AIR QUALITY

Testimony of Magdy Badr

INTRODUCTION

This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Sutter Power Plant Project (SPP). Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), ozone (O3) and its precursors (NOx and VOC), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM10) and its precursors: NOx, VOC, SOx, and lead (Pb).

In carrying out its analysis, the California Energy Commission staff identifies the potential air quality impacts associated with the SPP, evaluates the project's conformance with all applicable air quality laws, ordinances, regulations and standards (LORS), evaluates the adequacy of proposed mitigation measures and the need for alternative or additional mitigation measures, and proposes specific conditions of certification, including those recommended by the local air pollution control district (California Code Regs., Title 20, Section 1742(b), 1742.5(b), and 1744(b)).

Staff addresses the following questions:

- whether the project is likely to conform with applicable air quality laws, ordinances, regulations and standards,
- whether the process equipment and the pollution control devices are properly sized and will perform their functions as expected,
- whether the project is likely to cause significant adverse environmental effects, including new violations or contributions to existing violations of the applicable ambient air quality standards,
- whether any identified air quality impacts are adequately mitigated, and
- whether any specific project configurations, gas turbines, or control devices, alone or in combination, will result in lesser impacts to the environment, and thus can be considered as potential mitigation measures for air quality impacts.

The air quality regulatory agencies involved in the review of the SPP, including the Feather River Air Quality Management District (District), the California Air Resources Board (CARB), and the U.S. Environmental Protection Agency (EPA), Region IX, and the commission staff, have participated in resolving all of the potential air quality issues associated with the project. The District has issued its Final Determination of Compliance on the project and staff has finalized their recommendations.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

The federal New Source Review (NSR) program, which is administered by the District requires the SPP to comply with the Lowest Achievable Emission Rate (LAER) for NOx, VOC and CO and to provide offsets for emissions of these pollutants. In addition, Calpine must certify that all facilities they own and operate comply with applicable requirements contained in the State Implementation Plan. The Environmental Protection Agency (EPA) has revoked the one hour ozone standard for the northern portion of Sutter County in which the SPP will be located, as of July 1998, and it has been replaced by the new 8-hour ozone standard. However, the existing District NSR rules will remain in effect until rules based on the new 8-hour ozone standard are developed and adopted. Therefore, the Calpine project must still comply with all existing Federal NSR rules.

The SPP facility is located in an attainment area for NO2, SO2 and CO, and is subject to the Prevention of Significant Deterioration (PSD) review for those air contaminants. In general, the project must comply with Best Available Control Technology (BACT) for NO2, SO2 and CO and demonstrate that its emission impacts will not significantly degrade the existing ambient air quality in the region. EPA Region IX retains PSD review authority. The PSD trigger levels are 40 tons per year for NOx, CO, VOC and SO2 and 15 tons for PM10. The SPP is subject to PSD review for NOx, CO and PM10 since the annual emission levels are higher than the PSD trigger levels.

The power plant's gas turbines are also subject to the federal New Source Performance Standards (NSPS). These standards include a NOx emissions of no more than 75 ppm at 15 percent excess oxygen (ppm@15%O2), and a SOx emissions of no more than 150 ppm@15%O2.

States are required by Title V of the Federal Clean Air Act (FCAA) to implement and administer the operating permit programs with the goal of ensuring that large sources are in compliance with all applicable requirements. These requirements are contained in Title 40 CFR, part 70. To comply with Title V, the District has the authority to administer the federal operating permit program and has adopted Regulation X, Rule 10.3. The Acid Rain Provisions of the FCAA establish an emission allowance/tracking program and impose monitoring of SO2 and NOx emissions. All electrical generating facilities labeled as "affected units" are subject to acid rain regulations. The SPP is subject to acid rain regulations and must comply with all requirements. Calpine will estimate SO2 emissions using the approved emission factors and measured heat input rate. The CO2 emissions are estimated using a carbon balance for natural gas and measured heat input. The heat input will be monitored on a continuous basis with an accuracy of $\pm$ 2 percent. The heat content of the natural gas will be measured or certified monthly by the natural gas distributor. Furthermore, the SPP will be required to install, operate and certify NOx continuous emission monitoring systems (CEMS). All calculation methodologies and CEMS must be installed and certified within 90 days following the commencement of the operation of the power plant. However, since the

SPP will utilize natural gas in its operation, the project is exempted from the installation of CEMS for SO2, CO2 and volumetric flow rate. The following AIR QUALITY Table 1 summarizes the federal and state ambient air quality standards and the averaging time for each pollutant.

STATE

The California State Health and Safety Code, Section 41700, requires that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property".

LOCAL

The following is a concise summary of the major applicable District Rules and Regulations:

Regulation III, Rule 3.0	Prohibits a person from discharging visible emissions greater than Ringleman No. 2, which is equivalent to 40 percent opacity.
Regulation III, Rule 3.2	Prohibits a person from discharging particulate matter in concentrations greater than 0.3 grains per cubic foot of gas at standard conditions.
Regulation III, Rule 3.10	Prohibits a person from discharging sulfur oxides in excess of 0.2 percent by volume (2,000 ppm), collectively calculated as SO2.
Regulation III, Rule 3.16	Regulates operations which periodically may cause fugitive dust emissions into the atmosphere.
Regulation IV	Defines the authority to construct and permit to operate processes associated with stationary emission sources.
Regulation X, Rule 10.1	Defines the New Source Review process, including best available control technology (BACT) requirements, and ambient air quality impact assessment and emission reduction credit requirements.

AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O3)	1 Hour	0.12 ppm (235 µg/m^3)	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO2)	Annual Average	0.053 ppm (100 µg/m^3)	---
	1 Hour	---	0.25 ppm (470 µg/m^3)
Sulfur Dioxide (SO2)	Annual Average	80 µg/m^3 (0.03 ppm)	---
	24 Hour	365 µg/m^3 (0.14 ppm)	0.04 ppm (105 µg/m^3)
	3 Hour	1300 µg/m^3 (0.5 ppm)	---
	1 Hour	---	0.25 ppm (655 µg/m^3)
Suspended Particulate Matter (PM10)	Annual Geometric Mean	---	30 µg/m^3
	24 Hour	150 µg/m^3	50µg/m^3
	Annual Arithmetic Mean	50 µg/m^3	---
Sulfates (SO_4)	24 Hour	---	25 µg/m^3
Lead	30 Day Average	---	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	---
Hydrogen Sulfide (H_2S)	1 Hour	---	0.03 ppm (42µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	---	0.010 ppm (26 µg/m^3)
Visibility Reducing Particulates	1 Observation	---	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Regulation X, Rule 10.3 Requires the preparation and submittal of Title V operating permit and acid rain permit applications. Applications for new sources are due within 12 months of initial operation of the source.

Regulation XI, Rule 11.3 Restricts the use of hexavalent chromium water treatment chemicals in cooling towers. Limits hexavalent chromium emissions to existing cooling towers.

SETTING

METEOROLOGY AND CLIMATE

The SPP will be located in Sutter County, approximately seven miles southwest of Yuba City, California. It will be constructed on a twelve acre parcel adjacent to the Greenleaf Unit 1 cogeneration facility. The area surrounding the project site is flat. The Sutter Buttes is the nearest elevated terrain, which is located nine miles northeast of the project site.

Sutter County is part of the Sacramento Valley Air Basin, which is surrounded by the Coastal Mountain Range to the west, the Sierra Nevada to the east, the Cascade Range to the north and the San Joaquin Valley Air Basin to the south. The Sacramento Valley has a moderate mediterranean climate, which is characterized by hot, dry summers and cool, rainy winters. The annual average rainfall is approximately 17 inches. The majority of the rain falls from October to April. The North Pacific storm track intermittently dominates the Valley weather, with periods of dense and persistent low-level fog often occurring between storms. The frequency and persistence of heavy fog in the Valley diminishes with the approach of spring, when the days lengthen and the intensity of the sun increases.

During the summer, the Pacific storm track is usually north of the Sacramento Valley, the afternoon temperatures are warm to hot, while nights are usually mild due to cool marine air intrusion from the San Francisco Bay Area. Meteorological data collected at the Sacramento Executive Airport (which is over 30 miles away from the project site) indicate that July is usually the warmest month of the year, with a normal daily maximum temperature of 93^{O}F, and a normal daily minimum of 59^{O}F. In the fall and spring, the afternoon temperatures are mild, in the 60's and 70's, while nights are cool, in the 40's and 50's. In the winter, temperatures are cool in the afternoon and crisp at night. The coldest month is usually January, with a normal daily maximum of 53^{O}F and a normal daily minimum of 38^{O}F. The recorded high temperature is 115^{O}F and the recorded low temperature is 18^{O}F.

The prevailing wind is southerly during most of the year. However, in November and December, a large north to south pressure gradient develops over Northern California and northerly winds prevail. Wind directions are often influenced by the topography of the Central Sacramento Valley and the surface pressure gradient between the coast and the Valley. Figures 1 through 5 show the annual and quarterly Windroses

AIR QUALITY Figure 1
Windrose Annual

AIR QUALITY Figure 2
Windrose Q1

AIR QUALITY Figure 3
Windrose Q2

AIR QUALITY Figure 4
Windrose Q3

AIR QUALITY Figure 5
Windrose Q4

reported (as reported by Calpine in December 1997 submittal) from the closest meteorological monitoring station at Beale Air Force Base which is located 15 miles east of the project.

EXISTING AMBIENT AIR QUALITY

Ambient air quality monitoring data collected in the Sutter area between 1993 and 1996 are shown in AIR QUALITY Table 2. Staff evaluated the data collected from the Sutter County air monitoring stations, which are located at Sutter Buttes, Yuba City and Pleasant Grove. As can be seen in AIR QUALITY Table 2, based on the magnitude of the pollutant concentrations and the numbers of days with violations of the California Ambient Air Quality Standards (CAAQS), ozone and PM10 are the air pollutants of the greatest concern in the Sutter County area. The highest one hour ozone concentrations exceed the CAAQS during all four years. The highest twenty four hour concentrations for PM10 also exceeds the CAAQS during all four years. But the highest annual pollutant concentrations in 1995 and 1996 are below the CAAQS standards. The data also show no violations of the one hour or the 8-hour state and federal CO standards. No violations of the one hour or the annual concentrations of the NO2 CAAQS and National Ambient Air Quality standards (NAAQS). There was no data available for SO2 from the Sutter County air monitoring stations. All PM10, NO2 and CO data presented in AIR QUALITY Table 2 were collected at the Yuba City monitoring station.

AIR QUALITY Tables 3 and 4 provide a summary of the PM10 and ozone ambient air quality monitoring data collected between 1991 and 1996 from air monitoring stations located in Sutter County and Colusa County. It is clear from Table 3 that the number of days in violation of the state 24-hour average concentration of PM10 standard varies from 1991 through 1996. However, there is no clear trend or indication that PM10 air quality is improving, but the data suggest that most of the violations occur during the fall season. However, the data collected in the Sutter County area are limited to the two air monitoring stations located in Yuba City and Colusa. AIR QUALITY Table 4 presents the highest one hour average ozone concentrations, number of days of violations of the state ozone standard and the months in which the violations occurred. It is clear that the state ozone standard is violated mostly during the summer months.

AIR QUALITY Table 2
Sutter Area Ambient Air Quality Monitoring Data

Pollutant		1996	1995	1994	1993	Most restrictive Ambient Air Quality Standard
Ozone	Highest 1-hr concen. (ppm)	0.12[S]	0.13[P]	0.12[S]	0.14[P]	0.09 (CAAQS)[E]
	# of days with violations of CAAQS	22	16	23	4	---
PM10	Highest 24-hr concentrations ($\mu g/m^3$)	82[Y]	128[Y]	154[Y]	78[Y]	50 (CAAQS)
	# of days with violations of CAAQS	5	16	7	11	---
	Highest annual concentrations ($\mu g/m^3$)	25.5	29.5	31.1	32.3	30 (CAAQS)
NO_2	Highest 1-hr concen.(ppm)	.07[Y]	0.07[Y]	0.08[Y]	0.09[Y]	0.25 (CAAQS)
	Highest annual concen.(ppm)	0.013	0.014	0.016	0.017	0.053 (NAAQS)[F]
CO	Highest 1-hr concen.(ppm)	8.0[Y]	8[Y]	9[Y]	10[Y]	20.0 (CAAQS)
	Highest 8-hr concen.(ppm)	4.9	4.8	6.3	7.3	9.0 (CAAQS)
SO_2	Highest 1-hr concen.(ppm)	NA	NA	NA	NA	0.25 (CAAQS)
	Highest 24-hr concen.(ppm)	NA	NA	NA	NA	0.05 (CAAQS)
	Annual Avg. (ppm)	NA	NA	NA	NA	0.003

Y Ambient data collected at Yuba City monitoring station.
S Ambient data collected at Sutter Buttes monitoring station.
P Ambient data collected at Pleasant Grove monitoring station.
F National Ambient Air Quality Standard.
E California Ambient Air Quality Standard.

Source: CARB. 1988-1991 "California Air Quality Data".

AIR QUALITY Table 3
PM10 Air Quality Summary 1991-1996
Maximum 24-hour Average Concentration (µg/m3)

Year	Yuba City - Almond St				Colusa - 100 Sunrise			
	Highest 24-hour Average (µg/m3)	Days above state std.	% of Annual Violations †	Months violations occurred	Highest 24-hour Average (µg/m3)	Days above state std.	% of Annual Violations †	Months violations occurred
1991	108	22	32%	J, O, N, D	102	19	31%	J, O, N, D
1992	79	13	18%	J, Au, S, O, N	84	8	11%	Au, S, O
1993	78	11	15%	S, O, N	70	4	6%	S, N
1994	154	7	11%	J, Au, S, O	57	5	8%	S, O
1995	128	16	24%	F, O, N	93	18	25%	S, O, N
1996	82	5	8%	J *	57	3	5%	My *
California Ambient Air Quality Standard: 50 µg/m^3 (24-hour average) National Ambient Air Quality Standard: 150 µg/m^3 (24-hour average)								

Source: CARB. 1991-1996 "California Air Quality Data".

† The percent of annual violations is the number of days above the CAAQS compared to the total number of measurements annually. Measurements usually occur every sixth day.

* The reported data for 1996 is limited to the months of January to June.

Month abbreviations: J-January, F-February, M-March, Ap-April, My-May, Ju-June, Jl-July, Au-August, S-September, O-October, N-November, D-December

AIR QUALITY Table 4
Ozone Air Quality Summary, 1991-1996

Year	Pleasant Grove			Sutter Buttes			Yuba City - Almond ST		
	Highest 1-hr. Avg. (ppm)	Days above state std.	Months violations occurred	Highest 1-hr. Avg. (ppm)	Days above state std.	Months violations occurred	Highest 1-hr. Avg. (ppm)	Days above state std.	Months violations occurred
1991	0.10	7	Jl, S, O	NA*	NA*	NA*	0.11	5	F, Jl, S, O
1992	0.12	12	My, Ju, Jl, Au, S	NA*	NA*	NA*	0.12	23	My, Ju, Jl, Au, S, O
1993	0.14	4	My, Ju, Au	0.12	11	Jl, Au, S, O	0.10	1	Jl
1994	0.10	1	Au	0.12	23	My, Ju, Jl, Au, S, O	0.11	12	Jl, Au, S, O
1995	0.13	11	Jn, Jl, Au, S	0.11	16	Ju, Jl, Au, S, O	0.11	8	Jl, Au, S
1996	0.10	7	Ju, Jl, Au	0.12	22	Ju, Jl, Au, S, O	0.11	11	Ju, Jl, Au, S, O
California Ambient Air Quality Standard: 0.09 ppm (1-hour average) National Ambient Air Quality Standard: 0.12 ppm (1-hour average)									

Source: CARB. 1991-1996 "California Air Quality Data".*
Data are Not Available (NA).

Month abbreviations: J-January, F-February, M-March, Ap-April, My-May, Ju-June, Jl-July, Au-August, S-September, O-October, N-November, D-December

ATTAINMENT STATUS

Sutter County is divided into north and south air quality regions with a dividing line at Subaco Road, approximately 7.1 miles south of the SPP site. For air quality planning purposes and based on the populations in the area, the U.S. EPA established that the southern portion of Sutter County is part of the Sacramento Air Quality Maintenance Area (SAQMA). The attainment status of Sutter County for different air pollutants is presented in AIR QUALITY Table 5.

AIR QUALITY Table 5
Attainment Status Of Sutter County

Pollutant	Federal Attainment Status	California Attainment Status
NOx	Attainment/Unclassified	Attainment/Unclassified
CO	Attainment/Unclassified	Attainment/Unclassified
SO2	Attainment/Unclassified	Attainment/Unclassified
Ozone-Northern Portion	No Status	Nonattainment
Ozone-Southern Portion	Serious Nonattainment	Serious Nonattainment
PM10	Attainment	Moderate Nonattainment
Lead	Attainment/Unclassified	Attainment/Unclassified

Source: Calpine (Calpine Corporation). 1997. Page 8.1-12.

PROJECT DESCRIPTION

This section describes the project design and criteria pollutant control devices as presented in the SPP's application and subsequent data responses filed since December 1997.

PROPOSED EQUIPMENT

The major equipment proposed in the SPP application includes the following:

- Two Westinghouse 501FC combustion turbine generators with a gross capacity of 170 MW of electricity each;
- One steam turbine generator with a gross capacity of 160 MW;

- Two heat recovery steam generators (HRSG) with a capacity of 463,769 lb/hr of high pressure steam;

- Two duct burners, each with a firing capacity of 170 MMBtu/hr high heating value (HHV);

- Dry cooling tower;

- Continuous emission monitoring system (CEMS) for NOx, oxygen (O2) or CO2 and exhaust flow rate;

- Emission control systems include:
  - dry low-NOx combustors;
  - selective catalytic reduction (SCR) to control NOx;
  - oxidation catalyst to control CO and VOC.

COMBINED CYCLE FACILITY OPERATION

Calpine is proposing to construct and operate a combined cycle facility using two combustion turbines, which will each exhaust into a HRSG. Each HRSG is also equipped with supplemental duct firing to be used to produce steam for the steam turbine. It is expected that each duct burner would operate 5,460 hours/year.

The inlet air will flow through the inlet air filter/evaporative coolers and air inlet ductwork of the CTGs. It will be compressed to increase its pressure, then flow to the combustion section of the turbine. Natural gas fuel will be injected at the appropriate pressure into the combustion section and ignited. The hot combustion gases will expand though the turbine section of the CTGs, causing the turbine blades to rotate and drive the electrical generators and compression sections. The hot combustion gases will exit the turbine sections into the HRSG where water will be heated. The water will be converted to superheated steam and delivered to the steam turbine. The steam turbine will drive the electrical generator to produce additional electrical capacity. The steam will exit the low pressure side of the steam turbine and pass through a surface condenser, which will give up heat to cooling water that will be condensed to a liquid.

The cooling water will cycle through a dry cooling tower where the heat will be rejected to the atmosphere. The project is expected to have an availability factor of over 90 percent. The CTGs will produce, each, approximately 170 MW of electrical power at an average ambient temperature of 61^{O}F.

The primary fuel used in the CTGs and the duct burner is pipeline quality natural gas. No other back-up fuel will be used in the project. The SPP project will require a new gas pipeline with two dehydrator units. These dehydrator units will remove water and condensable hydrocarbons from the natural gas. Glycol solution will be used in the condensation process to cool the natural gas. A natural gas boiler will be used to

regenerate the glycol solution by heating it to approximately 375 ^{o}F. These boilers are rated at a maximum heat input of 1,000,000 Btu per hour (HHV).

Air Pollution Control Equipment

The CTGs will employ dry low NOx combustors and good combustion design to control CO and NOx emissions. NOx emissions from the combustion turbines into the HRSGs will be controlled to 25 ppm. It will be controlled further by a SCR unit located in the HRSG which will reduce the NO_x level to 2.5 ppm (15 percent O_2), averaged over one hour, as measured at the stack. The SCR unit will use anhydrous ammonia. The ammonia slip (ammonia emissions in the exhaust) will be limited to 10 ppm measured at the stack.

Particulate emissions from the CTGs will be controlled by inlet air filtration, the use of filtered natural gas as the sole source of fuel, and the use of dry low NO_x combustion turbine burner technology.

The CTGs (Westinghouse) are designed to minimize the formation of CO and ROG. It is estimated that CO and ROG concentrations at a base load operating level will be as low as 4 ppm and 1 ppm (15 percent O_2), respectively. Calpine is proposing to install a CO/ROG oxidation catalyst to guarantee achieving these levels.

Continuous emission monitors (CEMs) are proposed to be installed on the exhaust stacks for NO_x and oxygen, to assure adherence to the proposed emission limits. The CEMs will be installed, calibrated, operated and maintained in accordance with District procedures and applicable EPA Performance Specifications 2, 3, and 4 of Title 40, Code of Federal Regulations, Part 60, Appendix B.

ESTIMATED PROJECT EMISSIONS

SPP Project's Construction Activities and Associated Air Emissions

During the project construction period, air emissions will be generated from the exhaust of heavy construction equipment, such as water trucks, rollers, excavators, graders, tractors, air compressors, forklifts, dozers, and scrapers; fugitive dust will be generated from activities such as cleaning, grading, and preparation of the site; and from the construction of the transmission lines and gas line.

The estimated air pollutant emissions in the tables below are based on the assumption that all equipment is operating concurrently and maintained and operated properly. The air emissions associated with the construction of these facilities are summarized in AIR QUALITY Tables 6 and 6A. AIR QUALITY Table 6 summarizes the daily air emissions associated with each construction phase of the project, including the linear facilities.

The construction of the proposed natural gas line, drip stations, natural gas dehydrators, switchyard and transmission lines will generate short-term air emissions

in the form of fugitive dust and vehicle emissions. The pipeline route requires a total of 13 miles of trenching for a 16-inch diameter pipe. The trench is expected to be 2.5 to 3 feet wide and 6 to 7 feet deep. The natural gas line requires two new dehydrator units, one to be located at the Sacramento Drip Station in Sutter County, and the other at Poundstone Drip Station in Colusa County. Both drip stations will be permitted, owned and operated by PG&E. The air emissions associated with the dehydrators are generated from the condensation tank, which will vent VOC emissions, and from operation of the boilers which will burn natural gas at 1,000,000 Btu per hour. The boilers will operate 8,760 hours per year. The air emissions associated with the dehydrators, boilers and fugitive VOC emissions from the valves and flanges are summarized in AIR QUALITY Table 7.

The electrical transmission line will require the installation of approximately 32-38 poles. Each pole will be supported by a 3.5 feet in diameter and 12 feet deep hole for concrete foundation. In addition, the switchyard site will be excavated to a depth of two feet to allow for the installation of the ground grid and conduits. A summary of the air emissions associated with the construction activities for the gas pipe line, switchyard and transmission lines is shown in AIR QUALITY Table 7A.

AIR QUALITY Table 6
Estimated SPP Construction Emissions (lb/Day)

NOx	SO_X	PM_{10}	CO	ROG
Phase I - Site Preparation Emissions				
315	27.7	343	153	37.5
Phase II - Construction Emissions				
163.5	14.1	19.3	77.2	19.8
Construction Worker Vehicle Emissions				
19.5	0	7.7	106	12.1
Natural Gas Line Construction Emissions				
40	4	37	28	5
Electrical Transmission Lines Construction Emissions				
57.9	4.2	7.2	26.3	6.8
Site Elevation Emission Estimates (Equipment & Fugitive Dust)				
154	18	1941(1)	178	23
Switchyard Construction Emissions				
57.5	5	11	35.1	9.3
1. This value includes 550 lb/day from equipment PM10 emissions and 1,391 lb/day from fugitive dust.				

Sources: Calpine (Calpine Corporation). 1997 page 8.1-25 through 8.1-31) and Calpine (Calpine Corporation). 1998j. Response to data requests 64 and 66 with additions to 63, 67 and 68.

AIR QUALITY Table 6A
Estimated SPP Construction Emissions (lb/Project)

Equipment Type	NOx	SOx	PM10	CO	ROG
Heavy-duty Construction Equip. Phase I[4]	6,659	616	819	3,188	886
Light-duty Trucks[4]	6,517	592	764	3,371	853
Worker Vehicles[1]	4,200	(2)	1,600	23,400	2,600
Delivery Vehicles[4]	1,235	82	141	534	141
Wheeled Tractors[4]	570	48	59	384	81
Track type loaders[4]	1,635	137	204	762	136
Fugitive Dust from Excavation & Delivery[3]			9,216		
Total Emissions (lbs)	**20,815**	**1,476**	**12,804**	**31,640**	**4,697**
SPP Construction Emissions (tons)	**10.4**	**0.74**	**6.4**	**15.82**	**2.35**

1. Assumes that: a) vehicles are 1990 models, 250 workers, 208 vehicle, 80 miles round trip, avg. speed 45 mi/hr., 1.2 worker/vehicle and 2 cold start-up/vehicle/day.
2. Anticipated to be negligible based on the fuel sulfur content and engine efficiency.
3. Based on: AP-42 section 13.2.3.3., 64 percent of the TSP emissions is PM10.
4. Based on: a) emission factors from EPA 1991, b) all particulate matter assumed to be PM10.

Source: Calpine (Calpine Corporation). 1997. Pages 8.1-27-30.

AIR QUALITY Table 7
Drip Stations Natural Gas Dehydrators Emissions*

Pollutant	lb/hour	lb/day	Ton/Year
NOx	0.2	4.8	0.86
CO	0.042	1.0	0.18
VOC	0.012	0.28	0.06
SO2	0.0012	0.028	0.006
PM10	0.024	0.56	0.1

* Natural gas dehydrator units construction emissions include Sacramento and Poundstone Drip Stations. Emissions estimates are based on the revised (oct. 1996) U.S. EPA AP-42 emission factors, section 1.4.

Source: Calpine (Calpine Corporation). 1997. Page 8.1-25.

AIR QUALITY Table 7A
Estimated Linear Facilities Construction Emissions

	NOx	SOx	PM10(1)	CO	ROG
Natural Gas Line	4,247	385	3,925	2,932	526
Electrical Transmission Lines	3,400	280	280	1,440	280
Switchyard	5,800	400	1,200	3,600	1,000
Site Elevation (equipment)	5,529	654	550	6,392	810
Site Elevation (Fugitive Dust)		0	49,891		
Total Emissions (lbs/Project)	18,976	1,719	55,846	14,364	2,616
Total Emissions (tons/Project)	**9.5**	**0.86**	**28**	**7.2**	**1.3**

1. Includes both vehicle exhaust and fugitive dust.

Source: Calpine (Calpine Corporation). 1997. Pages 8.1-30-32.

Potential Criteria Pollutants Generated from the Operation of SPP Project

Air emissions will be generated from the dehydrators and the major components of the SPP project. Calpine assumes that each dehydrator unit includes 100 glove valves and 100 flat gasket flanges. By using the American Petroleum Institute (1980) emission factors of 0.471 lbs/day for the valves and 0.267 lbs/day for the flanges, the total hydrocarbon emissions are 26,937 lbs/year. The Applicant assumes that natural gas is approximately 95.21 percent by volume methane and carbon dioxide and 4.79 percent by volume VOCs. By using these assumptions, the maximum annual fugitive VOC emissions for all valves and flanges is 0.65 ton per year.

Air pollutant emissions will also be generated from operating the major project components. The SPP will utilize two combustion turbines. Calpine examined more than one turbine type and chose the Westinghouse 501FC turbine for the SPP project. Staff evaluated the air emissions associated with the turbine based on manufacturer hourly guaranteed emission factors.

The proposed operating assumptions are:

a) operating each turbine for 19 hours per day with a maximum 8,110 hours per year;

b) operating each duct burner for 22 hours per day with a maximum 5,460 hours per year;

c) two start-ups per day for each turbine, one hot start-up for one hour and one cold start-up of 3 hours (only two hours of uncontrolled emissions); cold start-up is when the turbine has not been in operation for 72 hours or longer;

d) two one-hour shut-downs per day for each turbine;

e) 50 cold start-ups and 250 hot start-ups per each turbine on an annual basis;

f) operating the dry cooling tower, no PM10 emissions;

g) steam injection for power augmentation is based on 19 hours per day, with a maximum of 2,000 hours per year.

Westinghouse Turbine

AIR QUALITY Table 8 shows the hourly air emission levels as calculated by Calpine and guaranteed by the manufacturer for the major components of the project.

AIR QUALITY Table 8
Maximum Hourly Emissions (lb/hour) Using Westinghouse Turbine

Pollutant	CTG(2)	Duct Burner(3)	Steam Injection	Hot Start-up	Cold Start-up(4)	Shutdown
NOx	16.8	1.4	0.9	170	175	26.6
CO	16.7	3.4	14.2	902	838	98.2
VOC	1.5	2.0	0.01	7.2	7.2	7.2
SO2	3.7	0.005	0.31	2.3	2.3	2.3
PM10	9.0	2.5	0.0	6.7	6.7	6.7

(1) No emissions associated with cooling towers.
(2) All air emissions are calculated based on CTG operation at 20F and 100 percent load rate.
(3) Duct burner emissions are calculated based on firing 170 MMBtu/Hr (HHV) of natural gas.
(4) Cold start-up emission levels represent one hour.

Sources: Calpine (Calpine Corporation). September 22,1998. Cooling Tower Information.
Calpine (Calpine Corporation). 1998j. Response to data requests 64 and 66 with additions to 63, 67 and 68.

AIR QUALITY Table 9 presents the maximum daily emission levels as estimated by Calpine using the assumptions presented above. The air emission levels assume maximum hourly operation of the project per day. Calpine estimates that uncontrolled air emissions associated with cold start-ups are based on 2 hours, which staff believes is sufficient time for the SCR to warm-up and control the NOx emissions consistent with manufacture guarantees.

AIR QUALITY Table 9
Maximum Daily Emissions (lb/day) Using Westinghouse Turbine

	CTG	Duct Burner	Steam Injection	Hot Start-up	Cold Start-up(1)	Shutdown	Total Emission Per CTG	Calpine(2) Maximum Project Daily Emissions
Hrs./Day	19	22	19	1	2	2	24	24
NOx	318.3	29.9	17.5	170	349	24	909	1817
CO	317.3	74.8	269.5	902	1,675	25	3264	6528
VOC	28.5	44.9	0.2	1.1	2	2.2	79	158
SO2	70.3	0.12	5.9	2.7	5	5.3	90	179
PM10	171.0	54.6	-	9.0	18	18	271	541

(1) Cold start-ups are based on 1.5 of uncontrolled emissions to allow the SCR to warm-up, then, all the emissions will be controlled.

(2) Based on two turbines, Calpine (Calpine Corporation). 1998j. Response to data requests 64 and 66 with additions to 63, 67 and 68. Submitted to the California Energy Commission, May 6, 1998, Sept.22, 1998.

Source: California Energy Commission Staff assumptions and calculations of daily emissions.

AIR QUALITY Table 10 presents the maximum annual emissions, as estimated by Calpine using the above assumptions. The air emission levels assume maximum hourly operation of the project per year.

AIR QUALITY Table 10
Annual Emissions Using Westinghouse Turbine (Tons/Year)

	CTG	Duct Burner	Steam Injection	Hot Start-up	Cold Start-up(1)	Shutdown	Total Emission Per CTG	Calpine(2) Annual SPP Emissions
Hrs/Yr.	8,110	5,460	2,000	250	100	300		
NOx	65.9	3.7	0.9	21.2	8.7	1.8	102	205.86
CO	61.6	9.3	14.2	113	41.9	1.9	242	483.18
VOC	5.9	5.6	0.01	0.1	0.1	0.2	11.9	24.41
SO2	14.6	0.01	0.3	0.3	0.1	0.4	15.7	31.5
PM10	36.5	6.8	0.0	1.1	0.5	1.4	46.2	92.5

(1) Cold start-up emissions are based on 50 annual start-ups, each for 2 hours.

(2) Calpine (Calpine Corporation). 1998(j). Response to data requests 64 and 66 with additions to 63, 67 and 68. These emission levels include Dehydrators, valves and flanges emissions.

Source: California Energy Commission Staff assumptions and calculations of annual emissions.

PROJECT INCREMENTAL IMPACTS

This section discusses the project's direct impacts and cumulative impacts, as estimated by Calpine and evaluated by the CEC staff.

DIRECT IMPACTS

The project's principle air pollutant emissions will be generated during the construction of the project and during the operation of the gas turbines and the duct burners. Several operating scenarios were evaluated and the worst case scenario was chosen to be modeled to estimate the project's ambient air quality impacts. The U.S. EPA approved SCREEN model was used first to evaluate the project's ambient air quality impacts. If the impacts were significant and violated the ambient air quality standards, considering the ambient background, a more refined modeling of the worst case scenario was conducted to evaluate and quantify the project ambient air quality impacts. For that purpose, the U.S. EPA recommends the use of the Industrial Source Complex (ISC) model, with either short-term (ST) or long term (LT) option. Short-term refers to impact predictions of 1 to 24 hours, whereas long-term refers to

monthly, seasonal and annual averaging periods. The ISC model is a steady-state Gaussian plume model, appropriate for regulatory use to assess pollution concentrations from a wide variety of sources associated with an industrial source complex.

Five years of hourly meteorological data collected at the Sacramento Metro Airport National Weather Service (NWS) station monitor (1985 through 1989) were used in the modeling analysis. Concurrent mixing height data from the Oakland Airport, as well as different meteorological conditions, such as stability classifications and various wind speeds, were also used in the modeling analysis.

Construction Impacts

The SPP construction activities will be completed in two phases. Phase I will include the site preparation, phase II will be limited to the construction of the project. The air quality impacts of construction and site preparation are summarized in AIR QUALITY Table 14 below. The linear facilities impacts are insignificant because they require minimal equipment and occur along roads covering a large geographical area. The impacts from the construction equipment are anticipated to be of short duration and unavoidable, because of the sporadic nature of the construction phase of the project.

As AIR QUALITY Table 14 also shows that the estimated PM10 and NO2 impacts from the project incombination with ambient pollutant levels, exceed air quality standards. The ISC model was used to evaluate the maximum impact levels. However, for SO2 and CO, the SCREEN model was used to quantify the emission impacts.

AIR QUALITY Table 14
Summary of the SPP Construction Activities Impacts
On Ambient Air Quality

Pollutant	Averaging Period	Max. Impacts (µg/m3)	Background	AAQS Standard (µg/m3)
SO2	3 hours	138.7	26.1	1,300 NAAQS
	24 hours	61.6	7.83	105 CAAQS
	annual	15.4	0.0	80
CO	1 hour	840.6	11.4	23,000 CAAQS
	8 hours	488.4	8.3	10,000 CAAQS
NO2	1 hour	170.9	150.4	470 CAAQS
	annual	90.4	31.97	100 NAAQS
PM10	24 hours	699.3	154	50 CAAQS
	annual	14.4	36/7	30 CAAQS
(1) Calpine used ISC model to evaluate NOx and PM10 emissions impacts, and used SCREEN model to evaluate the SO2 and CO impacts.				

Source: Calpine (Calpine Corporation). 1997. Page 8.1-35.

OPERATING IMPACTS

The modeling analysis of the operation of the combined cycle facility indicated that the worst case emission scenario resulted from operating the CTG during cold start-up for one hour and the duct burner at 100 percent load. The SCREEN model was used initially to evaluate the NO2, CO and SO2 emissions impacts. More refined modeling was needed to accurately evaluate the impacts. The ISC model was used for the refined analysis. AIR QUALITY Table 15 summarizes the ISC modeling results. The impacts from the project added to the ambient background were much lower than the most stringent standards for these pollutants, as shown in AIR QUALITY Table 15.

In evaluating PM10 impacts from the project, Calpine included the two CTGs, duct burners, and steam injection emissions. Since the project's PM10 impacts will likely contribute to existing violations of the state 24 hour standard, the ISC model was used to refine the analysis and better evaluate the PM10 impacts. The project impacts were added to the ambient background and calculated as a percent of the National or California standards. As shown in AIR QUALITY Table 15, project emissions will violate both the 24 hour and annual PM10 standards.

Given the complexities of secondary pollutant formation in the atmosphere, staff did not model the ozone or the secondary PM10 impacts of the project. Staff, nevertheless, assumes that emissions of ozone precursors, such as NOx and VOC, in areas of ozone non-attainment, may contribute significantly to ongoing violations within the District and therefore cause an adverse air quality impact. Staff considered the significance of such contributions in the context of historical air quality trends, current ambient air quality conditions and expected future air quality conditions, as described in the District's air quality management plan. Staff also assumes that the project's NOx emissions may be converted to nitrates and potentially contribute to existing PM10 violations. As with ozone, staff evaluates the significance of such contributions in the context of current and expected future PM10 air quality trends. As shown in AIR QUALITY Table 5, the District is currently classified nonattainment for both the state ozone and PM10 standards. Therefore, staff believes that the project's contributions of NOx and VOC emissions to ozone and secondary PM10 formation are potentially significant and should be mitigated.

AIR QUALITY Table 15
SPP Nonreactive Pollutant
Ambient Air Quality ISC Modeling Results

Pollutant	Averaging Period	Project Impact (µg/m3)	Background (µg/m3)	Total Impact (µg/m3)	Limiting Standard (µg/m3)	Type of Standard	Percent of Standard (%)
NO2(1)	1-hour	241.2	150.4	391.6	470	CAAQS	83
	Annual	0.26	31.96	32.2	100	NAAQS	32
PM10(1)	24-hours	0.55	154	154.55	50	CAAQS	309
	Annual	0.097	36.7	36.8	30	CAAQS	123
PM2.5(1)	24-hours	0.55	154	154.55	50	CAAQS	238
	Annual	0.097	36.7	36.8	30	CAAQS	245
CO(1)	1-hour	1243	11.4	1254	23,000	CAAQS	6
	8-hours	305.2	8.3	314	10,000	CAAQS	3
SO2	3-hours	1.3	26.1	27.4	1,300	NAAQS	2
	24-hours	0.6	7.83	7.89	365	NAAQS	8
	Annual	0.1	0.0 [3]	0.1	80	NAAQS	0.1

1. The project emissions include emissions during start-up.
2. Background data is based on Yuba City monitoring station.
3. No representative ambient data available within the region.

Source: Calpine (Calpine Corporation). 1997. Pages 8.1-33-35, November 2,1998.

CUMULATIVE IMPACT ANALYSIS

The Energy Commission staff provided Calpine with a modeling protocol to conduct the cumulative impact analysis. The major component of the protocol required Calpine to include in the modeling all known future projects within six miles of the SPP. Then, the modeling results (impacts) would be added to the ambient background levels to establish the total impact. The District conducted a comprehensive review and determined that there are no planned facilities within the six miles that are eligible for modeling. Therefore, the cumulative impact analysis was unnecessary.

The cumulative impacts of the linear facilities reviewed by the Sutter Community Services Department identified that Hughes Road - East Sutter Bypass Canal Bridge replacement is a proposed project within the County. This project is adjacent to the natural gas pipeline route. The project construction will be completed by October 15, 1998. The natural gas line construction is planned for the summer of 2000. Since the Hughes Road - East Sutter Bypass Canal Bridge replacement project will be completed prior to the start of construction of natural gas line, a cumulative impact analysis was not necessary.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Calpine has submitted an application for a PSD permit to the EPA Region IX Office. At the time of preparation of this analysis, the PSD application has been deemed complete. Staff will maintain contact with the EPA staff to track the status of the permit review and any project issues identified.

STATE

Based on our assessment of the project's impacts, staff believes that the project complies with section 41700 of the California State Health and Safety Code.

LOCAL

The District has issued their Final Determination Of Compliance (FDOC) on November 10, 1998. Based on a review of the FDOC,staff has determined that the project will comply with applicable District rules and regulations subject to the completion of the memorandum of understanding (MOU) between the District and Sacramento Metropolitan Air Quality Management District (SMAQMD), and approval of the paving the road contract between Calpine and the Sutter County.

MITIGATION

In this section we evaluate the measures that Calpine is proposing to mitigate the project's air pollutant emissions impacts from the construction of the combined cycle facility and the transmission line, and from operation of the power plant.

CONSTRUCTION MITIGATION

Project construction activities will occur over a two-year period. The fugitive dust emissions from the construction of the project, switchyard and transmission line will be controlled by periodic watering of the site, assuming a 50 percent effectiveness, along with the following mitigation measures proposed by Calpine:

1. Areas of excavated or disturbed soils where construction activities have ceased for more than 15 days will be covered, or treat with a dust suppressant compound (such as magnesium chloride).

2. The beds of trucks will be covered when hauling excavated soils which have the potential to generate fugitive dust.

3. The construction area and scheduled activities will be limited to minimize disturbance.

4. Before trucks leave the site, their tires will be rinsed so they will not track soil off-site.

5. A maximum speed limit of 15 miles per hour will be posted on site.

6. Construction activities will be discontinued when wind speeds are greater than 20 mph.

The emissions from the construction equipment listed in AIR QUALITY Tables 6 and 7 will be minimized through the proper maintenance of the construction equipment to meet the applicable equipment emission standards.

OPERATION MITIGATION

The project's air pollutant emission impacts will be mitigated through a combination of the use of natural gas as the sole fuel, the use of air pollution control equipment and the provision of offsets. Calpine proposes to use a CTG with dry-low NO_X combustors, combined with an SCR system which uses ammonia injection to further reduce the NOx missions.

Calpine proposes to use a CO oxidation catalyst to reduce CO emissions to 4 ppm (15 percent O_2). Air pollutant emission levels will be properly monitored through the use of a continuous emission monitoring system.

Control of NOx Emissions

The project's NO_X emissions consist primarily of nitric oxide (NO) and a small percentage of nitrogen dioxide (NO2). Thermal NOx is the product of the oxidation of NO2 (present in the air used for combustion) at the temperatures present in the combustion process. Some NOx is formed from the oxidation of nitrogen present in the fuel. Nitrogen is not present in significant quantities in natural gas, so most of the NOx emissions from this project are due to thermal NOx.

Combustion chamber NO_X can be controlled by reducing the flame temperature in the combustion chamber through quenching steam and dilution using water and steam

injection. Additionally, thermal NOx can be controlled with combustor designs that premix the air and fuel and stage the combustion process (a reducing atmosphere followed by an oxidizing atmosphere).

NOx emissions from the generation facility will be controlled through the use of dry low NOx combustors in the CTGs and the use of SCR as a post-combustion emission control. The turbines will be equipped with a number of dry low-NOx combustors to ensure optimal uniform temperature distribution in the primary air zone. A reduction in NOx emissions is also achieved by raising the mean air/fuel ratio. The dry-low NOx burner produces emissions as low as 25 ppm when natural gas is burned before entering the SCR.

Calpine's proposed SCR system will control NOx emission levels to 2.5 ppm corrected @ 15 percent O_2. SCR is a process that chemically reduces NOx with ammonia (NH_3) over a catalyst in the presence of oxygen (O_2). The process is termed selective because the NH_3 reducing agent preferentially reacts with NOx rather than O_2 to form N_2 in the presence of excess O_2 at temperatures in the range of 400 to 750 ^oF. If the temperature is lower than 400^oF, the ammonia reaction rate is low, and therefore, NH_3 emissions (called ammonia slip) will increase.

SCONOx Technology as An Alternative Mitigation

The SCONOx system uses a catalyst bed which is located inside the HRSG anywhere within a 260 ^oF to 700 ^oF temperature range. As hot exhaust gases pass through the catalyst rack, the NOx molecules are adsorbed onto the catalyst surface. When the catalyst is regenerated using a regeneration gas containing 4 percent hydrogen, 3 percent nitrogen, and 1.5 percent carbon dioxide. The regeneration gas is created by reacting natural gas with air in the presence of an electrically heated nickel oxidation catalyst, which is electrically heated to 1900 ^oF. The gas is then mixed with steam (produced from the HRSG) and passes over a second catalyst to form the regeneration gas. The regeneration gas is introduced into the catalyst rack through a system of piping and louvers. The regeneration gas exits the catalyst rack is ducted back into the HRSG, upstream of the SCONOx.

SCONOX has been evaluated by USEPA Region IX, and they have acknowledged that a 2 ppm @ 15% O_2 NOx control level can be achieved in practice using the technology. Furthermore, USEPA recommended that new sources subject to the BACT requirements in Part C of the CAA should consider the 2.0 ppmv @15% O_2 for three hours avenging time or 2.5 ppmvd @15% O_2 for one hour avenging time as an achievable emissions limit in their BACT analyses.

Control of Carbon Monoxide (CO) and Reactive Organic Gases (ROG)

Combustion turbines inherently generate low CO and ROG emissions. High combustion temperatures, fuel/air mixing, and the excess air inherent in the CTG's combustion process favor complete combustion of fossil fuels. These conditions, however, also lead to higher NO_x emissions. Current CTG designs attempt to

balance achieving low NO_X emissions (from the CTG prior to post-combustion controls) while keeping CO and ROG emissions low. Good operating and maintenance practices will be used to limit the project's CO and ROG emissions.

Calpine proposes to install an oxidation catalyst downstream from the CTGs and the duct burners to reduce CO emissions. While the catalyst's ROG removal effectiveness is not guaranteed, the oxidation catalyst, which is a standard design, is expected to reduce ROG emissions by five percent for this project.

Control of PM10

Natural gas fuel contains only trace quantities of noncombustible material. Particulate emissions (PM_{10}) will be controlled by inlet air filtering for the combined cycle CTG and HRSG unit. In addition, Calpine proposes to use a dry cooling tower which has no PM10 emissions associated with its operation, which is the best control technology available.

Sulfur Dioxide Emissions Control

SO2 emissions result from the combustion of any sulfur-bearing fuel. The SPP SO2 emissions will be controlled by burning only natural gas, which typically contains only traces of sulfur. The emissions from the project's CTGs are expected to be very small without any additional post-combustion SO2 control equipment. Since natural gas contains only 2000 grains of sulfur per million cubic feet, the resulting SO2 emission concentrations should be less than 1.0 ppm @15% O_2.

Emission Offsets

To fully mitigate the facility's potential emission increases, Calpine plans to purchase emission reduction credits (ERCs) from District's ERCs bank and the Sacramento Metropolitan Air Quality Management District (SMAQMD) ERCs bank. Calpine has option contracts with some of these sources of ERCs and has letters of intent to purchase ERCs with others. Calpine will provide option contracts for all of the ERC sources before the Commission's makes its final decision on the project. AIR QUALITY Table 16 provides a summary of all proposed sources of ERCs, including quantities and contract types. The ERCs levels in the table are much greater than the SPP liabilities to satisfy the District rules.

AIR QUALITY Table 16
ERCs Sources Types And Location

ERC Source	Contract Type	Location	ERC Certificate No.	NOx Location Emissions (Tons)	VOC Emissions (Tons)	PM10 Emissions (Tons)
Atlantic Oil Co.	Optional Contract	FRAQMD	95-1	21.9	5.0	0
PG&E	Letter of intent	SMAQMD	0020	105	0	0
PG&E	Letter of intent	SMAQMD	287/288	132	3.8	0
Rosboro Lumber	Optional Contract	FRAQMD	94-1	41.1	20.6	28.1
Tri-Union	Letter of intent	FRAQMD	98-101	6.8	0	0
Tri-Union	Letter of intent	FRAQMD	992024	34	0.52	0
Road Paving	MOU	FRAQMD		0	0	82.8
Total ERCs under negotiation and secured with option contracts				**340.8**	**29.92**	**110.9**
Total SPP Project Liabilities				**205.86**	**24.41**	**92.5**

Source: Feather River Air Quality Management District (FRAWMD)

According to the District rules, District's staff has to prepare a memorandum of understanding (MOU) with the SMAQMD for those ERCs coming from the Sacramento District's bank. The District's staff is actively preparing the MOU and is in the process of presenting it to the Sutter District Board. Furthermore, Calpine is in the process of signing an agreement with the Sutter County to pave 5.6 miles of county roads to partially mitigate PM10 emissions from the SPP. These roads are 0.7 mile of McClatchy Road, 0.5 mile of Schlag Road, 3.5 miles of Boulton Road and 0.9 mile of Pierce Road.

Interpollutant Trading Ratios

Calpine has suggested that they may use interpollutant trading of VOC ERCs for NOx

ERCs as part of their offset strategy, which is identified and evaluated in the PDOC. Both VOCs and NOx are precursors to the formation of ozone in the atmosphere. The premise of interpollutant trading is based on "interprecursor offsets", which are limited to exchange between pollutants which are both precursors to the same secondary pollutant. However, this concept does not apply when a pollutant is a precursor to a nonattainment pollutant but would also contribute to existing violations of a state or federal standard. The District New Source Review Rule 10.1 section E.2.d., which deals with the use of interpollutant trading, reads: "...The APCO may approve the substitution of one air contaminant for another air contaminant to meet the requirement for offsetting an emission increase on a case-by-case basis, provided that the applicant demonstrates to the satisfaction of the APCO, through the use of an impact analysis, that the emission increases from the new or modified source will result in a net air quality benefit and will not cause or contribute to a violation of any air quality standard." Calpine is proposing to mitigate NOx for NOx and VOC for VOC at this time. They may choose to use interpollutant trading ratio of 2 to 1 VOC for NOx.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the evidence of record, and assuming the implementation of the following Conditions of Certification, including the conditions contained in the FDOC, the Commission staff concludes that the SPP will meet all applicable air quality requirements and will not cause any significant air quality impacts.

CONDITIONS OF CERTIFICATION

AQ-1 As part of the requirements for Condition SOIL&WATER-3 for the preparation of a grading and erosion control plan for the project site, the project owner shall include and identify in that plan the following:

- the location of all paved roads, parking and laydown areas,
- the location of all roads, parking areas and laydown areas that are surfaced with gravel,
- the location of all roads, parking areas and laydown areas that are treated with magnesium chloride dust suppressant or equivalent, and
- the location of all dirt storage piles

Verification: At least 30 calendar days prior to the start of grading on the project site, the project owner shall submit for review and approval to the Commission Compliance Project Manager (CPM) in writing, and with construction drawings, a City/County of Sutter-approved erosion and sediment control plan. This plan shall include the delineation of the control measures discussed above for all roads, parking areas and laydown areas, and the location of all dirt storage piles.

AQ-2 The project owner shall perform the following mitigation measures during the construction phase of the project:

a. The areas of disturbance within the construction site shall be watered so that they are visibly wet, twice or more daily, as necessary. This condition shall not apply on rainy days when precipitation exceeds 0.1 inch.

b. Any graded areas where construction ceases shall be treated with a magnesium chloride (or equivalent) dust suppressant within fifteen days, or sooner if windy conditions create visible dust beyond the project site boundary.

c. Magnesium chloride (or equivalent) dust suppressant or fabric covers shall be applied to any dirt storage pile within three days after the pile is formed, or sooner if windy conditions create visible dust beyond the project site boundary.

d. Prior to entering public roadways, all truck tires shall be visually inspected, and, if found to be dirty, cleaned of dirt using water spraying or methods of equivalent effectiveness, subject to CPM approval.

e. At least 500 yards from construction site entrances, public roadways shall be cleaned on a weekly basis, or when there are visible dirt tracks on the public roadways, by either mechanical sweeping or water flushing.

f. A speed limit sign shall be posted at the entrance of the construction site, to limit vehicle speed to no more than 15 miles per hour on unpaved areas.

g. All construction equipment shall be properly maintained to detect and prevent mechanical problems that may cause excess emissions.

h. No construction equipment shall be kept idling when not in use for more than 30 minutes.

Verification: The project owner shall maintain a daily log of water truck activities, including the number of gallons of water used to reduce the dust at the construction sites. A log or record of the frequency of public road cleaning shall also be maintained. These logs and records shall be available for inspection by the CPM during the construction period. The project owner shall identify in the monthly construction reports, the area(s) that the project owner shall cover or treat with dust suppressants. The project owner shall make the construction site available to the District staff and the CPM for inspection and monitoring.

AQ-3 Prior to the start of construction (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation

and soil remediation activities) , the project owner shall provide the CPM with the following information: the name, telephone number, resume, and indication of availability of the on-site Environmental Coordinator.

Protocol: The resume shall include appropriate education and/or experience in environmental management or coordination such as monitoring hazardous waste site remediation, experience as an inspector with an air pollution control district, or experience as an environmental health and safety project manager.

The CPM will review the qualifications of, and must approve in writing, the project owner's designated Environmental Coordinator prior to the start of construction.

Verification: At least 90 days prior to the start of construction, the project owner shall submit to the CPM for review and written approval the information required above.

AQ-4 The on-site Environmental Coordinator shall be on-site every work day during site preparation.

Duties: The on-site Environmental Coordinator shall inspect and ensure that all fugitive dust mitigation measures during the site preparation phase of construction are properly implemented, including, but not limited to, the mitigation measures specified in Condition AQ-2. The primary responsibility of the Environmental Coordinator is to insure that no fugitive dust emissions are seen being emitted beyond the property line under control by the project owner.

Verification: See verification for Condition AQ-5.

AQ-5 The on-site Environmental Coordinator will exercise the authority to halt any on-site activity, temporarily stop activities, or direct activities to proceed under a modification of the mitigation requirements of Condition AQ-2, if, in the opinion of the Environmental Coordinator, the project owner is not complying with the requirements of Condition AQ-2 or fugitive dust emissions are noticed beyond the project boundary.

Verification: The environmental Coordinator will prepare a daily report of the day's construction activities and appropriate fugitive dust mitigation measures employed by the project owner. A summary of the daily reports shall be included in the monthly compliance report to the CPM. If any complaints by the public are received, or if the project owner does not agree to comply with instructions given by the Environmental Coordinator, or if any other fugitive dust issue, in the judgement of the Environmental Coordinator, needs to be brought to the attention of the CPM, the Environmental Coordinator shall contact the CPM immediately.

AQ-6 For all utility trenching activities, the project owner shall implement the following control measures if necessary to prevent fugitive dust emissions:

a. To top layer of soil shall be pre-wetted prior to excavation,

b. Travel surfaces shall be wetted with the use of a water truck, and

c. All exposed soil areas shall be wetted by the use of hose spraying.

Verification: District staff and the CPM may inspect utility trenching sites at any time to monitor compliance for this condition.

AQ-7 The facility shall not discharge from any source whatsoever such quantities of air contaminants or other materials that cause a public nuisance. (District General ATC Permit Condition a)

Verification: As part of the semiannual Air Quality Reports (as required by AQ-43), the project owner shall include the date and time when any accidental release of air contaminants or other materials occur. The Air Quality Report shall also include the reason for the accidental release and measures taken to correct it.

AQ-8 The facility shall not emit particulate emissions from any single source which exceed an opacity equal to or greater than twenty percent (20%) for a period aggregating more than three (3) minutes in any one (1) hour, excluding uncombined water vapor. (District General ATC Permit Condition b)

Verification: As part of the semiannual Air Quality Reports (as required by AQ-43), the project owner shall include an explanation and the date, time, and duration of any violation of this condition.

AQ-9 The facility shall not discharge into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of gas at standard conditions. When the source involves a combustion process, the concentration must be calculated to 12 per cent carbon dioxide (CO_2). (District General ATC Permit Condition c)

Verification: As part of the annual Air Quality Reports, the project owner shall submit to the District and CPM the annual source test and specify the level of particulate matter in grains per cubic foot of gas at standard conditions.

AQ-10 Facility shall not discharge in any one hour from any source whatsoever fumes in total quantities in excess of the amounts as prescribe for and shown in District's Rule 3.3 Table of Allowable Rate of Emission Based on Process Weight Rate. (District General ATC Permit Condition d)

Verification: As part of the semiannual Air Quality Reports (as required by AQ-43), the project owner shall indicate the date, time, and duration of any violation of this

condition.

AQ-11 The facility shall not discharge into the atmosphere from any single source of emission whatsoever, any sulfur oxides in excess of 0.2 percent by volume (2,000 ppm) collectively calculated as sulfur dioxide (SO_2). (District General ATC Permit Condition e)

Verification: As part of the annual Air Quality Reports, the project owner shall submit to the District and CPM the annual source test and specify the level of sulfur oxides in percent by volume of gas at standard conditions.

AQ-12 Project owner shall not build, erect, install, or use any article, machine, equipment or other contrivance to conceal an emission which would otherwise constitute a violation of the Health and Safety Code of the State of California or of these Rules and Regulations. (FRAQMD General ATC Permit Condition f)

Verification: Refer to AQ-34 through AQ-36. The project owner shall obtain approval from the District and the CPM prior to installing any new equipment that results in releasing air contaminants.

AQ-13 Project owner shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation. Reasonable precautions shall include, but are not limited to: Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land; Application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dusts; Other means approved by the Air Pollution Control Officer. (FRAQMD General ATC Permit Condition g)

Verification: Refer to conditions AQ-1 through AQ-6.

AQ-14 In the case of shut-down or re-start of air pollution equipment for necessary scheduled maintenance, the intent to shut down such equipment shall be reported to the Air Pollution Control Officer at least twenty-four (24) hours prior to the planned shutdown. Such prior notice may include, but is not limited to the following:

a. Identification of the specific equipment to be taken out of service as well as its location and permit number;

b. The expected length of time that the air pollution control equipment will be out of service;

c. The nature and quantity of emissions of air contaminants likely to occur during the shut-down period;

d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period;

e. The reasons that it would be impossible or impractical to shut down the source operation during the maintenance period. (FRAQMD General ATC Permit Condition h)

Verification: As part of the semiannual Air Quality Report (as required by AQ-43), the project owner shall include the dates of the equipment maintenance schedule including when each piece of equipment will be shut-down and when it will start-up.

AQ-15 In the event that any emission source, air pollution control equipment, or related facility breaks down in such a manner which may cause the emission of air contaminants in violation of any permit condition or applicable rules or regulations, other than as exempted here in, the shall immediately notify the Air Pollution Control Officer of such failure or breakdown and subsequently provide a written statement giving all pertinent facts, including the estimated duration of the breakdown. The Air Pollution Control Officer shall be notified when the condition causing the failure or breakdown has been corrected and the equipment is again in operation. (FRAQMD General ATC Permit Condition i)

Verification: As part of the semiannual Air Quality Report (as required by AQ-43), the project owner shall include the date and duration of all equipment breakdowns, the cause of the breakdown, how it was corrected, and the measures that will be used to prevent the problem from occurring again.

AQ-16 Project owner shall submit an application for a Federal Operating Permit Title-V within 12 months after operational startup. (FRAQMD General ATC Permit Condition j)

Verification: The project owner shall submit to the CPM a copy of the report at the time of filing it to the District.

AQ-17 Project owner shall prepare and submit to the District a Toxic Hot Spots emission inventory by the first month of August following the first full calendar year of facility operational history. (FRAQMD General ATC Permit Condition k)

Verification: As part of the semiannual Air Quality Report (as required by AQ-43), the project owner shall submit to the District and the CPM an inventory of all Toxic Hot Spots emissions.

AQ-18 A PSD permit must be obtained from the USEPA before commencement of

facility operations. (FRAQMD General ATC Permit Condition L.)

Verification: At least 90 days prior to commencement of facility operations, the project owner shall submit to the CPM a copy of the PSD permit from the US EPA.

AQ-19 The equipment is subject to the federal NSPS codified at 40 CFR Part 60, Subparts A (General Provisions), Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Systems), and GG (Standards of Performance for Stationary Gas Turbines), Compliance with all applicable provisions of these regulations is required. (FRAQMD General ATC Permit Condition m)

Verification: As part of the first semi-annual Air Quality Report, the project owner shall submit to the District and CPM a copy of a statement of compliance with the above federal applicable provisions and regulations.

AQ-20 Project owner shall meet the provisions of the Federal Acid Rain Program Title-IV by filing an Acid Rain permit 24 months before operational startup and by certifying CEMS for NOx and O_2 within 90 days after operational startup. (FRAQMD General ATC Permit Condition n)

Verification: The project owner shall provide the District and the CPM with a copy of the Acid Rain permit within 90 days after the permit is approved. Refer to AQ-33 for verification.

AQ-21 Project owner shall file an RMP with the Sutter County office in charge of the prevention of accidental releases prior to operational startup. (FRAQM General ATC Permit Condition o)

Verification: Refer to Hazardous Materials conditions and verifications HazMat-2..

AQ-22 The Athority To Construct (ATC) is not transferable from one location to another, or from one person to another without the written approval of the APCO. (FRAQMD General ATC Permit Condition p)

Verification: At least sixty days in advance, the project owner shall notify, in writing, the District and the CPM of any intended transfer of ownership or location and obtain written approval prior to any transfer.

AQ-23 District personnel shall be allowed access to the plant site and pertinent records at all reasonable times for the purposes of inspections, surveys, collecting samples, obtaining data, reviewing and copying air contaminant emission records and otherwise conducting all necessary functions related to this permit. (FRAQMD General ATC Permit Condition q)

Verification: During site inspection, the project owner/operator shall make the plant logs available to the District, California Air Resources Board (CARB), and Commission staff.

AQ-24 Project owner shall maintain a copy of all District permits at the facility. (FRAQMD General ATC Permit Condition r)

Verification: During site inspection, the project owner/operator shall make all plant permits available to the District, California Air Resources Board (CARB), and Commission staff.

AQ-25 Combustion turbine exhaust stacks shall exhaust at a height of 145 feet and the maximum diameter shall not exceed 18 feet. (FRAQMD General ATC Permit Condition s)

Verification: The project owner/operator shall make the site available for inspection to the District, California Air Resources Board (CARB), and Commission staff.

AQ-26 Project owner shall submit to the District and the Energy Commission ERC option contracts or final signed contracts for the project's ERC liability, except for PM10, as listed in condition AQ-42 prior to the Energy Commission's Final Decision on the project. (FRAQMD General ATC Permit Condition t)

Verification: At least 10 days prior to the Commission adoption of the final decision on the project, the Project owner shall have provided copies of all option contracts or signed contracts required by this condition.

AQ-27 The following Sutter County roads and corresponding miles are to be paved prior to operational startup of the project by the Project owner in order to obtain a portion of the PM10 ERC credits, as indicated in AQ-42:

Roads	Length to be paved (miles)
McClatchy	0.7
Schlag	0.5
Boulton	3.5
Pierce	0.9

a. The location and distance of the roads above may be changed provided that the total offset PM10 ERC credits remain the same, and that the District and CPM is notified, in writing, prior to the start of project construction.

b. Project owner shall provide, prior to start of construction, a copy of an executed legally binding contract between project owner and Sutter County that ensures the paving and maintenance of said roads and which provides conditions enforceable by the District. (FRAQMD General ATC Permit Condition u)

Verification: At least 30 days prior to the start of construction, project owner shall submit to the District and CPM a copy of the required contract.

AQ-28 Calpine has produced evidence indicating that it has an enforceable right to ERCs located in another District. These ERCs cannot be used until the District Board adopts an approving resolution and enters into an MOU with the other District. The District intends to act on the resolution and MOU as soon as practicable after CEC completes an environmental analysis document and the criteria in Section 15253, Subdivison (b) of the CEQA Guidelines are met.(FRAQMD General ATC Permit Condition v)

Verification: At least 30 days prior to the start of construction, Project owner shall provide a copy of the signed MOU to the CPM.

AQ-29 Project owner may substitute interpollutant offsets of VOCs (ROCs) for NOx at a 2.0 to 1.0 interpollutant offset ratio pursuant to Rule 10.1, Section E.2, d. (FRAQMD General ATC Permit Condition w)

Verification: The project owner shall submit to the District and the CPM a copy of the offsets calculations that satisfy AQ-42 if they choose to use the interpollutant substitution offset ratio specified in this condition.

AQ-30 The facility shall exclusively use California PUC pipeline quality natural gas as fuel. The fuel gas total sulfur and heat content will be determined and reported to the District by collecting and analyzing a sample on a monthly basis or by providing monthly certification of the natural gas total sulfur and/or heat content issued by the natural gas distributor. (FRAQMD General ATC Permit Condition x)

Verification: As part of the semi-annual Air Quality Report (as required by AQ-43), the project owner shall submit to the District and CPM a copy of the natural gas analysis or certification issued by the natural gas distributor to satisfy this condition.

AQ-31 All basic and control equipment is to be operated and maintained in accordance with vendors recommended practices and procedures. (FRAQMD General ATC Permit Condition y)

Verification: Refer to AQ-14 verification.

AQ-32 The maximum heat input allowed to each permitted internal and external combustion emissions unit, expressed in MMBtu units on a High Heating

Value basis (HHV), shall not exceed the limits indicated in the table below: (FRAQMD specific ATC Permit Condition a)

Emission Unit	MMBtu/hour (1)	MMBtu/day (2)	MMBtu/year (3)
CTG-1	1,900	45,600	16,644,000
CTG-2	1,900	45,600	16,644,000
Duct Burners-1	170	4,080	928,200
Duct Burners-2	170	4,080	928,200

(1) Based on a rolling three-(3) hour average
(2) Based on 24 hour-day
(3) Based on 365 days/year

Verification: As part of the semi-annual Air Quality Reports (as required by AQ-43), the project owner shall document the date and time when the hourly fuel consumption exceeds the hourly limits included in this condition. The reports shall include a summary of hourly and daily fuel consumption in MMBtu [high heating value (HHV)] for all the cases indicated in the table above. The January Air Quality Report shall also include information on the amount of fuel consumed, in MMBtu (HHV), in the prior calendar year.

AQ-33 The following definitions and limitations shall apply: (FRAQMD specific ATC Permit Condition b)

(1) Startups are defined as the time period commencing with the introduction of fuel flow to the gas turbine and ending when the NOx concentrations do not exceed 2.5 ppmvd at 15% O2 averaged over 1-hour.

(2) Cold Startups are those that occur after the CTG has not been in operation for more than 72 hours.

(3) For each CTG, the Cold Startup shall not exceed 180 consecutive minutes.

(4) Hot Startups are startups that are not Cold Startups.

(5) The maximum allowable NOx emissions for Hot and Cold Startups from each CTG shall not exceed 519 lb/day.

(6) For each CTG, the Hot Startup shall not exceed 60 consecutive minutes.

(7) Shutdowns are defined as the time period commencing with a 15 minute period during which the 15 minute average NOx concentrations exceed 2.5 ppmvd at 15% O_2 and ending when the fuel flow to the gas turbine is discontinued.

(8) For each CTG, the Shutdown shall not exceed 60 consecutive minutes.

(9) The maximum duration of Cold Startups per CTG shall be 150 hours per year and 39 hours per calendar quarter.

(10) The maximum duration of Hot Startups per CTG shall be 250 hours per year, and 63 hours per calendar quarter.

(11) The maximum duration of Shutdowns per CTG shall be 300 hours per year, and 76 hours per calendar quarter.

(12) Compliance with the above yearly limits shall be calculated based on a rolling 12 month average.

(13) All emissions during startups and shutdowns shall be included in all calculations of daily and annual mass emissions required by this permit.

(14) For each CTG the maximum number of Duct Burner hours of operation shall not exceed 5,460 per calendar year.

(15) For each CTG the maximum number of Power Augmentation Steam Injection hours shall not exceed 2,000 per calendar year.

(16) For each CTG the maximum hourly emission rates (lbs/hr) (for a cold startup not to exceed 120 minutes of uncontrolled emissions) are given in the table below:

Pollutant	CTG	Duct Burner	Steam Injection	Hot Start-up	Cold Start-up	Shutdown
NOx	16.8	1.4	0.9	170	175	26.6
CO	16.7	3.4	14.2	902	838	98.2
VOC	1.5	2.0	0.01	7.2	7.2	7.2
SO2	3.7	0.005	0.31	2.3	2.3	2.3
PM10	9.0	2.5	0.0	6.7	6.7	6.7

(17) For maximum project daily emissions (lbs/day) are given in the table below:

	CTG	Duct Burner	Steam In-jection	Hot Start-up	Cold Start-up	Shutdown	Total Emission Per CTG	Calpine Maximum SPP Daily Emissions
NOx	318.3	29.9	17.5	170	349	24	909	1817
CO	317.3	74.8	269.5	902	1,675	25	3264	6528
VOC	28.5	44.9	0.2	1.1	2	2.2	79	158
SO2	70.3	0.12	5.9	2.7	5	5.3	90	179
PM10	171.0	54.6	-	9.0	18	18	271	541

(18) The maximum quarterly emissions for the facility are given in the table below:

	January-March lb/quarter	April-June lb/quarter	July-Sept. lb/quarter	October-December lb/quarter
NOx	102,500	102,500	102,500	102,500
CO	241,600	241,600	241,600	241,600
VOC	11,850	11,850	11,850	11,850
SO2	15,750	15,750	15,750	15,750
PM10	46,200	46,200	46,200	46,200

(19) The maximum annual calendar year emissions (tons/year) for the facility are given in the table below:

	CTG	Duct Burner	Steam Injec.	Hot Start-up	Cold Start-up	Shut-down	Total Emission Per CTG	Calpine Annual SPP Emission
Hrs/Yr.	8,110	5,460	2,000	250	100	300		
NOx	65.9	3.7	0.9	21.2	8.7	1.8	102	205.86
CO	61.6	9.3	14.2	113	41.9	1.9	242	483.18
VOC	5.9	5.6	0.01	0.1	0.1	0.2	11.9	24.41
SO2	14.6	0.01	0.3	0.3	0.1	0.4	15.7	31.5
PM10	36.5	6.8	0.0	1.1	0.5	1.4	46.2	92.5

Verification: As part of the semi-annual Air Quality Report (as required by AQ-43), the project owner shall provide all data required in this condition. In the semi-annual Air Quality Reports (as required by AQ-43), the project owner shall indicate the date, time, and duration of any violation to the NO_X, and VOC limits presented in this condition. The project owner shall include in the semi-annual Air Quality Reports (as required by AQ-43) daily and annual emissions as required in this condition.

AQ-34 BACT Emission Limits:

The BACT emission limits (including duct burners emissions) specified in Conditions (a), (b), (c), (d), and (e) apply under all operating load rates except during CTG startups and shutdowns, as defined in Condition AQ-33. (FRAQMD specific ATC Permit Condition c)

(a) NOx emission concentrations shall be limited to 2.5 ppmvd @ 15% O2 on a 1 hour rolling average (based on readings taken at 15 minute intervals) and with a maximum of 10 ppmvd ammonia slip.

(b) CO emission concentrations shall be limited to 4.0 ppmvd @ 15% O2, on a calendar day average.

(c) VOC emission concentrations shall be limited to 1 ppmvd @ 15% O2, on a calendar day average.

(d) PM10 emissions shall be limited to 11.5 pounds per hour, on a calendar day average.

(e) SO2 emission concentrations shall be limited to 1 ppmvd @ 15% O2, on a calendar day average.

Verification: At lease sixty (60) days before conducting a source test, the project owner shall submit to the District and the CPM a detailed performance annual source test procedure designed to satisfy the requirements of this condition for their review. The project owner shall incorporate the District's and Commission's comments on or modifications to the procedure if any are received. The project owner shall also notify the District and the CPM within seven (7) working days before the project begins initial operation and/or plans to conduct source test as required by this condition. All source test results shall be submitted to the CPM and District within 30 days of the date of the tests.

AQ-35 Each CTG set exhaust vent stack shall be equipped with NOx and % oxygen (O2) CEMs in order to analyze and record exhaust gas flow rate and concentrations. CO, PM10, SO2, and VOC emissions shall be monitored by the CEMs, using source test derived algorithms as indicated in (e) below. In the event that test results show that CO emission limits are exceeded, the APCO may require CEMs for recording concentrations of CO.

(a) The NOx CEMs shall have the capability of recording NOx concentrations during all operating conditions, including startups and shutdowns.

(b) Relative accuracy testing shall be performed on the CEMs on a semi-annual basis or as required by the Acid Rain requirements in Title 40, CFR, Part 75, Appendix B. (FRAQMD specific ATC Permit Condition d)

Verification: At least one hundred and twenty (120) days before initial operation, the project owner shall submit to the District and the CPM a continuous emissions monitoring procedure. Within sixty (60) days of receipt of the procedure, the District and the CPM will advise the project owner of the acceptability of the procedure. Based on the results of the source test identified in AQ-36, the District and CPM may require CEMs for recording concentrations of CO.

AQ-36 Within ninety days after the start of commercial operation of the SPP, source testing shall be performed to determine the mass emission rates and concentrations of NOx, CO, VOC, and SO2 emissions at four different steady-state CTG load rates over the expected operating range of either combustion turbine, as required by 40 CFR 60.335.c (2). The source testing will be used to determine compliance with the permitted emission limits indicated in Specific ATC Permit Conditions (b) and (c). Source testing shall be conducted to determine PM10 mass emissions and concentrations while the CTG is operating at 100 percent load with and without the duct burners, firing at the maximum rated capacity or 170 MMBtu/hr (HHV), whichever is greater.

(a) The source testing results shall be used to develop predictive emission algorithms to estimate mass emission rates for CO, VOC, and SO2, and PM10 emissions.

(b) Source testing to determine the mass emission rates and concentrations of NOx shall be conducted annually after the initial source test indicated in e) above.

(c) Source testing to determine the mass emission rates and concentrations of CO, VOC, SO2 and PM10 shall be conducted annually. The Air Pollution Control Officer may waive annual source testing requirements if prior test results indicate an adequate compliance margin has been maintained. (FRAQMD specific ATC Permit Condition e)

Verification: At least sixty (60) days before the start of commercial operation of the project, the project owner shall submit to the District and the CPM for review a detailed performance test procedure necessary to comply with this condition. The project owner shall incorporate the District and CPM's comments on or modifications to the procedure. At least sixty (60) days prior to any subsequent annual compliance source tests, the project owner shall submit to the District and the CPM for review any proposed changes to the original source test procedure. The project owner shall incorporate the District's and CPM's comments on or modifications to the annual source test procedure.

The project owner shall also notify the District and the CPM within seven (7) working days before the project begins initial operation and/or plans to conduct source testing as required by this condition. Source test results shall be submitted to the District and the CPM within 30 days of the date of the tests.

AQ-37 Source tests to determine ammonia slip shall be conducted within ninety days after commercial operation of the SPP and thereafter as required by the APCO. (FRAQMD specific ATC Permit Condition f)

Verification: Please refer to AQ-36 verification.

AQ-38 The maximum allowable ammonia injection rate to each of the SCR systems shall be 25 pounds per hour. This injection rate may be set at a lower limit based on source tests results. (FRAQMD specific ATC Permit Condition g)

Verification: Please refer to AQ-34 verification.

AQ-39 Within ninety days after beginning commercial operation of the SPP, cold startup, hot startup, and shutdown source tests shall be conducted to determine the emissions of CO and NOx. The APCO may approve the use of the NOx CEMS readings in lieu of source testing if annual Relative Accuracy Testing Audits (RATA) testing is provided. (FRAQMD specific ATC Permit Condition h)

Verification: Within ninety days after the start of commercial operation of the project, the project owner shall submit to the District and the CPM for review a detailed performance source test procedure designed to satisfy the requirements of this condition. The project owner shall incorporate the District's and Commission's comments on or modifications to the procedure. The project owner shall also notify the District and the CPM within seven (7) working days before the project begins commercial operation and/or plans to conduct source test as required by this condition. Source test results shall be submitted to the District within 30 days of the date of the tests.

AQ-40 Records and logs of all data generated by CEMS and algorithms shall be maintained for a period of five (5) years. (FRAQMD specific ATC Permit Condition i)

Verification: During site inspection, the project owner shall make all data generated by the CEMS and algorithm, and included in the plant logs for a period of five years, available to the District, California Air Resources Board (CARB), and the Commission staff.

AQ-41 The project owner shall provide calendar quarterly reports to the District in a format determined in consultation with the District. The calendar quarterly reports shall include the following: CEMS and predictive algorithm emissions data; CTG and duct burner fuel use and operating hours; power augmentation steam injection rates and hours of operation; ammonia injection rates; emission control systems and CEMS hours of operation including the time, date, duration, and reason for any malfunctions of these systems; the number of hot startups, cold startups, and shutdowns; and the electrical and steam production rates. These data shall be averaged on a daily basis, except where required to demonstrate compliance with an emission limitation. (FRAQMD specific ATC Permit Condition j)

Verification: Within 30 days of the end of the calendar quarter, the project owner shall provide to the District and CPM the data required in this condition.

AQ-42 Prior to the start of construction, the SPP facility must provide ERC certificates for NOx, ROC, and PM10, as indicated in the table below. (A portion of required PM10 ERCs and offsets are to be provided by AQ-27.) The ERC sources are Atlantic Oil Company, PG&E, Tri Union, and Rosboro Lumber, as specified in Air Quality Table 16 of the FSA. (FRAQMD specific ATC Permit Condition k)

Verification: At least 30 days prior to the start of constuction, the project owner must submit a copy of the required ERC certificates to the CPM and the District.

	January-March (pounds)	April-June (pounds)	July-September (pounds)	October-December (pounds)	Total ERCs & Offsets	
					Total Pounds	Total Tons
Required NOx	170,061	170,037	170,012	171,535	681,643	340.8
Required VOC	14,797	14,796	14,797	15,558	59,949	29.92
Required PM10	55,440	55,440	55,440	55,440	221,760	110.9

AQ-43 The project owner must file a semi-annual air quality report with the CPM documenting the information required by these conditions and verifications.

Verification: The semi-annual Air Quality report (as required by AQ-43) must be submitted to the CPM within 30 days of the end of the 6 month reporting period.

REFERENCES

Calpine (Calpine Corporation). 1997. Application for Certification, Sutter Power Project (97-AFC-2). Submitted to the California Energy Commission, December 15, 1997.

Calpine (Calpine Corporation). 1998a. Additional Data for Sutter Power Plant (97-AFC-2). Submitted to the California Energy Commission, January 8, 1998.

Calpine (Calpine Corporation). 1998e. Sutter Power Plant Prevention of Significant Deterioration Permit Application. Submitted to the California Energy Commission, February 10, 1998.

Calpine (Calpine Corporation). 1998f. Sutter Power Plant, Responses to February 2, 1998 Data Requests. Submitted to the California Energy Commission, March 4, 1998.

Calpine (Calpine Corporation). 1998i. Cooling Tower Information. Submitted to the California Energy Commission, May 22, 1998.

Calpine (Calpine Corporation). 1998j. Response to data requests 64 and 66 with additions to 63, 67 and 68. Submitted to the California Energy Commission, May 1, 1998.

CEC (California Energy Commission). 1998a. Data Requests Numbers 1 through 59. Submitted to Charlene Wardlow, Calpine Corporation, February 2, 1998.

CEC (California Energy Commission). 1998c. March 25 and March 31 workshop Data Requests 60 through 69. Submitted to Charlene Wardlow and Curt Hildebrand, Calpine Power project, April 7, 1998.

Foster Wheeler (Foster Wheeler Environmental Corporation). 1998. Oxides of Nitrogen Isopleths for Sutter Power Project's PSD Permit Application. Submitted to the California Energy Commission, March 27, 1998.

Calpine (Calpine Corporation). 1998i. Cooling Tower Information. Submitted to the California Energy Commission, September 22, 1998.