

Feather River Air Quality Management District

Serving the Counties of Yuba and Sutter

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Steven A. Speckert

Air Pollution Control Officer

TITLE V APPLICATION REVIEW

Permit Number: 13003

ISSUED TO:

Calpine Corporation
Greenleaf Unit One Associates
P.O. Box 3330
Yuba City, CA 95992-3330

PLANT SITE LOCATION:

Greenleaf Unit One
5087 South Township Road
Yuba City, CA

Reviewed By:

David Valler, District Engineer

Date

Issued By:

Steven A. Speckert, Air Pollution Control Officer

Date

Nature of Business:

SIC CODE:

Power Production

4911

Responsible Official:

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PROPOSAL

Calpine Greenleaf I is proposing that an initial Title V Permit be issued for its existing natural gas fired combined cycle turbine electric generating facility in Yuba County, California. The purpose of this evaluation is to identify all applicable requirements, determine if the facility will comply with those applicable requirements, and to provide the legal and factual basis for proposed permit conditions. This analysis is in conformity to Rule 10.3 E.4.a.1.

FACILITY LOCATION

The facility is located Southwest of Yuba City at 5087 South Township Road. The facility can be found on USGS 7.5 minute topographic map Gilsizer Slough (CA) latitude N39° 04' 7.03" longitude W121° 41' 28.00". The facility location is mapped in Figure 1.

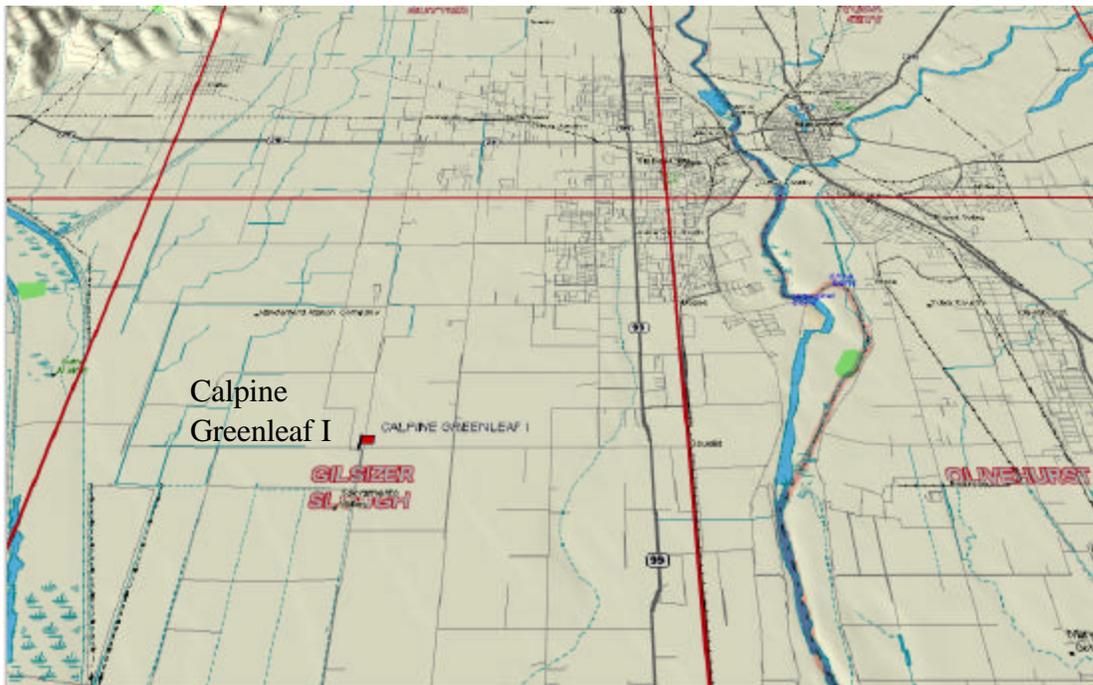


Figure 1. Location Map Calpine Greenleaf I

EQUIPMENT LISTING

Equipment at the facility has been classified into categories that are significant to this permit review, and insignificant emissions units. Significant emissions units are shown in Table 1 and are included in Permit section VIII. Significant emissions units are the turbine and duct burner, wood material handling equipment, wood drying system and cooling tower. Insignificant emissions units are identified in Attachment 3 to Rule 10.3 Feather River AQMD Rules and Regulations. An insignificant activity is any activity, process, or emissions unit which is not

subject to a source-specific requirement of a State Implementation Plan, preconstruction permit, or federal standard¹ and which: 1) meets the “Criteria for Specific Source Categories” or emits no more than 0.5 tons per year of a federal hazardous air pollutant (HAP)² and no more than two tons per year of a regulated pollutant that is not a HAP. The rationale for determining a source or activity at the facility is insignificant is summarized in Table 2.

The cooling tower was considered for insignificant source status, but exceeds a process flow rate of 10,000 gallons/minute (Attachment 1, Rule 10.3 B.3).

Table 1. Significant Emissions Units.

S#	Permit #	Description	Control Device (s)
S-1	13001	Electric Generating Unit: General Electric LM6000 natural gas fired steam injected turbine-generator, Coen duct burner and heat recovery steam generator (HRSG).	Steam injection (NOx) Low sulfur fuel (SOx) Combustion controls (NOx, CO)
S-2	13001	Wood material handling including: truck tipper, hopper, batch load transfers and truck loading, mechanical conveying, stack-out, storage.	Full and partial equipment enclosures, covered conveyors, Water dust suppression (PM fugitive dust)
S-3	13001	Wood drying system: MEC 12' x 42' single pass rotary dryer Stearnes-Roger 10' X 60' single pass rotary dryer Hiel 12' X 42' triple pass rotary dryer Hoppers, Pneumatic conveying, settling chambers, air system and cyclones	Cyclone Separators – one on each dryer. (PM)
S-4	13001	Thermal-Dynamic two-cell counterflow mechanical draft cooling tower model TD-4848-2-2823-CF, pumps and chemical feed system.	Mist eliminator (PM)

¹ Federal standards include: 40 CFR Parts 60 (New Source Performance Standards), 61 (National Emission Standards for Hazardous Air Pollutants), 63 (National Emission Standards for Hazardous Air Pollutants for Source Categories).

² HAPs are toxic substances listed pursuant to Section 112(b) of the Federal Clean Air Act.

Table 2. Exempted And Insignificant Emissions Units (partial listing)

Source ID	Description	Capacity	Basis of Exemption
E-1	Mobile Equipment (nonroad vehicles) ¹		Rule 4.3 a. and g.
E-2	Mobile Equipment (road vehicle)		Rule 4.3 a.
E-3	HVAC equipment		Rule 4.3 d. and e.
E-4	RTC66 Cat fork lift (nonroad vehicle)		Rule 4.3 a.
E-5	Solvent cleaning tank (Safety Kleen)	30 gallon	Rule 3.14 a. Attachment 1, Rule 10.3 B.15 a
E-6	2-Quincy Northwest QNW-C30 air compressors electric drive w/ evaporative coolers.	150 cfm 125 psi each	Electric
E-7	Turbine lube oil tanks (vapor pressure < 1.5 psig)	N/A	Rule 3.9 capacity and vapor pressure Attachment 1, Rule 10.3 B.7d
E-8	Emergency feedwater pump		Steam Drive
E-9	Diesel storage tank	500 gallon	Rule 3.9 capacity and vapor pressure Attachment 1, Rule 10.3 B.7c
E-10	Brazing, welding, soldering associated with maintenance.		Attachment 1, Rule 10.3 B 17

EPA AND PUBLIC REVIEW

This initial Title V permit is subject to notices and review in accordance with Rule 10.3 E.4. Written notice of the proposed permit, and upon request this analysis will be provided to all interested parties of record.

APPLICABLE REQUIREMENTS

The Title V permit incorporates all known applicable federal requirements in accordance with Rule 10.3 F. 1.

¹ Long term measures off road industrial equipment emission standards, California SIP at 40 CFR 52.20(c)(204)(i)(A)(4) may impose future conditions on this equipment. The equipment shall comply with the SIP requirements for replacement or engine remanufacturing upon the effective date. Requirements for non-road engines are not applicable under Title V.

- a. A permit condition that addresses an applicable federal requirement shall be specifically identified in the permit, or otherwise distinguished from any requirement that is not enforceable by the U.S. EPA;
- b. Where an applicable federal requirement and a similar requirement that is not federally enforceable apply to the same emissions unit, both shall be incorporated as permit conditions, provided that they are not mutually exclusive; and
- c. Where an applicable federal requirement and a similar requirement that is not federally enforceable apply to the same emissions unit and are mutually exclusive (e.g., require different air pollution control technology), the requirement specified in the preconstruction permit (or, in the case of sources without preconstruction permits, the more stringent requirement) shall be incorporated as a permit condition and the other requirement shall be referenced.

The District has also conformed to permit streamlining guidance (White Paper for Stream-lined Development of Part 70 Permit Applications 7/10/95). This effectively modifies rule 10.3. F.1 above by allowing the option to combine similar requirements into a single condition. Where streamlining was used in the permit, this analysis defines the elements of the condition and demonstrates that the most stringent federally applicable requirement was implemented.

FEDERALLY ENFORCEABLE CONDITIONS AND STREAMLINING

I General Requirements And Conditions

The general requirements are taken from 40 CFR 70.6 and District Rule 10.3 F. the requirements are applicable facility-wide. The general terms and conditions are summarized in the table below with cross references to the current District Permit to Operate (13003d), the Prevention of Significant Deterioration Permit (NSR 4-4-4 84-01) and the statutory citation.

Requirement Summary	PO 13003	PSD	Title V	Rule Local	Regulation (40 CFF
Term	N/A	I	I.A.	Rule 10.3 F.2.o.	70.6(a)(2)
Fees	e	N/A	I.B.	Rule 10.3 F.2.p.	70.6(a)(7)
Entry	k.	V	I.C.	CH&S Code §41410, Rule 10.3 F.2.J,	70.6(c)(2)
Severability	f.	VII	I.D.	Rule 10.3 F.2. m	70.6(a)(5)
Circumvention	N/A	N/A	I.E	Rule 3.13	N/A
Defense Limitation	N/A	N/A	I.F	Rule 10.3 F.2.k	70.6 (a)(6)(ii)
Reopenings for Cause. Modification does not stay.	N/A	N/A	I.G	Rule 10.3 E. 8; 10.3 E. 2.k.	70.6(a)(6)(iii)
Information Record Submittal	N/A	N/A	I.H.	Rule 10.3 F 2 k.	70.6(a)(6)(v)
Compliance	a, g	N/A	I.I.	Rule 10.3 F.2.k	70.6(a)(6)(i)
Property Rights not conveyed	N/A	N/A	I.J.	Rule 10.3 F.2.k	70.6 (a)(6)(iv)]
Apply for Renewal	N/A	N/A	I.K.	Rule 10.3 D.2.b.	70.5(a)(1)(iii)]
Emergency Provisions	N/A	N/A	I.L. 1-4	Rule 10.3 F.2.l	70.6(g)(1-4)

Streamlining (Section M reserved)

This section documents the record of decision by the District for permit streamlining in accordance with White Paper Number 2 for Improved Implementation of The Part 70 Operating Permits Program, March 5, 1996. The equipment and requirements that have been streamlined are identified at Table 1. The purpose of streamlining is to distill or "streamline" multiple overlapping requirements into one set that will assure compliance with all requirements. Permit streamlining applies when more stringent requirements subsume a less stringent requirement resulting in presumptive compliance to a standard or term, or for conditions that are streamlined to incorporate the requirements of similar requirements that may exist in federal and local regulations or permits. This section also documents equipment with known permit exemptions.

Streamlined permit terms should be covered by a permit shield. The permit shield will result in an essential degree of certainty by providing that when the source complies with the streamlined requirement, the source will be considered to be in compliance with all of the applicable requirements subsumed under the streamlined requirement. The Feather River AQMD program does not now provide for a permit shield. It is the intent of the District to adopt permit shield provisions into Rule 10.3 in the near future. This section (M) is therefore reserved in the permit for shield provisions when the rule is adopted.

District Rule 3.2 Particulate Matter

The permit does not include a condition for District Rule 3.2. The rule prohibits emissions of particulate matter exceeding 0.3 grains per standard cubic foot. Based on new source review, emission of particulate matter at the facility are limited to 2.4 lb/hour from the turbine and a combined 5.5 lb/hour from the dryer stacks (includes turbine exhaust). Based on a limit of 5.5 lb/hour and an average stack flow rate of 116,562 dscf/minute the maximum emissions from the turbine are equal to $(5.5 \text{ lb/hour} * 7000 \text{ gr/lb}) / (116,562 \text{ cfm} * 60) = 16800 / 6993720 = 0.0055 \text{ grain/dscf}$. The limitations in section II B of the permit are more stringent than Rule 3.2. Compliance with the emission limitations and operating requirements in Section II of the permit constitute presumptive compliance with Rule 3.2.

District Rule 3.10 Sulfur Dioxide

The permit does not include a condition for District Rule 3.10. the rule prohibits emissions of sulfur dioxide exceeding 0.2% (2000 ppm). There are no significant sources of sulfur at the plant, and the facility operates using pipeline or local field produced natural gas for fuel. The locally produced natural gas is not odorized and has no detectible sulfur content. Utility natural gas has very low concentrations of sulfur used for odor detection of gas leaks. The permit limits emission of sulfur dioxide to 5.8 lb/hour. Based on 0.08 lb/cubic foot of exhaust, and 6,993,720 cubic feet/hour, the permit emission limits are equivalent to $1.14 \times 10^{-8} \%$. Compliance with the emission limitations and operating requirements in Section II of the permit constitute presumptive compliance with Rule 3.10.

District Rule 3.3 Dust and Fumes

The permit does not include a condition for Rule 3.3. The rule sets limits on the emissions of dust and fumes based on throughput or production rate. The District has determined that Rule 3.3 is not applicable to this source. Compliance with the emission limitations and operating requirements in the permit constitute presumptive compliance with Rule 3.3.

Streamlining Emergency Provisions, Upset, Breakdown, Malfunction

The permit has proposed streamlining the numerous requirements for notification of upset, breakdowns and malfunctions. These notification requirements can be found in the current operating permit conditions j and z; the PSD permit condition IV; at 40 CFR 70.6(a)(3)(iii)(B) and in the NSPS 40 CFR 60.7(b) and (c); and District Rule 10.3 F.2.1.2.

The current permit provides for notification either immediately (condition j) or within two hours of equipment upset or breakdown (condition z). The local conditions also require notification within 24 hours of a continuous emissions monitor failure (condition z) and allows for an emergency variance in the event a failure extends more than 24 hours for equipment or 96 hours for continuous monitors (condition j). The District rules do not contain any provisions related to upset, breakdown, malfunction and related notification or reporting. The rules provide for regulatory relief in the form of variances; however the use of variances is not allowed in the federally enforceable permit. Due to the lack of any regulatory authority to issue or enforce the current conditions j or z in the Title V, the District has determined that it will not continue the conditions in the Title V permit in favor of notification and breakdown reporting requirements in NSPS, Title V and the PSD permit.

The PSD permit provides for notification of the Regional Administrator within 48 hours following any failure that results in excess emissions. The notification must be followed by a written report within 15 days of the failure. The emergency provisions of 40 CFR 70.6(g)(3)(iv) require that the permittee submit notice within two days (48 hours) of the emergency. Therefore the enforceable notice period for the purpose of the Title V permit was determined to be 48 hours based on the PSD permit and Title V regulations.

The PSD permit requires a follow-up report to be submitted within fifteen (15) days of the breakdown (emergency). This requirement has been retained at condition V.A.1. The contents of the follow up report are specified in the PSD permit. This requirement has been retained at condition V.A.1. a.-f. The follow-up reports are in addition to any records and excess emission reports required pursuant to NSPS at 40 CFR 60.7(b) and (c).

The Title V emergency provisions do not require a written report to be submitted, but instead requires certain facts to be demonstrated in order to establish an affirmative defense. These facts, required to establish an affirmative defense under Title V emergency provisions (40 CFR 70.6(g)), may be maintained as records. The permit includes a requirement to retain these records at condition IV.B.

The NSPS 40 CFR 60.7(b) requires records be maintained for the occurrence and duration of any startup, shutdown, or malfunction of an operation, control device or monitoring system. Excess emissions reports are required to be submitted pursuant to 40 CFR 60.7(c) and PSD permit IX.F.6. These requirements have been included in the permit at sections IV. B.1.(records) and V.B. (excess emissions reports). The excess emissions reporting requirements of the PSD permit and the NSPS have been determined to be equivalent and have been streamlined into a single condition at permit section V.B.

The emergency provisions streamlining proposal attempts to simplify the multiple requirements for upsets, breakdowns and equipment failures as well as excess emission reports as contained in the current operating permit, PSD permit, and make the requirements consistent with the emergency provisions under Title V. The proposal includes malfunction reporting requirements

consistent with the time-lines (48 hour notice and 15 day report) and contents provided for in the PSD permit. In addition, the recordkeeping and reporting requirements of 40 CFR 60.7 (b) and (c) are retained, and the excess emission reporting requirements of 40 CFR 60.7(c) and the PSD permit IX.F.6. have been streamlined. The requirements of the District permit have been streamlined. The information required by the operating permit conditions 13003 j and z is not substantially different from the streamlined proposal; however the time-lines are shorter and inconsistent. While the District may allow for variances, these are not normally allowed in a Title V permit.

PSD Permit Emission Limits

PSD permit condition IX.C. specifies a permit limitation of 42 ppm NO_x with mass emissions of 97.4 lb/hour. This requirement is subsumed by the District NSR determination that set the limit at 29 ppm and 45.66 lb/hour. PSD permit condition IX.C. is subsumed by the more stringent requirement.

The PSD permit limits CO emissions to 18 ppm and 23.2 lb/hour. The District issued a permit in response to modification of the facility equipment. The results of the determination resulted in much more stringent NO_x limitations. The District performed an evaluation of CO emissions and issued limits of 24 ppm and 23.2 lb/hour. The emission concentration of CO was allowed to be increased while mass emissions remained the same. This determination was based on a calculation using ultimate fuel analyses from year 2000 at the time of the initial performance source test. The increased CO concentration was determined to be insignificant, and was required in order to decrease emissions of NO_x and to accommodate the changes in operation authorized by the District authority to construct. NO_x emissions are a higher priority in the District as compared to CO due to attainment status. The former CO concentrations are not based on a BACT determination. Mass emissions are unchanged and as a result there is no increase in emissions that would affect air quality. EPA was contacted regarding the change in limits and informally concurred. A change in the PSD permit has not been issued by U.S. EPA. Based on the most recent analysis and determination by the district streamlining is proposed for the NO_x and CO limits in the PSD permit, and the overall more stringent District permit limits are proposed for the Title V.

NSPS Emissions Rate NO_x

40 CFR 60.332 requires turbine electric generators to comply with NO_x emissions determined by the following calculation:

$$\text{STD} = 0.0075 * (14.4/Y) + F \text{ for electric generators } > 100 \text{ MMBTU/hour LHV}$$

where

STD = NO_x emissions percent by volume at 15% O₂

Nitrogen % by weight

Y = Rated heat input

F = fuel bound nitrogen allowance
percent by volume

The results of this calculation indicated a limit of 46 ppm would comply with the standard. The applicant has a limitation of 29 ppm at 15% oxygen at condition II.B.5 of the permit. The NSPS limit is subsumed by the District NSR determination.

NSPS Monitoring Requirements

40 CFR 60.334 specifies an indirect monitoring method using fuel consumption and the ratio of water to fuel to determine NO_x emissions. The permittee uses continuous emissions monitoring to determine NO_x emissions. Permit condition III.A.1.a. subsumes the NSPS monitoring requirement by providing more stringent direct monitoring.

The PSD permit condition IX.F.c. provides “In lieu of the continuous monitoring systems required by b. and/or e. above, Greenleaf may choose an alternate method to continuously measure stack gas:O₂ and/or CO concentrations. The method shall be submitted to EPA for approval and at a minimum shall include 1) measurements of the turbine water injection flow rate, fuel flow rates, gas turbine inlet temperature, and the ambient conditions of atmospheric pressure, temperature, and humidity and/or wet bulk temperature and 2) a demonstration of the correlation between these measured values and actual stack gas O₂ and/or CO.” The applicant has complied with the provision to install continuous monitors. The contingency in the PSD permit is not needed due to enforceable conditions to operate a continuous monitoring system at permit condition III.A. All requirements and recordkeeping related to determination of NO_x emissions by measurement of water injection rate in accordance with 40 CFR 60.334 have been subsumed and will not be included in the permit.

II. Emission Limitations and Operating Requirements

A. Facility-Wide General Operating Requirements

Section II of the permit is derived from the current District operating permit, SIP approved District Rules and PSD permit. The conditions are applicable facility-wide and are not specific to any equipment or operation.

Condition II.A.1. All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this permit shall at all times be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions. This requirement is derived from 40 CFR 60.11(d) and PSD permit condition III.

Condition II A.2. The requirements for adequate and safe sampling facilities are required by operating permit 13003 condition u and 40 CFR 60.8(e). The condition uses the language of 40 CFR 60.8(e) which is more specific and more stringent.

Condition II.A.3. Implements SIP approved District Rule 3.0 which prohibits visible emissions greater than 40% opacity. The opacity limit is applicable for all sources unless a more stringent opacity limitation is specified for an emission source as a result of a federally enforceable standard.

Condition II.A.4. Implements SIP approved District Rule 3.16 which requires the permittee to take reasonable precautions to prevent emissions of fugitive dust beyond the property line.

Condition II.A.5. Implements SIP approved District Rule 3.14 which requires containers of solvent larger than 55 gallons to contain instructions to be stored in a closed condition.

B. LM-6000 Turbine, Coen Duct Burner, HRSG (S-1)

Conditions in this section are specifically applicable to the turbine, duct burner and heat recovery steam generator (HRSG). Limitations are based on current permits, New Source Performance

Standards and SIP approved District Rules. This facility has both a district operating permit based on authority to construct permits, and a PSD permit. Similar and identical terms and conditions have been streamlined. The final condition proposed in the Title V permit reflects the most specific and stringent basis.

Condition II.B.1. requires injection of steam to control NO_x emissions. The District permit condition m.1 specifies steam injection, while PSD permit IX.B.1. specifies water injection. The facility uses steam injection, and that is the control method incorporated into the Title V.

Condition II.B.2. requires use of a low NO_x burner implementing identical requirements in the PSD and District permits.

Condition II.B.3. requires the facility to be fired on natural gas, not to exceed 1.10x10⁶ scf/hr of natural gas. This implements District permit condition n and PSD permit and permit IX. G.

Condition II.B.4. allows 8760 hours per year of operations. There is no limitation in the PSD permit, and annual emissions allowed in the District permit condition s would equate to 8760 hours per year of operation at the maximum hourly limit.

Condition II.B.5. are the emission limitations for the unit expressed in lb/hour and ppmv at 15% oxygen. A daily limit is also specified. Hourly mass limits (lb/hour) are enforced on a 3-hour average, and concentrations are enforced as excess emissions on a 24-hour rolling average pursuant to PSD permit condition IX.F.6. Excess emissions are defined in condition II.B.7.

The PSD permit includes tiered emission limitations for operation with and without the Duct burner. The normal mode of operation at the facility was determined to be with the Duct burner operating. This is the test condition for performance testing. The District determined that the tiered permit limits were unenforceable, or at least impractical due to difficulties in coordinating the operating condition with the applicable limit. The facility is authorized for 8760 hours of operation with the duct burner and full turbine operations. The emission inventory and air quality impact assessment considers this to be the normal operating mode; therefore, the tiered limits have been eliminated.

The District has recently reviewed the permit and issued more stringent limitations for NO_x. The emission concentration of CO was allowed to be increased from 18 to 24 ppm, while mass emissions remained the same. This determination was based on a calculation using ultimate fuel analyses from year 2000 at the time of the initial performance source test. The increased CO concentration was determined to be insignificant, and was required in order to decrease emissions of NO_x and to accommodate changes in natural gas quality. NO_x emissions are a higher priority in the District as compared to CO due to attainment status. Mass emissions for CO are unchanged and as a result there is no increase in emissions that would affect air quality. EPA was contacted regarding the change in limits and informally concurred. A change in the PSD permit has not been issued by U.S. EPA; however the conditions have been reviewed and accepted as minor.

Except during normal start-up and shutdown periods and upset/breakdown conditions, if reported to the District, and considered as qualifying upset/breakdown conditions by the District, the owner or operator shall not discharge or cause the discharge into the atmosphere from turbine and duct burner, gases that exceed the following limits. [PTO 13003 r, s; PSD permit IX.C.]

Pollutant	lbs/hr	ppmv	lbs/day
ROG	8.5	--	204
NOx (as NO ₂)	45.66	29	1096
SOx	5.8	--	139
CO	23.2	24	557
PM	2.4	--	58

Note: All values are calculated on a dry basis and the pollutant concentration values are corrected to 15 percent oxygen (O₂). All emission limits shall be measured on a 3-hr average (an average of three one hour tests) for the purpose of annual source testing.

Condition II.B.6. is a new condition implementing a quarterly and annual emission profile. This information is included in the permit to assist with implementation of Rule 10.1 (new source review) which requires that offsets and emissions reduction credits be based on calendar quarters. FRAQMD has established that the quarterly limits should be calculated using the daily limits times the number of days in each quarter (e.g., Q1=90, Q2=91, Q3=92, Q4=92 days per quarter).

Pollutant	Q1 (lbs)	Q2 (lbs)	Q3 (lbs)	Q4 (lbs)	tons/yr
ROG	18,360	18,564	18,768	18,768	37
NOx (as NO ₂)	98,626	99,721	100,817	100,817	200
SOx	12,528	12,667	12,806	12,806	25
CO	50,112	50,669	51,226	51,226	102
PM	5,184	5,242	5,299	5,299	11

Condition II.B.7. defines excess emissions. The language is based on PSD permit IX.F.6. Excess emissions are not defined in the District permit. Determination of excess emissions is based on results of continuous emissions monitoring systems (CEMS) or “alternate methods”. The District narrowly determines alternate methods means performance source tests and verifiable emissions calculations (i.e. 40 CFR §334).

Condition II.B.8. is a compliance provision from the PSD permit. Excess emissions indicated by the CEM system or alternate method shall be considered violations of the applicable emission limit for the purposes of this permit, except during periods of startup and start-up and shutdown periods, flame stabilization and upset/breakdown conditions. [NSR IX.F.6.]

C. Wood Material Handling (S-2)

The wood material handling system is not addressed in the PSD permit and is based solely on District New Source Review and conditions in operating permits. This section contains terms and conditions taken directly from the operating permit 13003 and does not include streamlining or changes. Emissions controls for this section consist of covering conveyors and transfer points and good housekeeping practices.

D. Wood Drying System (S-3)

This section implements conditions PSD permit conditions IX.B.2. which requires high efficiency cyclones and IX.D.1. which limits particulate matter emissions from wood drying to 5.5 lb/hour. The District limits operations to less than 24 hours per day, 5 days/week, 350 days per year based on district permit condition q. To avoid nuisance, only untreated wood products may be dried; however district approval may be requested for other materials.

E. Cooling Towers (S-4)

The cooling towers exceed the flow rates for exemption under attachment 1 to rule 10.3 and are therefore included in the significant emission unit section. The cooling towers are likely to be a source of particulate matter from spray drift, and are equipped with mist eliminators. There are no rules or permit terms that limit the operations or quantify the emissions from this equipment. Rule 11.3 and 40 CFR 63.400 prohibit the use of hexavalent chrome containing compounds in such cooling towers. This is the only identified federally enforceable limit applicable to the unit.

III Monitoring and Performance Testing

A. Continuous Monitors

Condition III.A.1. is the requirement for continuous monitoring equipment and specification as required in PSD permit condition IX.F. District monitoring requirements w1, w2 and w3 are equivalent, and have been streamlined with the PSD requirement. Condition w also contains calibrations gas standards and documentation. This condition appears separately in the Title V permit at III.A.5.

Condition III.A.2. requires a QA/QC program. The updated citation to Appendix F to 40 CFR Part 60 is used. This condition implements PSD permit condition IX.F.7. which contain an outdated reference.

Condition III.A.3 and 4. require an annual relative accuracy test audit, and quarterly CGAs of continuous monitors. These conditions implement requirements of 40 CFR Part 60 and do not appear in existing permits.

Condition III.A.5. implements the calibration gas standards in the District permit 13003 w. These are existing permit conditions and are considered enforceable by the district; however, the provisions may overlap condition III.A.2. which includes (by reference) requirements on calibration gases.

B. Performance Source Tests

The requirement for annual performance source tests is found at district permit condition t; PSD condition IX.E and is based on 40 CFR 60.8(c). Condition III.B.1. streamlines these requirements. The PSD condition describes an initial source test requirement. The District requirement for annual testing is more stringent. For the purposes of annual testing, the district requires the unit to be operated at its maximum operating capacity (see III.B.2). The PSD permit calls for separately testing the emissions with and without the duct burner operating. As discussed under Section II, the tiered permit limits have been removed from the permit and separate testing of the duct burner is no longer necessary. In addition, it has been determined that the combined duct burner and turbine emissions meet the standards at 40 CFR Part 60.334 by a substantial margin, and that separate testing is not required.

The proposed permit also requires testing of emissions at the dryer stacks. This was required in the District permit, but was not specified in the PSD.

Finally condition III.B.4. includes applicable criteria from 40 CFR 60.8(f) for test conditions and data consolidation.

C. Additional Monitoring

The facility does not have a flue gas flow monitor. Flow is calculated using measurements of fuel flow and f-factors. Condition III.C.1. implements PSD condition IX.F.4. for flow determination.

The determination of sulfur content in fuel is required by the NSPS at 40 CFR 60.335(d). Condition III.C.2. has been added to implement this requirement.

IV Recordkeeping Requirements

A General Requirements

Conditions IV.A. 1 and 2 implement general record requirements of Title V from Rule 10-3.F.2.f.; and 40 CFR 70.6(a)(3). Similar conditions were not issued in previous permits.

Condition IV.A.3. implements PSD permit condition IX.F.8. for records related to continuous emissions monitoring.

B. Startup Shutdown Malfunction and Emergency Provisions Records

Condition IV.B.1. implements 40 CFR 60.7(b) requiring that the facility maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is in-operative. This condition supports reporting requirements in Section V of the permit.

Condition IV.B.2. implements emergency provisions of Rule 10.3 F.2.1.2.e. and 40 CFR 70.6(g)(2). These are not mandatory records, but are required to create an affirmative defense in the event an emergency condition exists that causes excess emissions.

C. Additional Recordkeeping

The amount of natural gas used in the unit is a required record. This implements PSD condition IX.G. and is used in the calculation of flow rates and mass emissions.

V. Reporting Requirements

A Notification and Reporting of Emergency

The streamlining of the emergency provisions and malfunction, breakdown and upset conditions is discussed in Section II.M. of this analysis. Condition V.A. requires notification of U.S. EPA and the District within 48 hours of any emergency (e.g. upset, breakdown, malfunction), and submittal of a written report within 15 days. The requirements are streamlined from PTO 13003 condition z; Rule 10.3 F.2.g; and 40 CFR 70.6(a)(3)(iii)(B)]

B. Excess Emissions and Monitoring Report

The reporting of excess emissions is based on 40 CFR 60.7(c) and the PSD permit condition IX.F.6. The default reporting frequency is every calendar quarter.

C. Provisions for Reduced Reporting Frequency for Excess Emissions

A provision for reduced reporting frequency is included in the permit as provided by 40 CFR 60.7(e). The provision is directly from the regulation and can be implemented without a permit

modification provided the conditions and notification requirements are met. Reduced frequency of reporting requires approval from the permitting authority.

D. Additional Quarterly Reporting

The permit to operate condition y requires the submittal of emissions data from continuous monitors, logs of maintenance for the gas turbine, duct burner and emission control equipment; operating hours and fuel use of the gas turbine and duct burner; and the production rates of steam and electricity. The district operating permit rule 10.1 is SIP approved and the reporting condition is enforceable.

E. Annual Compliance Certification

An annual compliance certification for the Title V permittee is required pursuant to Rule 10-3 F.2.n. and 40 CFR 70.6(b)(5).

F. Certification of Reports

All reports are required to be submitted with a certification specified by Rule 10-3 D.3.a.13 and 40 CFR 70.5(d).

G. Non-routine Reporting and Notifications

The PSD permit condition II requires notice of initial startup in accordance with 40 CFR 60.2(o) at condition II. The citation is obsolete. An equivalent requirement was identified at 40 CFR 60.7(a)(3). The condition has been streamlined using the NSPS language and is found at permit conditions V.G.2 and 3. (non-routine reporting requirements). If the facility is modified, any authority to construct permit issued by the District will require notification of startup as a standard condition.

PSD condition IX.F.5. requires notification of demonstration of the continuous emissions monitors. The condition is streamlined with 40 CFR 60.7(a)(5) at permit condition V.G.4.

PSD permit condition IX.a. requires notification to be submitted to U.S. EPA of initial compliance with pollution control equipment and emissions limitations. No equivalent notification requirement was identified in the regulations. Such compliance was demonstrated shortly after the facility became operational and the condition is obsolete. The District has determined that a requirement to submit a notice of the date construction (or reconstruction) as required by 40 CFR 60.7(a)(1) should be included. The notice is included at condition V.G.1.

VI Locally Enforceable Conditions

Conditions that are based on district rules that are not part of the State Implementations Plan, or requirements for which no specific authority could be identified have either been removed from the permit as discussed in the streamling provisions (II.M), or included in a locally enforceable section of the permit. Permit section VI identifies locally enforceable provisions. Pursuant to 40 CFR 70.6(b)(2), the rules of this section are enforceable by local permit authorities and shall not be enforceable by U.S. EPA or any citizen. This section is exempt from compliance certification requirements of 40 CFR 70.6, and administrative requirements for permit issuance and permit review of 40 CFR 70.7 and 70.8. All other sections of the permit are considered federally enforceable.

The following conditions are found in Section VI. An explanation of the reason these requirements are not federally enforceable is included.

Locally Enforceable Terms and Conditions

<u>Condition</u>	<u>Permit Condition</u>	<u>Explanation</u>
P.O. 13003 o	The following operating mode and limits shall apply to the gas turbine/duct burner systems: expected normal operating time of twenty-four hours per day at an average heat input of 450 million BTU/hr, Lower Heat Value (LHV).	Condition is descriptive of expected operations and is not an enforceable limit on production. No monitoring recordkeeping, reporting or averaging time specified.
P.O. 13003 d	Operating staff of the subject facility shall be advised of and familiar with all conditions contained herein.	No applicable rule. Condition of local permit. Strict liability in section I.I. of Title V subsumes this requirement.
P.O. 13003 q	Hot Spots The District reserves the right to require the permittee to reevaluate the health risk, in accordance with the Emission Inventory Criteria and Guidelines Regulation if there is a significant change in population, emissions or new health data becomes available.	California Air Toxics Hot Spots requirements are not federally enforceable SIP requirements.
N/A	Portable Sources The operation of portable equipment at the facility shall not require modification of this permit provided that the permittee verifies that the portable source is registered with CARB in accordance with CCR Title 13, Article 5 §2450 - 2465.	The California Air Resources Board permits portable sources. This permit is not designed to regulate or prohibit temporary portable sources.

VII Operating Permit Issuance, Reopenings, and Revisions

This section was included in the permit to incorporate and streamline the provisions of 40 CFR Part 70 and District Rule 10.3. This was done because the two regulations contain inconsistencies. The terms and conditions in Section VII predominately reflect the 40 CFR and provide consistency and clarity as to the District’s intent for issuing permit modifications and revisions. This section may be deleted from the permit in the event rule changes are completed that make this section unnecessary.

VIII Facility Emissions Units and Equipment Lists

This section was included to identify the specific equipment identified as insignificant units not subject to the Federal Operating Permit. This section implements Attachment 1 to Rule 10.3 and other exemptions in District Rules.

Significant emissions units are identified and enumerated. This section replaces descriptive information in the local Permit to Operate and PSD permit.

ATTACHMENT 1. DISTRICT OPERATING PERMIT

PERMIT TO OPERATE # 13003

IS HEREBY GRANTED TO

Calpine Greenleaf, Inc. **Greenleaf Unit One**

5087 South Township Road, Yuba City, CA 95993

TO OPERATE

(1) Natural Gas Fired Cogeneration Facility consisting of

- (1) GENERAL ELECTRIC **Model LM6000-GE-NGA** Natural Gas Fired Gas Turbine
with
Woodward Netcom Controls and Steam Injection for NOX Suppression
- (1) GENERAL ELECTRIC two pole-brushless machine, 3600 rpm, 46 MVA Gas Turbine Generator
 - (1) VOGT two drum design Heat Recovery Steam Generator
rated at
1,000/200 psi and 174,000/37,000 pph
 - (1) GENERAL ELECTRIC 850 psi, 900 degree F, 14 stage condensing Steam Turbine
 - (1) GENERAL ELECTRIC 20 MW, 60 cycle, 13.8 KV, hydrogen cooled Steam Turbine Generator
 - (1) 131,000 scfh COEN Natural Gas Fired Duct Burner
 - (1) 50 MVA MAGNETEK Model RHP-32261 Transformer
 - (1) 41.7 MVA OHIO TRANSFORMER Model 9R1533 Transformer
- (1) 21,700 gpm THERMAL-DYNAMIC Model TD-4848-2-2823CF Induced Draft Counterflow Cooling Tower
 - (2) 150 cfm at 125 psi (each) QUINCY NORTHWEST Model QNW-C30 Air Compressors
- (1) ROSEMOUNT ANALYTICAL, MODEL 2000 MLT 1.2 CO AND O2 ANALYZER FOR CEMS MONITORING**
- (1) ROSEMOUNT ANALYTICAL, MODEL NGA 2000 CLD NOx CHEMILUMINESCENCE ANALYZER FOR CEMS MONITORING**

(1) BIOMASS DRYING FACILITY

consisting of

(1) M.E.C. 12'x 42' single pass Rotary Dryer
with
associated conveyers, hoppers, settling chambers, air system & cyclones

(1) STEARNES-ROGER 10'x 60' single pass Rotary Dryer
with
associated conveyers, hoppers, settling chambers, air system & cyclones

(1) HIEL 12'x 42' triple pass Rotary Dryer
with
associated conveyers, hoppers, settling chambers, air system & cyclones

|

This Permit to Operate does not authorize the emission of air contaminants in excess of those allowed by Federal,
State or District Rules and Regulations.

Facility Description

This facility is a natural gas-fired cogeneration facility used to generate electricity and produce useful thermal energy. In addition to electrical energy produced by both the gas turbine and steam turbine generators, Greenleaf Unit One provides a drying service for locally produced biomass and forest products.

The major mechanical components of the power generation side of the plant include a single gas-fired turbine-generator set, an associated natural circulation duct-fired heat-recovery steam generator (HRSG); and a condensing steam turbine-generator set. Other major systems include a cooling tower, switchgear, and the main transformer for produced electricity. In addition, the facility has water wells, water and wastewater treatment facilities, and facilities and equipment for biomass drying. The latter includes “untreated” wood product handling, drying, and storage facilities. The plant can be divided into three inter-related functional systems:

- the gas turbine and exhaust heat recovery system, a flow-through system including an evaporate cooler, a gas turbine-generator, the HRSG, exhaust stacks, the wood chip dryer and cube processing facility;
- the steam cycle, a loop interlacing with the exhaust heat recovery system through the HRSG, and consisting of a turbine and generator, condenser, and feed pump; and,
- the circulating water system, a loop connected with the steam cycle system via the condenser, consisting of a cooling tower and circulating water pump.

Gas Turbine and Exhaust Heat Recovery System - For the gas turbine and exhaust heat recovery system, combustion air enters the evaporative cooler, where it is adjusted to an optimized temperature and then compressed in the gas turbine. Natural gas is injected into the compressed air and burned in the combustion section of the gas turbine. Combustion exhaust drives the gas turbine-generator, and produces electricity. The gas turbine-generator is a 46 MW (at design ambient conditions), General Electric LM 6000 machine complete with lube oil system, inlet air filtration, starting system, fire protection, and microprocessor based control panel. The combustion section of the turbine includes steam injection for nitrogen oxides emission control. The electrical generator is air-cooled using water-to-air heat exchange.

The gas turbine exhaust flows through ductwork to the HRSG, a chamber enclosing coils through which water is pumped to produce steam. A supplemental burner in the duct increases the inlet temperature of the turbine exhaust gas to raise the HRSG's steam output. The HRSG is a dual pressure, natural circulation unit producing high pressure superheated steam and low pressure saturated steam. After the gas turbine exhaust passes through the HRSG, it is released through the plant's main stack or a portion is diverted to the dryers where materials are dried by direct contact with the hot flue gas.

Steam Cycle System

The steam cycle produces additional electrical power by expanding steam from the HRSG through a steam turbine generator. The steam turbine-generator is a 23 MW, dual admission, condensing machine with lube oil system, steam seal system, electrohydraulic controls, and turning gear.

Circulating Water System

The circulating water system provides cooling water for the condenser and auxiliary coolers (such as lube oil coolers and vacuum pump coolers). The major components in the system include a two-cell, counterflow, mechanical draft cooling tower, two vertical circulating water pumps, underground supply and return headers, and acid and chlorine addition systems.

Biomass Drying

The drying process entails the delivery of a steady flow of uniformly sized “untreated” wood products into controlled contact with hot exhaust gases from the HRSG exit. The system consists of three rotary dryers, each with cyclone separators, induced draft fans, exhaust stacks, and interconnecting ductwork.

FACILITY DESCRIPTION

(CONTINUED)

The dryers are rated for 425,000 lb/hr gas flow with a 350 degrees F inlet. Also included in the system is the mechanical equipment used to size and convey the high moisture content "untreated" wood products to the dryer, and the equipment to convey the dried material to truck load-out facilities.

In typical operations, trucks delivering high moisture content "untreated" wood products are weighed at the scale, then driven to the hydraulic truck dumper area for offloading. The high moisture content product is placed in the dryer feed hoppers with a front-end loader and conveyed to the dryers. After processing through the dryers, the product is pneumatically conveyed to cyclone separators for separation of waste fines and finished product. The dry finished product collected from the cyclone separator is conveyed to the storage bay then loaded by front-end loaders onto trucks for offsite delivery. The waste fines are collected and disposed.

GENERAL CONDITIONS

This permit shall be subject to the following conditions to assure facility compliance with all applicable rules and regulations:

- a) Operation under this permit is deemed acceptance of all conditions as specified. Failure to comply with any condition of this permit shall be grounds for enforcement action.
- b) This permit is not transferable from either one location to another, one piece of equipment to another or from one person to another, without the written approval of the Air Pollution Control Officer.
- c) In the event the control of the subject facility is assumed by a new owner, the District shall be notified of such transfer by the submittal of a written request for transfer.
- d) Operating staff of the subject facility shall be advised of and familiar with all conditions contained herein.
- e) The person to whom this permit is issued shall be responsible for payment of annual fees.
- f) If any provision of this permit is found to be invalid, such finding shall not affect the remaining provisions.
- g) The facility operations shall be in accordance with the information submitted by the applicant and these permit conditions.
- h) The permittee shall obtain written approval from the District prior to making any alteration in equipment or method of operation, including hours of operation, materials processed, or production rate. Such change typically requires further evaluation and permit modification.
- i) The physical integrity of all process and air pollution control equipment, including pneumatic duct systems, shall be maintained at all times during plant operations to ensure minimal discharge of emissions. No visible emissions shall be discharged over the plant property line.
- j) Any condition which causes an exceedance of the emission limitations as set forth in District Rules or as a condition of this permit, including dryer fires, shall be reported to the District and corrected immediately. In the event that such exceedance may persist longer than 24 hours (96 hours for monitoring equipment), the owner or operator may request an emergency variance in lieu of shutdown.
- k) The "Right of Entry" as stipulated in the California Health and Safety Code Section 41410, of Division 26, shall apply at all times.

OPERATING CONDITIONS

- l) Calpine Greenleaf, Inc. shall comply with all applicable provisions of 40 CFR, parts 52, 60 and 61 and all other applicable Federal, State, and local air quality regulations.
- m) Calpine Greenleaf, Inc. shall operate and maintain the following air pollution control equipment: during applicable equipment/process operation:
1. Steam injection shall be used to reduce emissions of nitrogen oxides from the gas turbine.
 2. High efficiency cyclone collectors shall be used to control emission of particulate matter from the rotary dryers.
 3. Low NOx design duct burners on the heat recovery steam generator.
 4. All mechanical conveyors shall be completely covered, with partial enclosure at conveyor discharge points. The pneumatic conveyor carrying material from the dryer to the multicyclone shall be completely enclosed, with the multiclone separating the product from the air stream.
 5. The following transfer points upstream of the dryers shall handle only high moisture content material, and have little dust emission potential. The following identifies these transfer points:
 - Hydraulic Truck Dumper to Product Receiving Area
 - Product Receiving Area to Storage Piles
 - Front End Loader transfer to Dryer Feed Hoppers
 - Transfer Points from the Dryer Feed Hoppers to the Dryer Inlet
 6. Transfer points from the Feed Hoppers to the Dryers shall be completely covered.
 7. All trucks shall be covered with tarpaulins while moving to prevent airborne fugitive dust emissions. Materials stored prior to or after drying, which could easily become airborne, shall be covered to prevent fugitive dust emissions. Storage area grounds shall be maintained in good housekeeping condition.
- n) Calpine Greenleaf, Inc. shall burn only natural gas. No more than 1.10x10⁶ scf/hr of natural gas shall be combusted at the facility.
- o) The following operating mode and limits shall apply to the gas turbine/duct burner systems:
- expected normal operating time of twenty-four hours per day at an average heat input of 450 million BTU/hr, Lower Heat Value (LHV)
- p) The typical operating mode for turbine/duct burner operations shall be 24 hours/day, 7 days/week.
- q) The operating limit for drying operations shall be 24 hours/day, 5 days/week, 350 days/year with only "untreated" wood products approved for processing. Other materials must be source tested and approved prior to processing. In addition, a preliminary Air Toxics "Hot Spots" evaluation may be required prior to the start of processing other materials to project potential toxic emissions. An actual Air Toxics emissions evaluation may be required after a given interval of operation as determined by the District to meet AB2588 Program requirements.

EMISSION LIMITATION CONDITIONS

r) The emission limits shall exclude normal start-up and shutdown periods and upset/breakdown conditions, if reported to the District, and considered as qualifying upset/breakdown conditions by the District.

s) EMISSION LIMITS

Note: All values are calculated on a dry basis and the pollutant concentration values are corrected to 15 percent oxygen (O₂).

Gaseous and particulate emissions from the exhaust stack of the heat recovery steam generator shall be limited to the following concentrations and rates:

<u>Pollutant</u>	<u>lbs/hr</u>	<u>ppmv</u>	<u>lbs/day</u>	<u>tons/yr</u>
ROG	8.5	--	204	37
NOx (as NO ₂)	45.66	29	1096	200
SOx	5.8	--	139	25
CO	23.2	24	557	102
PM	2.4	--	58	10.6

All of the above emission limits shall be measured on a 3-hr average (an average of three one hour tests) for the purpose of annual source testing.

The following calendar quarter limits shall apply:

<u>Pollutant</u>	<u>Q1 (lbs)</u>	<u>Q2 (lbs)</u>	<u>Q3 (lbs)</u>	<u>Q4 (lbs)</u>
ROG	18,360	18,564	18,768	18,768
NOx (as NO ₂)	98,640	99,736	100,832	100,832
SOx	12,510	12,649	12,788	12,788
CO	50,130	50,687	51,244	51,244
PM	5,220	5,278	5,336	5,336

Dryer Stacks Particulate Matter

Calpine Greenleaf, Inc. shall not discharge or cause the discharge into the atmosphere, from the three (3) dryer stacks, gases which:

1. Contain particulate matter in excess of 5.5 lbs/hr total all stacks. (3-hour avg.)
2. Exhibit an opacity of 20 percent or greater for any period or periods aggregating more than three minutes in any one hour.

SOURCE TESTING CONDITIONS

t) An emissions source test shall be conducted on the facility on an annual basis or sooner if required by the District, and shall conform to EPA or ARB methodology and procedures. Any deviation from these requirements shall first be approved by the District. A source test protocol shall be submitted to the District at least thirty days prior to the scheduled test date. The District shall be notified at least thirty days prior to any scheduled source test. The results of the source test shall be submitted to the District within sixty days following testing.

- u) Source testing ports, platforms, and access ladders shall be provided which conform to the California Air Resources Board and Occupational Health and Safety administration standards. This includes constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures and providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test methods and procedures. [40 CFR 60.8(e)]
- v) The facility's HRSG stacks shall be source tested at maximum operating capacity to determine the emission rates of the following pollutants: total organic gas (TOG), total non-methane hydrocarbon (TNMHC), oxides of nitrogen (NO_x), carbon monoxide (CO), and total particulate (PM). Testing for particulate matter of 10 microns and less (PM₁₀) shall be optional, at the discretion of the District. Testing for CO at a heat input rate of 400 million BTU/hr shall also be optional at the discretion of the District. The oxides of sulfur (SO_x) emissions may be determined by mass balance equations. Each Dryer stack shall be source tested at maximum operating capacity to determine the emission rate of particulate matter. Facility operating parameters under which the tests are conducted shall be reported in the test results.

MONITORING AND REPORTING CONDITIONS

- w) Documentation shall be made available to the District upon request containing gas calibration standard information, including an identification number corresponding to the gas cylinder number, gas mixture constituents and concentrations, and gas cylinder fill and expiration dates. If a gas cylinder expiration date is not provided by the gas vendor a two (2) year expiration date from the cylinder fill date shall apply. Gas standards in use beyond the expiration date will be considered a violation of this permit. Greenleaf shall install, maintain, and operate the following continuous monitoring systems (CEMS) in the exhaust stack of the heat recovery steam generator:
 1. A
continuous monitoring system to measure stack gas NO_x concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 60.13 and 40 CFR 60, Appendix B, performance specification 2).
 2. A
continuous monitoring system to measure stack gas O₂ concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 60, Appendix B, performance specification 3).
 3. A
continuous monitoring system to measure stack gas CO concentrations. The system shall meet EPA monitoring performance specifications. The system shall meet EPA monitoring performance specifications (40 CFR 60, Appendix B, performance specification 4).
- x) Records and logs of all data generated by the continuous emission monitors shall be maintained for a period of two years and shall be available to the District upon request.
- y) Calpine Greenleaf, Inc. shall provide a quarterly report to the District in a format determined in consultation with the District and Calpine Greenleaf, Inc. . The quarterly report shall include the following:
 - emissions data from continuous emission monitors
 - maintenance on the gas turbine, duct burner and air pollution equipment
 - operating hours and fuel use of the gas turbine and duct burner
 - electric and steam production rates
- z) The District shall be notified within two (2) hours of any upset or breakdown condition which causes a violation of any emission limit as prescribed by District rules or as a condition of this permit, including dryer fires, or within twenty-four (24) hours of any failure or malfunction of any required continuous emission monitoring equipment. Within ten (10) days after an upset or breakdown condition, the permittee shall submit a written report to the District, including the following:

PERMIT APPLICATION REVIEW

CALPINE GREENLEAF I

- duration of excess emissions
- estimate of quantity of emissions
- statement of cause
- corrective measures taken

ISSUE DATE: February 13, 2001
EFFECTIVE DATE: February 13, 2001
THIS PTO IS VALID UNTIL: DECEMBER 31, 2001
PERMIT TO OPERATE 13003

STEVEN A. SPECKERT
AIR POLLUTION CONTROL OFFICER

ATTACHMENT 2. PSD PERMIT

The attached permit was scanned from the original documents and edited for accuracy. The permit includes the original issuance of April 18, 1985 as updated by a 1986 amendment.

Permit Conditions

I. Permit Expiration

This Approval to Construct/Modify shall become invalid (1) if construction is not commenced (as defined in 40 CFR 52.21(b)(8)) within 18 months after the approval takes effect, (2) if construction is discontinued for a period of 18 months or more, or (3) if construction is not completed within a reasonable time.

II. Notification of Commencement of Construction and Startup

The Regional Administrator shall be notified in writing of the anticipated date of initial start-up (as defined in 40 CFR 60.2(o)) of each facility of the source not more than sixty (60) days nor less than thirty (30) days prior to such date and shall be notified in writing of the actual date of commencement of construction and start-up within fifteen (15) days after such date.

III. Facilities Operation

All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this Approval to Construct/Modify shall at all times be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions.

IV. Malfunction

The Regional Administrator shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above any allowable emissions limit stated in Section IX of these conditions. In addition, the Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Section IX of these conditions, and the methods utilized to restore normal operations. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violations of this permit or of any law or regulations which such malfunction may cause.

V. Right to Entry

The Regional Administrator, the head of the State Air Pollution Control Agency, the head of the responsible local air pollution control agency, and/or their authorized representatives, upon the presentation of credential, shall be permitted:

- A. to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this Approval to Construct/Modify; and
- B. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Approval to Construct/Modify and
- C. to inspect any equipment, operation, or method required in this Approval to Construct/Modify; and
- D. to sample emissions from the source.

VI. Transfer of Ownership

In the event of any changes in control or ownership of facilities to be constructed or modified, this Approval to Construct/Modify shall be binding on all subsequent owners and operators. The applicant shall notify the succeeding owner and operator of the existence of this Approval to Construct/Modify and its conditions by letter, a copy of which shall be forwarded to the Regional Administrator and the State and local Air Pollution Control Agency.

VII. Severability

The provisions of this Approval to Construct/Modify are severable, and, if any provision of this Approval to Construct/Modify is held invalid, the remainder of this Approval to Construct/Modify shall not be affected thereby.

VIII. Other Applicable Regulations

The owner and operator of the proposed project shall construct and operate the proposed stationary source in compliance with all other applicable provisions of 40 CFR Part. 52, 60 and 61 and all other applicable Federal, state and local air quality regulations.

IX. Special Conditions

A. Certification

Greenleaf Power Corporation (Greenleaf) shall notify the EPA in writing of compliance with Special Conditions IX.B. and E, and shall make such notification within 15 days of such compliance. This letter must be signed by a responsible representative of Greenleaf.

B. Air Pollution Control Equipment

On and after the date of startup of the cogeneration facility Greenleaf shall install, continuously operate, and maintain the following air pollution control equipment:

1. Water injection shall be used to reduce emissions of nitrogen oxides from the gas turbine.
2. High efficiency cyclone collectors shall be used to control emissions of particulate matter from the wood chip dryers.
3. Low NOx design duct burners on the heat recovery steam generator.

C. Emission Limits For NOx and CO

On and after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the exhaust stack of the heat recovery steam generator when the duct burners are not in operation, pollutants in excess of the following limits:

<u>Pollutant</u>	<u>Maximum Emission Limit</u> <u>(lbs/hr)</u>	<u>Average Emission Limit</u> <u>(ppmv)</u>
NO ₂ (as NO ₂)	91.0	42
CO	20.4	15

When the gas turbine and duct burners are both in operation, the following limits shall apply:

<u>Pollutant</u>	<u>Maximum Emission Limit</u> <u>(lbs/hr)</u>	<u>Average Emission Limit</u> <u>(ppmv)</u>
NO ₂ (as NO ₂)	97.4	42
CO	23.2	18

All of the above emission limits shall be measured on a 3-hr average (average of three one hour tests) for the purpose of annual source tests.

Upon written request by Greenleaf, EPA may revise (not to exceed 75 ppmv) the 42 ppmv NOx limit contained in this permit condition. The request shall provide performance test results, NO monitoring data, or other information available at the time of turbine shakedown, which demonstrates that compliance with the 42 ppmv NOx limit will cause excessive wear or damage to the gas turbine.

D. Emission Limit for Particulate Matter [As Amended]

1. On or after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the wood chip dryer stack and HSRG stack together gases which contain particulate matter in excess of 5.5 lbs/hr (3-hour average).
2. On or after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the HSRG stack gases Which contain particulate matter in excess of 2.44 lbs/hr (3-hour average).

~~On or after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the wood chip dryer stack gases which:~~

- ~~a. Contain particulate matter in excess of 3.1 lbs/hr (3-hour average).~~
- ~~b. Exhibit an opacity of 20 percent or greater for any period or periods aggregating more than three minutes in any one hour.~~

E. Performance Tests

1. Within 60 days after achieving the maximum production rate of the cogeneration facility but no later than 180 days after initial startup as defined in 40 CFR 60.2(o) , and at such other times as specified by the EPA, Greenleaf shall conduct performance tests for NOx and CO at the HSRG stack with and without the duct burners in operation. Performance tests for particulate matter shall be conducted at the wood dryer stack. Volumetric flow rate performance tests shall be conducted on both stacks. Greenleaf shall furnish the Sutter County APCD, the California Air Resources Board and the EPA a written report of the results of such tests. All performance tests shall be conducted on an annual basis and at the maximum operating capacity of the unit being tested.
2. Performance tests for the emissions of NOx, CO, and PM shall be conducted and results reported in accordance with the test methods sets forth in 40 CFR 60 Appendix A, and 40 CFR 60.8. The following test methods shall be used:
 - a. Performance tests for the emissions of CO shall be conducted using EPA methods 1-4 and 10.
 - b. Performance tests for the emissions of NOx shall be conducted using

EPA methods 1-4 and 7.

- c. Performance tests for the emissions of PM shall be conducted using EPA methods 1-5.
3. At least 30 days prior to actual testing, Greenleaf shall submit to the EPA (Attn: A-3-3) a quality assurance project plan detailing methods and procedures to be used. Such a plan shall conform to EPA guidelines for developing project plans. A test plan or QA plan that does not have EPA approval may be grounds to invalidate any test and require a retest.
4. For performance test purposes, sampling ports, platforms, and access shall be provided by Greenleaf on the heat recovery steam generator and the wood chip dryer exhaust stacks in accordance with 40 CFR 60.8(e).

F. Continuous Monitoring

1. Prior to the date of startup and thereafter, Greenleaf shall install, maintain and operate the following continuous monitoring systems in the exhaust stack of the heat recovery steam generator:
 - a. A continuous monitoring system to measure stack gas NO_x concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 60.13 and 40 CFR 60, Appendix B, Performance Specification 2).
 - b. A continuous monitoring system to measure stack gas O₂ concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 60, Appendix B, Performance Specification 3).
 - c. A continuous monitoring system to measure stack gas CO concentrations.

In lieu of the continuous monitoring systems required by b. and/or e. above, Greenleaf may choose an alternate method to continuously measure stack gas: O₂ and/or CO concentrations. The method shall be submitted to EPA for approval and at a minimum shall include 1) measurements of the turbine water injection flow rate, fuel flow rates, gas turbine inlet temperature, and the ambient conditions of atmospheric pressure, temperature, and humidity and/or wet bulk temperature and 2) a demonstration of the correlation between these measured values and actual stack gas O₂ and/or CO.

- ~~2. Prior to the date of startup and thereafter, Greenleaf shall install, maintain and operate a transmissometer system (or continuous measurement of the opacity of stack gases from the wood chip dryer. The system shall meet EPA performance specifications (40 CFR 60.13 and 40 CFR 60, Appendix B, performance Specification 1), [Deleted by amendment]~~
3. On and after the date of startup, Greenleaf shall install, operate and maintain at the cogeneration facility devices to monitor and record the amount of fuel and water consumed in the gas turbine and duct burners.

4. Within 90 days of startup of the cogeneration facility, Greenleaf shall submit to EPA a plan for the determination of stack gas flow rates from the HRSG and dryer stacks based on the amount of fuel burned, water injected, excess oxygen, or other monitored parameters.
5. Greenleaf shall notify EPA (Attn: A-3-3) of the date upon which demonstration of the continuous monitoring system performance commences (40 CFR 60.13(c)).
6. Greenleaf shall submit a written report of all excess emissions to EPA (Attn: A-3-3) for every calendar quarter. The report shall include the following:
 - a. The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions.
 - b. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the cogeneration facility. The nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted shall also be reported.
 - c. The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.
 - d. When no excess emissions have occurred or the continuous monitoring system has not been inoperative, repaired, or adjusted, such information shall be stated in the report.

Excess emissions shall be defined as:

- (1) any consecutive 3-hour period during which the average emissions of NOx or CO, as measured by the continuous monitoring system or alternate method, exceeds the maximum emission limits set for each pollutant in IX.C. above.
- (2) any consecutive 24-hour period during which the average emissions of NOx or CO, as measured by the continuous monitoring system (or alternate method), exceeds the average emission limits set for each pollutant in IX.C. above.
- ~~(3) any three-minute period during which the opacity, as measured by the continuous monitoring system exceeds the opacity limit set in Special Condition IX.D. [Deleted by amendment]~~

Excess emissions indicated by the CEM system or alternate method shall be considered violations of the applicable emission limit for the purposes of this permit, except during periods of startup and flame stabilization.

7. Quality Assurance for CEM

Not less than 90 days prior to the date of startup of the cogeneration facility, Greenleaf shall submit to the EPA (Attn: A-3-3) a quality assurance project plan for the certification and operation of the continuous emission monitors. Such a plan shall conform to the EPA document guidelines for Developing a Quality Assurance Project Plan (QMS 005/80). Continuous emission monitoring may not begin until the QA project plan has been approved by EPA Region 9.

8. Greenleaf shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration check.; adjustments and maintenance performed on these systems or devices; and all other information required by 40 CFR 60 recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports and records.

G. Fuel Useage

The Greenleaf cogeneration facility shall burn only natural gas. No more than 1.10×10^6 scf/hr of natural gas shall be combusted at the facility.

A written record of the amount of natural gas burned shall be maintained for at least three years following the date recording.

H. New Source Performance Standards

The cogeneration facility shall comply with all portions of 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines.

X. Agency Notification

All correspondence as required by this Approval to Construct/Modify shall be forwarded to:

- A. Director
Air Management Division (Attn: A-3-3)
EPA Region 9
215 Fremont Street
San Francisco, CA 94105
- B. Chief, Regional Programs Division
California Air Resources Board
PO. Box 2815
Sacramento, CA 95814
- C. Air Pollution Control Officer
Sutter County Air Pollution Control District
142 Garden Way
Yuba City, CA 95991

ADDENDUM

PERMIT CONDITIONS

GREENLEAF POWER CORPORATION

(NSR 4-4-4, SAC 84-01)

The April 18, 1985, Approval to Construct issued to Greenleaf Power Corporation is hereby amended.

Special Condition IX. D. is amended to read as follows:

D. Emission Limit for Particulate Matter

1. On or after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the wood chip dryer stack and HSRG stack together gases which contain particulate matter in excess of 5.5 lbs/hr (3-hour average).
2. On or after the date of startup of the cogeneration facility, Greenleaf shall not discharge or cause the discharge into the atmosphere from the HSRG stack gases Which contain particulate matter in excess of 2.44 lbs/hr (3-hour average).

Special Condition IX. F.2. and special Condition IX. F.6.d.(3) are deleted.

All other permit conditions are unchanged and remain in effect.