0.816
Pre-Catalyst Initial Tuning	<=8	<=9	50-100%	51	408	14688	1.836	7.344
Post-Catalyst Initial Tuning	<=8	<=15	50-100%	34	272	16320	2.04	8.16
Total Emissions					884	32640	4.08	16.32

Table A-8
Expected Commissioning Phase CO Emissions for a Single GE LM 6000 Turbine

Phase (Each Turbine)	Hours/Day Operation	Days operation	Load Range	CO lbs/hr	CO lbs/day	CO for 4 turbines lbs/year	CO in tons per Turbine	CO in tons for 4 Turbines
Initial Load Testing and Engine Checkout	<=4	<=2	<=10%	45	180	1440	0.18	0.72
Pre-Catalyst Initial Tuning	<=8	<=9	50-100%	45	360	12960	1.62	6.48
Post-Catalyst Initial Tuning	<=8	<=15	50-100%	6.2	49.6	2976	0.372	1.48
Total Emissions					589.6	17376	2.172	8.68

Table A-9
Expected Commissioning Phase POC Emissions for a Single GE LM 6000 Turbine

Phase (Each Turbine)	Hours/Day Operation	Days operation	Load Range	POC lbs/hr	POC lbs/day	POC for 4 turbines lbs/year	POC in tons per Turbine	POC in tons for 4 Turbine
Initial Load Testing and Engine Checkout	<=4	<=2	<=10%	4.48	17.92	143.36	0.01792	0.07168
Pre-Catalyst Initial Tuning	<=8	<=9	50-100%	4.48	35.84	1290.24	0.1613	0.06452
Post-Catalyst Initial Tuning	<=8	<=15	50-100%	1.2	9.6	576	0.072	0.288
Total Emissions					63.36	2009.6	0.25122	1

Mariposa Energy Project
Commissioning Emissions

Table A-10 Expected Commissioning Phase PM10 Emissions for a Single GE LM 6000 Turbine								
Phase (Each Turbine)	**Hours/Day Operation**	**Days operation**	**Load Range**	**PM10 lbs/hr**	**PM10 lbs/day**	**PM10 for 4 turbines lbs/year**	**PM10 in tons per Turbine**	**PM10 in tons for 4-Turbine**
Initial Load Testing and Engine Checkout	<=4	<=2	<=10%	2.2	9	72	0.01	0.04
Pre-Catalyst Initial Tuning	<=8	<=9	50-100%	2.2	18	648	0.08	0.36
Post-Catalyst Initial Tuning	<=8	<=15	50-100%	2.2	18	1080	0.14	0.6
Total Emissions						1800	0.23	0.9

Table A-11 Expected Commissioning Phase SOx Emissions for a Single GE LM 6000 Turbine								
Phase (Each Turbine)	**Hours/Day Operation**	**Days operation**	**Load Range**	**SOx lbs/hr**	**SOx lbs/day**	**SOx for 4 turbines lbs/year**	**SOx in tons per Turbine**	**SOx in tons for 4-Turbine**
Initial Load Testing and Engine Checkout	<=4	<=2	<=10%	1.35	5.4	43.2	0.006	0.022
Pre-Catalyst Initial Tuning	<=8	<=9	50-100%	1.35	10.8	389	0.049	0.195
Post-Catalyst Initial Tuning	<=8	<=15	50-100%	1.35	10.8	648	.081	0.324
Total Emissions					10.8	1080	0.136	0.541

Mariposa Energy Project
Toxic Air Contaminant Emissions

Table A-12
MAXIMUM FACILITY TOXIC AIR CONTAMINANT (TAC) EMISSIONS

Toxic Air Contaminant	EF lb/MMbtu	Per Turbine lb/hour	Per Turbine lb/year	Total for 4 Turbines lb/hour	Total for 4 Turbines lb/year	Acute Risk Screening Trigger Level (lb/hr)	Chronic Risk Screening Trigger Level (lb/yr)
1,3-Butadiene	0.00000012	0.000060	0.258	0.00024	1.0307	None	0.63
Acetaldehyde	0.00013431	0.064645	277.974	0.25858	1111.8974	1	38
Acrolein	0.00001853	0.008918	38.348	0.03567	153.3931	0.0055	14
Ammonia	0.00680000	3.272840	14073.212	13.09136	56292.8480	7.1	7700
Benzene	0.00001304	0.006276	26.986	0.02510	107.9433	2.9	3.8
Benzo(a)anthracene	0.00000002	0.000011	0.046	0.00004	0.1834	None	None
Benzo(a)pyrene	0.00000001	0.000007	0.028	0.00003	0.1128	None	0.0069
Benzo(b)fluoranthene	0.00000001	0.000005	0.023	0.00002	0.0917	None	None
Benzo(k)fluoranthene	0.00000001	0.000005	0.022	0.00002	0.0893	None	None
Chrysene	0.00000002	0.000012	0.051	0.00005	0.2045	None	None
Dibenz(a,h)anthracene	0.00000002	0.000011	0.048	0.00004	0.1907	None	None
Ethylbenzene	0.00001755	0.008446	36.319	0.03379	145.2771	None	43
Formaldehyde	0.00045000	0.216585	931.316	0.86634	3725.2620	0.21	18
Hexane	0.00025392	0.122212	525.514	0.48885	2102.0542	None	270000
Indeno(1,2,3-cd)pyrene	0.00000002	0.000011	0.048	0.00004	0.1907	None	None
Naphthalene	0.00000163	0.000783	3.368	0.00313	13.4726	None	None
Propylene	0.00075588	0.363806	1564.367	1.45522	6257.4662	None	120000
Propylene Oxide	0.00004686	0.022555	96.987	0.09022	387.9467	6.8	29
Toluene	0.00006961	0.033502	144.060	0.13401	576.2388	82	12000
Xylene (Total)	0.00002559	0.012316	52.957	0.04926	211.8286	49	27000
Sulfuric Acid Mist (H2SO4)	0.00058950	0.283550	1197.997	1.1342	4791.9866	0.26	39
Benzo(a)pyrene equivalents	0.0000000448	0.000022	0.093	0.00009	0.3706	None	0.0069
PAH	0.001132	1.0640	------	-------	-----	-----	-----
One (1)-Diesel Engine (0.127 g/bhp/hr)		(220 bhp)		(50 hrs/yr)	(3.07 lb/yr)	None	0.63

Notes: PAH impacts are evaluated as Benzo(a)pyrene equivalents.

Equivalency Factor	
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenz(a,h)anthracene	1.05
Indeno(1,2,3-cd)pyrene	0.1

Mariposa Energy Project
Ammonia Emissions

Ammonia Emission Factors

The limit for ammonia concentration will be 5 ppm @ 15% O2. This concentration is converted to a mass emission factor as follows:

(5 ppmv)(20.95 - 0)/(20.95 - 15) = 17.6 ppmv of NH_3, dry @ 0% O_2

(17.6 E-6)(1 lbmol/385.54 dscf)(17 lb of NH_3/lbmol)(8710 dscf/MMbtu)

= 0.00675 lb of NH_3/MMbtu

(0.0068 lb of NH_3/MMbtu) (481 MMbtu/hr) = 3.27 lb of NO_x (as NO_2)/hr

Mariposa Energy Project
Toxic Air Contaminant Emissions

Table A-13
CATEF Gas Turbine TAC Emission Factors

ID	System Type	Material Type	SCC	APC Device	Other Desc	CAS	Substance	Max Emission factor	Mean	Median	Unit	lb/MMbtu
4543	Turbine	Natural gas	20200203	COC/SCR	None	106-99-0	1,3-Butadiene	1.33E-04	1.27E-04	1.24E-04	lbs/MMcf	1.25E-07
4568	Turbine	Natural gas	20200203	COC/SCR	None	75-07-0	Acetaldehyde	5.11E-01	1.37E-01	5.38E-02	lbs/MMcf	1.34E-04
4573	Turbine	Natural gas	20200203	COC/SCR	None	107-02-8	Acrolein	6.93E-02	1.89E-02	1.09E-02	lbs/MMcf	1.85E-05
4584	Turbine	Natural gas	20200203	COC/SCR	None	71-43-2	Benzene	4.72E-02	1.33E-02	1.01E-02	lbs/MMcf	1.30E-05
4593	Turbine	Natural gas	20200203	COC/SCR	None	56-55-6	Benzo(a)anthracene	1.34E-04	2.26E-05	3.61E-06	lbs/MMcf	2.22E-08
4598	Turbine	Natural gas	20200203	COC/SCR	None	50-32-8	Benzo(a)pyrene	9.16E-05	1.39E-05	2.57E-06	lbs/MMcf	1.36E-08
4603	Turbine	Natural gas	20200203	COC/SCR	None	205-99-2	Benzo(b)fluoranthene	6.72E-05	1.13E-05	2.87E-06	lbs/MMcf	1.11E-08
4618	Turbine	Natural gas	20200203	COC/SCR	None	207-08-9	Benzo(k)fluoranthene	6.72E-05	1.10E-05	2.87E-06	lbs/MMcf	1.08E-08
4623	Turbine	Natural gas	20200203	COC/SCR	None	218-01-9	Chrysene	1.50E-04	2.52E-05	4.99E-06	lbs/MMcf	2.47E-08
4628	Turbine	Natural gas	20200203	COC/SCR	None	53-70-3	Dibenz(a,h)anthracene	1.34E-04	2.35E-05	3.03E-06	lbs/MMcf	2.30E-08
4633	Turbine	Natural gas	20200203	COC/SCR	None	100-41-4	Ethylbenzene	5.70E-02	1.79E-02	9.74E-03	lbs/MMcf	1.75E-05
4648	Turbine	Natural gas	20200203	COC/SCR	None	50-00-0	Formaldehyde	6.87E+00	9.17E-01	1.12E-01	lbs/MMcf	8.99E-04
4653	Turbine	Natural gas	20200203	COC/SCR	None	110-54-3	Hexane	3.82E-01	2.59E-01	2.19E-01	lbs/MMcf	2.54E-04
4658	Turbine	Natural gas	20200203	COC/SCR	None	193-39-5	Indeno(1,2,3-cd)pyrene	1.34E-04	2.35E-05	2.87E-06	lbs/MMcf	2.30E-08
4663	Turbine	Natural gas	20200203	COC/SCR	None	91-20-3	Naphthalene	7.88E-03	1.66E-03	9.26E-04	lbs/MMcf	1.63E-06
4678	Turbine	Natural gas	20200203	COC/SCR	None	115-07-1	Propylene	2.00E+00	7.71E-01	5.71E-01	lbs/MMcf	7.56E-04
4683	Turbine	Natural gas	20200203	COC/SCR	None	75-56-9	Propylene Oxide	5.87E-02	4.78E-02	4.48E-02	lbs/MMcf	4.69E-05
4693	Turbine	Natural gas	20200203	COC/SCR	None	108-88-3	Toluene	1.68E-01	7.10E-02	5.91E-02	lbs/MMcf	6.96E-05
4708	Turbine	Natural gas	20200203	COC/SCR	None	1330-20-7	Xylene (Total)	6.26E-02	2.61E-02	1.93E-02	lbs/MMcf	2.56E-05

Natural Gas 1020 Btu/scf

Mariposa Energy Project
H2SO4 Estimates

H2SO4 Estimate

Worst Case lb/hr

1 grain Sulfur/100 scf

lb S/MMbtu = 1 grain S/100 scf x lb/7000 grains x scf/1020 Btu x 1E06 Btu/MMbtu = 0.0014 lb S/MMbtu

lb SO2/MMbtu = 0.0014 lb S/MMbtu x 64/32 = 0.0028 lb SO2/MMbtu

Worst Case lb/hour assume 55% SO2 converts to H2SO4

lb H2SO4/MMbtu = 0.0028 lb SO2/MMbtu x 98/64 x 0.55 = 0.002358 lb H2SO4/MMbtu

Simple Cycle Turbine lb/hr H2SO4 = 481 MMbtu/hour x 0.002358 lb H2SO4/MMbtu = 1.134 lb/hour per turbine

Annual Average assume 55% SO2 converts to H2SO4

0.25 grain Sulfur/100 scf

lb S/MMbtu = 0.25 grain S/100 scf x lb/7000 grains x scf/1020 Btu x 1E06 Btu/MMbtu = 0.00035 lb S/MMbtu

lb SO2/MMbtu = 0.00035 lb S/MMbtu x 64/32 = 0.0007 lb SO2/MMbtu

Worst Case Annual Average lb/hour assume 55% SO2 converts to H2SO4

lb H2SO4/MMbtu = 0.0007 lb SO2/MMbtu x 98/64 x 0.55 = 0.0005895 lb H2SO4/MMbtu

Simple Cycle Turbine lb/hr H2SO4 = 481 MMbtu/hour x 0.0005895 lbH2SO4/MMbtu = 0.2835 lb/hour per turbine

Total H2SO4 = 4 x (0.2835 lb/hour x 4300 hour/year) = 4877.05 lb/year, 2.44 ton/year

Appendix B

Health Risk Assessment Results

INTEROFFICE MEMORANDUM
August 11, 2009

TO: **Madhav Patil** **Via:** **Scott Lutz**
Daphne Chong

FROM: **Ted Hull**

SUBJECT: **Results of Health Risk Screening Analysis for Mariposa Energy, LLC (Byron, CA), Plant #19730, Application #020737**

SUMMARY: Per your request, we have completed a health risk screening analysis (HRSA) for the above referenced permit application. The analysis estimates the combined health risks associated with toxic air contaminant (TAC) emissions from a proposed power generation facility consisting of (4) natural gas fired combustion turbines. In addition, the analysis includes emissions from the non-emergency operation of a diesel IC engine used to drive a fire pump.

Results from the HRSA indicate that the maximum cancer risk is 1.3 in a million, the chronic hazard index is 0.015, and the acute hazard index is 0.026. In accordance with Regulation 2-5-301 these are acceptable project risks. It should be noted that nearly all of the worker cancer risk (1.3 in a million) is attributed to the non-emergency operation of the fire pump engine diesel engine. This risk level is considered acceptable, since it has been demonstrated that the engine meets the current TBACT emissions standard for diesel PM.

EMISSIONS: The emission rates for toxic air contaminants used in this evaluation are those provided in your memorandum. TAC emissions were adjusted for toxicity and assumed exposure levels, so that a single risk based emission value was entered for each source component (See Spreadsheet Tables 1 through 5). Model runs were set up to estimate the maximum project risk in the following categories: (1) Cancer Risk and (2) Chronic Hazard Index for Residential and Off-site Worker receptors; and (3) Acute Hazard Index for the maximally exposed receptor.

The California Air Resources Board's Hotspots Analysis and Reporting Program (HARP), version 1.4a was used to determine the Cancer, Chronic Hazard Index (HI) and Acute HI risk factors for each compound. In addition to the inhalation exposure pathway, the polycyclic aromatic hydrocarbon group (PAH) also has cancer risks associated with oral ingestion and dermal exposure.

MODELING: The ISCST3 air dispersion computer model was used to estimate annual average and maximum 1-hour ambient air concentrations. Model runs were made with Screen3 meteorological data because actual data was not available for this area. Elevated terrain was considered using input from the USGS Altamont, Byron Hot Springs, Clifton-Court-Forebay, and Midway digital elevation maps (NAD27 format). Model runs were made with Rural land use dispersion coefficients to best represent the area surrounding the facility. Stack parameters for the analysis were based on information provided by the applicant.

HEALTH RISK: Estimates of residential risk assume exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume exposure occurs 8 hours per day, 245 day per year, for 40 years. Risk estimates for students assume a higher breathing rate, and exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years. The estimated health risks for this permit application are presented in the table below.

Receptor	Cancer Risk	Non-cancer Hazard Index (HI)	Max. Acute Non-cancer HI
Resident	0.3 in a million	0.015	N/A
Worker	1.3 in a million	0.001	N/A
Any	N/A	N/A	0.026

Risk to Students was not calculated because there are no schools within 1,000 feet of the source.

Health Risk Screening Analysis Summary for Gas Turbines
Facility = Mariposa Energy, LLC (Byron, CA)
- Plant #19370, Application #020737

Table 1: HARP Multipathway Unit Risk Factors - Gas Turbine

TACs	(HARP) Residential Cancer Risk Factors[1]	(HARP) Residential Chronic HI Factors[2]	(HARP) Unadjusted Worker Cancer Risk Factors[3]	(HARP) Unadjusted Worker Chronic HI Factors[3]	(HARP) Acute Hazard Index (HI) Factors[3]
	$(ug/m^3)^{-1}$	$(ug/m^3)^{-1}$	$(ug/m^3)^{-1}$	$(ug/m^3)^{-1}$	$(ug/m^3)^{-1}$
Acetaldehyde	2.90E-06	7.14E-03	5.72E-07	7.14E-03	2.13E-03
Acrolein	0.00E+00	2.86E+00	0.00E+00	2.86E+00	4.00E-01
Ammonia	0.00E+00	5.00E-03	0.00E+00	5.00E-03	3.13E-04
1,3 Butadiene	1.74E-04	5.00E-02	3.43E-05	5.00E-02	0.00E+00
Benzene	2.90E-05	1.67E-02	5.72E-06	1.67E-02	7.69E-04
Ethylbenzene	2.52E-06	5.00E-04	4.97E-07	5.00E-04	0.00E+00
Formaldehyde	6.08E-06	1.11E-01	1.20E-06	1.11E-01	1.82E-02
Hexane	0.00E+00	1.43E-04	0.00E+00	1.43E-04	0.00E+00
Naphthalene	3.48E-05	1.11E-01	6.86E-06	1.11E-01	0.00E+00
PAH, as B(a)P	1.85E-02	0.00E+00	6.00E-03	0.00E+00	0.00E+00
Propylene	0.00E+00	3.33E-04	0.00E+00	3.33E-04	0.00E+00
Propylene Oxide	3.76E-06	3.33E-02	7.43E-07	3.33E-02	3.23E-04
Sulfuric Acid Mist	0.00E+00	1.00E+00	0.00E+00	1.00E+00	8.33E-03
Toluene	0.00E+00	3.33E-03	0.00E+00	3.33E-03	2.70E-05
Xylene	0.00E+00	1.43E-03	0.00E+00	1.43E-03	4.55E-05

Notes:
1. HARP Version 1.4a, Derived Adjusted Method
2. HARP Version 1.4a, Derived OEHHA Method
3. HARP Version 1.4a, Point Estimate Method

Table 2: Exposure Adjustment Factors (EAFs) - Gas Turbine

Receptor	Presence During Source Operation			Potential for Exposure			Annual Exposure (%)	Exposure Correction Factor	Exposure Adjustment Factors	
	Daily (hours/day)	Weekly (days/week)	Annually (weeks/year)	Daily (hours/day)	Weekly (days/week)	Annually (weeks/year)			Cancer	Chronic HI
Resident	24	7	50	11	7	50	96.2%	1.04	1.00	0.96
Worker	8	5	49	8	5	49	49.0%	4.47	2.19	0.49
Student	10	5	36	10	5	36	45.0%	4.87	2.19	0.45
Source Operation	11	7	52							

Note:
HARP chronic risk values assume 8,400 hrs/yr of residential exposure, 1,960 hrs/yr of worker exposure, and 1,800 hrs/yr of student exposure from a continuously operating source (8,760 hours/yr).
Risk based emissions from sources that do not operate continuously are scaled to account for exposure outside these parameters.

Health Risk Screening Analysis Summary for Gas Turbines
Facility = Mariposa Energy, LLC (Byron, CA)
- Plant #19370, Application #020737

Table 3: Resident - Cancer, Chronic, and Acute Risk Adjusted Total Emission Rates for Each Turbine

TACs	Annual Emission Rate (lb/yr)	Annual Emission Rate (g/sec)	Hourly Emission Rate (lb/hr)	Hourly Emission Rate (g/sec)	(HARP) Multi-Path Unit Cancer Risk Factor $(ug/m^3)^{-1}$	(HARP) Chronic Hazard Index (HI) per Unit Conc. $(ug/m^3)^{-1}$	(HARP) Acute Hazard Index (HI) per Unit Conc. $(ug/m^3)^{-1}$	Cancer Risk (in a million) Weighted Emissions (g/s)/(ug/m^3)	Chronic HI Weighted Emissions (g/s)/(ug/m^3)	Acute HI Weighted Emission Rate (g/s)/(ug/m^3)
Acetaldehyde	2.78E+02	4.00E-03	6.46E-02	8.14E-03	2.90E-06	7.14E-03	2.13E-03	1.16E-02	2.76E-05	1.73E-05
Acrolein	3.83E+01	5.51E-04	8.92E-03	1.12E-03	0.00E+00	2.86E+00	4.00E-01	0.00E+00	1.61E-03	4.50E-04
Ammonia	1.41E+04	2.03E-01	3.27E+00	4.12E-01	0.00E+00	5.00E-03	3.13E-04	0.00E+00	9.75E-04	1.29E-04
1,3 Butadiene	2.58E-01	3.71E-06	5.99E-05	7.55E-06	1.74E-04	5.00E-02	0.00E+00	6.47E-04	1.78E-07	0.00E+00
Benzene	2.70E+01	3.88E-04	6.28E-03	7.91E-04	2.90E-05	1.67E-02	7.69E-04	1.13E-02	6.24E-06	6.08E-07
Ethylbenzene	3.63E+01	5.22E-04	8.45E-03	1.06E-03	2.52E-06	5.00E-04	0.00E+00	1.32E-03	2.51E-07	0.00E+00
Formaldehyde	9.31E+02	1.34E-02	2.17E-01	2.73E-02	6.08E-06	1.11E-01	1.82E-02	8.16E-02	1.43E-03	4.98E-04
Hexane	5.26E+02	7.57E-03	1.22E-01	1.54E-02	0.00E+00	1.43E-04	0.00E+00	0.00E+00	1.04E-06	0.00E+00
Naphthalene	3.37E+00	4.85E-05	7.83E-04	9.87E-05	3.48E-05	1.11E-01	0.00E+00	1.69E-03	5.17E-06	0.00E+00
PAH, as BaP	9.27E-02	1.33E-06	2.15E-05	2.71E-06	1.63E-02	0.00E+00	0.00E+00	2.21E-02	0.00E+00	0.00E+00
Propylene	1.56E+03	2.24E-02	3.64E-01	4.59E-02	0.00E+00	3.33E-04	0.00E+00	0.00E+00	7.18E-06	0.00E+00
Propylene Oxide	9.70E+01	1.40E-03	2.26E-02	2.85E-03	3.70E-06	3.33E-02	3.23E-04	5.29E-03	4.47E-05	9.20E-07
Sulfuric Acid Mist	8.85E+02	1.27E-02	2.06E-01	2.60E-02	0.00E+00	1.00E+00	8.33E-03	0.00E+00	1.22E-02	2.16E-04
Toluene	1.44E+02	2.07E-03	3.35E-02	4.22E-03	0.00E+00	3.33E-03	2.70E-05	0.00E+00	6.63E-06	1.14E-07
Xylene (Total)	5.30E+01	7.62E-04	1.23E-02	1.55E-03	0.00E+00	1.43E-03	4.55E-05	0.00E+00	1.06E-06	7.05E-08
								1.36E-01	1.63E-02	*1.31E-03*

1-Hour to Annual Ave. Concentration Conversion: 0.1 ***1.36E-02*** ***1.63E-03***

Table 4: Worker - Cancer, Chronic, and Acute Risk Adjusted Total Emission Rates for Each Turbine

TACs	Annual Emission Rate (lb/yr)	Annual Emission Rate (g/sec)	Hourly Emission Rate (lb/hr)	Hourly Emission Rate (g/sec)	(HARP) Multi-Path Unit Cancer Risk Factor $(ug/m^3)^{-1}$	(HARP) Chronic Hazard Index (HI) per Unit Conc. $(ug/m^3)^{-1}$	(HARP) Acute Hazard Index (HI) per Unit Conc. $(ug/m^3)^{-1}$	Cancer Risk (in a million) Weighted Emissions (g/s)/(ug/m^3)	Chronic HI Weighted Emissions (g/s)/(ug/m^3)	Acute HI Weighted Emission Rate (g/s)/(ug/m^3)
Acetaldehyde	2.78E+02	4.00E-03	6.46E-02	8.14E-03	5.72E-07	7.14E-03	2.13E-03	5.00E-03	1.40E-05	1.73E-05
Acrolein	3.83E+01	5.51E-04	8.92E-03	1.12E-03	0.00E+00	2.86E+00	4.00E-01	0.00E+00	7.71E-04	4.50E-04
Ammonia	1.41E+04	2.03E-01	3.27E+00	4.12E-01	0.00E+00	5.00E-03	3.13E-04	0.00E+00	4.98E-04	1.29E-04
1,3 Butadiene	2.58E-01	3.71E-06	5.99E-05	7.55E-06	3.43E-05	5.00E-02	0.00E+00	2.78E-04	9.09E-08	0.00E+00
Benzene	2.70E+01	3.88E-04	6.28E-03	7.91E-04	5.72E-06	1.67E-02	7.69E-04	4.86E-03	3.17E-06	6.08E-07
Ethylbenzene	3.63E+01	5.22E-04	8.45E-03	1.06E-03	4.97E-07	5.00E-04	0.00E+00	5.68E-04	1.28E-07	0.00E+00
Formaldehyde	9.31E+02	1.34E-02	2.17E-01	2.73E-02	1.20E-06	1.11E-01	1.82E-02	3.52E-02	7.28E-04	4.98E-04
Hexane	5.26E+02	7.57E-03	1.22E-01	1.54E-02	0.00E+00	1.43E-04	0.00E+00	0.00E+00	5.30E-07	0.00E+00
Naphthalene	3.37E+00	4.85E-05	7.83E-04	9.87E-05	6.86E-06	1.11E-01	0.00E+00	7.27E-04	2.63E-06	0.00E+00
PAH, as BaP	9.27E-02	1.33E-06	2.15E-05	2.71E-06	6.00E-03	0.00E+00	0.00E+00	1.75E-02	0.00E+00	0.00E+00
Propylene	1.56E+03	2.24E-02	3.64E-01	4.59E-02	0.00E+00	3.33E-04	0.00E+00	0.00E+00	3.65E-06	0.00E+00
Propylene Oxide	9.70E+01	1.40E-03	2.26E-02	2.85E-03	7.43E-07	3.33E-02	3.23E-04	2.27E-03	2.27E-05	9.20E-07
Sulfuric Acid Mist	8.85E+02	1.27E-02	2.06E-01	2.60E-02	0.00E+00	1.00E+00	8.33E-03	0.00E+00	6.23E-03	2.16E-04
Toluene	1.44E+02	2.07E-03	3.35E-02	4.22E-03	0.00E+00	3.33E-03	2.70E-05	0.00E+00	3.38E-06	1.14E-07
Xylene (Total)	5.30E+01	7.62E-04	1.23E-02	1.55E-03	0.00E+00	1.43E-03	4.55E-05	0.00E+00	5.34E-07	7.05E-08
								6.84E-02	8.28E-03	*1.31E-03*

1-Hour to Annual Ave. Concentration Conversion: 0.1 ***6.84E-03*** ***8.28E-04***

Health Risk Screening Analysis Summary for Diesel Engine
Facility = Mariposa Energy, LLC (Byron, CA)
- Plant #19370, Application #020737

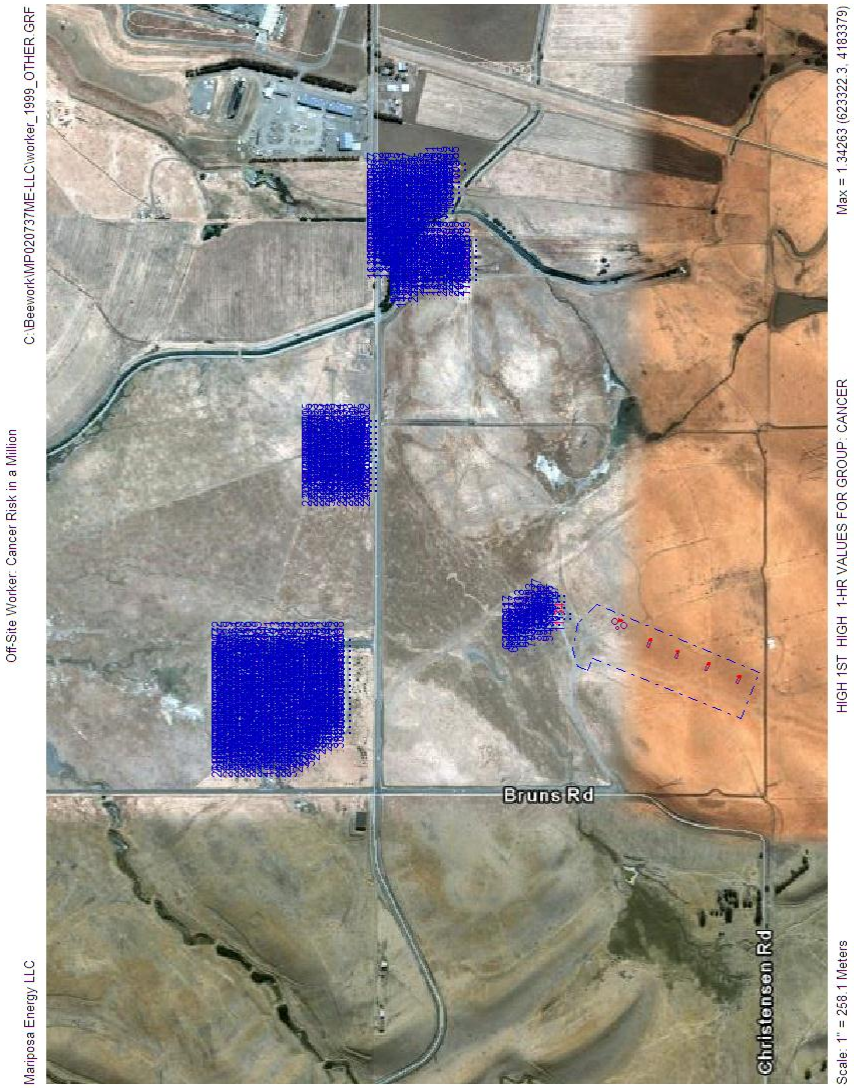
Table 5: Risk Based ISC Emissions Inputs - Diesel Engine

				Resident				Worker			
Source	Annual Emission Rate (lb/yr)	Annual Average Emission Rate (g/sec)	(HARP) Residential Cancer Risk Factors $(ug/m^3)^{-1}$	(HARP) Residential Chronic HI Factors $(ug/m^3)^{-1}$	Exposure Adjusted Cancer Risk Factor $(g/s)/(ug/m^3)$	Exposure Adjusted Chronic HI Factor $(g/s)/(ug/m^3)$	(HARP) Unadjusted Worker Cancer Risk Factors $(ug/m^3)^{-1}$	(HARP) Unadjusted Worker Chronic HI Factors $(ug/m^3)^{-1}$	Cancer Risk (in a million) Weighted Emissions $(g/s)/(ug/m^3)$	Chronic HI Weighted Emissions $(g/s)/(ug/m^3)$
S-5	3.09E+00	4.43E-05	3.19E-04	2.00E-01	1.47E-02	8.86E-06	6.29E-05	2.00E-01	1.22E-02	8.68E-06
	1-Hour to Annual Ave. Concentration Conversion:		0.1		*1.47E-03*	*8.86E-07*			*1.22E-03*	*8.68E-07*

Table 6: Exposure Adjustment Factors (EAFs) - Diesel Engine

Receptor	Presence During Source Operation			Potential for Exposure			Annual Exposure (%)	Exposure Correction Factor	Exposure Adjustment Factors	
	Daily (hours/day)	Weekly (days/week)	Annually (weeks/year)	Daily (hours/day)	Weekly (days/week)	Annually (weeks/year)			Cancer	Chronic HI
Resident	24	7	50	1	1	50	100.0%	1.04	1.04	1.00
Worker	8	5	49	1	1	49	98.0%	4.47	4.38	0.98
Student	10	5	36	1	1	36	72.0%	4.87	3.50	0.72
Source Operation	1	1	50							

Note:
HARP cancer risk values assume 8,400 hours per year of residential exposure and 1,960 hours per year of worker exposure from a continuously operating source (8,760 hours/yr).
Risk based emissions from sources that do not operate continuously must be scaled to account for exposure outside these parameters.



Mariposa Energy Project
Risk Screening Report

```
NO ECHO

BEE-Line ISCST3 "BEEST" Version 9.00

Input File - C:\Beework\MP020737MS-LLC\worker_1999_OTHER.DTA

Output File - C:\Beework\MP020737MS-LLC\worker_1999_OTHER.LST

  Met File - C:\Beework\metdata\screen3.asc

*** Message Summary For ISC3 Model Setup ***

--------- Summary of Total Messages -------

A Total of           0 Fatal Error Message(s)
A Total of           1 Warning Message(s)
A Total of           0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***

   ********   WARNING MESSAGES   ********
RE W282  1845 CHK_EL:RecElev < SrcBase; See non-DFAULT HE>ZI option in  MCB#9

**********************************
*** SETUP Finishes Successfully ***
**********************************
```

```
*** ISCST3 - VERSION 02035 ***   *** Mariposa Energy LLC                    ***     08/10/09
                                 *** Application #020737                    ***     11:23:36
                                                                                    PAGE   1
**MODELOPTs:
CONC                  RURAL ELEV       DFAULT

                                       ***    MODEL SETUP OPTIONS SUMMARY    ***

**Intermediate Terrain Processing is Selected
**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations
**Model Uses RURAL Dispersion.
**Model Uses Regulatory DEFAULT Options:
        1. Final Plume Rise.
        2. Stack-tip Downwash.
        3. Buoyancy-induced Dispersion.
        4. Use Calms Processing Routine.
        5. Not Use Missing Data Processing Routine.
        6. Default Wind Profile Exponents.
        7. Default Vertical Potential Temperature Gradients.
        8. "Upper Bound" Values for Supersquat Buildings.
        9. No Exponential Decay for RURAL Mode
**Model Accepts Receptors on ELEV Terrain.
**Model Assumes No FLAGPOLE Receptor Heights.
**Model Calculates  1 Short Term Average(s) of:    1-HR
**This Run Includes:     10 Source(s);     2 Source Group(s); and    1671 Receptor(s)
**The Model Assumes A Pollutant Type of:  OTHER
**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
     Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
     Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =   10.00 ;   Decay Coef. =    0.000    ;   Rot. Angle =    0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =  0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =    1.4 MB of RAM.

**Input Runstream File:          worker_1999_OTHER.DTA
**Output Print File:             worker_1999_OTHER.LST
```

**MODELOPTs:
CONC RURAL ELEV DFAULT

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
S1CAN	0	0.66400E-02	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CAN	0	0.66400E-02	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CAN	0	0.66400E-02	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CAN	0	0.66400E-02	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CAN	0	0.12200E-02	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	
S1CHR	0	0.82800E-03	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CHR	0	0.82800E-03	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CHR	0	0.82800E-03	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CHR	0	0.82800E-03	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CHR	0	0.86800E-06	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
CANCER	S1CAN , S2CAN , S3CAN , S4CAN , S5CAN ,
CHRONIC	S1CHR , S2CHR , S3CHR , S4CHR , S5CHR ,

Mariposa Energy Project
Risk Screening Report

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*** ISCST3 - VERSION 02035 ***    *** Mariposa Energy LLC                                    ***      08/10/09
                                  *** Application #020737                                    ***      11:23:36
**MODELOPTs:                                                                                          PAGE    3
CONC                    RURAL ELEV          DFAULT

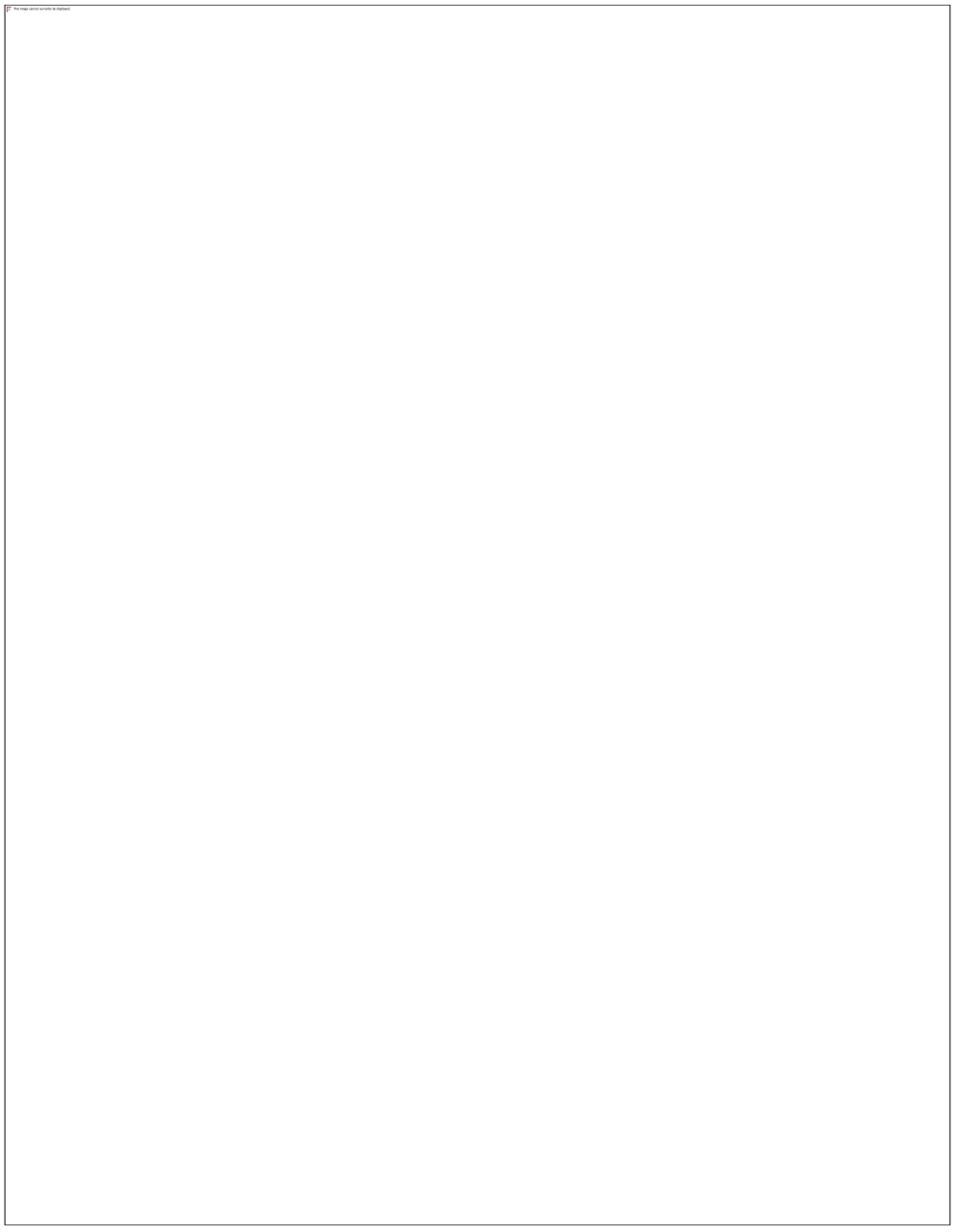
                                  *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: S1CAN
 IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK
   1 10.1, 17.5,   0,    2 10.1, 17.2,   0,    3 10.1, 17.4,   0,    4 10.1, 17.4,   0,    5 10.1, 17.0,   0,    6 10.1, 15.9,   0,
   7 10.1, 14.5,   0,    8 10.1, 12.5,   0,    9 10.1, 10.2,   0,   10 10.1,  7.6,   0,   11 10.1,  4.8,   0,   12 10.1,  6.5,   0,
  13 10.1,  9.2,   0,   14 10.1, 11.7,   0,   15 10.1, 13.8,   0,   16 10.1, 15.5,   0,   17 10.1, 16.7,   0,   18 10.1, 17.4,   0,
  19 10.1, 17.5,   0,   20 13.7, 15.2,   0,   21 13.7, 16.0,   0,   22 10.1, 17.4,   0,   23 10.1, 17.0,   0,   24 10.1, 15.9,   0,
  25 10.1, 14.5,   0,   26 10.1, 12.5,   0,   27 10.1, 10.2,   0,   28 10.1,  7.6,   0,   29 10.1,  4.8,   0,   30 10.1,  6.5,   0,
  31 10.1,  9.2,   0,   32 10.1, 11.7,   0,   33 10.1, 13.8,   0,   34 10.1, 15.5,   0,   35 10.1, 16.7,   0,   36 10.1, 17.4,   0,

SOURCE ID: S2CAN
 IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK
   1 10.1, 17.6,   0,    2 10.1, 17.3,   0,    3 10.1, 17.4,   0,    4 10.1, 17.4,   0,    5 10.1, 16.9,   0,    6 10.1, 15.9,   0,
   7 10.1, 14.4,   0,    8 10.1, 12.4,   0,    9 10.1, 10.1,   0,   10 10.1,  7.5,   0,   11 10.1,  4.7,   0,   12 10.1,  6.7,   0,
  13 10.1,  9.4,   0,   14 10.1, 11.8,   0,   15 10.1, 13.9,   0,   16 10.1, 15.6,   0,   17 10.1, 16.8,   0,   18 10.1, 17.5,   0,
  19 10.1, 17.6,   0,   20 10.1, 17.3,   0,   21 10.1, 17.4,   0,   22 10.1, 17.4,   0,   23 10.1, 16.9,   0,   24 10.1, 15.9,   0,
  25 10.1, 14.4,   0,   26 10.1, 12.4,   0,   27 10.1, 10.1,   0,   28 10.1,  7.5,   0,   29 10.1,  4.7,   0,   30 10.1,  6.7,   0,
  31 10.1,  9.4,   0,   32 10.1, 11.8,   0,   33 10.1, 13.9,   0,   34 10.1, 15.6,   0,   35 10.1, 16.8,   0,   36 10.1, 17.5,   0,

.
SOURCE ID: S3CAN
 IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK
   1 10.1, 17.6,   0,    2 10.1, 17.2,   0,    3 10.1, 17.4,   0,    4 10.1, 17.5,   0,    5 10.1, 16.9,   0,    6 10.1, 15.9,   0,
   7 10.1, 14.4,   0,    8 10.1, 12.4,   0,    9 10.1, 10.1,   0,   10 10.1,  7.5,   0,   11 10.1,  4.6,   0,   12 10.1,  6.7,   0,
  13 10.1,  9.5,   0,   14 10.1, 11.9,   0,   15 10.1, 14.0,   0,   16 10.1, 15.6,   0,   17 10.1, 16.8,   0,   18 10.1, 17.5,   0,
  19 10.1, 17.6,   0,   20 10.1, 17.2,   0,   21 10.1, 17.4,   0,   22 10.1, 17.5,   0,   23 10.1, 16.9,   0,   24 10.1, 15.9,   0,
  25 10.1, 14.4,   0,   26 10.1, 12.4,   0,   27 10.1, 10.1,   0,   28 10.1,  7.5,   0,   29 10.1,  4.6,   0,   30 10.1,  6.7,   0,
  31 10.1,  9.5,   0,   32 10.1, 11.9,   0,   33 10.1, 14.0,   0,   34 10.1, 15.6,   0,   35 10.1, 16.8,   0,   36 10.1, 17.5,   0,

SOURCE ID: S4CAN
 IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK   IFV   BH    BW   WAK
   1 10.1, 17.5,   0,    2 10.1, 17.2,   0,    3 10.1, 17.5,   0,    4 10.1, 17.5,   0,    5 10.1, 17.0,   0,    6 10.1, 16.0,   0,
   7 10.1, 14.6,   0,    8 10.1, 12.6,   0,    9 10.1, 10.3,   0,   10 10.1,  7.7,   0,   11 10.1,  4.9,   0,   12 10.1,  6.6,   0,
  13 10.1,  9.3,   0,   14 10.1, 11.8,   0,   15 10.1, 13.8,   0,   16 10.1, 15.5,   0,   17 10.1, 16.7,   0,   18 10.1, 17.4,   0,
  19 10.1, 17.5,   0,   20 10.1, 17.2,   0,   21 10.1, 17.5,   0,   22 10.1, 17.5,   0,   23 10.1, 17.0,   0,   24 10.1, 16.0,   0,
  25 10.1, 14.6,   0,   26 10.1, 12.6,   0,   27 10.1, 10.3,   0,   28 10.1,  7.7,   0,   29 10.1,  4.9,   0,   30 10.1,  6.6,   0,
  31 10.1,  9.3,   0,   32 10.1, 11.8,   0,   33 10.1, 13.8,   0,   34 10.1, 15.5,   0,   35 10.1, 16.7,   0,   36 10.1, 17.4,   0,
```



Mariposa Energy Project
Risk Screening Report

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*** ISCST3 - VERSION 02035 ***    *** Mariposa Energy LLC                                    ***      08/10/09
                                  *** Application #020737                                    ***      11:23:36
**MODELOPTs:                                                                                         PAGE    5
CONC                              RURAL ELEV          DFAULT

                                  *** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: S4CHR
 IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK
   1  10.1,  17.5,  0       2  10.1,  17.2,  0       3  10.1,  17.5,  0       4  10.1,  17.5,  0       5  10.1,  17.0,  0       6  10.1,  16.0,  0
   7  10.1,  14.6,  0       8  10.1,  12.6,  0       9  10.1,  10.3,  0      10  10.1,   7.7,  0      11  10.1,   4.9,  0      12  10.1,   6.6,  0
  13  10.1,   9.3,  0      14  10.1,  11.8,  0      15  10.1,  13.8,  0      16  10.1,  15.5,  0      17  10.1,  16.7,  0      18  10.1,  17.4,  0
  19  10.1,  17.5,  0      20  10.1,  17.2,  0      21  10.1,  17.5,  0      22  10.1,  17.5,  0      23  10.1,  17.0,  0      24  10.1,  16.0,  0
  25  10.1,  14.6,  0      26  10.1,  12.6,  0      27  10.1,  10.3,  0      28  10.1,   7.7,  0      29  10.1,   4.9,  0      30  10.1,   6.6,  0
  31  10.1,   9.3,  0      32  10.1,  11.8,  0      33  10.1,  13.8,  0      34  10.1,  15.5,  0      35  10.1,  16.7,  0      36  10.1,  17.4,  0


SOURCE ID: S5CHR
 IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK    IFV   BH     BW     WAK
   1  13.7,  18.9,  0       2  13.7,  15.2,  0       3  13.7,  16.0,  0       4  13.7,  19.6,  0       5  13.7,  23.1,  0       6  13.7,  26.4,  0
   7  13.7,  29.3,  0       8  13.7,  31.7,  0       9  13.7,  33.5,  0      10  13.7,  34.7,  0      11  13.7,  35.3,  0      12  13.7,  35.2,  0
  13  13.7,  34.5,  0      14  13.7,  33.1,  0      15  13.7,  31.2,  0      16  13.7,  28.7,  0      17  13.7,  25.8,  0      18  13.7,  22.5,  0
  19  13.7,  18.9,  0      20  13.7,  15.2,  0      21  13.7,  16.0,  0      22  13.7,  19.6,  0      23  13.7,  23.1,  0      24  13.7,  26.4,  0
  25  13.7,  29.3,  0      26  13.7,  31.7,  0      27  13.7,  33.5,  0      28  13.7,  34.7,  0      29  13.7,  35.3,  0      30  13.7,  35.2,  0
  31  13.7,  34.5,  0      32  13.7,  33.1,  0      33  13.7,  31.2,  0      34  13.7,  28.7,  0      35  13.7,  25.8,  0      36  13.7,  22.5,  0
```

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 *** ISCST3 - VERSION 02035 ***    *** Mariposa Energy LLC                                      ***      08/10/09
                                   *** Application #020737                                      ***      11:23:36
**MODELOPTs:                                                                                             PAGE   6
CONC                     RURAL ELEV         DFAULT

                              *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                               (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

    NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

                        *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                               (METERS/SEC)

                                    1.54,   3.09,   5.14,   8.23,  10.80,

                                      *** WIND PROFILE EXPONENTS ***

    STABILITY                                WIND SPEED CATEGORY
    CATEGORY          1              2              3              4              5              6
       A         .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01
       B         .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01     .70000E-01
       C         .10000E+00     .10000E+00     .10000E+00     .10000E+00     .10000E+00     .10000E+00
       D         .15000E+00     .15000E+00     .15000E+00     .15000E+00     .15000E+00     .15000E+00
       E         .35000E+00     .35000E+00     .35000E+00     .35000E+00     .35000E+00     .35000E+00
       F         .55000E+00     .55000E+00     .55000E+00     .55000E+00     .55000E+00     .55000E+00

                            *** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
                                       (DEGREES KELVIN PER METER)

    STABILITY                                WIND SPEED CATEGORY
    CATEGORY          1              2              3              4              5              6
       A         .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00
       B         .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00
       C         .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00
       D         .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00     .00000E+00
       E         .20000E-01     .20000E-01     .20000E-01     .20000E-01     .20000E-01     .20000E-01
       F         .35000E-01     .35000E-01     .35000E-01     .35000E-01     .35000E-01     .35000E-01
```

*** ISCST3 - VERSION 02035 *** *** Mariposa Energy LLC *** 08/10/09
*** Application #020737 *** 11:23:36
**MODELOPTs: PAGE 7
CONC RURAL ELEV DFAULT

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: screen3.asc
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,14,f7.2)
SURFACE STATION NO.: 99999 UPPER AIR STATION NO.: 99999
NAME: ' ' NAME: ' '
YEAR: 1999 YEAR: 1999

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
99	01	01	01	5.0	1.00	293.0	1	320.0	320.0	0.0000	0.0	0.0000	0	0.00
99	01	01	02	5.0	1.50	293.0	1	480.0	480.0	0.0000	0.0	0.0000	0	0.00
99	01	01	03	5.0	2.00	293.0	1	640.0	640.0	0.0000	0.0	0.0000	0	0.00
99	01	01	04	5.0	2.50	293.0	1	800.0	800.0	0.0000	0.0	0.0000	0	0.00
99	01	01	05	5.0	3.00	293.0	1	960.0	960.0	0.0000	0.0	0.0000	0	0.00
99	01	01	06	5.0	1.00	293.0	2	320.0	320.0	0.0000	0.0	0.0000	0	0.00
99	01	01	07	5.0	1.50	293.0	2	480.0	480.0	0.0000	0.0	0.0000	0	0.00
99	01	01	08	5.0	2.00	293.0	2	640.0	640.0	0.0000	0.0	0.0000	0	0.00
99	01	01	09	5.0	2.50	293.0	2	800.0	800.0	0.0000	0.0	0.0000	0	0.00
99	01	01	10	5.0	3.00	293.0	2	960.0	960.0	0.0000	0.0	0.0000	0	0.00
99	01	01	11	5.0	3.50	293.0	2	1120.0	1120.0	0.0000	0.0	0.0000	0	0.00
99	01	01	12	5.0	4.00	293.0	2	1280.0	1280.0	0.0000	0.0	0.0000	0	0.00
99	01	01	13	5.0	4.50	293.0	2	1440.0	1440.0	0.0000	0.0	0.0000	0	0.00
99	01	01	14	5.0	5.00	293.0	2	1600.0	1600.0	0.0000	0.0	0.0000	0	0.00
99	01	01	15	5.0	1.00	293.0	3	320.0	320.0	0.0000	0.0	0.0000	0	0.00
99	01	01	16	5.0	1.50	293.0	3	480.0	480.0	0.0000	0.0	0.0000	0	0.00
99	01	01	17	5.0	2.00	293.0	3	640.0	640.0	0.0000	0.0	0.0000	0	0.00
99	01	01	18	5.0	2.50	293.0	3	800.0	800.0	0.0000	0.0	0.0000	0	0.00
99	01	01	19	5.0	3.00	293.0	3	960.0	960.0	0.0000	0.0	0.0000	0	0.00
99	01	01	20	5.0	3.50	293.0	3	1120.0	1120.0	0.0000	0.0	0.0000	0	0.00
99	01	01	21	5.0	4.00	293.0	3	1280.0	1280.0	0.0000	0.0	0.0000	0	0.00
99	01	01	22	5.0	4.50	293.0	3	1440.0	1440.0	0.0000	0.0	0.0000	0	0.00
99	01	01	23	5.0	5.00	293.0	3	1600.0	1600.0	0.0000	0.0	0.0000	0	0.00
99	01	01	24	5.0	8.00	293.0	3	2560.0	2560.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

```
 *** ISCST3 - VERSION 02035 ***    *** Mariposa Energy LLC                                              ***        08/10/09
                                   *** Application #020737                                              ***        11:23:36
**MODELOPTs:                                                                                                       PAGE   8
CONC                    RURAL ELEV         DFAULT

                                              *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                                      ** CONC OF OTHER    IN MICROGRAMS/M**3                        **

                                                         DATE                                                           NETWORK
GROUP ID                          AVERAGE CONC       (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

CANCER   HIGH  1ST HIGH VALUE IS       1.34263  ON 99010408: AT (  623322.31,  4183379.00,     33.50,      0.00)  DC       NA
         HIGH  2ND HIGH VALUE IS       1.28731  ON 99010918: AT (  623347.31,  4183391.50,     33.10,      0.00)  DC       NA

CHRONIC  HIGH  1ST HIGH VALUE IS       0.00127  ON 99012523: AT (  624275.75,  4183743.50,     20.00,      0.00)  DC       NA
         HIGH  2ND HIGH VALUE IS       0.00126  ON 99012317: AT (  624275.75,  4183781.00,     19.00,      0.00)  DC       NA

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY

*** Message Summary : ISCST3 Model Execution ***

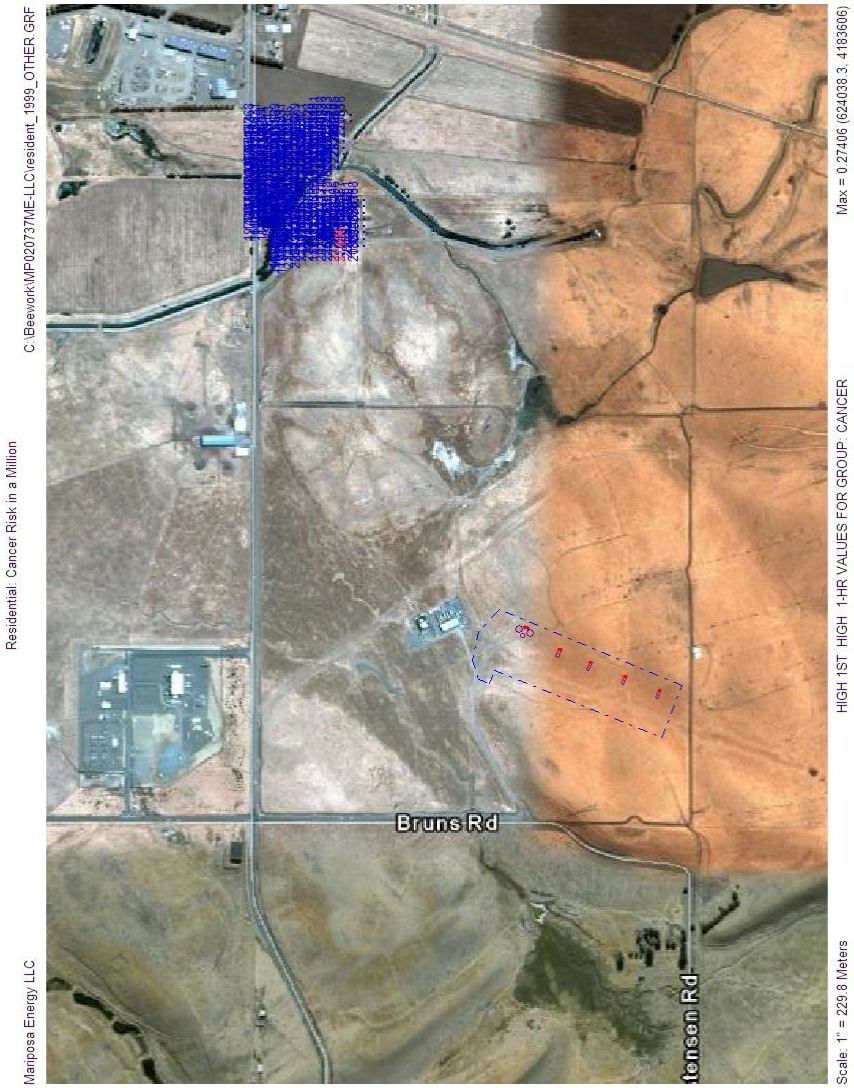
 --------- Summary of Total Messages --------

A Total of           0 Fatal Error Message(s)
A Total of           1 Warning Message(s)
A Total of           0 Informational Message(s)

   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***

   ********   WARNING MESSAGES   ********
RE W282  1845 CHK_EL:RecElev < SrcBase; See non-DFAULT HE>ZI option in  MCB#9

   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```



Mariposa Energy Project
Risk Screening Report

worker_1999_OTHER

*** ISCST3 - VERSION 02035 ***
*** Mariposa Energy LLC ***
*** Model Executed on 08/10/09 at 16:37:31 ***
Input File - C:\Beework\MP020737ME-LLC\worker_1999_OTHER.DTA

Output File - C:\Beework\MP020737ME-LLC\worker_1999_OTHER.LST

Met File - C:\Beework\metdata\screen3.asc

Number of sources - 10
Number of source groups - 3
Number of receptors - 1671

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
S1CAN	0	0.66400E-02	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CAN	0	0.66400E-02	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CAN	0	0.66400E-02	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CAN	0	0.66400E-02	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CAN	0	0.12200E-02	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	
S1CHR	0	0.82800E-03	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CHR	0	0.82800E-03	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CHR	0	0.82800E-03	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CHR	0	0.82800E-03	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CHR	0	0.86800E-06	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
CANCER	S1CAN , S2CAN , S3CAN , S4CAN , S5CAN ,
CHRONIC	S1CHR , S2CHR , S3CHR , S4CHR , S5CHR ,
ICECAN	S5CAN ,

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
CANCER	HIGH 1ST HIGH VALUE IS	1.34263	ON 99010408:	AT (623322.31, 4183379.00, 33.50, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.28731	ON 99010918:	AT (623347.31, 4183391.50, 33.10, 0.00)	DC	NA
CHRONIC	HIGH 1ST HIGH VALUE IS	0.00127	ON 99012523:	AT (624275.75, 4183743.50, 20.00, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.00126	ON 99012317:	AT (624275.75, 4183781.00, 19.00, 0.00)	DC	NA
ICECAN	HIGH 1ST HIGH VALUE IS	1.34263	ON 99010408:	AT (623322.31, 4183379.00, 33.50, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.28676	ON 99010918:	AT (623347.31, 4183391.50, 33.10, 0.00)	DC	NA

```
                                                         resident_1999_OTHER
*** ISCST3 - VERSION 02035 ***
*** Mariposa Energy LLC                                         ***
*** Model Executed on 08/10/09 at 10:25:07 ***
 Input File - C:\Beework\MP020737ME-LLC\resident_1999_OTHER.DTA

Output File - C:\Beework\MP020737ME-LLC\resident_1999_OTHER.LST

   Met File - C:\Beework\metdata\screen3.asc

      Number of sources -        10
Number of source groups -         2
    Number of receptors -      1154
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
S1CAN	0	0.13600E-01	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CAN	0	0.13600E-01	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CAN	0	0.13600E-01	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CAN	0	0.13600E-01	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CAN	0	0.14700E-02	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	
S1CHR	0	0.16300E-02	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2CHR	0	0.16300E-02	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3CHR	0	0.16300E-02	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4CHR	0	0.16300E-02	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	
S5CHR	0	0.88600E-06	623306.6	4183270.8	36.6	3.66	740.93	35.26	0.15	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

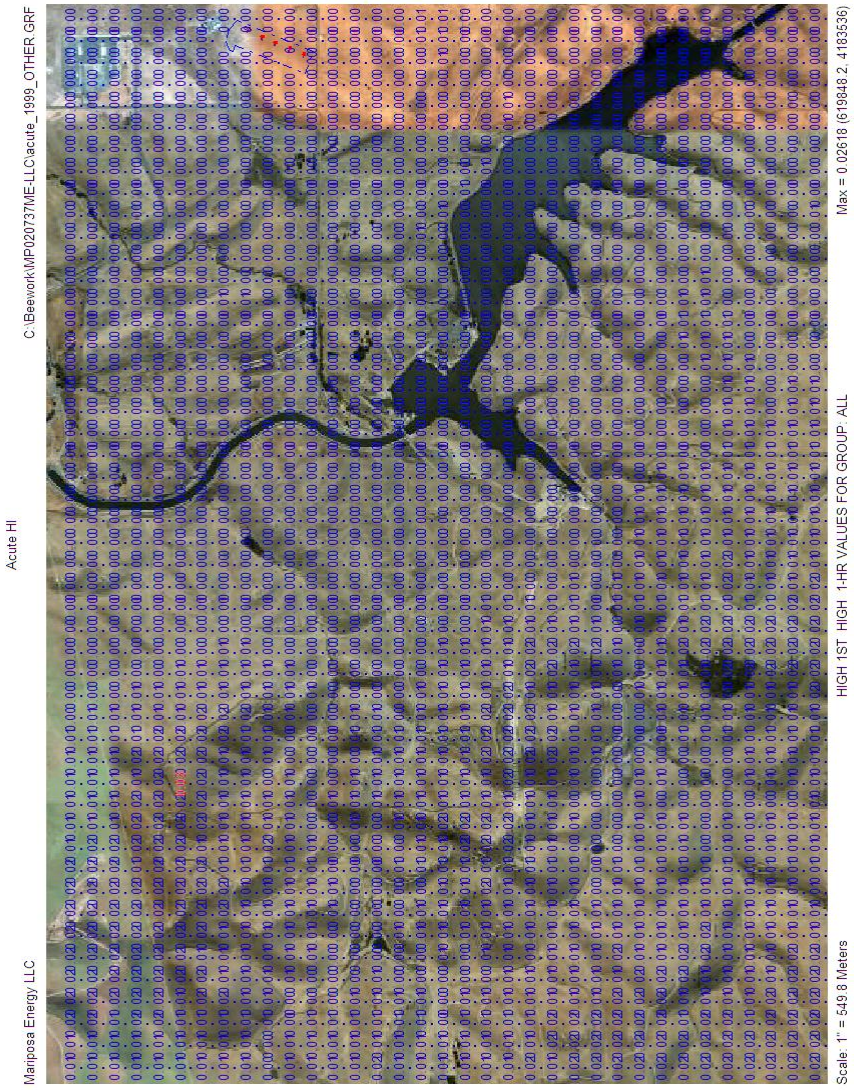
GROUP ID	SOURCE IDs
CANCER	S1CAN , S2CAN , S3CAN , S4CAN , S5CAN ,
CHRONIC	S1CHR , S2CHR , S3CHR , S4CHR , S5CHR ,

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
CANCER	HIGH 1ST HIGH VALUE IS	0.27406	ON 99012924: AT	(624038.25, 4183606.00, 22.90, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.21477	ON 99013001: AT	(624038.25, 4183606.00, 22.90, 0.00)	DC	NA
CHRONIC	HIGH 1ST HIGH VALUE IS	0.01525	ON 99042024: AT	(616424.25, 4180092.50, 254.40, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.01525	ON 99041818: AT	(616424.25, 4180092.50, 254.40, 0.00)	DC	NA

Page 1



Mariposa Energy Project
Risk Screening Report

acute_1999_OTHER

*** ISCST3 - VERSION 02035 ***
*** Mariposa Energy LLC ***
*** Model Executed on 08/10/09 at 15:19:10 ***
Input File - C:\Beework\MP020737ME-LLC\acute_1999_OTHER.DTA

Output File - C:\Beework\MP020737ME-LLC\acute_1999_OTHER.LST

Met File - C:\Beework\metdata\screen3.asc

Number of sources - 4
Number of source groups - 1
Number of receptors - 3571

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
S1	0	0.13100E-02	623264.9	4183205.5	36.9	24.23	726.48	46.37	3.66	YES	
S2	0	0.13100E-02	623239.9	4183147.2	36.9	24.23	726.48	46.37	3.66	YES	
S3	0	0.13100E-02	623213.3	4183081.2	36.9	24.23	726.48	46.37	3.66	YES	
S4	0	0.13100E-02	623186.1	4183015.5	36.9	24.23	726.48	46.37	3.66	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	S1 , S2 , S3 , S4 ,

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.02618	ON 99050206:	AT (619848.19, 4183535.50, 231.60, 0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.02618	ON 99050412:	AT (619848.19, 4183535.50, 231.60, 0.00)	DC	NA

Appendix C

Mariposa Energy Project

Public Comments

Comments Received on Mariposa Energy Project in Alphabetical Order

From: Michael Anburaj <michaelanburaj@yahoo.com>
Sent: Monday, August 30, 2010 12:26 PM
To: Brenda Cabral
Subject: Mariposa Power Plant Public Hearing request

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community since 2004 which is 2.5 miles close to the proposed Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thanking you

Regards,
-Michael.

From: Robert Anderson <randerson110@gmail.com>
Sent: Tuesday, September 07, 2010 11:38 PM
To: Brenda Cabral
Subject: public hearing request and cumulative impacts analysis request for the Mariposa project

Follow Up Flag: Follow up
Flag Status: Flagged

Ms. Cabral,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of the Mountain House community which is directly downwind from the Mariposa power plant site and also the East Altamont Energy site which is permitted for a 1,100 MW facility but not yet operating.

First, I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Secondly, I do not see a cumulative impacts analysis for the permitted but not yet operating East Altamont Energy Center facility. Is there a cumulative impacts analysis, and if so, where can I find it?

Regards,
Robert Anderson

From: Aaron Basilius <aaron_basilius@yahoo.com>
Sent: Sunday, August 29, 2010 9:42 PM
To: Brenda Cabral
Subject: Mariposa Power Plant -- Request for Public Hearing in Mountain House

Ms. Cabral,

I reside at 622 W. Sombra Way in Mountain House, CA, which is immediately east of the proposed site for the Mariposa power
plant. By this e-mail I hereby request a public hearing in Mountain House in connection with the potential issuance of a permit for the
Mariposa facility by the Bay Area Air Quality Management District. Please let me know if I can be of assistance or provide additional
information in furtherance of my request.

Thank you,
Aaron Basilius

P. Aaron Basilius, Esq.
Cell: 650.862.3361
(Admitted in California and Illinois)

From: Melanie Butler <ps2714@yahoo.com>
Sent: Wednesday, September 15, 2010 11:11 AM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Hi Brenda,
Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community which is 2.5 miles close
to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the
BAAQMD Permit.

Sincerely,

Melanie and Scott Butler

STATE OF CALIFORNIA -THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Govel7lor*

CALIFORNIA ENERGY COMMISSION

1516 NINTH
STREET
SACRAMENTO
, CA 95814-5512

September 28, 2010

Ms. Brenda Cabral Supervising Air Quality Engineer Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109

Dear Ms. Cabral:

Mariposa Energy Project (09-AFC-3) PRELIMINARY DETERMINATION OF COMPLIANCE, Application 20737

Energy Commission staff appreciates the opportunity to provide written public comments on the Preliminary Determination of Compliance (PDOC) issued by the District on August 18, 2010 for the Mariposa Energy Project (MEP) in eastern Alameda
County.

Energy Commission staff, pursuant to both the Warren-Alquist Act and the California Environmental Quality Act (CEQA), must determine whether the facility is likely to conform with applicable laws, ordinances, regulations, and standards, and whether mitigation measures can be developed to lessen potential impacts to a level of insignificance. These determinations may be difficult without additional information from the Bay Area Air Quality Management District (BAAQMD or District) in support of the Final Determination of Compliance.

Potential Operation in Combustor Tuning Mode

We have concerns about the PDOC allowing "Gas Turbine Combustor Tuning Mode." The 2009 Application for Certification (AFC) for MEP does not propose any tuning mode operation except during initial commissioning. The PDOC identifies tuning as a mode that may recur after the initial commissioning period, and provides exclusions for hours spent in tuning mode. For a tuning mode after one-time initial commissioning, neither MEP nor the BAAQMD PDOC has indicated the potential emission rates or how often tuning could occur.

It is not clear what level of emissions should be expected or if any emission limits would apply during a tuning mode. Tuning mode air quality impacts were not disclosed in MEP's March 16, 2010 letter to the BAAQMD regarding dispersion modeling for the new short-term federal standard for nitrogen dioxide (N02). Without more information on tuning, Energy Commission staff will be unable to fully analyze project impacts.

At a minimum, we recommend the analysis be modified to show the expected maximum emission rates during tuning and to clarify that the emissions limits in Conditions 19 and

20 would apply to all modes of operation, including tuning. However, BAAQMD may simply want to consider removing the definition given for tuning (PDOC p. 84) and the exclusion in Condition 15a.

Potential Typographical Errors

We recommend the BAAQMD investigate the following discrepancies in reported emission rates:

Condition 18: The maximum hourly emissions of 18.5 pounds per hour (Ib/hr) nitrogen oxides (NOx) are not consistent with those (21.276 Ib/hr) shown on PDOC p. 60.

Condition 20: The limit of 45.6 tons per year (tpy) for NOx does not match the total facility emission (of 45.958 tpy and 45.67 tpy) shown in the discussion of offsets on PDOC p. 67 and Table 35.

Condition 20: The limit of 5.9 tpy for precursor organic compounds (POC) does not match the maximum facility emissions (of 5.7 tpy) shown in PDOC Table 14.

We appreciate the District working with Energy Commission staff on this licensing case. If you have any questions regarding our comments, please contact Gerald Bemis at (916) 654-4960. We look forward to discussing our comments in further detail with you.

MATTHEW S LAYTON
Supervising Mechanical Engineer

cc: Docket (09-AFC-3) Proof of

From: hui chen <hui_chen_chen@yahoo.com>
Sent: Tuesday, August 31, 2010 10:31 AM
To: Brenda Cabral
Subject: oppose mariposa

> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of
>Compliance
>
>http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-
>18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> Thanking you
>
> Regards
>
> Hui Chen

From: Hari Krishna Dara <haridara@gmail.com>
Sent: Wednesday, August 25, 2010 5:27 PM
To: Brenda Cabral
Cc: jbyron@energy.state.ca.us; rweisenm@energy.state.ca.us; docket@energy.state.ca.us; choffman@energy.state.ca.us; publicadviser@energy.state.ca.us; dighe.rajesh@gmail.com
Subject: Mariposa power plant public hearing

Hello Brenda,

I live in Mountain House, CA which is less than 3 miles from the proposed site of Mariposa Power plant and so would like request a public hearing at Mountain House for the BAAQMD permit.

Thank you,
Hari

From: Rajesh Dighe <dighe.rajesh@gmail.com>
Sent: Tuesday, August 24, 2010 10:48 AM
To: Brenda Cabral
Subject: Mariposa Power Plant Project (near Mountain House) - CEC application 09-AFC-03

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

I am also one of the intervener to Maripose application 09-AFC-03 filed at CEC.

Thanking you

Regards

Rajesh Dighe

415 533 4289

From: Rajesh Dighe <dighe.rajesh@gmail.com>
Sent: Friday, September 10, 2010 2:58 PM
To: Brenda Cabral
Subject: Re: Mariposa Power Plant Project (near Mountain House) - CEC application 09-AFC-03

Hi Brenda

Good afternoon.

I was wondering if BAAQMD has made any decision around having a public hearing here in Mountain House for the Mariposa Energy project BAAQMD permit?

I know lot of people here in Mountain House have shown interest for having such a hearing here in Mountain House.

Also I have some questions around the Air pollution dispersion model for this project and how far geographically the effects of the pollutants are estimated by the applicant. Who should I email or talk to inside BAAQMD around this subject ?

Thanking you
Regards

Rajesh Dighe
415 533 4289

On Tue, Aug 24, 2010 at 3:03 PM, Brenda Cabral <BCabral@baaqmd.gov> wrote:
>
> Thank you for your interest in commenting on the Preliminary Determination of Compliance (PDOC) for the Mariposa Energy Project.
>
> In the case that the District decides to hold a public meeting, the District will notify you of the time, date, and place via the email that you have provided.
>
> If you have any other questions or comments, please call me at (415) 749-4686, email me at bcabral@baaqmd.gov, or write to me at the address below.
>
> Sincerely,
>
> Brenda Cabral
> Supervising Air Quality Engineer
> BAAQMD
> 939 Ellis St.
> San Francisco, CA 94109
> Tel: (415) 749-4686
> Fax: (415) 749-5030
> bcabral@baaqmd.gov
>
>
> -----Original Message-----
> From: Rajesh Dighe [mailto:dighe.rajesh@gmail.com]
> Sent: Tuesday, August 24, 2010 10:48 AM
> To: Brenda Cabral
> Subject: Mariposa Power Plant Project (near Mountain House) - CEC
> application 09-AFC-03
>
>
> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of
> Compliance
>
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08
> -18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> I am also one of the intervener to Maripose application 09-AFC-03 filed at CEC.
>
> Thanking you
>

> Regards
>
> Rajesh Dighe
>
> 415 533 4289

>
From: Badri Ghimire <badri_ghimire@yahoo.com>
Sent: Sunday, August 29, 2010 12:18 PM
To: Brenda Cabral
Subject: Mariposa Power Plant

Hi Brenda,
Reference: Mariposa Power Plant- Preliminary Determination of Compliance

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site. I would like to request a public hearing in Mountain House for the BAAQMD Permit. I am concerned about the Air Pollution the plant is going to cause and I completely oppose the Mariposa Power Plant Project Near Mountain House.

Thanking you

Regards

Badri Ghimire

From: Katherine Havener <kchavener@att.net>
Sent: Monday, August 30, 2010 2:00 PM
To: Brenda Cabral
Cc: byron@energy.state.ca.us; rweisenm@energy.state.ca.us; docket@energy.state.ca.us; choffman@energy.state.ca.us; publicadviser@energy.state.ca.us; dighe.rajesh@gmail.com
Subject: Request for Public Hearing in Mountain House for BAAQMD Permit (CEC Mariposa Power Plant Application Docket: 09-AFC-03)

Dear Ms. Cabral and Honorable Energy Commissioners:

I am a Mountain House, California homeowner, and am writing in reference to the proposed Mariposa power plant site. I have great concerns about a power plant being built a mere 2.5 miles from our community, and the toxic and negative effects it will have on my children and our environment.

Accordingly, I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thank you very much,

Katherine Havener

From: mhulsoor@comcast.net
Sent: Sunday, August 29, 2010 11:52 AM
To: Brenda Cabral
Subject: Mariposa Energy Project

Dear Ms. Cabral,

I am writing you to express my strong opposition to the installation of the Mariposa Energy Project. It amazes me that anyone would even consider the idea of a project that would further degrade the air quality of this portion of the San Joaquin Valley. Even now, all it takes is a short period of triple-digit temperatures (which is common in this area in the summertime) and our air quality is officially labelled "Unhealthy". What does one do when the air we breathe is not healthy? We breathe unhealthy air.

I have lived in Stockton for 10 years, and in that time, I have noticed that when federal deadlines for improving the air quality of this area have loomed, those in charge have had a simple solution: they applied to the federal government (the Bush administration) for extensions of time, and these extensions were granted. That had been the extent of their activity on behalf of the air-breathing citizens of this area. Naturally, the air quality has worsened as the population grew, and we now exceed federal pollution standards.

Now, an additional source of air pollution is proposed. Somehow, this is supposed to be "offset" by the plan to decrease emissions from a factory in Santa Clara! Add to this the idea that a payment from the plant's developer, Mariposa Energy LLC, of $644,503 will somehow "make up for the impact" of the additional air pollution, and you have the measure of just how inept and ineffective the SJ Valley Air Pollution Control District really is. It boggles the mind of this air-breathing citizen.

Thank you for the opportunity to express my thoughts on this vital issue.

Sincerely,
Marilyn F. Hulsoor

209-462-8618

>From: Sivanantham kandan <paramsiva@yahoo.com>
Sent: Wednesday, September 01, 2010 6:23 AM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the
BAAQMD Permit.
I am concerned about the Air Pollution the plant is going to cause
and I completely oppose the Mariposa Power Plant Project Near Mountain House.

Thanking you

Regards
Siva

>

From: Atul Khanna <AKKhanna@yahoo.com>
Sent: Wednesday, September 01, 2010 11:09 AM
To: Brenda Cabral
Subject: Reference: Mariposa Power Plant- Preliminary Determination of Compliance

I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
> I am concerned about the Air Pollution the plant is going to cause
> and I completely oppose the Mariposa Power Plant Project Near Mountain House.
>
> Thank you
>
> Regards

Atul Khanna, MD
akkhanna@yahoo.com

From: Amit Kothari <akothari11@yahoo.com>
Sent: Tuesday, August 31, 2010 10:26 PM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance

I am a resident of Mountain House community which is 2.5 miles close
to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the
BAAQMD Permit. I am concerned about the Air Pollution the plant is going to cause
and I completely oppose the Mariposa Power Plant Project Near Mountain House.

Thanking you

Regards

Amit Kothari

From: Amy Krista <amykrista@sbcglobal.net>
Sent: Friday, September 03, 2010 7:45 PM
To: Brenda Cabral
Subject: No to the Mariposa Energy Project Power plant in Alameda County

Dear Ms. Cabral,

Please do not allow the proposed Mariposa Energy power plant to be built in Alameda County. The air in Tracy is already grossly polluted and we do not need more noxious fumes spilled into our city and surrounding areas. I had never suffered asthma or lung problems before moving to Tracy. Now the last year has left me on oxygen and suffering. My move from the Bay Area to the polluted San Joaquin County with horrid air quality has been the cause.

Again I implore you please do not approve the Mariposa Energy Power Plant.

Thank you,

Amy Krista
CMV Service
phone: 209-640-9011
fax: 209-834-1707

Sep. 23-2010

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance

http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thanking you

Regards,

ChingChuan Flora Li
323 Ashlee Ave.

Mountain House, CA 95391

From: hui chen <hui_chen_chen@yahoo.com>
Sent: Tuesday, August 31, 2010 12:46 PM
To: Brenda Cabral
Subject: request public hearing in ountain house for BAAQMD

> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of Compliance
>
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08
> -18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> Thanking you
>
> Regards
>
> Jack Li
>
>

From: hui chen <hui_chen_chen@yahoo.com>
Sent: Tuesday, August 31, 2010 12:48 PM
To: Brenda Cabral
Subject: request for public hearing in mountain house for BAAQMD

:
> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of Compliance
>
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08
> -18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.

>
> Thanking you
>
> Regards
>
>Jerry Li

From: hui chen <hui_chen_chen@yahoo.com>
Sent: Tuesday, August 31, 2010 12:43 PM
To: Brenda Cabral
Subject: public hearing in mouontain house for BAAQMD

> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of Compliance
>
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08
> -18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> Thanking you
>
> Regards
>
>Wentao Li
>
>

From: hui chen <hui_chen_chen@yahoo.com>
Sent: Tuesday, August 31, 2010 12:53 PM
To: Brenda Cabral
Subject: request public hearing in mountain house for BAAQMD

> Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of Compliance
>
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08

> -18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> Thanking you
>
> Regards
>
>Peter Liou
>

From: Rajeev Ponnayyan <ponnayyan@yahoo.com>
Sent: Tuesday, September 07, 2010 9:32 PM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.
I am concerned about the Air Pollution the plant is going to cause and I completely oppose the Mariposa Power Plant Project Near Mountain House.

Thanks and Regards
Rajeev Ponnayyan
(-: Believe yourself and others will believe you :-)

From: Jerry.Salamy@CH2M.com
Sent: Monday, September 27, 2010 4:31 PM
To: Brenda Cabral
Cc: b.buchynsky@dgc-us.com; g.normoyle@dgc-us.com; p.zagrecki@dgc-us.com; Doug.Urry@CH2M.com; Keith.McGregor@CH2M.com; Madhav Patil
Subject: Mariposa Energy's Comments on the Mariposa Energy Project Preliminary Determination of Compliance
Attachments: MEP PDOC Comment Letter - 09-27-10.pdf

Brenda,

Attached are Mariposa Energy LLC's comments on the Mariposa Energy Project Preliminary Determination of Compliance for your consideration.

Thanks,

Jerry Salamy
Principal Project Manager
CH2M HILL/Sacramento
Phone 916-286-0207
Fax 916-614-3407
Cell Phone 916-769-8919

Mariposa Energy, LLC
333 S. Grand Ave., Suite 1570, Los Angeles, CA 90071
Tel: (213) 473-0080 Fax: (213) 620-1170

September 27, 2010

Ms. Brenda Cabral
Supervising Air Quality Engineer
Bay Area Air Quality Management District
939 Ellis Street
San Francisco CA 94109

Subject: Mariposa Energy LLC's Comments on the Mariposa Energy Project Preliminary Determination of Compliance - Application 20737

Ms. Brenda Cabral:

Mariposa Energy LLC (Mariposa Energy) appreciates the Bay Area Air Quality Management District's (District) efforts to prepare the Preliminary Determination of Compliance (PDOC) for the Mariposa Energy Project (MEP) and appreciates the opportunity to provide these clarifying comments. Our comments focus primarily on the permit conditions presented in Section 9 of the PDOC. Additionally we have provided general comments to assist the District in preparing the Final Determination of Compliance. Any proposed changes have been provided in an underline/strike-through format for your convenience.

General Comments

Section 1, Page 1, 3rd Paragraph, 2nd Sentence – Please correct the statement regarding the facility's electrical production "…, providing a power output from a low of 25 MW to a high of a nominal 200 MW (194 MW net at 59 F)." These values are referenced on Page 2-2 in Volume 1 of the AFC. These corrections should also be made in Sections 3.2 of the PDOC.

Section 1, Page 1, 3rd Paragraph, 5th Sentence – The turbines have a net rated generation rate of 48.5 MW and a nominal rated generation rate of 50 MW. Please correct the references to turbine production in Sections 3.6, 9 and 10 of the PDOC to reflect the nominal generation rate of 50 MW.

Section 1, Page 1, 4th Paragraph, 3rd and 4th Sentences – Please make the following edits to the statement regarding ownership: "The Mariposa Energy Project will be constructed, owned, and operated by Mariposa Energy LLC, which is owned by Diamond Generating Corporation, a wholly owned subsidiary of Mitsubishi Corporation." These corrections should also be made in Section 3.2 of the PDOC.

Section 3.1, Page 3, 1st Paragraph, 4th Sentence – The MEP will be dispatched by Pacific Gas and Electric Company, not the California Independent System Operator. Suggest the following text "The Pacific Gas and Electric Company (PG&E), through dispatch orders from the California Independent System Operator (CAISO), would be responsible for dispatching the plant to meet electrical demand."

Section 3.1, Page 4, 1st Paragraph, 2nd Sentence – The MEP natural gas pipeline should be corrected to 580 feet in length.

Section 3.2, Page 4, 4th Paragraph, 4th Sentence – This sentence states that the hydrocarbon emissions rates are higher for the DLE models over all temperature considered, please remove the phrase "hydrocarbon and" from this sentence as it is not consistent with data presented in Table 1. This change should also be reflected in the text on last paragraph of page 33 of the PDOC.

Section 3.4, Page 11, 6th Paragraph, 4th Sentence – Suggest the following clarification edit "Since each turbine will be limited to 4,000 hours of steady-state operation per year, this plant is not considered a base-loaded plant under the definitions of California Code of Regulations, Title 20, sections 2900, et seq."

Section 4.3.3, Page 17, 1st Paragraph, 2nd Sentence – Mariposa Energy will not be conducting more than one phase of commissioning for each of the turbines. Therefore, Mariposa Energy suggests the following change to the text "Because Mariposa Energy will only conduct one phase of commissioning per turbine per day, the following commissioning emission estimates for each turbine are based on the maximum daily emissions from 4 hours of gas turbine testing at 10% load, 8 hours of Pre-Catalyst Initial tuning at 100% load or 8 hours of Post-Catalyst tuning at 100% load."

Section 4.1.3, Page 17, Table 5 – Based on the previous comment, Mariposa Energy suggests the following revisions to the values in Table 5. These revisions should also be incorporated in Tables 32.

TABLE 5. COMMISSIONING PERIOD EMISSION LIMITS FOR ONE GAS TURBINE

Air Pollutant	Proposed Commissioning Period Emissions Limits for One Gas Turbine	
	lb/hr	lb/day
NO2	51	408
CO	45	360
POC		36
PM10		20
SO2		10.8

Section 4.1.3, Page 17, Table 6 – The emission rates (lb/hr) for SOx should be revised to reflect 1.0 grain of sulfur per 100 dry standard cubic feet of natural gas to be consistent with the assumptions used for the steady state operations. This revision should also be incorporated in Tables 7, 33, 34, and Appendix A.

Section 4.1.4, Page 21, Tables 8 and 9 – These tables present the California Air Resources Board (ARB) certified engine emission rates for the fire pump engine but do not reflect the engine manufacturer's lower emission rates (Document 2 of the May 26, 2010 email materials on your

website). Furthermore, the project will be mandated to use ARB compliant ultra low sulfur diesel fuel (i.e., 15 ppm sulfur). Therefore, Mariposa Energy proposes the use of the engine manufacturer's emission factors for 15 ppm sulfur diesel fuel.

Section 5.5, Page 50, 1st Paragraph, 2nd Sentence – The reference to a PM_{10} emission rate on a lb/MMBtu basis appears inappropriate as the District concludes on page 55 that "Since the combustion process by itself creates a very small amount of PM_{10} emissions, …". Mariposa Energy requests all references to the PM_{10} emission rate of 0.0052 lb/MMBtu be removed from this page and pages 52, 53, 55, and Appendix A.

Section 6.5, Page 68, 2nd Paragraph, 1st Sentence - Diamond Generating Corporation is in possession of the valid emission reduction credits to offset the emission increases from the permitted sources for the Mariposa Energy Project. Please update the text and Tables 35 and 36, accordingly.

Appendix B – Although Mariposa Energy believes that the analysis conducted by the District accurately characterizes the potential health risk associated with the MEP, the health risk screening analysis indicates that actual meteorological data was not available. For clarification, the meteorological data used to prepare the air dispersion modeling results in the Application for Certification (AFC) were submitted with a copy of the MEP permit application to the District on June 16, 2009.

Comments on Permit Conditions (Section 9)

Page 84, Definition of Commissioning Activity – This definition includes references to heat recovery steam generators and a steam turbine. Please remove these references as MEP does not include this equipment.

Page 86, Condition 9 – The first sentence of the condition indicates the emission limits are for each turbine but the emission limits presented below the text represent the facility limits. Please revise the commissioning emission rates in this condition to reflect the limits for each turbine in Table 5 (see general comment above).

Page 87, Condition 10 – The first sentence of this condition refers to a "startup" when discussing the timing requirements for source testing after the initiation of the commissioning period. Mariposa Energy requests the replacement of "Within 90 days after startup,…" with "Within 90 days of initiation of the Commissioning Period,…" as the term Commissioning Period is defined in the permit. This suggested change should also be made in Conditions 25, 26, 28, and 30.

Page 87, Condition 15a – This condition specifies an annual operational limit of 4,000 hours for each turbine. The discussion on page 74 states "A permit condition limiting operation of any single turbine for more than 5,200 hours/any consecutive 12 months has been added to part 15b of Condition. Although 15b appears to have been omitted from the PDOC, Mariposa Energy requests the following changes to Condition 15a to incorporate the language on page 74:

15a. The owner operator shall not operate any turbine S-1, S-2, S-3, or S-4 such that the hours of operation for any of the four units exceeds ~~4,225~~5,200 hours per year or a combined 16,000 for all four units (excluding operations necessary for maintenance, tuning, testing, startup and shutdown). (Basis: Offsets, Cumulative Increase)

Page 88, Condition 17(g) – Mariposa Energy suggests revising the sulfur dioxide emission rate from 1.347 pounds per hour to 1.35 pounds per hour consistent with Table 2 of the PDOC.

Page 88, Condition 18 – The maximum hourly carbon monoxide (CO) and precursor organic compound (POC) emission rates and the shutdown CO and POC emission rates do not reflect the lower operational BACT emission levels of 2 parts per million by volume at 15 percent oxygen (ppmvdc) CO and 1 ppmvdc POC required in the PDOC. Mariposa Energy proposes the revised Table 40 below. These changes should also be reflected in Appendix A, Tables 3, 4, 12, 14, 28, 29, 30, 31, and the discussion of 40 CFR 64, Compliance Assurance Monitoring (CAM) starting on page 76.

TABLE 40. STARTUP AND SHUTDOWN

Pollutant	Maximum Emissions Per Startup (lb/startup)	Maximum Emissions During Hour with Startup and/or Shutdown(lb/hr)	Maximum Emissions Per Shutdown (lb/shutdown)
NOx (as NO2)	14.2	18.5	3.2
CO	14.1	17.3~~18.1~~	2.7~~2.9~~
POC (as CH4)	1.1	1.4~~1.7~~	0.12~~0.2~~

Page 90, Condition 19 – Mariposa Energy proposes the following revisions to the daily emission rates in Condition 19 to maintain consistency with the comments on Condition 18 above. These changes should also be reflected in Appendix A and Table 12.

19. The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, and shutdowns to exceed the following limits during any calendar day:
    (a) 1098~~1129.7~~ pounds of NO_x (as NO_2) per day (Basis: Cumulative Increase)
    (b) 934~~1171.5~~ pounds of CO per day (Basis: Cumulative Increase)
    (c) 95.1~~120.82~~ pounds of POC (as CH_4) per day (Basis: Cumulative Increase)
    (d) 240~~241.44~~ pounds of PM_{10} per day (Basis: Cumulative Increase)
    (e) 130~~178.26~~ pounds of SO_2 per day (Basis: Cumulative Increase)

Page 90, Condition 20 – Mariposa Energy proposes the following revisions to the annual emission rates in Condition 20 to maintain consistency with the comments on Condition 18 above. These changes should also be reflected in Appendix A and Table 14.

20. The owner/operator shall not allow cumulative combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-

ups, shutdowns, and malfunctions to exceed the following limits during any consecutive twelve-month period:

(a) 45.6 tons of NO_x (as NO_2) per year (Basis: Offsets)
(b) 27.229.98 tons of CO per year (Basis: Cumulative Increase)
(c) 5.65.90 tons of POC (as CH_4) per year (Basis: Cumulative Increase)
(d) 21.213 tons of PM_{10} per year (Basis: Cumulative Increase)
(e) 2.987 tons of SO_2 per year (Basis: Cumulative Increase)

Page 90, Condition 21 – The formaldehyde emissions presented in Condition 21 do not appear to be based on a California Air Toxic Emission Factors (CATEF) presented on page 117 of the PDOC. Please provide a reference to the formaldehyde emission factor was used.

Page 95, Diesel Fire Pump Condition 1 – Mariposa Energy requested a 4 hour per year operating limit for the fire pump in the AFC based on actual operating experience at other company-owned plants. Please revise the operating hour limit to 4 hours.

Page 96, Diesel Fire Pump Condition 4(e) – The MEP only has one diesel engine so the reference to each engine is inappropriate. Please replace the word "each" with "the" and "engines" with "engine".

If you have any questions regarding our comments, please contact either me or Mr. Jerry Salamy at 916-286-0207.

Sincerely,
Mariposa Energy LLC

Gary B. Normoyle
Director Engineering & Construction

cc: Craig Hoffman/CEC
Doug Urry/CH2M HILL
Jerry Salamy/CH2M HILL
Keith McGregor/CH2M HILL

From: Sarveybob@aol.com
Sent: Monday, September 27, 2010 5:10 PM
To: Brenda Cabral; Jack Broadbent; Alexander Crockett
Cc: Sarveybob@aol.com
Subject: Comments on the PDOC for the Mariposa Energy Center
Attachments: Mariposa PDOC Comments First Draft.doc

Attached are Robert Sarvey's comments on the PDOC for the Mariposa Energy Center.

Robert Sarvey

501 W. Grantline Rd.

Tracy, CA 95376

(209) 835-7162

sarveybob@aol.com

COMMENTS ON THE PDOC MARIPOSA ENERGY CENTER APPLICATION 20737

Dear Ms. Cabral,

Thank you for the opportunity to comment on the Preliminary Determination of Compliance for the Mariposa Energy Center, Application Number 20737. In accordance

with Regulation 2, Rule 2, Section 405 I request a public hearing on the project to receive verbal comment from the public preferably in the Mountain House Community where the impacts of this project will be felt. The most difficult aspect of this permit is its location on the edge of the San Joaquin Valley. The majority of the projects emissions impact the San Joaquin Valley. The San Joaquin Valley is a much dirtier airshed than the BAAQMD partly due to the emissions from BAAQMD sources. Here in the Valley we have much stricter standards and Valley residents are facing millions of dollars in extra vehicle registration fees and other taxes as penalties for not achieving clean air standards.[1]

The PDOC as proposed also fails to comply with BACT requirements for NOx and PM-10. The proposed PDOC also violates other federal, state, and local air quality standards and plans and the non conformance must be addressed in the FDOC.

Power Plant Permitting Process and Opportunities for Public Participation

[1] http://valleyair.org/recent_news/News_Clippings/2010/In%20the%20News%2008-26-10.pdf

Page 3 of the PDOC states that, "The California Energy Commission (CEC) is the primary permitting authority for new power plants in California. The California Legislature has granted the Energy Commission exclusive licensing authority for all thermal power plants in California of 50 megawatts or more. (*See* Warren-Alquist State Energy Resources Conservation and Development Act, Cal. Public Resources Code §§ 25000 *et seq*.) This licensing authority supersedes all other local and state permitting authority."

The BAAMD has the authority over all air quality laws ordinances regulations and standards. The CEC's licensing authority does not supersede the BAAQMD Rules and Regulations. § 1752.3. of the Warren Alquist Act prescribes that the presiding members proposed decision: *"shall include findings and conclusions on conformity with all applicable air quality laws, including required conditions, based upon the determination of compliance submitted by the local air pollution control district. (b) If the determination of compliance concludes that the facility will comply with all applicable air quality requirements, the commission shall include in its certification any and all feasible conditions necessary to ensure compliance. If the determination of compliance concludes that the proposed facility will not comply with all applicable air quality requirements, the commission shall direct its staff to meet and consult with the agency concerned to attempt to correct or eliminate the noncompliance. (c) If the noncompliance cannot be corrected or eliminated, the commission shall determine whether the facility is required for the public convenience and necessity and whether there are not more prudent and feasible means of achieving such public convenience and necessity. In such cases, the commission* ***shall require compliance with all provisions and schedules required by the Clean Air Act and compliance with all applicable air quality requirements which in the judgment of the commission, can be met****."*

Despite this presumption of authority by the CEC the CEC does not have **any** jurisdiction over the ability of the air district to enforce all provisions and schedules required by the Clean Air Act since the Districts authority for licensing and review of power plant operations is delegated to it by the EPA through the Federal NSR and Title V Provisions and the SIP approved by the EPA. If the CEC were to attempt to exercise its authority over any provision or schedule required by the Clean Air Act or the Districts Title V Programs it would violate federal regulations and lead to the removal of the Districts authority for NSR, SIP and Title V programs including sanctions against the district and the State.

California law also supports the authority of the district to prevent construction and operation of a non complying source. Health and Safety Code § 41513 provides that "any violation of any provision of this part, or of any order rule or regulation of the state board or of any district may be enjoined in a civil action." Other provisions for injunctive relief are found at Health and Safety Code §§ 42453, 42454. State law authorizes the air district under Health and Safety §§ 42450, 42451 to issue an order for abatement that enforces the requirements of the permit program. The district may also bring a proceeding before the district's hearing board to revoke a permit that the district has issued if the permit holder is violating any district rule under health and safety code § 42307.

Finally Health and Safety Code Section 42302.1 states, "a person who participated in a permitting action may request the Hearing Board of the district to hold a public hearing to determine whether the permit was properly issued." The FDOC, should one be issued, must clarify this statutory scheme as to do otherwise misleads the public. The CEC's authority over air quality matters is subject to the jurisdiction of the air districts.

Mariposa Energy Project: A Simple-Cycle Power Plant

Page 3 of the PDOC states, **"***The simple-cycle design is especially well suited for power plants operating to meet peak demand because the turbines can be started up very quickly when required by demand. With combined-cycle turbines, startups take longer because the heat recovery boilers and steam turbines take additional time to come up to operating temperature. Simple-cycle turbines are also well suited to peaking applications because such plants, by their nature, are not called upon to run for extended periods of time. This is an important consideration because simple-cycle turbines are inherently less efficient than combined-cycle turbines, which recover some of the heat from the turbine exhaust that would otherwise be wasted. Since such plants are operated for a relatively small number of hours per year, this energy penalty – which translates into additional fuel used to generate the same amount of power – is not as much of a concern."*

While this statement may have been true several years ago the new modern combined cycle projects have start times that are similar to "simple cycle peaker plants." The district is well acquainted with

these new designs as they are permitting several new combined cycle fast start facilities such as the Willow Pass Generating Station with its proposed Flex Plant 10 units.[2]

Based on vendor information, startup (i.e., the period from initial firing to compliance with emission limits) of the 275 MW FP10 units proposed for Willow Pass is expected to occur within 12 minutes.[3] In comparison the units proposed for the Mariposa Project have a 10 minute startup time and will not meet emission limits for as long as 30 minutes.

The advent of these faster starting combined cycle turbines has permitting implications. Because "simple-cycle turbines are inherently less efficient than combined-cycle turbines," they emit much higher GHG emissions per megawatt and also have much higher criteria air pollutant emissions per megawatt and consume much more natural gas per megawatt. It is no longer necessary to sacrifice efficiency for shorter start up times. The FDOC needs to address these factors in the permitting analysis.

Project Location

The project is located on the border of the BAAQMD and the San Joaquin Valley Air Pollution Control District. The projects emissions flow directly into the San Joaquin Valley which is a dirtier air shed that has more stringent standards than the BAAQMD. According to page 24 of the PDOC the project will emit directly into the San Joaquin Valley the following amounts of criteria pollutants:

[2] http://www.energy.ca.gov/sitingcases/willowpass/documents/intervenors/2008-08-21_LETTER_FROM_BAAQMD_REAGARDING_PRELIMINARY_REVIEW_OF_DETERMINATION_OF_COMPLIANCE_TN-47183.PDF

[3] http://www.energy.ca.gov/sitingcases/willowpass/documents/applicant/afc/Volume_01/7.1%20Air%20Quality.pdf page 7.1-9 Willow Pass AFC http://www.energy.siemens.com/co/pool/hq/energy-topics/pdfs/en/combined-cycle-power-plants/PowerGen2007PaperFinal_.pdf Page 15

TABLE 14. MAXIMUM ANNUAL STEADY STATE CRITERIA AIR POLLUTANT EMISSIONS FOR THE FACILITY INCLUDING STARTUP AND SHUTDOWN					
	NO_2 (ton/yr)	**CO (ton/yr)**	**POC (ton/yr)**	**PM_{10} (ton/yr)**	**SO_2[e] (ton/yr)**
One Gas Turbine	8.8	4.28	1.22	5	0.68
Four Gas Turbines	35.2	17.12	4.88	20	2.72
Diesel Engine Fire Pump[f]	0.3	0.1	0.02	0.02	0.0
Startup	8.5	8.5	0.66	0.75[a]	0.102[c]
Shutdown	1.92	1.74	0.12	0.375[b]	0.051[d]
Total subject to District Regulations	46.0	27.5	5.7	21.1	2.9

The projects offsets consist of one ERC for 52.52 tons of NOx from Santa Clara issued in 1993. In the Tesla Proceeding the CEC determined that 70 % of the emissions from sources in Antioch and Pittsburg impact the San Joaquin Valley and 22% of emissions from sources on the other side of the Altamont Pass including Santa Clara impact the San Joaquin Valley. [4] The CEC in cooperation with CARB concluded that a reduction of emissions east of the Altamont Pass including Santa Clara would provide a 22% reduction in the San Joaquin Valley. The value of the 52.52 tpy emission reduction credit from Santa Clara by that formula would be 11.55 tpy of NOx reductions in the San Joaquin Valley. This leaves a potential 34.4 tpy of NOx, 27.5 tpy of CO, 5.7 tpy of POC, 21.1 tpy of PM-10, and 2.9 tpy of Sox, and 28.4 tpy of ammonia emissions unmitigated in the San Joaquin Valley since the Mariposa Project emits directly into the Valley.

If the project were in the San Joaquin Valley rather than just emitting into it, emission offsets would also be required for PM-10 pursuant to Rule 2201 Section 4.5.3.[5]

In addition to these more stringent offset requirements the SJVUAPCD also has more stringent requirements for offsets based on the location of the offsets in relation to the source. Rule 4.8.3 provides that the standard distance offset ratio for ERC's located more than 15 miles form the source would be 1.5 to 1.[6]

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[4] Commission Decision Tesla Project Page 158 http://www.energy.ca.gov/sitingcases/tesla/documents/2004-06-22_FINAL.PDF

[5] http://valleyair.org/rules/currntrules/Rule2201_June_10_2010.pdf Table 4-1

[6] http://valleyair.org/rules/currntrules/Rule2201_June_10_2010.pdf Table 4-2

The proposed mitigation in the form 52.52 tons of NOx ERC's from Santa Clara issued in 1993 simply does not mitigate the projects impacts in San Joaquin Valley which creates a public nuisance to a considerable number of residents in the San Joaquin Valley in violation of Regulation 1, Section 301 Public Nuisance and the California Health and Safety Code.

This project in combination with several other projects that are being permitted or are already approved are further degrading air quality in the San Joaquin Valley. The BAAQMD has recently approved or is considering approval of the following emission sources.

Total Maximum Annual Emissions

	NO2	VOC	PM 2.5	CO	SO2
Marsh Landing	**72.0**	**14.2**	**31.6**	**138.9**	**4.96**
Oakley	**98.8**	**30.0**	**76.3**	**98.8**	**12.6**
Willow Pass	**77.1**	**28.5**	**39.4**	**142.78**	**10.5**
Total	**247.9**	**83.6**	**147.3**	**380.48**	**28.06**
70% Impact	**173.5**	**58.5**	**103.1**	**266.33**	**19.64**
Mariposa 100%	**48.6**	**11.1**	**25.8**	**69.5**	**3.2**
Total Impact SJV	**222.1**	**69.6**	**128.9**	**335.83**	**22.84**

As the district knows from its increment consumption analysis for the Tesla Project, the project area has a maximum modeled 24-hour average PM10 increment consumption of 140 µg/m3, and annual average PM10 increment consumption of 30 µg/m3.[7]

The ARB originally established transport mitigation requirements in 1990 which are contained in Title 17, California Code of Regulations, Sections 70600 and 70601. These regulations were amended in 1993

[7] PSD Increment Consumption Status Report April 16, 2008 Page 4

and more recently in 2003. The Board adopted amendments on May 22, 2003, which were approved by the Office of Administrative Law on December 4, 2003, and became effective on January 3, 2004. These amendments added two new requirements for upwind districts. These amendments require upwind districts to (1) consult with their downwind neighbors and adopt "all feasible measures" for ozone precursors[8] and (2) amend their "no net increase" thresholds for permitting so that they are equivalent to those of their downwind neighbors no later than December 31, 2004.[9] The amendments clarify that upwind districts are required to comply with the mitigation requirements, even if they attain the State ozone standard in their own district, unless the mitigation measures are not needed in the downwind district.

The impact of these newly permitted facilities are in addition to the East Altamont Energy Center and the dormant Tesla Power Project now owned by PG&E.

Best Available Control Technology (BACT)

District Regulation 2-2-301 requires that the Mariposa Energy Project use the Best Available Control Technology to control NOx, CO, POC, PM10, and SOx emissions from sources that will have the potential to emit over 10 pounds per highest day of each of those pollutants. Pursuant to Regulation 2-2-206, BACT is defined as the more stringent of:

(a) “The most effective control device or technique which has been successfully utilized for the type of equipment comprising such a source; or

(b) The most stringent emission limitation achieved by an emission control device or technique

for the type of equipment comprising such a source: or

(c) Any emission control device or technique determined to be technologically feasible and cost effective by the APCO, or

[8] First, is a new requirement that upwind districts adopt all feasible measures for the ozone-forming pollutants, independent of the upwind district’s attainment status.

[9] A new requirement intended to equalize permitting programs in upwind and downwind areas. The ARB staff is proposed and the ARB passed into law that “no net increase" thresholds for new source review permitting programs in upwind areas must be as stringent as those in downwind districts.

(d) The most effective emission control limitation for the type of equipment comprising such a source which the EPA states, prior to or during the public comment period, is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitations are not achievable. Under no circumstances shall the emission control required be less stringent than the emission control required by any applicable provision of federal, state or District laws, rules or regulations."

The districts policy actually applies a different standard in its analysis in the PDOC. The District in its BACT analysis determines its emission limits for BACT by examining the most recent worst performing facility and then uses the worst performing facilities highest emissions as BACT, to as the district states, "provide a reasonable margin of compliance." Put another way instead of looking to the best performing facilities with the lowest emission rate as District rule 2-2-06 (b) requires the district utilizes the worst performing facilities emissions performance as BACT. The district's burden in determining BACT for this project is to assume that the Mariposa Project would in fact perform comparably to the best performing similar facility, unless there was something to suggest otherwise.

The purpose of the BACT analysis as described by District regulation 2-2-05 (b) is to examine like kind facilities and their emissions and determine which facility is performing the best and examine the work practices and technological improvements employed at the facility and make a BACT determination based on the best performing facility.

The district approach is just the opposite. The district looks at the highest emission rate from all the facilities in the analysis and chooses the highest emission rate as BACT without ever analyzing how and if the facility undergoing review can achieve the lowest achievable emission rate demonstrated by the other facilities. Each facility has different equipment and work practices and this is precisely the analysis the district must perform to determine BACT. Instead of choosing BACT based on the best performing facility analyzing the equipment and combustion practices this PDOC chooses BACT based on the emissions performance of the worst facilities worst performance. A perfect example is the districts approach to setting its BACT limit for PM-10.

Best Available Control Technology for Particulate Matter (PM) for Turbines

The district in its analysis of BACT for PM-10 looked at emissions performance data for seven recently permitted simple cycle facilities that utilize the LM6000 turbine.[10] Of those seven facilities analyzed only one facility has measured PM-10 emissions over 2.3 pounds per hour which was the Goosehaven Facility. The next highest PM-10 emission rate was from the Los Esteros Facility which had a 2.266 lb/hr emission rate back in 2005. Five of the seven facilities have never exceeded 2.2 pounds per hour for PM-10. The best performing facility the Gilroy energy Center has never exceeded 2 lbs/hr. The district instead of looking to the BEST performing facilities and their work practices and technology the district looked to the worst performing facility the Goosehaven facility to establish a BACT limit of 2.5 pound per hour. An emission limit between 2.0 and 2.3 pounds per hour should be considered BACT since these limits have been achieved in practice at similar facilities.

The district in table 25 of the PDOC also completes a review of "**RECENT BACT PM-10 PERMIT LIMITS FOR LARGE SIMPLE-CYCLE GAS TURBINES"** The districts review omits three recent PM-10 BACT determinations for large simple cycle turbines that have been recently licensed by the CEC and support a lower PM-10 BACT emission rate for the Mariposa Project. The first determination is for the Hanford facility. The projects simple cycle PM-10 emission rate is 2.2 pounds per hour utilizing the LM 6000 turbine.[11] The Henrietta Project has just been licensed with a 2.2 lb/hr PM-10 emission limit for simple cycle operation also with the LM-6000.[12] The Marsh Landing simple cycle facility was just permitted with PM-10 rate of 0.0041 lb/MMBTU or just 1.97 lbs/hr. The three most recent BACT determinations for simple cycle turbines have been 2 pounds per hour or less for PM-10 and support a lower BACT limit for PM-10.

The district clearly needs to establish a lower emission limit for PM-10 to comply with the BACT requirements of District Regulation 2-2-301. The Majority of the LM-6000 turbines examined by the district have achieved in practice a PM-10 emission rate of 2.2 lbs/hr or less which would qualify as BACT under District Regulation 2-2-301(b). "The most stringent emission limitation achieved by an emission control device or technique."

[10] PDOC page 54
[11] http://www.energy.ca.gov/2009publications/CEC-700-2009-012/CEC-700-2009-012-REV1.PDF Page 4.1-12
[12] http://www.energy.ca.gov/2009publications/CEC-700-2009-013/CEC-700-2009-013-REV1.PDF Page 4.1-21

5.2 **Best Available Control Technology for Oxides of Nitrogen (NOx) for Turbines**

The District examined technologies that may be effective to control NOx emissions in two general areas: combustion controls that will minimize the amount of NOx created during combustion; and post-combustion controls that can remove NOx from the exhaust stream after combustion has occurred.

Combustion Controls

Water-injection and dry low-NOx combustion are both technically feasible simple-cycle combustion turbine control technologies that are available to control NOx emissions from the Mariposa project. Water injection is capable of reducing NOx concentrations to 25 ppm while DLE systems are capable of reducing NOx concentrations to 15 ppm. Clearly the DLE system is BACT for combustion controls since it is capable of a 40% reduction in NOx concentrations over water injection prior to application of the SCR post combustion control technology.

The Draft PDOC states on page 24, "Overall, all three of the LM6000-based gas turbines could meet the project contractual requirements of dispatchable and high degree of unit turndown. However, the LM6000PD and LM6000PF gas turbines do not meet the project objective of being capable of generating 184 MW (net electrical output of all 4 combustion turbines including parasitic loads) during peak July conditions. Furthermore, the limited hours of operating data available for the LM6000PF turbine increases the risk the turbine may not be available "on demand" which would lead to the imposition of penalties per the PPA. Therefore, the LM6000PC turbine was selected by Mariposa Energy for MEP in order to meet the electrical output and reliability requirements outlined in the Mariposa Energy PPA with PG&E.[13]

[13] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/044-email%205-26-2010%20CH2M%20to%20Patil%20Attached%20Doc_27.ashx Draft PDOC Page 24

Overall, all three of the LM6000-based gas turbines would have met the project contractual requirements of dispatchable and high degree of unit turndown. However, the LM6000PD

First the applicants PPA with PG&E is irrelevant to the BACT analysis. Secondly the PPA is confidential and is not available to BAAQMD or members of the public who wish to comment on this permit application. BAAQMD and the public have no way to confirm the applicant's claims about the PPA's, "required output" and "the imposition of any penalties that the applicant would incur." In any case those issues are of no concern in determining which combustion control technology is BACT for this project.

In the BACT analysis the district has ignored several other distinct advantages of the LM-6000 PF turbine with DLE and other new DLE systems introduced by GE which should be examined in the BACT analysis for combustion controls.

According to the GE website the LM 6000 PF turbine features high efficiency, superior fuel gas consumption and fuel flexibility, coupled with lower emissions and water usage in both the 50 Hz and 60 Hz segments. The LM 6000-PF has a superior heat rate and "avoids 15,000 metric tons of CO_2 emissions over the course of a 3,000-hour peaking season while producing the same electricity output, which is equivalent to the annual CO_2 emissions of more than 2,800 cars on U.S. roads. The LM 6000 PF can reduce natural gas consumption by more than 264,000 MMBtu, equivalent to the amount of natural gas consumed annually by more than 3,700 U.S. households, which can yield an annual fuel cost savings of $1.58 million at $6 per MMBtu. The LM 6000 PF can reduce NO_x emissions by 815,000 pounds, which is equivalent to the annual NO_x emissions of 21,000 cars on U.S. roads, when operating at 15 ppm NO_x instead of 25 ppm NO_x like the LM6000 PC. Most importantly the LM 6000 PF can, by incorporating DLE technology, can eliminate the use of water while lowering emissions of NO_x to 15 ppm and CO to 25 ppm, unlike the typical 60 Hz, simple-cycle turbine in this range, which uses water as a diluent. This can avoid annual water consumption of 9.9 million gallons, and can yield $100,000 per year in operational savings and eliminate the need to purchase a water treatment system[14]

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and LM6000PF gas turbines do not meet the project objective of being capable of generating 184 MWs during peak July conditions. MARIPOSA ENERGY PROJECT BEST AVAILABLE CONTROL TECHNOLOGY REVIEW Page 4

[14] http://www.gepower.com/prod_serv/product
http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/downloads/GEH12985H.pdf

The combustion controls BACT analysis must identify the superior performance of the LM 6000 PF and other new variants recently developed by GE such as the GE LM6000 Nexgen. The BACT analysis must consider the collateral impacts of the additional water use and the superior NOx reduction capability of the dry low NOx products. The impacts of the treatment, transportation, and consumption of the additional water must be considered and quantified in the BACT analysis. The lower heat rate offered by other variations of the GE LM-6000 turbine must be investigated as the lower heat rate will save millions of dollars of ratepayer money and reduce greenhouse gas and criteria pollutant emissions per megawatt.

The analysis in the PDOC reports slightly higher CO emissions from the DLE systems. "The District prioritizes NOx reductions over carbon monoxide, however, because the Bay Area is not in compliance with applicable ozone standards, but does comply with carbon monoxide standards. The District therefore requires applicants to minimize NOx emissions to the greatest extent feasible, and then to optimize CO and POC emissions for that level of NOx control. This is a trade-off that must be kept in mind when selecting appropriate emissions control technologies for these pollutants."[15]

Post-Combustion Controls

The applicant has proposed and the district has selected the use of Selective Catalytic Reduction (SCR) as BACT for the simple-cycle gas turbines. SCR is capable of over 90 percent NOx removal. Therefore, when combined with water or steam injection, NOx emissions levels of 2.5 ppmvd at 15 percent O2 when firing natural gas are achievable. This technology is considered feasible for MEP.[16]

In doing so the District recognizes that the use of SCR results in collateral impacts because of ammonia slip from the SCR system. The district lists three impacts from the use of ammonia in SCR systems: secondary particulate formation, health risks, and ammonia transportation and storage dangers.

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[15] PDOC PAGE 32

[16] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/020-email%205-26-2010%20CH2M%20to%20Patil%20Attached%20Doc_3.ashx Page 8

The district ignores one very large collateral impact from ammonia slip which is nitrogen deposition. Nitrogen deposition is the input of nitrogen oxide (NOx) and ammonia (NH3) derived pollutants from the atmosphere to the biosphere. Mechanisms by which nitrogen deposition can lead to impacts on sensitive species include direct toxicity, changes in species composition among native plants, and enhancement of invasive species. The project area is home to many endangered species including the red legged frog and tiger salamander among others.[17] The ammonia emissions from power plants are a larger contributor to nitrogen deposition than the projects NOx emissions. The PDOC fails to analyze or discuss this collateral impact entirely.

With respect to secondary particulate formation the district relies on a modeling report to conclude that there would be no significant impact from secondary particulate formation from the projects ammonia emissions [18] The BAAQMD Draft PM 2.5 study concluded, "Reducing ammonia emissions by 20 percent (around 15 tons/day) was the most effective of the precursor emissions reductions. Secondary PM2.5 levels were typically reduced 0-4 percent, depending on location, with an average around 2 percent. Reducing NOx and VOC emissions by 20 percent (around 250 tons/day total) was relatively ineffective. Reducing sulfur containing PM precursor emissions by 20 percent (around 16 tons/day) typically had a small impact on Bay Area PM2.5."[19] The districts own modeling report has preliminarily concluded that reductions in other PM-2.5 precursors would be ineffective in reducing particulate matter formation and that only reductions in ammonia emissions have the potential to reduce particulate formation.[20] Despite the contrary conclusions of the study the district concludes that ammonia slip would not form significant secondary particulate in the BAAQMD.

The study and the districts conclusions regarding secondary particulate formation in the BAAQMD are not particularly relevant since the emissions from the Mariposa Project will primarily impact the San Joaquin Valley not the BAAQMD. The districts efforts in this regard are misplaced and an additional analysis of secondary particulate matter formation in the San Joaquin Valley is necessary to conclude that the impacts would not be significant enough to eliminate SCR as a post combustion control.

BAAQMD did not perform an air quality analysis for Mariposa Project to examine the potential formation of secondary PM from the 28 tons per year of ammonia slip, but instead relied on a drat

[17] http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-04-20_DOD_Letter_to_US_Fish+Wildlife_Services_Re_Consultation._TN-56408.pdf
[18] Draft PM2.5 Modeling Report
[19] Draft PM2.5 Modeling Report Page
[20]

study that concludes that ammonia slip is the only precursor emission that contributes to significant secondary formation of particulate. The limited nature of the draft analysis did not confirm a direct "causation" for nitrate PM formation and did not include an investigation on trends for ammonia and fine particulate formation in the ambient air in the project area or San Joaquin Valley. The potential increase in secondary PM from the ammonia slip could violate Health and Safety Code section 42301(a) by preventing or interfering with the attainment of the State's PM10 and/or PM2.5 standards for both the BAAQMD and the SJVAPCD.

A second potential environmental impact that may result from the use of SCR involves ammonia transportation and storage. The proposed facility will utilize aqueous ammonia for SCR ammonia injection, which will be transported to the facility and stored onsite in tanks. The transportation and storage of ammonia presents a risk of an ammonia release in the event of a major accident.

The project, if allowed to use SCR, can eliminate the impact from transportation accidents by utilizing a technology called NOxOUT ULTRA®. There are dozens of systems in service, one in Southern California at UC Irvine. Most of the UC campuses have decided not to risk bringing ammonia tankers through campus or having to offload or store ammonia. NOxOUT ULTRA is being specified for new units at UCSD, University of Texas and Harvard. The NOxOUT ULTRA system requires a tank for the urea. Urea has no vapor pressure and no smell. If it spills, the evaporated water will leave behind a pile of crystal salts. There are no hazards to labeling or training required for the operator and absolutely no risk to adjacent facilities or neighbors. In an emergency, there is very little, if any, ammonia exposure. Other than the seven seconds between the chamber and the AIG, the only exposure is the harmless urea.

Determination of BACT emissions limit for NOx for Simple-Cycle Gas Turbines

The District is also proposing to establish a BACT emissions limit in the permit of 2.5 ppm (averaged over one hour) utilizing SCR and pre combustion water control for NOx. SCR is capable of over 90 percent NOx removal. Therefore, when combined with water or steam injection which reduces NOx

concentrations to 25 ppm before the SCR , NOx emissions levels of 2.5 ppmvd at 15 percent O2 when firing natural gas are achievable. This technology is considered feasible for MEP.[21]

By employing the DLE system which reduces NOx concentrations to 15 ppm the project should be able to achieve a 1.5- 2.3 ppm NOx emissions limit with the 90% control efficiency of the SCR.[22] The BACT emission limit should be set at 1.5- 2.3 PPM utilizing DLE and SCR. That would represent the proper BACT limit for this project.

The proposed Riverside Energy Center has just been permitted with a 2.3 PPMVD for NOx emissions.[23] The project consists of two General Electric LM6000 PC SPRINT NxGen combustion turbine generators with Emission Control Modules (ECMs) equipped with inlet air chiller coils, exhaust ducting, flue gas treatment system, emission monitoring system, a common chiller package with cooling tower, and gas compressor equipment.

Start up and shut down NOx emissions

The DLE system lowers NOx concentrations to 15 ppm. The lower concentration will lower NOx emissions form start up and shut down and the district should analyze what concentrations are achievable and require that limit as BACT.

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[21] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/020-email%205-26-2010%20CH2M%20to%20Patil%20Attached%20Doc_3.ashx Page 8

[22] DLE reduces NOx concentration to 15PPM x .9 SCR 90% control efficicny = 13.5 PPM in NOx reduction for a 1.5 PPM Nox emission limit.

[23] **Final** Initial Study of the Riverside Energy Resource Center Power Plant Project (08-SPPE-1), Staff Report, publication # CEC-700-2008-010-SF. Posted: December 22, 2008. (PDF file, 302 pages, **7.2 megabytes**) Page 3-34

Compliance with the new Federal NO2 standard

The PDOC does not contain a demonstration of compliance with the new Federal NO_2 standard. Maximum NO_2 hourly emissions for the project are 21.276 pounds per hour.[24]

The applicant has provided an analysis which purportedly demonstrates compliance with the new NO_2 standard when the maximum hourly NO_2 emissions are 18.5 lbs per hour for each turbine.[25] This analysis conflicts with the analysis presented in the AFC which predicts a maximum modeled concentration of 130 µg/m_3 from normal operation combined with a background of 105 µg/m_3 which does not meet the new Federal NO_2 standard.

The PDOC also does not contain a demonstration of compliance with the NO_2 standard during commissioning when emissions from a single turbine could be as high as 51 Pounds per Hour.[26] The AFC filed by the applicant predicts a one hour NO_2 turbine commissioning impact of 216 µg/m_3 and a background of 105 µg/m_3 which shatters the new Federal 1 hour NO2 standard.[27] The district should consider a limitation on the number of turbines that can be operated simultaneously in commissioning mode.

Health Risk Assessment

[24] PDOC Page 60 in order to protect hourly air quality standards, the District is also proposing an additional hourly limit for operating hours during which startups occur. This limit is based on a reasonable need for the facility to start up twice in a one-hour period, which is not unforeseeable given the facility's operation as a peaker facility. The District is basing this proposed limit on two startups with a typical emissions profile as summarized in Table 27, using the following scenario: The first startup will last 10 minutes, followed by an 8 minute shutdown. The turbine would start up again for a total of 24 minutes, and the remainder of the hour (18 minutes) will be at steady-state BACT levels. These maximum hourly emissions with two startups are summarized in Table 29 below.

[25] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/049-email%207-8-2010%20CH2M%20to%20Cabral.ashx

[26] PDOC Page 64

[27] AFC Page 5.1-28 Table 5.1-25

Please describe how the health impacts from particulate matter emissions are calculated and represented in the health risk assessment. Since the district is not in compliance with the Federal 1 hour PM 2.5 standards this discussion should be included in the health risk assessment.

From: Linda <birdielovr@sbcglobal.net>
Sent: Sunday, September 26, 2010 1:41 AM
To: Brenda Cabral
Subject: Proposed Mariposa Energy Project
Attachments: Mariposa Energy Plant NO.docx

Dear Ms Cabral:

I fear my comments on the proposed Mariposa Energy Project are more of a collection of research that I have pulled from the internet over the past several days than a cohesive argument.

However, I want to express that I am firmly AGAINST the building of this power plant in Eastern Alameda County.

My rambling thoughts, along with references when I remembered to quote sources, are attached as a Word file.

I am extremely concerned that Alameda County would consider building this plant so close to a new town community (Mountain House), a town that was barely in existence 5 years ago, and a town that is in another county's jurisdiction (San Joaquin). I feel, as do my neighbors, that Alameda County is building it here, away from their own cities, because Alameda County residents are saying NIMBY ("not in my back yard"). The benefits of the plant will not be felt or utilized here, but rather benefit those back over the Altamont Hills to the west. If you were to come spend a day in Mountain House, you would notice the wind patterns (thus the windmills on the Altamont) and know that anything blown into the sky 2 miles away will end up here, no matter what other research says. Spend any windy night here, where the wind comes up about 5pm and doesn't stop till 9am the next morning, if then, and you will understand. The wind has blown out our gas bbq more times than I can count, and that is taking precautionary measures so it doesn't blow out. Garbage on the night before pickup days ends up all over the neighborhood as the wind first blows the lid open on the toter and then blows any loose garbage or recycling out of the toter and down the street. And once the toters are emptied, it is like a dancing parade of garbage cans up and down the streets, as they move on their own from home to home, until the owners come home scratching their heads and trying to figure out which can on the block (or around the corner) is really theirs! The wind just swirls here, and comes from different directions, sometimes on a daily basis. Statistics will not show you this. Someone living here in this town can show you this.

As I have spent way too much time researching this, and getting upset over this matter this week, I leave you to decipher my rambling thoughts.

Sincerely,

Linda Selvidge

My children attend a school in the town of Mountain House within three miles of the plant. There is another school exactly two miles from the plant and one more planned that is just over two miles from the plant. I am concerned about my children's health and breathing polluted air (air which is already noncompliant with state and Federal standards). How are you going to inform us of a leak, my children's school, everyone within the vicinity of any health hazards from problems at plant? How do you mitigate health issues for asthmatics and others with breathing problems? I already have a daughter with exercise-induced asthma, who running a mile out of doors for physical education. She is the 2nd slowest in her class due to the excrutiating pain she has experienced during these outdoor runs. I know these chemicals/fumes cause cancer and I don't want my children, ages 6 and 12, exposed to such risks. There are already a large number of those with cancers who have been exposed to these chemicals in one way or another. Our children are more important than any need for a power plant. I would hope you would try to avoid an unnecessary plant. We moved from Alameda County in the East Bay to a family community three years ago that had no power plant other than green energy windmills! Everything else being equal, we would not have purchased our home in Mountain House in February of 2007 if we knew that a peaker plant would be built shortly thereafter.

I believe the land for the Mariposa Energy Plant was purchased BEFORE the town of Mountain House came into existence, although the land may have changed hands from the original owner in the interim. The fact that a town does exist here now, as opposed to rural farmland, in such close proximity to the proposed power plant, should make a significant impact on the decision of the BAAQMD.

'Our job is to protect the American public where they live, work and play – and that certainly includes protecting schoolchildren where they learn.' US EPA Administrator Lisa P. Jackson

The emissions may occur locally, but their impacts are global and their impacts are cumulative.

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As part of a new air toxics monitoring initiative, EPA, state and local air pollution control agencies will monitor the outdoor air around schools for pollutants known as toxic air pollutants, or air toxics. The Clean Air Act includes a list of 187 of these pollutants. Air toxics are of potential concern because exposure to high levels of these pollutants over many decades could result in long-term health effects. http://www.epa.gov/air/sat/

The air children breathe impacts their health. People exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of health problems including damage to the immune system, and neurological, developmental, respiratory and other health problems including cancer. In some cases, children may be more vulnerable to these health effects than adults because:

- their bodies are still developing; and
- their behavior can expose them to more chemicals.

Particulate matter," also known as particle pollution or PM, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. EPA groups particle pollution into two categories:

- "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter.

- "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. http://www.epa.gov/air/particles/

Health studies have shown a significant association between exposure to fine particles and premature mortality. Other important effects include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. http://www.epa.gov/ttn/naaqs/pm/pm25_index.html

The EPA promulgated a revised NAAQS for $PM_{2.5}$ on October 17, 2006 (71 Federal Register 61144). The effective date for the new standard was December 18, 2006. The EPA retained the annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and revised the 24-hour $PM_{2.5}$ standard, changing it from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard was revised based on a number of health studies showing that short-term exposure to $PM_{2.5}$ is associated with increased mortality and a range of serious health effects, including aggravation of lung disease, asthma attacks, and heart problems. This memo describes the designation process for the revised 24-hour $PM_{2.5}$ standard. It outlines the next step in developing and implementing emission control programs for attaining and maintaining this standard – a standard that addresses an important public health problem.

http://www.epa.gov/ttn/naaqs/pm/docs/june_2007_guidance_for_area_designations_for_2006_24-hour_pm2.5.pdf

Air in the San Joaquin Valley has been defined as "Severe", placing an air pollutting business in an already polluted county an area appears irresponsible. On 1-7-02 Channel 13 News (10pm) report San Joaquin coutny/valley as the worst pollution in the nation, specifically worse that Los Angeles, Calif.

Although the proposed Mariposa Plant is on Alameda County land, it is officially in the air space of the San Joaquin Valley Air Pollution Control District.

The Valley's meteorology,
topography and economy differ significantly from those in other jurisdictions. Although it is valuable to review and evaluate efforts of other agencies, we must consistently look for solutions that fully consider the Valley's unique needs. http://www.valleyair.org/General_info/pubdocs/AnnualReport2009-web.pdf

The District has the responsibility for issuing or denying permits, registrations and plan approvals for more than 30,000 non-mobile sources of air contaminants, and for tracking and assessing impacts of these facilities' annual pollutant emissions.

Authorities to Construct and Permits to Operate: Air permits are required in the San Joaquin Valley for very small stationary sources of air pollution. In fact, most facilities that emit air contaminants, from gas stations and body shops to refineries and power plants, must obtain permits from the District before constructing or operating. The permitting process involves two steps.

The first step requires the applicant to apply for and receive an Authority to Construct (ATC) permit. This process can be fairly lengthy, but it provides an important opportunity for the project proponent, the District, and interested public to provide input and to assess a project's compliance with federal, state, and local air requirements prior to beginning construction. The requirements that must be met to obtain a permit in the Valley are among the strictest in the nation, requiring the best available air pollution control equipment and mitigation of emissions increases.

The second step, issuing the Permit to Operate, occurs after the applicant has properly installed the equipment allowed by the Authority to Construct. . http://www.valleyair.org/General_info/pubdocs/AnnualReport2009-web.pdf

It is my opinion that, by building in Alameda County, the Mariposa Energy Project is trying to side-step the requirements of the San Joaquin Valley Air Quality District.

The Mountain House Master Plan follows state guidelines for Specific Plans, though it is called the Master Plan to distinguish it from Specific Plans for smaller areas within the Mountain House community. The Mountain House community is a “new town” development, currently with 2 neighborhoods fully constructed and two currently under construction, which is located approximately less than two miles east of the project site. The Mountain House Master Plan implements the amendment to the San Joaquin County 2010 General Plan which added the Mountain House community to the General Plan. The Master Plan presents plans for land use, infrastructure, environmental resources, public service provisions, objectives, policies, and implementation measures (San Joaquin County, 2000).

We recognize the difficult situation of overlapping jurisdictions faced by San Joaquin County, the Town of Mountain House and the City of Tracy as opposed to the County of Alameda who owns the land. While Alameda County’s zoning currently covers the Mariposa site, the Sphere of Influence and corresponding Specific Plans are relevant to those in San Joaquin county as the plant is closer to their businesses and residences than to those in Alameda County.

Noise abatement is another concern. In noisy urban/industrial environments, other utility staff has traditionally utilized the lowest hourly L_{90} as a basis of measurement. In a quiet rural environment, such as that surrounding this proposed peaker plant, this is not necessarily the most reliable measure. Under certain circumstances, it is common in the noise industry to average noise descriptors over some relevant period of time. For example, where traffic noise defines the background noise regime, it is common to average the L_{90} measurements over some period of time, typically the nighttime hours.[2] Given the extremely quiet background noise levels encountered at the site, it is appropriate to average the L_{90} levels over a representative period such as eight hours. Where the nighttime hours present the quietest time of day, then averaging over the nighttime would be appropriate. I expect our community represents an extremely quiet noise regime.

At the Tracy Peaker Plant, which is fairly local, the largest short-term (1-hour) ground level concentration of PM is located 2.2 miles to the southwest. Assuming geographic similarities, that would put the Mariposa Energy Plant 1 hour ground level concentration right at the level of three of our local Lammersville Unified School District schools.

San Joaquin County requires: New sources of air pollution, and modifications of existing sources must comply with District Rule 2201 (New and Modified Source Review), also known as New Source Review or NSR. This rule is a component of Regulation II of our District Rulebook. The NSR rule provides the mechanism for the District to issue permits to new and expanding businesses without interfering with efforts to meet the state and federal health-based air quality standards. NSR contains a couple of main requirements – BACT and Offsets.

Best Available Control Technology

The best available air pollution control technology (BACT) is required for new and modifying units that result in certain calculated emissions increases. BACT is, at a minimum, the most stringent control technique or limitation that has been achieved in practice for the same class of source. However, if there is a more effective control that is both technologically feasible and cost effective, or that is contained in an approved implementation plan, the more effective control technique must be used.

Emissions Offsets

Emissions Offsets are emissions reductions that are provided to "offset" emissions increases from new or modifying sources of air pollution. District Rule 2201 requires offsets for increases in allowed emissions above certain trigger levels.

Offsets, when required, may be provided by onsite or offsite emissions reductions and must be real, surplus, quantifiable, enforceable, and permanent. Offsets may be obtained by purchasing emissions reduction credits from another party. Procedures for banking and use of emission reduction credits are described in Rule 2301 (Emission Reduction Credit Banking) in Regulation II of the District Rulebook. A list of names and addresses of owners of emission reduction credit certificates is available from any of the regional District offices for a nominal fee, or may be downloaded free from our ERC Certificate Holders page.

Other Requirements

For larger projects, or for those with a potentially significant health impact, New Source Review also requires public noticing of preliminary decisions and/or analysis of alternate sites or processes.

As the proposed plant resides on Alameda County land, but the air will be blown into San Joaquin County, the peaker plant needs to acknowledge and abide by the governing air pollution guidelines of San Joaquin County.

Overall, we need more GREEN means of power, like solar and wind, and not another natural gas-fired power plant! I would whole heartedly support a solar or wind farm!

Linda Selvidge **birdielovr@sbcglobal.net**
481 W Callado Ct, Mountain House CA 95391
(209) 835-5664 or (510) 851-5043

From: Gyanesh Sharma <gyanesh@yahoo.com>
Sent: Monday, August 30, 2010 11:38 AM
To: Brenda Cabral
Subject: Public hearing for Mariposa power plant

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thanking you

Regards
Gyanesh

"There will be plenty of time to sleep when you are dead, life is for living. So wake up and perform"

From: Jass Singh <jass.singh2000@gmail.com>
Sent: Sunday, September 26, 2010 12:30 PM
To: Brenda Cabral
Subject: Request for Public hearing in Mountain House

Hi Brenda,
>
> Reference: Mariposa Power Plant- Preliminary Determination of Compliance
> http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf
>
> I am a resident of Mountain House community which is 2.5 miles close
> to the propose Mariposa power plant site.
>
> I would like to request a public hearing in Mountain House for the
> BAAQMD Permit.
>
> Thanking you
>
> Regards,

Jass

From: Andy So <andy.kso@gmail.com>
Sent: Monday, August 30, 2010 10:39 AM
To: Brenda Cabral
Subject: Mariposa Power Plant

To:

Hi Brenda,
Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf
I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Regards
Andy K. So

From: Tina Thao <mstinathao@yahoo.com>
Sent: Sunday, August 29, 2010 9:23 PM
To: Brenda Cabral
Cc: jbyron@energy.state.ca.us; rweisenm@energy.state.ca.us; docket@energy.state.ca.us; choffman@energy.state.ca.us; publicadviser@energy.state.ca.us
Subject: Reference: Mariposa Power Plant- Preliminary Determination of Compliance
Attachments: 2010-08-18_Preliminary_Determination_of_Compliance.pdf

Brenda Cabral, Supervising Air Quality Engineer,
Bay Area Air Quality Management District,
939 Ellis Street,
San Francisco, CA 94109

Hi Brenda,

Reference: Mariposa Power Plant- Preliminary Determination of Compliance
http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-08-18_Preliminary_Determination_of_Compliance.pdf

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa

power plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thanking you.

Regards,
Ms. Tina Thao

From: Alleane Tiffany-Mouloua <atmouloua@yahoo.com>
Sent: Wednesday, September 01, 2010 10:57 AM
To: Brenda Cabral
Subject: Mariposa Power Plant - Preliminary Determination of Compliance

I am a resident of the community of Mountain House which is 2.5 miles away from the proposed Mariposa powerplant site. I am requesting a public hearing in Mountain House for the BAAQMD permit.
Regards,

Alleane Tiffany-Mouloua
329 W. Saint Francis Ave
Mountain House, CA 95391

From: Smita Unnikrishnan <smita.dighe@gmail.com>
Sent: Wednesday, August 25, 2010 5:44 PM
To: Brenda Cabral
Cc: jbyron@energy.state.ca.us; rweisenm@energy.state.ca.us; docket@energy.state.ca.us; choffman@energy.state.ca.us; publicadviser@energy.state.ca.us
Subject: Request for Public hearing in Mountain House for BAAQMD permit (Mariposa Power Plant Project - 09-AFC-03)

Hi,

I am a resident of Mountain House community. I have 2 kids aged 8 & 4. I have serious concerns with regards to the proximity of this plant to where we live and our schools.
Our community was one of the biggest foreclosure epicenter in the country. You have no idea how much stress this has caused to all of us in this community (stress is an under statement). This is our home and I would not want anything that will harm the health and well being of this community. I am speaking in simple terms and I know this power plant will seriously affect the growth of this community.

I hereby request for a public hearing in Mountain House for a BAAQMD permit.

Sincerely,
Smitha Unnikrishnan

From: Reno Ursal <reno.ursal@gmail.com>
Sent: Wednesday, September 08, 2010 9:20 AM
To: Brenda Cabral
Subject: Mariposa Power Plant - Preliminary Determination of Compliance

Hi Brenda,

I am a resident of Mountain House community which is 2.5 miles close to the propose Mariposa power plant site. I am concerned about the environmental impact this proposed plan will have on the children and families of Mountain House.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thank you...

Reards,

RENO URSAL

From: Ryan Uyehara <r.uyehara@sbcglobal.net>
Sent: Tuesday, August 24, 2010 10:32 AM
To: Brenda Cabral
Subject: Public Hearing for BAAQMD Permit

Importance: High

Hi Brenda,

I would like to request a public hearing in Mountain House for the BAAQMD Permit. I would like to add that I'm against any project that would add to not decrease pollution levels as well as expose our families to power plant pollutants!

Thanks and best regards,

Ryan Uyehara
209-830-7995

From: David Walker <dave@glaeken.com>
Sent: Wednesday, September 08, 2010 7:21 PM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Dear Ms. Cabral,

I am a resident of Mountain House community which is located within 2.5 miles of the proposed Mariposa Power Plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit.

Thank you,
David Walker
150 N Hancock Park Drive
Mountain House, CA 95391

From: Rowena Walker <rowena@glaeken.com>
Sent: Wednesday, September 08, 2010 7:25 PM
To: Brenda Cabral
Subject: Mariposa Power Plant- Preliminary Determination of Compliance

Dear Ms. Cabral,

I am a resident of the Mountain House community, located within 2.5 miles of the proposed Mariposa Power Plant site.

I would like to request a public hearing in Mountain House for the BAAQMD Permit. Thank you.

Rowena Walker
150 N. Hancock Park Drive
Mountain House, CA 95391

Appendix D

Response to Comments

Responses to Public Comments

Final Determination of Compliance

Mariposa Energy Project

Bay Area Air Quality Management District
Application Number 20737

November 2010

The Bay Area Air Quality Management District (District) has received comments regarding the District's Preliminary Determination of Compliance (PDOC) for the proposed Mariposa Energy Project. The District has considered all comments that were submitted, and has made a final determination that the proposed project meets all applicable District Regulations as well as applicable state and federal regulatory requirements. The public comments received on the Preliminary Determination of Compliance are addressed below.

Table of Contents

I. PROCEDURES

Comment I.1. – Request for a Public Meeting
Commenters requested a public meeting as allowed by BAAQMD Regulation 2-2-405.

Response:
BAAQMD Regulation 2-2-405 allows a public meeting, but does not require one. The District has elected not to hold a public meeting. Many commenters who requested a public hearing also provided written comment on the substance of the project. Some comments pertained to the analysis in the PDOC, but it did not appear from these that live testimony was necessary to articulate the concerns raised. Other comments dealt with aspects of the project such as project siting that, while not unimportant, are beyond the scope of the District's review. Such comments are best addressed to the California Energy Commission (CEC). The CEC, which is the lead agency on this project, will hold public meetings that allow the public to provide comments on the proposed project. Members of the public who would like to provide additional input on the Mariposa Energy Project are encouraged to participate in the CEC licensing proceedings. To be advised of these meetings, commenters may sign up for notices of the CEC's meetings by signing up on the CEC's listserve for Mariposa at:

http://www.energy.ca.gov/listservers/index.html

Air District staff will attend and participate in the evidentiary hearing for the proposed project and concerned members of the public may comment at that time or during other CEC meetings for the project.

Comment I.2. – Public Comment Period
A commenter stated that the District did not provide the commenter a 30-day comment period. Commenter states this is a violation of state and federal law. Commenter states that the District is required to reopen the comment period and requests an additional 30-day comment period.

Response:
The District met or exceeded all of the public notice requirements of Regulation 2, Rule 2, Section 405 and Regulation 2, Rule 3, Section 404, including publishing in at least one newspaper of general circulation within the District a notice stating the preliminary decision, the location of the information available, and inviting written public comment for a 30-day period following the date of publication, sending written notice to ARB, the regional office of the EPA and adjacent districts, and providing notice to any person who requested such specific notification in writing.

Comment I.3. – Compliance with Regulations
A commenter stated that the FDOC as presented does not comply with all federal and state regulations.

Response:

The commenter failed to provide specific areas of the PDOC that do not comply with federal and state regulations. The District is not aware of any deficiencies that would make the PDOC not comply with federal and state regulations.

Comment I.4. – Warren-Alquist Act

The Air District received comments stating that the licensing authority of the CEC is subject to, and does not supersede, the District's authority over air quality regulations and the Clean Air Act. The comment claims that the District's authority for licensing and review of power plant operations is delegated by the United States Environmental Protection Agency (EPA) through the federal NSR and Title V provisions and in the EPA-approved State Implementation Plan (SIP), and that if CEC attempted to exercise authority over any provision required by the Clean Air Act or the District's Title V program, it would violate federal regulations, and lead to the loss of the District's authority for federal programs and to sanctions against the State and District. The comment further claims that various sections of the Health and Safety Code regarding injunctive relief and permit appeals show that California law supports the authority of air districts to prevent the construction and operation of a noncomplying source.

Response:

Through the Warren-Alquist Act, the California Legislature established a "one-stop" licensing process for power plant permitting. Commenters are incorrect in stating that the Warren-Alquist Act provides an exception for air quality permitting issues. The Warren-Alquist Act explicitly provides that the CEC license "shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency . . ." (Cal. Pub. Util. Code § 25500) so as to streamline the licensing process by consolidating all applicable regulatory determinations in a single proceeding. It also grants the California Supreme Court sole jurisdiction to hear any legal challenge to the CEC's licensing decision (Cal. Pub. Util. Code § 25531 subd. (c)), thereby streamlining judicial review of power plant licenses. There is no indication that the Warren-Alquist Act was intended to work any differently with respect to air quality permitting.

Commenters also confuse the interplay between state and federal law with respect to air quality regulation. Both the states and the federal government each have their own separate authority for regulating air pollution. The federal Clean Air Act establishes a system of "cooperative federalism" whereby the states either create their own regulatory programs using their own authority and have the programs approved by EPA as satisfying the requirements of the Clean Air Act, or leave it to EPA to implement EPA's own federal regulations if the state does not create its own program. There is no inconsistency between the Warren-Alquist Act and approvability of California's air quality regulatory programs by EPA. EPA has approved of California's permitting programs, including provisions in air district rules, such as District Regulation 2, Rule 3, that defer to the "one-stop" licensing process established in the Warren-Alquist Act. EPA has never objected to the CEC's primacy in power plant permitting as being inconsistent in with the federal Clean Air Act. Through the CEC licensing process under the Warren-Alquist Act, all clean air regulations are applied to power plants.

II. PROJECT DESCRIPTION

Comment II.1 – Clarifications to Gas Turbine Output

- Section 1, Page 1, 3rd Paragraph, 2nd Sentence – Please correct the statement regarding the facility's electrical production "…, providing a power output from a low of 25 MW to a high of a nominal 200 MW (194 MW net at 59 F)." These values are referenced on Page 2-2 in Volume 1 of the Application for Certification. These corrections should also be made in Sections 3.2 of the PDOC.
- Section 1, Page 1, 3rd Paragraph, 5th Sentence – The turbines have a net rated generation rate of 48.5 MW and a nominal rated generation rate of 50 MW. Please correct the references to turbine production in Sections 3.6, 9 and 10 of the PDOC to reflect the nominal generation rate of 50 MW.

Response:
The District has no objection and will make the changes.

Comment II.2 – Corrections to Project Ownership
Section 1, Page 1, 4th Paragraph, 3rd and 4th Sentences – Please make the following edits to the statement regarding ownership: "The Mariposa Energy Project will be constructed, owned, and operated by Mariposa Energy LLC, which is owned by Diamond Generating Corporation, a wholly owned subsidiary of Mitsubishi Corporation." These corrections should also be made in Section 3.2 of the PDOC.

Response:
The correction has been made.

Comment II.3 – Correction to Dispatch Responsibility
Section 3.1, Page 3, 1st Paragraph, 4th Sentence – The MEP will be dispatched by Pacific Gas and Electric Company, not the California Independent System Operator. Suggest the following text "The Pacific Gas and Electric Company (PG&E), through dispatch orders from the California Independent System Operator (CAISO), would be responsible for dispatching the plant to meet electrical demand."

Response:
The correction has been made.

Comment II.4 – Correction to Pipeline Length
Section 3.1, Page 4, 1st Paragraph, 2nd Sentence – The MEP natural gas pipeline should be corrected to 580 feet in length.

Response:
The District will make the correction.

III. AIR QUALITY STANDARDS

Comment III.1 – Cumulative Impacts Analysis

A commenter stated that the project in combination with other projects that are being permitted or are already approved are further degrading air quality of San Joaquin Valley. Commenter summarizes proposed emissions from Marsh Landing Generating Station, Oakley Generating Station, Willow Pass Generating Station and estimates the emissions impact on the San Joaquin Valley. Commenters stated that the impact of these newly permitted facilities is in addition to the East Altamont Energy Center and the dormant Tesla Power Project. Comments stated that the District is aware that PM10 impacts in the project area are already of concern based on an increment consumption analysis prepared during the Tesla Project permitting.

Response:

The California Energy Commission (CEC) will prepare a cumulative impact analysis for the project area in the staff assessment for the project. The applicant has submitted such an analysis to the CEC that contains the East Altamont Facility. The CEC will evaluate the analysis in its Staff Assessment. A summary of the applicant's results is contained in the Applicant's Data Response Sets 1A and 1B, starting on page 11. The applicant has submitted the modeling files to CEC and has offered to provide them to others upon request. The document can be found at:
http://www.energy.ca.gov/sitingcases/mariposa/documents/applicant/2009-12-01_Data_Response_Sets_1A_and_1B.pdf.
All of the projects identified by the commenter will be required to meet all BAAQMD Regulatory requirements including offsets and BACT and CEC conditions of certification (if each project receives a license). The CEC will ensure that air quality impacts from each project are mitigated. The District would encourage the commenter to participate in the CEC licensing process for the proposed projects.

Regarding the increment consumption analysis prepared by the District for the Tesla Power Project, the Mariposa Energy project does not trigger PSD permit requirements and no increment consumption analysis is required. The CEC will perform modeling for PM10 and PM2.5 including a cumulative impact analysis. The commenter should comment on the particulate modeling contained in the CEC Staff Assessment for the project.

Commenters should also be aware that the Tesla Power Project no longer has a license from the CEC and will not be built. Also, the District Authority to Construct for the East Altamont Facility has been cancelled by the applicant.

Comment II.2 – Federal NO2 Standard

Commenters stated that the PDOC does not contain a demonstration of compliance with the new federal NO2 standard. A commenter states that the modeled emissions from the project during commissioning will violate the federal NO2 standard based on information contained in the Application for Certification submitted by the applicant to the California Energy Commission. A commenter stated that the PDOC must analyze this impact as

District regulations do not allow projects to exceed ambient air quality standards. Commenter stated the District should consider limiting the number of turbines operating simultaneously during commissioning mode. A commenter stated that the NO2 modeling was done assuming that the maximum hourly emissions of the turbines were 18.5 lb NOx/hr, but the limit is 21.276 lb NOx/hr.

Response:
EPA established a new hourly NO2 standard in 40 CFR 50.11, National primary and secondary ambient air quality standards for oxides of nitrogen (with nitrogen dioxide as the indicator), on February 2, 2010, effective April 12, 2010.

The details of the new standard are in Sections 50.11(b) and 50.11(f), which state:
(b) The level of the national primary 1-hour ambient air quality standard for oxides of nitrogen is 100 ppb, 1-hour average concentration, measured in the ambient air as nitrogen dioxide.

(f) The 1-hour primary standard is met when the three-year average of the annual 98th percentile of the daily maximum 1-hour average concentration is less than or equal to 100 ppb, as determined in accordance with Appendix S of this part for the 1-hour standard.

100 ppb is approximately 188 µg/m3 (micrograms per cubic meter).[1] The 98th percentile for each year is the 175th highest hour for that year.

In the applicant's original Application for Certification (AFC), submitted to the CEC on June 18, 2009, the applicant proposed a maximum of 235 µg/m3 after commissioning (page 5.1-27 of AFC). This was based on maximum emissions of 22.46 lb NOx/hr/turbine and 0.37 lb NOx/hr for the fire pump engine (page 5.1-26 of AFC).

The applicant re-submitted modeling results to the CEC using a maximum emission rate of 18.5 lb NOx/hr/turbine on March 22, 2010. The results were 147.4 µg/m3 for the 4 turbines combined and 186.7 µg/m3 for the 4 turbines and fire pump combined.

The District acknowledges that on page 60 in Section 5.7, the PDOC states that the maximum NOx emission rate per turbine would be 21.276 lb/hr. This emission rate is in error. The correct emission rate of 18.5 lb NOx/hr is found in Table 3 on page 17, on page 90 in permit condition 18, on page 107 in the Startup/Shutdown Emission Estimates per CTG Table, and on page 111.

The CEC published its Staff Assessment for the project on November 8, 2010, which discusses the NO2 modeling that was submitted by the applicant. CEC describes the modeling and presents a summary of the results starting on page 4.1-22 of the Staff Assessment.

The CEC will ensure that air quality impacts from each project are fully mitigated. The District notes that commissioning emission impacts mentioned by the commenter are

[1] *See* http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

temporary emission rates that will not result in ongoing exceedances of the federal NO2 standard. In addition, the applicant has decided to commission just one turbine at a time, so the maximum hourly NOx emissions during commissioning will not exceed 51 lb/hr and commissioning will not cause exceedances of the standard.

The District would encourage the commenter to participate in the CEC licensing process for the proposed project.

Comment III.3 – PM2.5

Commenter stated that the FDOC needs to address the applicability of new rules related to PM2.5 and compliance of the project with the new PM2.5 rules. Commenter stated that NOx, SOx, and ammonia are precursors for PM2.5 which must be analyzed in the FDOC. Another commenter noted that District is not in compliance with the federal 24 hour PM2.5 standard.

Response:

The Bay Area was recently designated as non-attainment for the national 24-hour fine particulate matter (PM2.5) standard and will be required to prepare a PM2.5 State Implementation Plan (SIP) pursuant to federal air quality guidelines by December 2012.

As stated in footnote 19 of the PDOC:

> "This facility is subject to BACT requirements for PM10 only. PM2.5, a subset of PM10, is regulated under federal requirements in 40 C.F.R. Section 52.21 (PSD) and 40 C.F.R. Part 51, Appendix S (Non-Attainment NSR). The facility is not subject to PSD or PM2.5 Non-Attainment NSR permit requirements under Section 52.21 or Appendix S because the facility is not a "major facility" for the purposes of these regulations. The District is therefore not conducting a PSD permitting analysis or an Appendix S permitting analysis for PM2.5. The District notes, however, that for combustion turbines essentially all of the PM emissions are less than one micron in diameter, so it is both PM10 and PM2.5. (*See* AP-42, Table 1.4-2, footnote c, 7/98 (available at http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf). Moreover, the same emissions control technologies that will be effective for PM10 for this facility will also be similarly effective for PM2.5. The District's BACT analysis and emissions limit for PM10 will also therefore effectively be a BACT limit on PM2.5 emissions as well, even though the facility is not subject to the federal PM2.5 BACT requirements."

The PDOC contains the required PM10 BACT analysis, NOx BACT analysis, POC BACT analysis, and SO2 BACT analysis. The permit conditions in the PDOC also limit the ammonia slip from the project to 5 ppm. The ammonia slip limit and the application of BACT for PM10, NOx, POC, and SOx will limit the directly emitted PM10 emissions as well as the PM10 precursor emissions.

The project is not subject to federal PSD permit requirements or Appendix S requirements that would require a separate PM2.5 analysis for the project. EPA has addressed the issue of regulating ammonia as a precursor to particulate matter in its recent $PM_{2.5}$ rulemaking. EPA established there that it presumes that ammonia is not a secondary particulate matter precursor and should not be included in the PSD BACT

analysis.[2,3] EPA did provide that states will have the discretion to include ammonia in particulate matter regulations when adopting their own SIP-approved NSR permitting programs, provided they can make a technical showing that ammonia will be a significant contributor to $PM_{2.5}$ concentrations. But until that time, while states are applying EPA's rules for particulate matter, EPA has established that ammonia is not to be included in the permitting analysis as a precursor to secondary PM formation. This is clear from the definition of "Regulated NSR Pollutant" in 40 C.F.R. Section 52.21(b)(50)(i), which includes several precursors but specifically excludes ammonia.[4]

The BAAQMD 2010 Clean Air Plan does consider ammonia to be a PM2.5 precursor for the Bay Area and in the future the District may implement specific regulatory requirements to minimize ammonia emissions from specific sources. However, in the San Joaquin Valley, the situation is different. The San Joaquin Valley Air Pollution Control District (SJVAPCD) 2008 PM2.5 plan[5] states that "Ammonia is abundant throughout the valley and does not act as a limiting precursor." The SJVAPCD 2008 PM2.5 plan also references a study called *Processes Influencing Secondary Aerosol Formation in the San Joaquin Valley During Winter* that states "The results indicate ammonium nitrate formation is ultimately controlled by NOx emission rates and the other species, including VOCs and background ozone, which control the rate of NOx oxidation in winter, rather than by ammonia emissions."[6] Based on the analysis in SJVAPCD 2008 PM2.5 plan, additional ammonia emissions should not significantly influence PM2.5 levels in the San Joaquin Valley.

Nonetheless, the PDOC prepared for the Mariposa Energy Project meets all current regulatory requirements to minimize direct PM emissions as well as precursor emissions.

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[2] See 40 CFR 52.21(b)(50)(i).

[3] See 73 Federal Register 28321-28350 (May 16, 2008).

[4] EPA has established the same situation for Non-Attainment NSR permitting under Appendix S during the transition period while states are developing their own $PM_{2.5}$ Non-Attainment NSR permitting programs. "Regulated NSR Pollutant" is similarly defined under Appendix S to exclude ammonia as a particulate matter precursor. (*See* 40 C.F.R. Part 51, Appendix S, § II.A.31.iii.) These regulatory definitions in EPA's rules governing its NSR program provide that ammonia should be excluded as a particulate matter precursor when these rules are used. These definitions contrast with the provisions for states to adopt their own SIP-approved Non-Attainment NSR and PSD programs, which allow for states to regulate ammonia as a particulate matter precursor if they can show that ammonia will significantly contribute to secondary PM formation. (*See* 40 C.F.R. 51.165(a)(1)(xxxvii)(C)(4) (providing that ammonia can be included as a precursor to secondary formation when states adopt their own permitting programs, upon sufficient showing).) These issues are discussed in more detail in EPA's preamble to its final rule, where EPA explains its intention that ammonia is not to be included in PSD permitting but can be included in states' own non-attainment NSR permit programs where appropriate. (*See* 73 Fed. Reg. 28321, 28330 & 28347-49 (May 16, 2008).)

[5] See San Joaquin Valley Air Pollution Control District *2008 PM2.5 Plan*, April 30, 2008, at p. 3-8 (available at: http://www.valleyair.org/air_quality_plans/AQ_Final_Adopted_PM25_2008.htm)

[6] See San Joaquin Valley Air Pollution Control District *2008 PM2.5 Plan*, April 30, 2008, at p. 3-10 and footnote 5 of *2008 PM2.5 Plan*.

IV. HEALTH

Comment IV.1 – Public Health

Commenters raised concerns about public health impacts, including cancer and non-cancer impacts, from the proposed Mariposa Energy Project, specifically about impacts to the community of Mountain House and to sensitive populations such as children and people with asthma. A commenter stated that local wind patterns would blow plant emissions to Mountain House. Commenters questioned how the impacts will be mitigated.

Response:

The District enforces stringent requirements regarding the assessment of health impacts associated with emissions from a proposed project. Such impacts can be assessed by completing a site-specific Air Quality Impact Analysis (AQIA) for criteria air pollutants (pollutants for which air quality standards have been established by State or federal agencies), and/or a Health Risk Screening Analysis (HRSA) for toxic air contaminants (pollutants for which air quality standards have generally not been established). These analyses involve estimating ambient air concentrations of emitted pollutants using air quality dispersion models. The requirements to complete these analyses are established in permit rules, and are based on whether the maximum allowable emissions from a project exceed specified thresholds.

For criteria air pollutants, the maximum allowable emissions of the Mariposa Energy Project are not high enough to trigger an air quality impact analysis under applicable permit rules. The District has therefore identified this as not being an applicable regulatory requirement. In their role in preparing environmental documentation as required by the California Environmental Quality Act (CEQA) for the Mariposa Energy Project, the California Energy Commission staff will complete an AQIA for criteria air pollutants. The CEC is required to provide feasible mitigation for any identified significant health impacts.

For toxic air contaminants, the maximum allowable emissions of the Mariposa Energy Project are above the District's stringent thresholds for an HRSA. As explained in the PDOC and in greater detail below, the District assessed the health risk associated with TAC emissions from the project and determined that the relevant emissions are within acceptable levels established in the District's Regulation 2, Rule 5, and it is unlikely that TAC emissions related to the proposed project would harm the surrounding populations.

The District prepared an HRSA for the proposed operation of a natural gas-fired power plant at Mariposa Energy Center. HRSAs are used to determine if emissions of particular chemicals pose a significant risk to human health, and determine realistic goals for reducing exposure to toxics so that there is no significant health threat to the public. The HRSA estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from routine operation of the proposed natural gas-fired power plant at this facility. The potential health impacts are expressed in terms of the incremental increase risk of contracting cancer by individuals who live or work near the proposed power plant.

The potential for non-cancer health effects is evaluated by comparing the long-term (chronic or annual), and short-term (acute or hourly) exposure levels to corresponding Reference Exposure Levels (RELs). A REL is a concentration level at or below which no adverse health effects are anticipated. RELs are designed to protect sensitive individuals within the population. Comparisons to RELs are made by determining the hazard quotient (HQ), which is the ratio of the estimated exposure level to the REL. The hazard index (HI) is the sum of the individual HQs for TACs identified as affecting the same target organ or organ systems (including asthma).

In accordance with Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA) Health Risk Assessment Guidelines, ambient air concentrations of TACs were predicted using the ISCST3 air dispersion computer model. The model uses information about the facility and the emission rates of TACs to estimate air concentrations expected at various locations around the site. The estimated air concentrations of TACs are used to calculate the possible cancer and non-cancer health risk that might be expected to arise from this exposure.

The potential cancer risk was calculated using standard risk assessment methodology. For nearby residents, they include the assumptions that potential exposures occur 24 hours per day, 350 days per year for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 days per year, for 40 years. Cancer risk adjustment factors (CRAFs) are used to calculate all cancer risk estimates. The CRAFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. The cancer risk is based on the "best estimates" of plausible cancer potencies as determined by Cal/EPA's OEHHA. The actual cancer risk, which cannot be determined, may approach zero. This type of analysis is considered to be health-protective.

Based on results of the HRSA, the proposed operation of the natural gas-fired power plant would result in an increased maximum cancer risk of 0.3 chances in a million, and a non-cancer chronic hazard index of 0.015 for the nearest residences, located 0.5 mile from the facility. For the nearest offsite workers, located less than 0.1 mile from the facility, the maximum increased cancer risk is 1.3 chances in a million, and the maximum non-cancer chronic hazard index is 0.001. The maximum acute hazard index is estimated at 0.026. The maximum estimated health risks for residences living in the town of Mountain House, located more than 2.5 miles from the facility, is a cancer risk of 0.09 in a million, and a non-cancer chronic and acute hazard index of 0.001. The maximum health risk values identified in the HRSA (see Table 1 below) meet the criteria for acceptable levels established in the BAAQMD's Regulation 2, Rule 5. Therefore, it is unlikely that TAC emissions related to the proposed operation of a natural gas-fired power plant at Mariposa Energy Center would cause adverse health effects (including asthma) to the surrounding populations.

Table 1. Summary of HRSA Results

Receptor	*Cancer Risk*	*Non-cancer Hazard Index (HI)*	*Non-cancer Acute HI*
Resident (maximum)	0.3 in a million	0.015	NA
Resident (Mountain House)	0.09 in a million	0.001	0.001
Worker (maximum)	1.3 in a million	0.001	NA
Any (maximum)	NA	NA	0.026

Comment IV.2 – Health Impacts from PM

Comments ask how the health impacts from particulate matter emissions are calculated and represented in the health risk assessment. The District received comments suggesting that the District should consider fine particulate matter in its Health Risk Assessment. Another commenter stated that the short term maximum 1-hour impact for PM from the Tracy Peaker Plant is located 2.2 miles to the Southwest. The commenter stated that based on this information that the maximum 1-hour impact for PM from Mariposa Energy Plant would be near three nearby schools.

Response:

The District has considered adding fine particulate matter in our permitting procedures. In addition, OEHHA is planning to develop new procedures to address fine particulate matter and to incorporate them into its health risk assessment guidelines that are used by air districts. The District intends to participate in the public process to develop future updates to the risk assessment guidelines and procedures. These guidelines have not been developed at this stage, however, and so the Air District does not have the appropriate tools to include fine particulate matter in its formal Health Risk Assessment. The CEC will be required to address fine particulate matter impacts from the project in its staff assessment for the project. The commenters are encouraged to participate in the CEC licensing proceeding for the proposed project. The CEC staff assessment will have an air quality section that will quantify the particulate impacts due to the project.[7]

Comment IV.3 – Health Risk Screening Analysis

Appendix B: The Health Risk Screening Analysis states that meteorological data was not available. However, meteorological data that was used for the air dispersion modeling results was submitted to the District on June 16, 2009.

Response to Comment:

The meteorological data that was submitted to the District was data suitable for the AERMOD modeling program. ISCST3 was used for the Health Risk Screening Analysis. Since AERMOD inputs cannot be used in ISCST3, the District wrote that meteorological

[7] See *Mariposa Energy Project Staff Assessment* CEC 700-2010-017, California Energy Commission, November 2010, at Section 4.1 Air Quality. (Available at: http://energy.ca.gov/2010publications/CEC-700-2010-017/CEC-700-2010-017.PDF)

data was not available. ISCST3 is considered to be a conservative analysis. Since the analysis showed that the risks were acceptable, it was not necessary to use AERMOD.

V. OFFSETS

Comment V.1 – Offsets

Commenters stated the NOx offsets proposed to mitigate the project do not adequately mitigate impacts in the San Joaquin Valley. Commenter used findings by the CEC from the Tesla project to discount the ERCs used for the Mariposa project. Commenter provides estimates of emissions that are not fully mitigated in the San Joaquin Valley for NOx, CO, POC, PM-10, SOx, and ammonia. Another commenter discussed San Joaquin Valley Air Pollution Control District offset requirements that would require a higher offset ratio (1.5 to 1) and particulate offsets for the project. Comments state that emissions from the project would create a public nuisance to the residents of the San Joaquin Valley and violates BAAQMD Regulation 1, Section 301 and the California Health and Safety Code.

Response:

The proposed emissions for the Mariposa Energy Project are about:

POC:	5.7 tpy
NOx:	46.0 tpy
SO2:	2.9 tpy
PM10:	21.1 tpy
CO:	27.5 tpy

The thresholds at which the SJUAPCD would require offsets are:

POC:	10 tpy
NOx:	10 tpy
SO2:	27.37 tpy
PM10:	14.6 tpy
CO:	200 tpy

SJVAPCD would not require offsets for the VOC, SO2, or CO emissions. It would require offsets for particulate matter and NOx. The District acknowledges that the San Joaquin Valley Air Pollution offsetting requirements would be different for the proposed project if the project was located in their jurisdiction.

As discussed in Section 6 of the PDOC the offsets proposed by the applicant for the proposed project meet all BAAQMD regulatory requirements.

As the lead agency under the CEQA equivalent process used for power plant licensing, the CEC will be required to ensure that the mitigation for the proposed project is adequate to mitigate any potential project significant air quality impacts. In the CEC's Staff Assessment, the CEC is proposing that the applicant provide additional mitigation

to address air quality impacts in the San Joaquin Valley. In particular, the CEC is proposing to require offsets of POC, SO2, and PM10.[8]

Based on the District's analysis of the project and the mitigation measures, the District does not believe that the project will be a public nuisance to residents of the San Joaquin Valley or the Bay Area under District regulations or the California Health and Safety Code.

Comment V.2 – Control of Offsets
Section 6.5, Page 68, 2nd Paragraph, 1st Sentence - Diamond Generating Corporation is in possession of the valid emission reduction credits to offset the emission increases from the permitted sources for the Mariposa Energy Project. Please update the text and Tables 35 and 36, accordingly.

Response to Comment 13:
The discussion has been revised.

[8] See *Mariposa Energy Project Staff Assessment* CEC 700-2010-017, California Energy Commission, November 2010, AQ-SC7 at pp. 4.1-44 to 4.1-45. (Available at: http://energy.ca.gov/2010publications/CEC-700-2010-017/CEC-700-2010-017.PDF)

VI. BACT

A. BACT for PM10

Comment VI.A.1 – PM10 Emissions Limit

Comments state that the District chose the highest emission rate as BACT without ever analyzing how and if the facility can achieve the lowest achievable emission rate demonstrated by other facilities. Comments analyze PM10 source test results from PDOC and summarize high tests for each facility. Comments state that facilities use identical equipment, but for some facilities the maximum test result was less than the 2.5 lb per hour PM10 BACT limit. A commenter proposes that BACT should be between 2.0 and 2.3 lb per hour for PM10. A commenter states that District review of comparable permit limit omits two facilities (Hanford and Henrietta) with identical equipment that were permitted at 2.2 lb per hour for PM10. Commenter also states that Marsh Landing Generating Station has a PM10 permit limit that is lower on pound per MMbtu basis. Commenter states that the District needs to establish a lower emission limit for PM10 to comply with BACT requirements of District Regulation 2, Rule 2, Section 301.

Response:

The District has determined that the PM10 hourly numerical emissions limits that were included in the PDOC are not warranted under the BACT requirement. The District's BACT regulations require the District to implement BACT either as a control device or technique (Regulation 2-2-206.1 and 2-2-206.3) or as an emission limitation (Regulation 2-2-206.2 and 2-2-206.4), and do not require both types of BACT limits. The control techniques of using low-sulfur natural gas, good combustion practice, and high efficiency inlet air filters will fulfill the BACT requirement for PM in accordance with Regulations 2-2-206.1 and 2-2-206.3. The District has concluded that imposing a numerical emissions limit, in addition to requiring BACT technologies, would not be warranted given that there are no add-on control devices that the facility can use to control PM emissions. In a facility using good combustion practice, PM emissions will be determined by the amount of sulfur in the fuel and the way that the combustion equipment functions, which are factors that are not within the control of the operator. PM therefore presents a different situation than other pollutants such as NOx or CO where the project owner can design its add-on control systems to achieve the required level of emissions and ensure that it will comply with its emission limits by operating the add-on control systems properly. For these reasons, the District does not intend to include numerical hourly PM10 limits in the FDOC.

This BACT determination is consistent with guidance from the California Air Resources Board in setting BACT for natural gas-fired gas turbines.[9] This BACT determination is also consistent with District BACT Guideline 89.1.6, which specifies BACT for PM10 for combined-cycle gas turbines with rated output of > 40 MW as the exclusive use of

[9] Guidance for Power Plant Siting and Best Available Control Technology, California Air Resources Board, Stationary Source Division, September 1999, pg. 34.

clean-burning natural gas with a maximum sulfur content of < 1.0 grains per 100 scf.[10] These guidance documents do not suggest that a numerical emissions limit should be required as a BACT permit condition.

The District has reviewed the permit limits mentioned by the commenter and source test results for similar aeroderivitive turbines and the District agrees that emissions will most likely be below 2.2 lb/hour on average. The District is therefore proposing to base the annual emissions limit on this lower emission rate. The District will impose an annual limit of 18.6 tons PM10 per year. The facility will ensure compliance with the emissions limit by testing the emission rate for each turbine at least once per year. Given the high variability of the source tests results, the District is basing the emission factor on the average of the emissions rates observed during the 4 most recent source tests on that turbine (or, prior to the completion of 4 source tests on a turbine, on the average of the emission rates observed during all source tests on the turbine) (see Condition Part 20 for details).

Comment VI.A.2 – Inlet Air Filters and Lube Oil Coalescer

A commenter stated that the inlet air filters should be used to remove particulate matter from the combustion air stream, thereby reducing the amount of particulate matter emitted into the atmosphere and that a lube oil coalescer should be required to reduce emissions of oil mist.

Response:

The project will use high-efficiency inlet air filters and a lubrication oil system coalescing filter as required by the manufacturer.

Comment VI.A.3 – PM from Water Injection

A commenter stated that particulate emissions would be lower if a DLE (dry low-NOx) turbine were used instead of a water injection turbine because the dissolved solids in the water will contribute to particulate.

Response:

The CEC staff assessment and the applicant's Application for Certification state that the water that is used for water injection will be demineralized so that the dissolved solids are 5 parts per million. Water injection will not be a significant contributor to particulate emissions (less than 0.14 lb/hr).

B. BACT for NOx

Comment VI.B.1 – NOx Emissions Limit

Commenter states that by utilizing a turbine with a dry low NOx combustor that emissions from the turbine exhaust can be reduced from 25 ppm to 15 ppm. Commenter states that the SCR control efficiency is 90% and that the permit limit should be set at 1.5

[10] *See* Bay Area Air Quality Management District Best Available Control Technology (BACT) Guideline, § 1, Policy and Implementation Procedure, available at: http://hank.baaqmd.gov/pmt/bactworkbook/default.htm

to 2.3 ppm. Commenter states that the Riverside Energy Project has been permitted with a limit of 2.3 ppm.

Response:
As stated below in the response to Comment VI.C.1, "Gas Turbine Selection," there is no data or analysis that demonstrates the LM6000 PF with a turbine outlet emission rate of 15 ppm NOx could reliably meet a lower NOx permit limit.

The Riverside Energy Project does have a permit limit for similar equipment at 2.3 ppm NOx. At this time, this facility has completed construction and is finishing commissioning of the new gas turbine. The facility has not demonstrated compliance over a period of time with the 2.3 ppm NOx limit and this limit is not considered to be achieved in practice. Based on discussions with the SCAQMD permit staff, the 2.3 ppm NOx permit limit for the Riverside Energy Project was not imposed by the SCAQMD as a BACT permit limit[11], but was proposed by the applicant in part to reduce the amount of NOx offsets required for the facility[12].

The applicant provided information from a catalyst vendor to evaluate the cost effectiveness of a 2.3 ppm NOx limit for the Mariposa Energy Project.[13] The catalyst vendor estimates that the incremental cost difference for an SCR that could meet a 2.3 ppm NOx limit would be an additional $500,000 over a system that could meet a 2.5 ppm NOx limit. The additional catalyst volume would also add an additional back pressure (one inch water).[14] The applicant estimated the annualized costs at $106,000 with a potential NOx emission reduction of 0.7 tons per year. The corresponding incremental cost effectiveness was estimated at $151,000 tons per year. The District does not have a specific incremental cost effectiveness guideline, but the South Coast Air Quality Management District (SCAQMD) uses an average cost effectiveness value of $19,100 per ton of NOx controlled and an incremental cost effectiveness value of $57,200 per ton of NOx controlled.[15] The incremental cost for adding additional catalyst to meet a 2.3 ppm NOx permit limit exceeds the $57,200 cost threshold value used by the SCAQMD.

At this time adding additional catalyst to the SCR may be technologically feasible, but would increase the backpressure on the turbines which would reduce the efficiency and power output of the turbines. In addition, it is more difficult to maintain compliance with a low NOx limit averaged over 1 hour during periods of transient load. Transient load conditions and fast ramp rates are expected to become more common in the coming years as California moves to more renewable power generation. Renewable sources of

[11] South Coast Air Quality Management District Engineering Evaluation for the City of Riverside, Public Utilities Department, Application No. 481647, page 19, Table 16, "BACT Requirements for Simple Cycle Turbines".
[12] Id, page 22, Table 19, "NOx RTCs (Reclaim Trading Credits) Required.
[13] Letter dated October 19, 2010 from Jerry Salamy of CH2MHILL to Brenda Cabral of BAAQMD, See page 8.
[14] The turbine would be required to burn more fuel to overcome the additional backpressure, and this would result in lower turbine efficiency.
[15] South Coast Air Quality Management District BACT Guidelines, July 14, 2006, Table 4, pg. 29. The SCAMQD BACT Guidelines are available at: http://www.aqmd.gov/bact.

electrical power such as wind and solar are much more intermittent and uncertain that traditional power plants. Fossil fuel fired plants will be needed to fill in the gaps when the sun is not shining or the wind is not blowing, and they will be required to ramp up quickly when needed and then ramp back down when renewable sources come back on-line.[16] The uncertainty of whether a plant such as Mariposa Energy Project could meet a lower NOx limit and the high incremental cost effectiveness estimates do not justify mandating that the Mariposa Energy Project install additional catalyst to meet a 2.3 ppm NOx limit.

C. BACT for All Emissions

Comment VI.C.1 – Gas Turbine Selection

The District received comments that addressed the applicant's selection of the General Electric LM6000 PC turbine as the turbine model for the Mariposa Energy Project, including some comments that advocated alternatives to the LM6000 PC. One commenter submits information from the GE website regarding other LM6000 gas turbines including the LM6000 PF turbine and the LM6000 PG turbine. Another commenter states that there are numerous advantages to the new LM6000 models using dry low NOx combustors, including LM6000 PH, and that the new turbine technologies are technologically feasible, cost effective, and commercially available. Commenter also states that the LM6000 PF with dry low NOx combustors has a lower heat rate that could significantly reduce fuel consumption, criteria pollutant emissions, and greenhouse gas emissions. Commenter also states the project should have considered using the LM6000 PG which utilizes a high pressure turbine rotor. In addition, the District received comment that the PDOC's BACT analysis must consider turbines using dry low NOx combustors and the superior NOx reduction capability of such combustors. The District also received comments that the use of dry low NOx combustors would save water resources and the costs associated with a water treatment system and that the BACT analysis must consider the collateral impacts of additional water use. Finally, the District also received comment that stated it was contrary to law to allow the applicant to base its choice of turbine model for the project on confidential information in the applicant's power purchase agreement with PG&E, and stated that allowing the applicant to do so precluded comparison to other LM6000 models and negatively affects the PDOC's BACT determinations.

Response:

For the reasons in the PDOC for this project, the LM6000 PC emission rates of NOx, CO, POC, PM10, and SOx meet District BACT requirements, and the turbine models commenters propose as alternatives to the LM6000 PC do not alter the District's conclusion in this regard. Commenters propose as alternatives the LM6000 PF, LM6000 PG, and the LM6000 PH.

There is insufficient evidence to impose the LM6000 PF as BACT in favor of the LM6000 PC.

[16] Integration of Renewable Resources, Operational Requirements and Generation Fleet Capability at 20% RPS, August 31, 2010, California ISO, pg. iii.

The use of a turbine such as the LM6000 PF with a turbine outlet emission rate of 15 ppm NOx coupled with SCR to achieve a NOx emission rate below 2.5 ppm is not achieved in practice, may not be technically feasible, and would not be cost effective here, even if it were technically feasible.

The commenter has not provided any data or analysis that demonstrates the LM6000 PF with a turbine outlet emission rate of 15 ppm NOx could reliably meet a lower NOx permit limit, and if so, whether any additional emission reductions would be cost effective.

The method the commenters suggest of reducing NOx emissions to a rate below 2.5 ppm has not been achieved in practice. The District is unaware of any LM6000 PF gas turbines that have demonstrated compliance with a permit limit below 2.5 ppm NOx or that has CEM data demonstrating an emission rate below 2.5 ppm NOx for an extended period.

Also, the technical feasibility of reducing NOx emissions to a rate below 2.5 ppm using the LM6000 PF is uncertain. The assumption that the SCR will have the same 90% efficiency even though the outlet emission rate is lowered to 15 ppm (from 25 ppm) may not be correct. The SCR efficiency typically increases with a higher inlet concentration and decreases with lower inlet concentrations. At this time, there is no achieved in practice permit limit or emissions data from a LM6000 PF that supports a lower NOx permit limit.

In addition, even if it were technically feasible to do so, it would not be cost effective. The applicant provided information from GE that considered the additional capital costs associated with LM6000 PF. The cost is approximately 1.5 million dollars more for each gas turbine to install the dry low NOx combustors[17]. Even assuming, for the sake of conservatively analyzing cost, that the project's NOx emissions were entirely eliminated as a result, which of course would not happen, this corresponds to an approximate cost per ton of NOx controlled of $25,000/ton without considering any additional costs other than an annualized capital cost. This exceeds the District BACT cost effectiveness guideline of $17,500/ton of NOx controlled. The installation of the LM6000 PF is not considered cost effective for the Mariposa Energy Project.

The LM6000 PF is also capable of achieving the same emissions rates and therefore would be subject to the same BACT requirements. Thus, the BACT determination would be the same for either turbine, notwithstanding that mass emissions from the LM6000 PC will be slightly higher because of a higher heat rate.

Also, the District acknowledges that the heat rate of the LM6000 PC is nominally higher than the LM6000 PF gas turbine, at approximately 3.4% at ISO conditions (59 deg. F). This difference in heat rates means the LM6000 PC will burn slightly more fuel and will

[17] Letter dated October 19, 2010 from Jerry Salamy of CH2MHILL to Brenda Cabral of BAAQMD, See page 7.

have slightly higher greenhouse gas emission rates than the LM6000 PF. However, the nominal difference in efficiency and heat rate is not sufficient to eliminate the LM6000 PC from consideration for the Mariposa Energy Project. Moreover, as discussed in the PDOC, the LM6000 PF turbine does not meet the power requirements of the MEP.

The LM6000 PG turbine proposed for use by the Turlock Irrigation District Almond 2 Power Plant has a higher heat rate than the LM6000 PC (8,720 btu/KW-hr vs. 8,566 btu/KW-hr), therefore there is no advantage in efficiency or heat rate. The LM6000 PG turbine will also utilize water injection for NOx control. The permit limits for the Almond 2 Power Plant are equivalent or higher for all pollutants.[18] Thus, there would be no advantage in selecting the LM6000 PG turbine over the LM6000 PC turbine.

GE states in their press release on October 7, 2010,[19] that "The LM6000-PH, which is the dry low emissions equivalent of the PG, will begin first engine to test (FETT) qualifications in late 2010." GE also states that "The initial testing of the LM6000-PH is taking place at the GE facility in Evendale, Ohio." The LM6000-PH has therefore not yet been demonstrated in practice

The environmental impact that results from the proposed project's water use are not an element of BACT analysis. However, the CEC will evaluate any such impacts and the District would encourage the commenter to participate in the CEC licensing process.

Finally, the District disagrees that it is contrary to law to allow to the applicant to choose specific equipment to meet project requirements as specified in the Power Purchase agreement. The commenter does not explain what provision of law the commenter believes is violated by allowing the applicant to do so, and the District is unaware of any such provision.

In summary, the District has determined that the LM6000 PC gas turbine using water injection for NOx control meets the NOx BACT requirement. The consideration of the LM6000 PF, LM6000 PG, and LM6000 PH turbines does not establish a new BACT level for any pollutant and even to the extent the technology may be technologically feasible, it is not cost effective for reducing NOx emissions from the Mariposa Energy Project.

[18] Almond 2 Power Plant Project, Presiding Member's Proposed Decision, California Energy Commission, CEC-800-2010-018-PMPD, November 2010, See Conditions AQ-1 through AQ-95, available at: http://www.energy.ca.gov/sitingcases/almond/index.html

[19] See GE Energy Press Release " Major Milestones Reached for the Newest Versions of GE's LM6000 Aeroderivative Gas Turbines" October 7, 2010. (available at: http://www.gepower.com/about/press/en/2010_press/100710c.htm)

D. BACT for Startup

Comment VI.D.1 – Startup Emissions Limit

A commenter claimed that startup emissions would be lower from a DLE turbine (with dry low NOx combustors) compared with the LM6000 PC turbine proposed for Mariposa Energy Project since the NOx emissions from a DLE turbine (the LM6000 PF) at steady-state are lower than the water-injected LM6000 PC.

Response:

Commentator did not provide any basis to show that the LM6000 PF turbine will have lower startup and shutdown emissions than the LM6000 PC turbine. The turbine manufacturer, General Electric, stated that the emissions for startup and shutdown for both turbines are expected to be approximately equal.[20] Although the outlet emissions of the PF turbine is lower at baseload operating conditions, the PC turbine outlet emissions are generally the same or lower at reduced loads. Based on currently available information, there does not appear to be an advantage in selecting the PF turbine to reduce startup and shutdown emissions.

Comment VI.D.2 – Startup Duration Limit

A commenter stated that the startup duration is inappropriate since a proposed combined-cycle facility, Willow Pass Generating Station, has a shorter proposed startup time than the limit proposed for Mariposa Energy Project. Commenter references an article entitled, "Application of the Latest Aeroderivative Gas Turbine Technology" by Edward Wacekt, Warren Ferguson, *General Electric*, 2009, and states that the startup times can be improved from 10 minutes to 5 by properly maintaining the package purge requirements and by keeping the lube oil warm. Commenter states that these operational enhancements reduce startup and shutdown emissions for all pollutants.

Response:

With respect to the startup time limit, although the application for the Willow Pass Generating Station states startup will take 12 minutes, this facility has not been permitted and may not ultimately have a startup limit of 12 minutes. The District recently permitted another plant, Marsh Landing Generating Station, with the same gas turbines as proposed for Willow Pass, but in a simple-cycle configuration, and concluded a startup time limit of 30 minutes was appropriate to accommodate the emission control devices to reach operating temperature and to fully function.[21] The startup time limit of 30 minutes proposed for the Mariposa Energy Project is consistent with this limit.

The District reviewed the article and agrees that the authors state, "Also to support quick and frequent starts/stops, the LM6000 standard 10 minutes start time can be improved to just 5 minutes. The 10-min start is outlined in Figure 3, and shows the sequence that includes purge time, warm-up time, and finally gas turbine ramp time. By properly maintaining the package purge requirements, and by keeping the lube oil 'warm',

[20] See notes for telephone conversation between Weyman Lee, BAAQMD and Scott Dayer, GE, on November 16, 2010.

[21] See Marsh Landing Generating Station Final Determination of Compliance, June 2010, at p. 52.

approximately 2 minutes can be removed from the 10-min start sequence. Then the gas turbine acceleration rate to full load can be increased from 12MW/min to 50MW/min, reducing the time from sync idle to full load from 4 minutes down to approximately 1 minute. This reduced start time greatly enhances the LM6000's ability to get online quickly to support a reduction in load from the wind farm due to sudden changes in wind conditions."

The District would note that the authors did not make any statements regarding the emission reductions possible by reducing the startup time to full load for the gas turbine. The District would also note that the SCR will still need time to reach operating temperature, start injecting ammonia, saturate the catalyst with ammonia, and stabilize the NOx CEM readings. The District is interested in the approach discussed in this article to reduce the duration of startup time, but would also note that the implementation of the approach would require increasing the ramp rate of the gas turbine dramatically and this can cause additional maintenance requirements and potentially reduce equipment life. In addition, the authors do not provide any operational experience for any facilities consistently meeting a 5 minute start sequence (turbine start to full load).

The District discussed why a 30 minute startup period is appropriate for the Mariposa Energy project on pg. 59 of the PDOC. The District reviewed and considered the discussion contained in the article referenced by the commenter of potentially reducing startup times for LM6000 gas turbines. After considering all of the available information the District has determined that a 30 minute startup time is still an appropriate permit limit for the Mariposa Energy Project.

VII. AMMONIA

Comment VII.1 – Ammonia and Secondary PM

Commenters stated that the District had mistakenly concluded that ammonia emissions would not contribute to formation of secondary particulate in the San Joaquin Valley Air Pollution Control District.

Response:

Ammonia slip occurs as a result of the use of selective catalytic reduction (SCR) that achieves significant reductions of NO_x emissions. This technology has an inherent trade-off between NO_x and ammonia emissions. An optimal level trade-off is sought to balance $PM_{2.5}$ and ozone impacts. District modeling efforts have indicated that allowing 5 ppm ammonia slip provides a reasonable trade-off between NO_x and ammonia emissions.

$PM_{2.5}$ impacts

The BAAQMD draft $PM_{2.5}$ report concludes that ammonia emissions contribute more strongly to $PM_{2.5}$ formation than other types of precursor emissions, including NO_x. Because ammonia is an important $PM_{2.5}$ precursor, the proposed permitted level of ammonia slip is set as low as is reasonably technically achievable (5 ppm) to mitigate significant $PM_{2.5}$ formation. This low permitted level of ammonia slip reflects the District's efforts to control ammonia emissions. For example, the proposed 5 ppm ammonia slip for the Mariposa Energy Center is lower than 10-15 ppm ammonia slip historically permitted for similar gas-fired facilities. District modeling efforts have shown that allowing 5 ppm ammonia slip under worse-case meteorological conditions would not contribute to significant $PM_{2.5}$ buildup within the Bay Area or Central Valley. These modeling efforts have additionally shown that the reductions in NOx emissions associated with the SCR operating at 5 ppm ammonia slip will significantly benefit regional air quality as compared to allowing uncontrolled NO_x emissions from the Mariposa Energy Center.

Seasonality plays a very important role in balancing the trade-offs between $PM_{2.5}$ and ozone information. Ammonium nitrate $PM_{2.5}$ accumulates to elevated levels only during the cooler winter months when the compound is stable as a solid. (Ammonium nitrate $PM_{2.5}$ dissociates at higher temperatures and therefore generally does not accumulate to elevated levels outside of the winter season.) During winter season $PM_{2.5}$ episodes, the Central Valley is almost always upwind of the Bay Area. (Air flows are predominately from east to west through the mountain passes connecting the Bay Area and the Central Valley.) Therefore, during the winter season when $PM_{2.5}$ may accumulate to harmful levels, the Mariposa Energy Center would be downwind of the Central Valley. As such, ammonia emissions from this facility would be unlikely to significantly impact Central Valley air quality.

Ozone impacts

Ozone build up to harmful levels occurs almost exclusively during the summer season. During the summer months, the Central Valley is almost always downwind of the Bay Area. (Air flows are predominately from west to east through the mountain passes connecting the Bay Area and the Central Valley.) It is during these months that the Mariposa Energy Center emissions would be most likely to be transported into the Central Valley. As stated previously, ammonium nitrate $PM_{2.5}$ does not build to high levels during the warm summer season. Therefore, ammonia emissions being transported into the Central Valley during the summer would not likely contribute to significant air pollutant (i.e. ammonium nitrate $PM_{2.5}$) formation. On the other hand, emissions of NOx during the summer months may lead to significant ozone formation. For this reason, the facility is proposed to operate with SCR technology to achieve significant reductions of NO_x emissions. Further increasing the level of ammonia slip beyond 5 ppm to achieve greater levels of NO_x reduction was not determined to be cost-effective. Such excess ammonia slip (e.g. 10-15 ppm) in some cases produced significant amounts of winter $PM_{2.5}$ within the Bay Area without achieving significant further NO_x reductions leading to reduced ozone formation.

Comment VII.2 – Ammonia and Nitrogen Deposition

A commenter stated that the District ignored the potential collateral impact from ammonia slip of nitrogen deposition. The commenter states that nitrogen deposition is the input of nitrogen oxide (NOx) and ammonia (NH3) derived pollutants from the atmosphere to the biosphere, and that mechanisms by which nitrogen deposition can lead to impacts on sensitive species include direct toxicity, changes in species composition among native plants, and enhancement of invasive species. The commenter goes on to state that the project area is home to many endangered species including the red legged frog and tiger salamander among others,[22] and that ammonia emissions from power plants are a larger contributor to nitrogen deposition than the projects NOx emissions.

Response:
A project subject to PSD may require a nitrogen deposition analysis as part of the soil and vegetation impact analysis depending on project location.[23] The District is not required to perform an analysis of nitrogen deposition for the Mariposa Energy Project because the facility is not subject to the Prevention of Significant Deterioration, since it will not be a major stationary source as defined by 40 CFR 52.21(b)(1)(i).

The CEC may consider nitrogen deposition. Commenters are encouraged to submit comments to CEC, the lead agency on this project, on nitrogen deposition.

Comment VII.2 – Ammonia versus Urea
A commenter stated the District should consider the use of a product called NOxOUT ULTRA™ that utilizes urea and converts it to ammonia just prior to injection into the SCR to avoid risks from the transportation and storage of ammonia.

[22] http://www.energy.ca.gov/sitingcases/mariposa/documents/others/2010-04-20_DOD_Letter_to_US_Fish+Wildlife_Services_Re_Consultation._TN-56408.pdf
[23] *See* 40 CFR 52.21(o) (Additional Impact Analyses)

Response:
The CEC will evaluate the risks from the use of ammonia transport and storage in the staff assessment prepared for the project. Ammonia is a chemical widely used in many industries including at power plants abated by SCR. Anhydrous (gaseous) ammonia stored in pressurized tanks is much more of a safety concern than the aqueous ammonia (19% by weight) proposed for use at the Mariposa Energy Project. EPA does not require accidental release plans for aqueous ammonia unless the concentration is more than 20% by weight.[24] Storage of 500 pounds of ammonia in any form is regulated by the State of California in CCR Title 19, Div. 2, Chapter 4.5.

The Air District is aware of the NOxOUT ULTRA™ technology. The CEC will require the facility to adequately address any potential impacts from the use of aqueous ammonia at the facility in the staff assessment for the project. Given the relatively low risk of accidental releases and the additional safeguards provided by the measures required by the CEC, the District has concluded that the potential for impacts from the use of ammonia in the SCR system is not significant enough to reject SCR using aqueous ammonia as a control alternative. For the same reasons, the risk is not significant enough to require the facility to avoid using aqueous ammonia by using NOxOUT ULTRA™ instead.

[24] See 40 CFR 98.130

VIII. POWER GENERATION EQUIPMENT

Comment VIII.1 – Simple-cycle versus Combined-Cycle Turbines

Commenter states that simple cycle turbines are less efficient than fast start combined cycle designs and that this has permitting implications. Commenter states simple cycle turbines emit higher GHG emissions per MW, have higher criteria air pollutants per MW, and use more fuel per MW. Commenter states it is no longer necessary to sacrifice efficiency for shorter startup times.

Response:

The District agrees that combined-cycle plants are more efficient and emit less per MW than simple-cycle plants. However, peaker plants are not operated for long periods so their less-efficient design is not as great a concern. The fast-start plant that the commenter is referring to is the proposed Willow Pass Generating Station which would use large F-Class turbines (190 MW each) with steam turbines (60 MW each).[25] This equipment would be more efficient than a simple-cycle gas turbine when the heat in the gas turbine exhaust is recovered and the steam turbine is utilized. However, the units proposed for Willow Pass are not capable of operating at loads[26] as low as those proposed for the Mariposa Energy Center. The gas turbines proposed for the Mariposa Energy Project are significantly smaller at nominally 50 MW with the ability to operate at a minimum load of 25 MW.

In determining the Best Available Control Technology for a proposed facility, the Air District cannot require modifications that would alter the project's fundamental scope.[27] The design element of a high turndown capability at the proposed Mariposa Energy Project cannot, at this time, be achieved with the use of a fast-start combined-cycle plant. To require the use of a fast-start combined-cycle plant would not satisfy the facility's purpose of supplying a minimum of 25 MW.[28]

Comment VIII.2 – Inlet Air Cooling

Commenter provides information regarding various options available for cooling the inlet air to the turbine to increase power output on hot days. Commenter provides information on a refrigerated inlet chiller available for the LM6000.

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[25] See Willow Pass Application for Certification Table 2.5-2 at p. 2-41 http://www.energy.ca.gov/sitingcases/willowpass/documents/applicant/afc/Volume_01/2.0%20Project%20Description.pdf

[26] See Willow Pass Application for Certification at p. 2-4 (turndown capability of 60% of gas turbine full load, which is approximately 114 MW) http://www.energy.ca.gov/sitingcases/willowpass/documents/applicant/afc/Volume_01/2.0%20Project%20Description.pdf

[27] *See generally* NSR Workshop Manual at p. B.13; *In re Prairie State Generating Co.*, *supra* note 6, slip op. at 32; *In re Kendall New Century Dev.*, *supra* note 6, 11 E.A.D. at pp. 50-52 & n. 14; *In re Hillman Power Co.*, 10 E.A.D. 673, 691-92 (EAB 2002); *In re Knauf Fiber Glass, GmbH*, 8 E.A.D. 121, 136 (EAB 1999); after remand, 9 E.A.D. 1, 31-33 (EAB 2000); *In re SEI Birchwood, Inc.*, 5 E.A.D. 25, 29-30 n.8 (EAB 1994); *In re Hawaii Commercial & Sugar Co.*, 4 E.A.D. 95, 99-100 (EAB 1992); *In re Old Dominion Elec. Coop.*, 3 E.A.D. 779, 793 n. 38 (Adm'r 1992).

[28] See Mariposa Energy Project Application for Certification, Volume 1, Page 2-32, June 28, 2009.

Response:
The comment concerns changes that may or may not improve the power output or efficiency of the facility, considering parasitic loads. The District evaluates compliance with air quality regulations. The efficiency of the facility is not within the District's purview. CEC has provided an analysis of power plant efficiency in Section 5.4 of its Staff Assessment.[29]

[29] See *Mariposa Energy Project Staff Assessment* CEC 700-2010-017, California Energy Commission, November 2010, at Section 4.1 Air Quality. (Available at: http://energy.ca.gov/2010publications/CEC-700-2010-017/CEC-700-2010-017.PDF)

IX. EMISSIONS

Comment IX.1 – Commissioning

Section 4.3.3, Page 17, 1st Paragraph, 2nd Sentence – Mariposa Energy will not be conducting more than one phase of commissioning per day for each of the turbines. Therefore, Mariposa Energy suggests the following change to the text "Because Mariposa Energy will only conduct one phase of commissioning per turbine per day, the following commissioning emission estimates for each turbine are based on the maximum daily emissions from 4 hours of gas turbine testing at 10% load, 8 hours of Pre-Catalyst Initial tuning at 100% load or 8 hours of Post-Catalyst tuning at 100% load."

The hourly and daily estimates of emissions should be calculated assuming that only one turbine will be commissioned on any day, and that only one type of commissioning activity (initial load testing, pre-catalyst tuning, and post-catalyst tuning) will be performed per day.

Response:

The District understands that Mariposa Energy is agreeing to perform commissioning activities on only one turbine per day and that only one of the activities will occur per day. The maximum hourly emissions will be:

NOx	51
CO	45
POC	4.48
SOX	10.8
PM10	2.5

and the turbines will be commissioned for no more than 8 hours per day. The discussion has been revised to show that the hourly and daily emissions will be lower. Part 9 of the condition has also been revised to require lower hourly and daily emissions.

Comment IX.2 – SOx

The District received comment that the emission rates (lb/hr) for SOx on Section 4.1.3, Page 17, Table 6 should be revised to reflect 1.0 grain of sulfur per 100 dry standard cubic feet of natural gas to be consistent with the assumptions used for the steady state operations. This revision should also be incorporated in Tables 7, 33, 34, and Appendix A.

Response:

The corrections have been made.

Comment IX.3 – Fire Pump Diesel Engine

Section 4.1.4, Page 21, Tables 8 and 9 – These tables present the California Air Resources Board (ARB) certified engine emission rates for the fire pump engine but do not reflect the engine manufacturer's lower emission rates (Document 2 of the May 26, 2010 email materials on your website). Furthermore, the project will be mandated to use ARB compliant ultra-low sulfur diesel fuel (i.e., 15 ppm sulfur). Therefore, Mariposa

Energy proposes the use of the engine manufacturer's emission factors for 15 ppm sulfur diesel fuel.

Response:
It is the District's policy to use the emission factors in the CARB certification, unless some refinement is necessary due to the toxic risk. The District has reviewed the manufacturer's lower emission rates and has found the difference to be so small that it is not worthwhile to amend the calculations, especially considering that the engine has passed the risk screen analysis with a slightly higher particulate emission factor.

Comment IX.4 – PM10
Section 5.5, Page 50 - All references to the PM10 emission rate of 0.0052 lb/MMbtu should be removed, including those on pages 52, 53, 55, and Appendix A.

Response:
The District has removed some of the references to PM10 emission rates (in lb/MMbtu basis) from some discussions in the PDOC. However, in some PM10 analyses where it is necessary to compare proposed MEP PM10 emission rates to other power plants, the District still refers to lb/MMbtu emission rates.

X. PERMIT CONDITIONS

Comment X.1 – Correction to Definitions

Commenter requests removal of mention of HRSGs and steam turbine from definition of commissioning activities, since project will not include this equipment. Another commenter stated that no emission calculations were included in the PDOC for tuning and yet the proposed permit conditions contained a definition of tuning and exclusions from emission limits during tuning.

Response:

The references to HRSGs, steam turbine, and tuning have been removed since the proposed plant does not include this equipment and the applicant has not requested separate tuning provisions.

Comment X.2 – Clarification of Emission Limits

Page 86, Condition 9 – The first sentence of the condition indicates the emission limits are for each turbine but the emission limits presented below the text represent the facility limits. Commenter requests revision of the commissioning emission rates in this condition to reflect the limits for each turbine in Table 5.

Response:

In part 9 of the condition, the District originally assumed that the four turbines would be commissioned at the same time, and used this assumption to calculate maximum hourly emissions. The District now understands that only one turbine will be commissioned at a time. To make this clear, the District has split the condition into parts 9 and 9a. Part 9 contains the annual commissioning emission limits for the facility. Part 9a contains the hourly and daily limits for each turbine. In addition, a provision has been added that only allows the applicant to commission one turbine per day.

Comment X.3 – Clarification of Initial Operation

Page 87, Condition 10 – The first sentence of this condition refers to a "startup" when discussing the timing requirements for source testing after the initiation of the commissioning period. Commenter requests the replacement of "Within 90 days after startup,…" with "Within 90 days of initiation of the Commissioning Period,…" as the term Commissioning Period is defined in the permit. This suggested change should also be made in Conditions 25, 26, 28, and 30.

Response:

BAAQMD Regulation 2-1-411, Permit to Operate, Final Action states that:

> "The APCO shall take final action to approve, approve with conditions, or disapprove a permit to operate a facility subject to this rule within 90 days after the initial date of the start-up period of the new or modified source. This time period may be extended upon the written request of the applicant stating the reasons why further start-up time is needed. In no case shall the APCO allow the start-up period to be greater than 180 days."

Start-up is the term used in the regulation. Without restraints, the initiation of the commissioning period might not be within the time period envisioned by the regulation. .

Comment X.4 – Hours of Operation for Each Gas Turbine

Page 87, Condition 15a – This condition specifies an annual operational limit of 4,000 hours for each turbine. The discussion on page 74 states "A permit condition limiting operation of any single turbine for more than 5,200 hours/any consecutive 12 months has been added to part 15b of Condition. Although 15b appears to have been omitted from the PDOC, Mariposa Energy requests the following changes to Condition 15a to incorporate the language on page 74:

> 15a. The owner operator shall not operate any turbine S-1, S-2, S-3, or S-4 such that the hours of operation for any of the four units exceeds ~~4,225~~5,200 hours per year or a combined 16,000 for all four units (excluding operations necessary for maintenance, tuning, testing, startup and shutdown). (Basis: Offsets, Cumulative Increase)

The applicant requests the same correction to Section 3.4, Page 11, 6th Paragraph for discussion of why this plant is not base-loaded.

Response:

The applicant's comment requests 5,200 hours of operation for any turbine. The District understands that a generating unit is not considered to be base-loaded unless it is at 60% capacity, which would be roughly equivalent to 5,260 hours of operation per year. The District agrees with the increased hours of operation for one or more turbines as long as the total of hours of operation does not increase. In this case, any maintenance, startup, and shutdown hours must be included in the 5,200 hours.

Therefore, the discussion will be changed to add: "Since each turbine will be limited to 5,200 hours of operation per year, this plant will not be a base-loaded plant." The regulation is already cited in the paragraph.

The same modification has been made to Section 3.4.

Comment X.5 – Clarification of Emission Limits

Page 88, Condition 17(g) – Commenter suggests revising the sulfur dioxide emission rate from 1.347 pounds per hour to 1.35 pounds per hour consistent with Table 2 of the PDOC.

Response to Comment:

The revision has been made.

Comment X.6 – Correction to Startup/Shutdown Emission Limits

Page 88, Condition 18 – The maximum hourly carbon monoxide (CO) and precursor organic compound (POC) emission rates and the shutdown CO and POC emission rates do not reflect the lower operational BACT emission levels of 2 parts per million by volume at 15 percent oxygen (ppmvdc) [sic] CO and 1 ppmvdc [sic] POC required in the PDOC. Commenter suggests the revised Table 40 below. These changes should also be

reflected in Appendix A, Tables 3, 4, 12, 14, 28, 29, 30, 31, and the discussion of 40 CFR 64, Compliance Assurance Monitoring (CAM) starting on page 76. Another commenter stated the NOx limit Condition 18 (18.5 lb/hr) is inconsistent with page 60 of the PDOC (21.276 lb/hr).

TABLE 40. STARTUP AND SHUTDOWN			
Pollutant	**Maximum Emissions Per Startup (lb/startup)**	**Maximum Emissions During Hour with Startup and/or Shutdown(lb/hr)**	**Maximum Emissions Per Shutdown (lb/shutdown)**
NOx (as NO2)	14.2	18.5	3.2
CO	14.1	17.3~~18.1~~	2.7~~2.9~~
POC (as CH4)	1.1	1.4~~1.7~~	0.12~~0.2~~

Response:
The corrections to Table 40 and Table 29 (page 60 of the PDOC) have been made. Note that rounding the result of the calculation of the maximum emissions of POC during an hour that includes both a startup and shutdown actually yields an answer of 1.5 lb/hr, but 1.4 lb/hr is acceptable.

Comment X.7 – Corrections to Daily Emission Limits
Page 90, Condition 19 – Commenter suggests the following revisions to the daily emission rates in Condition 19 to maintain consistency with the comments on Condition 18 above. These changes should also be reflected in Appendix A and Table 12.

19. The owner/operator shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, and shutdowns to exceed the following limits during any calendar day:
    (a) 1098~~1129.7~~ pounds of NO_x (as NO_2) per day (Basis: Cumulative Increase)
    (b) 934~~1171.5~~ pounds of CO per day (Basis: Cumulative Increase)
    (c) 95.1~~120.82~~ pounds of POC (as CH_4) per day (Basis: Cumulative Increase)
    (d) 240~~241.44~~ pounds of PM_{10} per day (Basis: Cumulative Increase)
    (e) 130~~178.26~~ pounds of SO_2 per day (Basis: Cumulative Increase)

Response:
The maximum daily emission limits are based on 12 startups/day totaling 6 hours, 12 shutdowns/day totaling 3 hours, and 15 hours at steady state operation. The District's calculates that the maximum daily limit for NOx should be:

NOx: 1100 lb/day

The other corrections are acceptable.

Comment X.8 – Corrections to Annual Emission Limits
Page 90, Condition 20 – Commenter suggests the following revisions to the annual emission rates in Condition 20 to maintain consistency with the comments on Condition 18 above. These changes should also be reflected in Appendix A and Table 14.

20. The owner/operator shall not allow cumulative combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas

turbine start-ups, shutdowns, and malfunctions to exceed the following limits during any consecutive twelve-month period:

(a) 45.6 tons of NO_x (as NO_2) per year (Basis: Offsets)
(b) 27.2~~29.98~~ tons of CO per year (Basis: Cumulative Increase)
(c) 5.6~~5.90~~ tons of POC (as CH_4) per year (Basis: Cumulative Increase)
(d) 21.2~~13~~ tons of PM_{10} per year (Basis: Cumulative Increase)
(e) 2.9~~87~~ tons of SO_2 per year (Basis: Cumulative Increase)

Response:
The District agrees with these corrections.

Comment X.9 – Corrections to Annual Emission Limits for NOx
Condition 20: The limit of 45.6 tons per year (tpy) for NOx does not match the total facility emission (of 45.958 tpy and 45.67 tpy) shown in the discussion of offsets on PDOC p. 67 and Table 35.

Response:
The correct number for offsets is 45.9 tons NOx per year. The proposed annual emissions rate for the turbines is 45.6 tons per year. The proposed annual emissions rate for the engine is 0.3 tons NOx per year for a total of 45.9 tons NOx per year. The numbers in Section 6.5 (Offset Package) and Table 35 have been corrected. The number in Condition 20 is correct.

Comment X.10 – Corrections to Annual Emission Limits for POC
Condition 20: The limit of 5.9 tpy for precursor organic compounds (POC) does not match the maximum facility emissions (of 5.7 tpy) shown in PDOC Table 14.

Response:
The applicant has revised the annual POC emissions for the turbines down to 5.6 tons per year. In this case, the POC emissions for the facility are 5.6 tons per year because the POC emissions from the pump are negligible. Table 14 and Condition 20 have been corrected.

Comment X.11 – Toxics Emissions
Page 90, Condition 21 – Commenter stated that the formaldehyde emissions presented in Condition 21 do not appear to be based on a California Air Toxic Emission Factors (CATEF) presented on page 117 of the PDOC. Commenter requested the District provide a reference to the formaldehyde emission factor was used.

Response:
The District adjusted the CATEF emission factor for formaldehyde from the gas turbines during normal operations by assuming a 50% abatement efficiency due to the presence of the oxidation catalyst. The EPA has stated that the abatement efficiency for an oxidation

catalyst may be over 90% for formaldehyde.[30] Assuming a 50% abatement efficiency is a conservative assumption that still provides a conservative estimate of formaldehyde emissions for the health risk screening assessment. In addition, the District has reviewed source test data for identical equipment (LM6000 gas turbine, simple cycle, controlled by an SCR and Oxidation Catalyst) and concluded that emissions are typically well below 0.00045 lb formaldehyde per million Btu of fuel fired.

Comment X.12 – Diesel Fire Pump

Page 96, Diesel Fire Pump Condition 4(e) – The MEP only has one diesel engine so the reference to each engine is inappropriate. Please replace the word "each" with "the" and "engines" with "engine".

Response:

The District uses a standard condition for diesel engines that is suitable for single or multiple engines at a facility.

[30] Memorandum dated April 3, 2002 from Sims Roy of the U.S.E.P.A to Docket A-95-51, Subject: Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines, See Attachment A dated August 19, 1999.

XI. OTHER ISSUES NOT RELATED TO DISTRICT PERMITTING REQUIREMENTS

Comment XI.1 – Power Usage
A commenter stated that benefits from the plant will not be for the nearby area, but instead for people over the Altamont hills to the west.

Response:
The project will supply power to the grid that can deliver power over a wide area. Questions regarding where demand is located and where generating capacity should be sited to meet that demand are addressed by the California Energy Commission, the California ISO, and the California Public Utilities Commission.

These are energy policy issues not directly related to whether the facility would meet applicable air quality-related regulatory requirements, which is the subject of the District's Determination of Compliance.

Comment XI.2 – Water Usage
The District received several comments regarding the water use at the facility.

Response:
The BAAQMD does not regulate the water use of the proposed facility. The commenter is encouraged to provide water related comments to the CEC, the lead agency for this project under CEQA, which is analyzing water resources starting on page 4.12.1 of its Staff Assessment.

Comment XI.3 – Noise
A commenter raised concerns about noise from the proposed project and had recommendations for the type of analysis that should be performed.

Response:
The BAAQMD does not regulate noise impacts from the proposed facility. The commenter is encouraged to provide noise related comments to the CEC. The CEC staff assessment will address potential noise impacts from the proposed facility.

Comment XI.4 –Notification of a Plant Emergency
A commenter raised concerns about informing the community during an incident at the proposed facility such as a "leak" or other problems at the plant.

Response:
The community of Mountain House would likely be warned of any emergency situations at the plant by emergency response personnel such as the firefighters at Station No. 98 and the San Joaquin County Sheriff's Department.

As the lead agency for this project, CEC has prepared an analysis regarding hazardous material management for the project, starting on Page 4.4-1 of the Staff Assessment for Mariposa Energy Center. CEC has identified natural gas and aqueous ammonia as being the most important hazardous materials. CEC states that because a solution of ammonia and water (aqueous) is used instead of gaseous (anhydrous) ammonia, the hazards from ammonia are minimized.

In regards to the natural gas, CEC discusses the possible hazards and the mitigation of these hazards. The commenter is encouraged to submit questions or comments to the CEC regarding emergency situations.

Comment XI.5 –Alternative Energy Sources
Commenter states that more green power is needed like solar and wind and that another natural gas plant is not needed.

Response:
The demand and supply of electricity in California is overseen by other expert agencies such as the California Energy Commission, the California ISO, and the California Public Utilities Commission. The District defers to the judgment of expert agencies such as those in determining how demand will be met and what new generating capacity is needed and how it should be provided. The District therefore does not take a position on the need for this facility, whether this facility is the most appropriate way to meet that need, and what the appropriate mix of fossil fuel and renewable generation capacity is. These issues are not directly related to the District's air quality analysis and whether the facility will meet applicable air quality-related regulatory requirements, which is the subject of the District's Determination of Compliance.

The CEC has discussed the integration of peaking plants like this one with renewable sources of energy in Air Quality Appendix Air-1 to the CEC Staff Assessment, published on November 8, 2010.

Comment XI.6 –Greenhouse Gases
Commenter states that the PDOC does not contain a greenhouse gas BACT analysis.

Response:
Greenhouse gases from this facility are not subject to regulation under any federal, state or District regulatory requirements at this time.[31] There is therefore no regulatory basis for imposing GHG permit conditions at this time. GHG emissions from the proposed project will be reviewed by the CEC in its CEQA-equivalent environmental analysis (please see the CEC staff assessment).

[31] California does have an Emissions Performance Standard (EPS) requirement for procurement of power from combined-cycle, baseload facilities (those with an annual capacity factor of 60% or greater) which provides that such facilities must have greenhouse gas emissions below 1100 lb/MW-hr. But the EPS does not apply to this facility because it is a simple-cycle peaker plant with a maximum annual capacity factor of less than 60%.

Comment XI.7 –Project Location Near the Community of Mountain House

The District received a number of comments regarding the location of the Mariposa Energy Project near the community of Mountain House. Some comments express concern that the project might have an adverse effect on the growth of Mountain House. Many comments simply state the commenters are opposed to the project, and note its proximity to Mountain House.

Response:

The District defers to the Energy Commission regarding at what locations electrical generating capacity should be provided. The Air District therefore refers commenters who are generally unsatisfied with the decision to site a power plant at this location to the Energy Commission. The Air District's role in the approval process for new power plants is to review them to ensure that they will comply with all applicable air quality regulatory requirements if the Energy Commission approves them. The Air District has done so here and has found that this facility will satisfy all such requirements.

The likely effect of a power plant on the growth of Mountain House is beyond the scope of the District's evaluation of the project's compliance with air quality requirements. To the extent that the project will have the potential to negatively impact the growth of Mountain House, such concerns should be addressed to the Energy Commission in the context of siting the project at this location.

As the lead permitting agency, the California Energy Commission (CEC) conducts an in-depth review of environmental and other issues posed by the proposed power plant. This comprehensive environmental review is the equivalent of the review required for major projects under the California Environmental Quality Act (CEQA), and the Energy Commission's license satisfies the requirements of CEQA for these projects. This CEQA-equivalent review encompasses air quality issues within the purview of the District, and also includes all other types of environmental and other issues, including water quality issues, endangered species issues, and land use issues, among others.

The commenter is encouraged to participate in the CEC licensing process. Information regarding the project can be found at the CEC website:

http://energy.ca.gov/sitingcases/mariposa/index.html

Comment XI.8 – Permitting a Source Near the Border of the Bay Area AQMD and the San Joaquin Valley Unified APCD

The District received a number of comments regarding the location of the Mariposa Energy Project near the border of San Joaquin County. Some comments state that emissions from the project would affect the San Joaquin Valley. A commenter stated that San Joaquin Valley already has a severe designation for ozone non-attainment and expressed opposition to allowing a source of air pollution to be built in such an the area. Some comments state that the project should meet SJVAPCD requirements. A commenter mentions Section 70500(c) of the California Health and Safety Code and requirements for attainment plans for ozone adopted pursuant to Part 3, Chapter 10,

Division 26 (commencing with Section 40910), and discusses requirements for upwind air districts.

Response:
The project is within the jurisdiction of the BAAQMD, and as a result, BAAQMD regulations apply.. The SJVAPCD was afforded the opportunity to provide comments on the PDOC and may participate in the CEC licensing process for the project.

The San Joaquin Valley is designated as "non-attainment" for the state and federal ozone standards. The fact that the San Joaquin Valley is designated as "non-attainment" for certain pollutants does not mean that no new projects can be built. Neither BAAQMD nor SJVAPCD prohibit new projects solely as a result of "non-attainment" designations. Instead, the districts require new projects – including the proposed Mariposa Energy project – to incorporate strict air pollution controls to ensure that emissions are minimized, and also require new sources of emissions to be "offset" by shutting down older sources of emissions so that there is no net increase as a result of the new project. This process ensures that regional emissions from stationary sources will continually be reduced in order to bring the regions into "attainment" for all regulated pollutants.

As the lead agency under the CEQA equivalent process used for power plant licensing, the CEC will be required to ensure that the mitigation for the proposed project is adequate to mitigate any potential project significant air quality impacts including impacts in the San Joaquin Valley. The CEC's staff assessment for the project, published on November 8, 2010, and available on CEC's website, proposes that the applicant provide additional offsets if the funds provided are not sufficient to mitigate the project.[32]

The California Health and Safety Code requires the District's Clean Air Plan to address transport issues to neighboring air basins and does not require the District to mitigate individual projects.

The 2010 Clean Air Plan includes all feasible measures to reduce emissions of ozone precursors and to reduce transport of ozone precursors to neighboring air basins as required by state law. The 2010 Clean Air Plan is available at the District website at: www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx.

California Code of Regulations, Title 17, Sections 70600 and 70601 require district clean air plans, permit programs, and rule development efforts to address transport of pollutants into other air districts. These sections apply to district regulatory programs, not to individual stationary sources. To the knowledge of the District, its programs comply with Sections 70600 and 70601, and the commenter does not state otherwise.

[32] See *Mariposa Energy Project Staff Assessment* CEC 700-2010-017, California Energy Commission, November 2010, AQ-SC7 at pp. 4.1-44 to 4.1-45.

Comment XI.9 – Cost to Ratepayers

Comments were submitted stating that a more efficient plant would reduce cost to ratepayers.

Response:

Cost issues not directly related to whether the facility would meet applicable air quality-related regulatory requirements, which is the subject of the District's Determination of Compliance.

Cost issues may have been addressed by the California Public Utilities Commission.

Appendix E

Other Documents

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Dear Brenda,

Thank you for the opportunity to comment on the Mariposa Preliminary Determination of Compliance Application Number 20737. I discovered that this PDOC had been issued on September 27, 2010 during a conversation with a friend about recent power plant applications. I am on several notification lists for power plants at the districts office. I have exchanged at least 100 emails with the district and receive regular notices from the District for a number of issues. The district claimed that they notified me and sent me the two emails claiming they provided me notice with. Neither address that the district indicated is now, nor has ever been, my email address so I have never received "proper notification". I requested a 30 day extension of the comment period for this project on September 27, 2007 and the district informed me they would not extend the comment period. On September 30 the district again advised me that they would not extend the comment period. On October 15 the district sent me an email stating, "The District has decided to consider any comments submitted by you by October 27th on the Mariposa Energy project due to the mistaken email addresses that the District had for you in its records." Instead of providing a 30 day comment period as required by state and federal regulations the district has provided me with a thirteen day comment period. This is a violation of state and federal regulations. In addition the district is required to open the comment period for all of the public not just me. I therefore object and reiterate my request for an additional 30 day comment period for myself and all members of the public.

According to the PDOC, "The power plant approval process also provides opportunities for members of the public to participate in person in public hearings regarding this project. The District may hold a public meeting in accordance with Regulation 2, Rule 2, Section 405 to receive verbal comment from the public if there is sufficient reason to do so. Members of the public who would like to request that the District hold a public meeting should make such a

request, in writing, to Mr. Patil at the address set forth in the preceding paragraph prior to the end of the comment period, and should explain the reasons why a public meeting is warranted."[1]

In reviewing the CEC docket log for this project it appears that many people have requested that the district hold a public hearing. Under Regulation 2 Rule 2 Section 405 I request that a public hearing be granted for the PDOC. The district is responsible for compliance with all federal requirements not the California Energy Commission so it is necessary for the district to hear and respond to the many people who have concerns about this project. The FDOC as presented does not comply with all federal and state regulations and the analysis ignores the transport of pollutants into the San Joaquin Valley. The San Joaquin Valley is classified as a serious non attainment area for the Federal 8 hour ozone standard and severe non attainment for the California 1 hour ozone standard as opposed to the BAAQMD which is classified as marginal non attainment for the federal 8 hour ozone standard and non attainment for the California 1 hour standard. Districts within the areas of origin of transported air pollutants, as identified in HSC Section 70500(c), shall include sufficient emission control measures in their attainment plans for ozone adopted pursuant to Part 3, Chapter 10 (commencing with Section 40910) of Division 26 of the Health and Safety Code, to mitigate the impact of pollution sources within their jurisdictions on ozone concentrations in downwind areas commensurate with the level of contribution. An upwind district shall comply with the transport mitigation planning and implementation requirements set forth in this section regardless of its attainment status.

3.2 Gas Turbine Selection Process

The PDOC states on page 5,"As part of the turbine selection process, the turbine vendor provided performance data for both the water-injected and DLE LM6000 SPRINT gas turbines (see Table 1). As presented in Table 1, the water-injected LM6000 gas turbine (LM6000PC) would result in a higher electrical production rate compared to the DLE models. Although the LM6000PF turbine would have a lower NOx emission rate than the PC or PD models, the DLE models would have higher hydrocarbon and CO emission rates (except at the 17°F temperature case) compared to the water-injected PC turbine. Therefore, the LM6000PC turbine was selected by Mariposa Energy in order to meet the electrical output and reliability requirements outlined in the Mariposa Energy Project PPA with PG&E."

[1] PDOC Page 3

The conclusion to allow the applicant to choose to eliminate other variants of the LM-6000 turbine due to some classified information in their contract with PG&E is not only erroneous and contrary to law it precludes comparison of other LM-6000 variations and the significant advantages in both cost effectiveness and environmental performance and negatively affects the PDOC's BACT determinations.

According to the GE website the LM 6000 PF turbine which has been in operation since 2005 features high efficiency, superior fuel gas consumption and fuel flexibility, coupled with lower emissions and water usage in both the 50 Hz and 60 Hz segments. The LM 6000-PF has a superior heat rate and "avoids 15,000 metric tons of CO_2 emissions over the course of a 3,000-hour peaking season while producing the same electricity output, which is equivalent to the annual CO_2 emissions of more than 2,800 cars on U.S. roads. The LM 6000 PF can reduce natural gas consumption by more than 264,000 MMBtu, equivalent to the amount of natural gas consumed annually by more than 3,700 U.S. households, which can yield an annual fuel cost savings of $1.58 million at $6 per MMBtu. The LM 6000 PF can reduce NO_x emissions by 815,000 pounds, which is equivalent to the annual NO_x emissions of 21,000 cars on U.S. roads, when operating at 15 ppm NO_x instead of 25 ppm NO_x like the LM6000 PC. Most importantly the LM 6000 PF can, by incorporating DLE technology, can eliminate the use of water while lowering emissions of NO_x to 15 ppm and CO to 25 ppm, unlike the typical 60 Hz, simple-cycle turbine in this range, which uses water as a diluent. This can avoid annual water consumption of 9.9 million gallons, and can yield $100,000 per year in operational savings and eliminate the need to purchase a water treatment system[2]

The PDOC also states that, "the LM6000PD and LM6000PF gas turbines do not meet the project objective of being capable of generating 184 MWs during peak July conditions." GE has introduced new variants of the LM-6000 which have higher output than the LM-6000 PC but also contain significant economic and environmental features which should figure prominently in the BACT determination. The latest innovation for the LM6000 is the PH Dry Low Emissions (DLE) model. The new turbine has 90% common parts to the proven LM6000 family of

[2] http://www.gepower.com/prod_serv/product

http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/downloads/GEH12985H.pdf

industrial Aeroderivative gas turbines, but provides more power and better efficiency in the same footprint. The improvements are being created courtesy of advanced materials, improved manufacturing process, and minor adjustments in design. Leveraging the broad experience of GE in gas turbine technology, many of these improvements have been imported from GE Aviation and the larger GE Energy aeroderivative product, the LMS100. By utilizing already proven technology, the latest updates to the LM6000 are expected to maintain comparable reliability numbers as the existing products.

As an example of one of the changes from GE Aviation, the High Pressure Turbine (HPT) rotor of the LM6000 PG has been modified based on the GE CF6-80E aircraft engine (common on many Airbus A330 fleets). The LM6000 PC, on the other hand, has a rotor based on the older GE CF6-80C2 engine. The updated HPT rotor design improvements include new higher temperature alloys and improved cooling patterns. This switch of rotor effectively raises the pounds of thrust from 60,000 to 70,000. As a result, the LP compressor can operate at higher speeds to increase the flow, and the pressure ratio has gone from 30 to 32. Additional design changes to the HPT rotor include a new bolt pattern between the rotors in the HPT that has significantly reduced material stresses. On the PC model, the HPT rotor is the cyclic life limiting part. With the updated material and design advances, the cyclic life was improved in excess of 40% for the PG model. The LM6000 PH can reduce fuel consumption by the equivalent of 33,000 barrels of oil per year, when compared to other similar aeroderivative solutions in its class. GE's LM6000 uprate also reduces carbon dioxide emissions by 6,500 tons over the course of a typical operating year - the same emissions reduction achieved by removing 2,500 cars from the road annually. Providing an increase in power and reduced fuel consumption and emissions, the first LM6000-PG unit will be installed at Turlock Irrigation District's Almond Power Plant near Turlock, Calif. Shipment to the site will be in February 2011. The new turbine technologies are technologically feasible, cost effective and commercially available.

For the LM6000, water can be used for both NOx reduction and power augmentation. The LM-600 PF and PH use water only for power augmentation and not NOx control as the employ DLE systems. Most often the discussion on gas turbine efficiency is based on fuel consumption (heat rate, efficiency), but with many global water scarcity issues, the efficient use of water can be a critical operating profile consideration. An updated control algorithm in the fuel core manages water usage for maximum efficiency for preset conditions such as NOx output, power

output, and grid frequency. For a Single Annular Combustor (SAC) LM6000 model, water usage can be up to 13,400 l/hr during full load operation (not including any water used for cooling or inlet conditioning around the package). This water usage amount accounts for NOx abatement and for a power augmentation option called SPRINT®. Roughly 2/3 of the water consumption is for NOx abatement, and the rest is used for SPRINT®. In the control system, the water table algorithm controls water usage during key transitions of the gas turbine where excess water could be consumed. Such transitions include ramping up to full power, part power operation, and SPRINT® operation turning on/off. Figure 5 has an example of SPRINT utilization running the gas turbine at part power. As mentioned, plant efficiency analyses on operating costs are starting to analyze water consumption as well as fuel consumption. If a plant operation profile includes constant starts and stops, as well as part power operation, the savings in water can be substantial. Additionally, with improved water optimization at part power comes improved fuel efficiency seen through improved heat rate of the gas turbine. All this leads to improved operating costs for the power producer.[3] There are numerous advantages to the new DLE LM-6000 model turbines that must be considered in the PDOC's BACT and environmental analysis both in terms of environmental performance and cost effectiveness.

5.2 **Best Available Control Technology for Oxides of Nitrogen (NOx) for Turbines**

The PDOC examined combustion controls that will minimize the amount of NOx created during combustion; and post-combustion controls that can remove NOx from the exhaust stream after combustion has occurred.

Combustion Controls

The PDOC's analysis of combustion controls is limited to accepting the applicant's preference of the use of water-injection as BACT for the simple-cycle gas turbines. Water-injection is technologically feasible and commonly used at facilities of this type. The use of dry low NOx combustors is also technologically feasible and commonly used at facilities of this

[3] APPLICATION OF THE LATEST AERODERIVATIVE GAS TURBINE TECHNOLOGY Authors: Edward Wacekt, Warren Ferguson, *General Electric* http://www.iagtcommittee.com/symposium_2009/papers/203%20paper%20final.pdf Page 2

type. In this case the use of dry low NOx combustors leads to a 40% reduction in NOx concentrations before the SCR. Water injection is capable of reducing NOx concentrations to 25 ppm while DLE systems are capable of reducing NOx concentrations to 15 ppm.

The BACT analysis must consider the collateral impacts of the additional water use and the superior NOx reduction capability of the dry low NOx products. The impacts of the treatment, transportation, and consumption of the additional water must be considered and quantified in the BACT analysis. The lower heat rate offered by other variations of the GE LM-6000 turbine must be investigated as the lower heat rate will save millions of dollars of ratepayer money and reduce greenhouse gas and criteria pollutant emissions per megawatt. The applicants contract with PG&E includes a tolling agreement where ratepayers are responsible for paying for the natural gas used by the project so the applicant has no incentive to preserve fuel costs which in turn lower emissions and greenhouse gases.

Determination of BACT emissions limit for NOx for Simple-Cycle Gas Turbines

The District is also proposing to establish a BACT emissions limit in the permit of 2.5 ppm (averaged over one hour) utilizing SCR and pre combustion water control for NOx. SCR is capable of over 90 percent NOx removal. Therefore, when combined with water or steam injection which reduces NOx concentrations to 25 ppm before the SCR , NOx emissions levels of 2.5 ppmvd at 15 percent O2 when firing natural gas are achievable. This technology is considered feasible for MEP.[4]

By employing the DLE system which reduces NOx concentrations to 15 ppm the project should be able to achieve a 1.5- 2.3 ppm NOx emissions limit with the 90% control efficiency of the SCR.[5] The BACT emission limit should be set at 1.5- 2.3 PPM utilizing DLE and SCR. That would represent the proper BACT limit for this project.

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[4] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/020-email%205-26-2010%20CH2M%20to%20Patil%20Attached%20Doc_3.ashx Page 8

[5] DLE reduces NOx concentration to 15PPM x .9 SCR 90% control efficicny = 13.5 PPM in NOx reduction for a 1.5 PPM Nox emission limit.

The proposed Riverside Energy Center has just been permitted with a 2.3 PPMVD for NOx emissions.[6] The project consists of two General Electric LM6000 PC SPRINT NxGen combustion turbine generators with Emission Control Modules (ECMs) equipped with inlet air chiller coils, exhaust ducting, flue gas treatment system, emission monitoring system, a common chiller package with cooling tower, and gas compressor equipment.

Federal NO2 standard

The PDOC does not contain a demonstration of compliance with the new Federal NO_2 standard. Maximum NO_2 hourly emissions for the project are 21.276 pounds per hour.[7] The applicant has provided an analysis which purportedly demonstrates compliance with the new NO_2 standard when the maximum hourly NO_2 emissions are 18.5 lbs per hour for each turbine.[8] The higher NO2 hourly emissions from commissioning tuning and maximum hourly emissions of 21.276 pounds per hour have not been analyzed.

Modeled commissioning emissions will violate the federal NO2 standard as depicted in table 5.1-25 for the applicants AFC.

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[6] **Final** Initial Study of the Riverside Energy Resource Center Power Plant Project (08-SPPE-1), Staff Report, publication # CEC-700-2008-010-SF. Posted: December 22, 2008. (PDF file, 302 pages, **7.2 megabytes**) Page 3-34

[7] PDOC Page 60 in order to protect hourly air quality standards, the District is also proposing an additional hourly limit for operating hours during which startups occur. This limit is based on a reasonable need for the facility to start up twice in a one-hour period, which is not unforeseeable given the facility's operation as a peaker facility. The District is basing this proposed limit on two startups with a typical emissions profile as summarized in Table 27, using the following scenario: The first startup will last 10 minutes, followed by an 8 minute shutdown. The turbine would start up again for a total of 24 minutes, and the remainder of the hour (18 minutes) will be at steady-state BACT levels. These maximum hourly emissions with two startups are summarized in Table 29 below.

[8] http://www.baaqmd.gov/~/media/Files/Engineering/Public%20Notices/2010/20737/Application%20Correspondence%20and%20Supporting%20Documents/049-email%207-8-2010%20CH2M%20to%20Cabral.ashx

TABLE 5.1-25
Turbine Commissioning Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards
Impacts Associated with Commissioning Three Turbines Simultaneously

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour[b]	216	105	321	339	—
SO_2	1-hour	4.2	47.1	51.3	23,000	40,000
	3-hour	2.4	34.0	36.4	10,000	10,000
	24-hour	0.56	18.3	18.9		
CO	1-hour	205	5,039	5,244	23,000	40,000
	8-hour	69	2,645	2,714	10,000	10,000
PM_{10}	24-hour	1.9	126	128	50	150
$PM_{2.5}$	24-hour	1.9	85.3	87.2	—	35

The projects construction emissions are also expected to violate the Federal 1 NO_2 hour standard. Table 5.1-24 from the applicants AFC (below) shows that construction emissions by themselves will exceed the federal 1 hour NO2 standard without considering background concentrations. Construction emissions combined with background will be 331µg/m3. This will exceed the new Federal 1 hour NO2 standard of 188 µg/m3 by over 40%. The PDOC must analyze this impact as district regulations do not allow projects to exceed ambient air quality standards for operation of construction.

TABLE 5.1-24
Maximum Modeled Impacts from Construction and the Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration[a] ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour[b]	226	105	331	339	—
	Annual	19.5	18.8	38.3	57	100
SO_2	1-hour	1.2	47.1	48.3	655	—
	3-hour	1.1	34.0	35.1	—	1,300
	24-hour	0.19	18.3	18.5	105	365
	Annual	0.025	5.5	5.5	—	80
CO	1-hour	957	5,039	5,996	23,000	40,000
	8-hour	416	2,645	3,061	10,000	10,000
PM_{10}	24-hour	112	126	238	50	150
	Annual	6	27	33	20	—
$PM_{2.5}$	24-hour	17.9	85.3	103.2	—	35
	Annual	1.2	13.1	14.3	12	15

[a]Background concentrations were the highest concentrations monitored during 2006 through 2008.
[b]The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

PM-2.5 issues

The PDOC on page 50 states , "This facility is subject to BACT requirements for PM10 only. PM2.5, a subset of PM10, is regulated under federal requirements in 40 C.F.R. Section 52.21 (PSD) and 40 C.F.R. Part 51, Appendix S (Non-Attainment NSR). The facility is not subject to PSD or PM2.5 Non-Attainment NSR permit requirements under Section 52.21 or Appendix S because the facility is not a "major facility" for the purposes of these regulations. The District is therefore not conducting a PSD permitting analysis or an Appendix S permitting analysis for PM2.5. The District notes, however, that for combustion turbines essentially all of the PM emissions are less than one micron in diameter, so it is both PM10 and PM2.5. (*See* AP-42, Table 1.4-2, footnote c, 7/98 (available at http://www.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf). Moreover, the same emissions control technologies that will be effective for PM10 for this facility will also be similarly effective for PM2.5. The District's BACT analysis and emissions limit for PM10 will also therefore effectively be a BACT limit on PM2.5 emissions as well, even though the facility is not subject to the federal PM2.5 BACT requirements."

On October 20, 2010, the USEPA issued a final rule providing modeling thresholds for evaluating impacts of PM2.5 emissions under the Prevention of Significant Deterioration (PSD) program and the Non attainment NSR program. The rule establishes Class I and Class II Increment Thresholds and Significant Impact Levels (SILs), and a Significant Monitoring Concentration (SMC) threshold. The FDOC needs to address the applicability of the new rules and compliance of the project with the new rules. The EPA rule can be found at: http://edocket.access.gpo.gov/2010/pdf/2010-25132.pdf.

Also the projects emissions of NOx, Sox and ammonia are precursors for PM 2.5 which must be analyzed in the FDOC.

5.5 **Best Available Control Technology for Particulate Matter (PM) for Turbines**

BAAQMD originally proposed 2 pounds per hour PM-10 limit for the Mariposa Project.[9] After heavy lobbying by the applicant Mariposa Energy the PDOC proposes a 2.5 pounds per

[9] GE Paper **PM10 Emissions from LM6000 for Mariposa Energy, LLC "**BAAQMD is proposing an emissions rate of 0.0041 lb/MMBtu for

hour BACT limit. The limit is proposed based on an analysis by the applicant.[10] In the analysis the applicant list source tests for six different facilities that all utilize the LM-6000 turbines.

The data that is listed provides a solid foundation for a BACT limitation for PM-10 emissions of 1.9 to 2.3 pounds per hour per turbine. The Gilroy Energy Center has limited PM-10 emissions to 1.9 pounds per hour over a series of 9 source tests. Over a six year period from 2003 to 2006 the Creed Energy Center has achieved an emissions limit below 2.18 pounds per hour.[11] Over the same time period 2003 to 2006 the Lambie Energy Center has been able to limit PM-10 emissions to less than 2.104 pounds per hour.[12] The Los Esteros Energy Center has limited PM-10 emissions to 2.26 pound per hour in over 20 source tests conducted between July 2005 and May 2009 a four year period. The Wolfskill Peaker has limited PM-10 emissions to 2.15 pounds per hour from 2004 to 2009. Of the six facilities examined by CH2MHIL only one facility has exceeded 2.26 pounds per hour and that is the Goosehaven Peaker. Data from five of the six facilities supports a 1.9 to 2.3 pounds per hour or less PM-10 BACT emission rate. District Rule 2-2-301 (b) defines BACT as, "The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source." Clearly from CH2MHILL's analysis the most stringent emission limitation achieved by the LM-6000 turbine would be 1.9 pounds per hour achieved by the Gilroy Energy Center. To comply with Rule 2-2-301 (b) the FDOC should require a 1.9- 2.3 pounds per hour emission limitation per turbine.

The project should also be required to utilize inlet air filters to remove particulate matter from the combustion air stream, reducing the amount of particulate matter emitted into the atmosphere. A lube oil coalescer should also be required which would result in the merging together of oil mist to form larger droplets. The larger droplets will return to the oil stream instead of being emitted.

PM10 emissions. This amounts to a limit of about 2 lbs/hr of PM10 emissions for a 50 MW gas turbine out of the stack."

[10] Evaluation of General Electric LM-6000 Simple-Cycle Gas Turbine Particulate (Emissions Data) April 19, 2010 CH2MHill

[11] Evaluation of General Electric LM-6000 Simple-Cycle Gas Turbine Particulate (Emissions Data) April 19, 2010 CH2MHill Page 1

[12] Evaluation of General Electric LM-6000 Simple-Cycle Gas Turbine Particulate (Emissions Data) April 19, 2010 CH2MHill Page 1

The use of an LM-6000 turbine equipped with a DLE system will also reduce PM-10 emissions. An LM-6000 turbine equipped with a DLE system for NOx control will eliminate the particulate matter from the impurities in the water used for NOx control that can contribute to particulate matter emissions. These impurities are in the form of total suspended and dissolved solids. There are several models of the LM-6000 which come equipped with the DLE system. The LM 6000 PF, LM 6000 PH, and the LM-6000 PD all can be utilized with a DLE system which would reduce PM-10 emissions from the use of water as NOx control for the project. Two thirds of the water consumption for the project could be eliminated by using a DLE system.

5.7 **Best Available Control Technology For Startup and Shutdown Conditions for Turbines**

According to page 58 of the PDOC, "the only available approach to reducing startup and shutdown emissions from simple-cycle turbines is to use best work practices. By following the plant equipment manufacturers' recommendations, power plant operators can limit the duration of each startup and shutdown to the minimum duration achievable. Plant operators also use their own operational experience with their particular turbines and ancillary equipment to optimize startup and shutdown emissions. There is no other available control technology or technique beyond implementing best work practices that can further reduce startup and shutdown emissions from simple-cycle turbines."

The LM6000 standard 10 minutes start time can be improved to just 5 minutes. "By properly maintaining the package purge requirements, and by keeping the lube oil 'warm', approximately 2 minutes can be removed from the 10-min start sequence. Then the gas turbine acceleration rate to full load can be increased from 12MW/min to 50MW/min, reducing the time from sync idle to full load from 4 minutes down to approximately 1 minute. This reduced start time greatly enhances the LM6000's ability to get online quickly to support a reduction in load from the wind farm due to sudden changes in wind conditions"[13] and also greatly reduces start up and shut down emissions for all pollutants.

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[13] APPLICATION OF THE LATEST AERODERIVATIVE GAS TURBINE TECHNOLOGY Authors: Edward Wacekt, Warren Ferguson, *General Electric* http://www.iagtcommittee.com/symposium_2009/papers/203%20paper%20final.pdf Page 7

Innovation in Turbine Inlet Conditioning

Many GE Aeroderivative gas turbines are frequently needed to perform on the hottest days to provide peak power. Unfortunately, as the inlet air temperature to a turbine goes up, the power it can generate goes down. This has driven the need for inlet-chilling systems. Traditionally, there have only been two options available to customers: evaporative or mechanical coolers. In response to customers seeking more power with less variations due to ambient effects, GE Energy has teamed with Energy Concepts, Nooter/Eriksen and The Industrial Company (TIC) to design, build and supply an inlet air chilling unit that utilizes an ammonia-based absorption refrigeration cycle which recovers the exhaust heat from a gas turbine as the heat source. In place of a mechanical chilling system, the ARCTIC unit enables the gas turbine to provide up to 5 percent more power on hot days, no requirement for 4,160V power or switchgear, improved heat rate and less maintenance requirements. The preengineered skid allows for less site civil work and improves system interconnection compared to existing systems today. The use of an absorption system minimizes the impact of parasitic loads at hotter ambient temperatures. The use of inlet chilling on aeroderivative gas turbines provides a substantial improvement to a turbine's power output and efficiency. An innovative solution has been developed by a partnership to equip GE's aeroderivative gas turbines with a more efficient and factory packaged inlet chilling alternative. The new system provides more hot-day power than other chilling systems available on the market today. The first commercial unit has been shipped to site with commissioning to occur in the third quarter of 2009, where it will be operating on an LM6000 PC Sprint unit serving the Electric Reliability Council of Texas (ERCOT) market. The system description, customer benefits and market potential are discussed below.

Technology Alternatives

Turbine inlet chilling today is comprised of two primary technologies: mechanical chilling and evaporative cooling. Mechanical chilling uses mechanical compression to reduce the inlet air temperature to optimize the gas turbine's output. It does so, however, at the cost of high parasitic loads, which reduce the net gains achieved by chilling the inlet air. Evaporative cooling sprays water into the turbine inlet air stream where it evaporates, cooling the air. Evaporative cooling is not always as effective at increasing power output as mechanical chilling, but the capital costs

associated with it are less than the costs of mechanical chilling, as are the parasitic loads. The LM6000 has been among the most widely accepted aeroderivative gas turbine to serve the power generation segment since its commercial debut in 1992. The diversity and depth of the market experience gained has shown several key performance criteria sought by customers: Consistent net output, low parasitic load for a lower heat rate, 10-minute fast start and high reliability and low maintenance requirement. Neither traditional mechanical or evaporative cooling systems can support all of these needs, which established the design parameters for the new Absorption Refrigeration Cycle Turbine Inlet Chilling, or ARCTIC, system. This new system has the ability to provide more power on the hottest temperature days, which enables an even better heat rate than all other alternatives. There are some key economic advantages ARCTIC provides customers, notably: more power and fewer support systems. The use of absorption chilling reduces the parasitic loads associated with mechanical chiller compressors, pumps and motors. In applications where selective catalytic reduction is needed for emissions abatement, the reduced temperature of the exhaust can also eliminate the need for tempering air fans.

The system can also produce chilled air during unit startup so that more power can be produced faster than existing mechanical systems. Also, the ARCTIC system does not require 4,160 volt transformer, switchgear and cabling, thus reducing the total number of systems to interconnect. These benefits have all been enabled in a system that can be packaged in a factory for faster site installation, improving the efficiency of the overall plant.

Arctic System

The employment of an ammonia-water refrigeration cycle has been used for many smaller applications over the past 100 years and its favorable properties have caused it to become the industrial refrigerant of choice. The ARCTIC system is comprised of five simple core components: turbine inlet air coil, heat recovery vapor generator, evaporative condenser, absorber cooler and ARCTIC skid. The turbine inlet air coil (TIAC) is placed in the same position within the air filter house as today's mechanical chilling coils. The thermal energy of the gas turbine is extracted from the exhaust by the heat recovery vapor generator (HRVG) tubes. These tubes carry the high-pressure ammonia into the exhaust stream where it is heated to create the working temperature gradient needed for the ammonia water separation. The working fluid

is then passed through the skid-mounted Rectifier where the separation of the ammonia water solution occurs. The ammonia is then passed through a condenser to convert the fluid back into a liquid stage before going through the TIAC. The vapor is then blended with the water-ammonia mixture loop in the absorber cooler. The process is complete when the mixture is then pressurized and passed back through the rectifier in a closed capacity before reentering the HRVG. The elegance of the ARCTIC system is the ability to provide all of these systems in a skid-mounted design that facilitates plant flexibility along with unit operability. This simplified summary of components underscores the robust engineering analysis performed on this refrigeration cycle. The system has been evaluated for its structural impact to the air filter, the airflow distribution to ensure adequate cooling and thorough reviews of the manufacturing and controls aspects as well. All applicable design practices by GE have been incorporated to the motors, controls, hazardous protection and detection systems, which the entire team has incorporated. In full, there have been over 100 drawings created and hundreds of engineering hours spent to ensure the ARCTIC system is reliable and capable of meeting or exceeding design targets.[14]

. Greenhouse Gas BACT

The PDOC contains no BACT analysis for Greenhouse gasses. There are variations of the LM-6000 turbines which result in substantial reductions in greenhouse gas emissions. **GE's** latest enhancement of its proven LM6000 aeroderivative gas turbine product line is the LM6000 PG with single annular combustor (SAC) and its dry low emissions (DLE) equivalent, the LM6000 PH. Both turbines offer a 25% simple cycle power increase.[15] This translates into a large reduction in Greenhouse gas emissions using a slight variation of the proposed LM-6000.

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[14] http://www.powergenworldwide.com/index/display/articledisplay/5563823368/articles/power-engineering/volume-114/issue-10/features/innovation-in-turbine-inlet-conditioning.html

[15] http://www.gepower.com/about/press/en/2008_press/060408b.htm

The LM 6000-PF has a superior heat rate and ”avoids 15,000 metric tons of CO_2 emissions over the course of a 3,000-hour peaking season while producing the same electricity output, which is equivalent to the annual CO_2 emissions of more than 2,800 cars on U.S. roads.[16]

Incorporating the DLE system of the LM-6000-PF, Lm6000PH or the LM-6000 PD further reduces CO_2 emissions by eliminating two thirds of the water the facility uses for NOx control thus lowering the CO_2 emissions from the transportation, treatment and disposal of the ZLD waste.

[16] http://www.gepower.com/prod_serv/product

http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/downloads/GEH12985H.pdf

California Pilots Association (CALPILOTS)
c/o Andy Wilson
31438 Greenbrier Lane
Hayward, CA 94544
November 9, 2010

Via First Class Mail and EMAIL

Bay Area Air Quality District ("BAAQMD")
939 Ellis St.
San Francisco, CA 94109
Re: Mariposa Energy Project BAAQMD PDOC Application 20737
Attention: Brenda Cabral
(415) 749-4686

bcabral@baaqmd.gov
Supervising Air Quality Engineer

Dear Brenda,

California Pilots Association ("CALPILOTS") respectfully submits these comments on the Mariposa Energy Project PDOC Application 20737. For the reasons set forth below, the BAAQMD should not issue the Final Determination of Compliance ("FDOC") until the PDOC includes the cumulative effect of the CEC East Altamont Power plant California Energy Commission ("CEC") East Altamont Energy Center (CEC Docket 01-AFC-AC and 01-AFC-4) power plant to include but not limited to emission effects on pilots passengers and aircraft. Until this is considered and until the appeals pending before the EPA's Environmental Appeals Board are adjudicated the PDOC is incomplete.

Currently there are five appeals challenging the Russell City Energy Center's ("RCEC") Prevention of Significant Deterioration Permit ("PSD") pending before the EPA's Appeals Board ("EAB"). See EAB Appeal Nos. PSD 10-01, et al. available at
http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/f22b4b245fab46c6852570e6004df1bd/df250cdc9ddc2bce852576ef00513d84!OpenDocument

CALPILOTS is one of the petitioners in those appeals. The EAB heard arguments in the case on July 22, 2010, and the petitioners are now awaiting a decision.
In short, the BAAQMD should not approve or issue the proposed air quality FDOC; instead should be deferred until the EAB has adjudicated the pending appeals and include cumulative effects on pilots, passengers and aircraft of both power plant plumes that would have a direct of health and safety.

CALPILOTS hereby requests a Public Hearing on this matter.

Sincerely,
/s/
Andy Wilson
CALPILOTS Director-at-Large
CEC Intervener Mariposa Energy (Docket No. 09-AFC-3)
510-303-9027
Andy_psi@sbcglobal.net
CC:

CALPILOTS File