San Joaquin Valley
Unified Air Pollution Control District

Guidelines for Expedited Application Review (GEAR)
Emergency Internal Combustion Engines

Approved by: Signed Seyed Sadredin Director of Permit Services	Date: 12/18/97 Revised

Purpose: To outline the procedure for expedited processing of Authorities to Construct for emergency IC engines that use diesel and gaseous fuel.

I. Applicability

The guideline applies to Permit Services' actions relating to and dealing with emergency diesel-fired or gaseous-fired (natural gas or LPG/propane) internal combustion engines.

II. Permit Application and Supplementary Forms

The applicant must complete and submit an ATC application form along with an Internal Combustion Engine Supplemental Form. (See Attachment I.)

III. Priority Processing

Applications for emergency IC engines must be processed and a final decision made within 30 days of the date they are deemed complete. The 30 day priority processing timeline will be preempted if public noticing is required pursuant to Rule 2201, or school noticing is required pursuant to California Health & Safety Code section 42301.6.

IV. Application Review

In order to standardize the application reviews for this source category, the application review found in G:/per/gear/emgcy-ic will be used as a base document. The following pages are hard copies of the standard review for emergency IC engines fired on diesel or gaseous fuels. Different Best Available Control Technology (BACT) Guidelines apply depending on the rating of the equipment. Standard emission factors and emission control efficiencies are included and may be used if manufacturer's information is not available. This hard copy version for the GEAR Policy manual includes a copy of the required supplemental application form (Attachment I), the up-to-date Best Available Control Technology (BACT) analysis (Attachment II-A (diesel-fired) and II-B (gas-fired)), the standard Authority to Construct (ATC) conditions (Attachment III-A (diesel-fired) and III-B (gas-fired)) and general health risk prioritization (Attachment IV). The BACT analysis will be referred to, but will not be included in the review done for a specific application. The application review will only include the draft ATC conditions for the specific application. This will minimize the number of pages for the expedited application review.

IV. Application Review (continued)

The use of this standard Application Review will ensure:

A. That the proposed project complies with the Best Available Control Technology (BACT) requirements as specified in the District's current BACT Clearinghouse.

B. That the proposed project is either exempt for offsets or the emissions form the project do not trigger offset requirements.

C. That the PTO has enforceable daily emission limitations (DELs).

D. That the proposed project complies with all applicable prohibitory rules.

Health Risk Assessment

A site specific health risk prioritization must be performed for gas-fired engines. However, for diesel-fired engines, a general health risk prioritization table (Attachment IV) may be used to quickly determine health risk in lieu of performing a facility specific health risk prioritization. The table may only be used if no other health risk review has been required in the past for the facility; i.e. cumulative risk is zero for facility prior to project. The table only applies to diesel fired IC engines at the specified fuel use rates. For engines that do not meet the parameters for the general health risk prioritization a site specific prioritization must be performed for the new engine at the facility.

Daily Emission Limits

Rule 2201, New Source Review, requires each permit to contain Daily Emission Limits (DELs) and other enforceable conditions which validate emission limits and offset requirements. As emergency equipment is exempt from offset requirements, emissions from emergency IC engines do not contribute to either the NSR Balance or the Stationary Source Potential to Emit (SSPE). However, DELs are required to enforce the applicability of BACT. For emergency IC engines, DELs are stated in the form of emission factors, the maximum engine rating, and the maximum operational time of 24 hours per day. Because the engine is permitted to operate at maximum load for 24 hours a day, no further conditions are required.

Testing Requirements

There are no testing requirements for emergency IC engines.

V. Equipment Description

To ensure uniformity the equipment description shall specify the following:

- rating of engine in horsepower
- manufacturer
- model number
- fuel type
- control device(s)
- equipment powered by the engine

Examples:

336 HP CATERPILLAR MODEL 3306B DIESEL-FIRED EMERGENCY IC ENGINE POWERING A 250 KW ELECTRICAL GENERATOR

110 HP GENERAC MODEL 110B NATURAL GAS-FIRED EMERGENCY IC ENGINE SERVED BY A THREE-WAY CATALYST POWERING A 75 KW ELECTRICAL GENERATOR

VI. Authority to Construct Conditions

To ensure uniformity, a standard set of conditions will be used as a base for all applications (See Attachment III). Additional conditions may be necessary on a site specific basis due to health risk assessment.

VII. Updates

This GEAR will be updated as necessary to accommodate any changes in prohibitory rules, BACT Clearinghouse, cost information for the top-down analysis or other items affecting the policy.

The attached bibliography lists items which are referenced in this GEAR. Changes to the listed items may necessitate revisions to this document. Additionally, alterations to this policy may trigger changes to some of the listed items.

The Permitting Handbook will also be updated whenever this GEAR document is updated.

Each update will be submitted to the GEAR coordinator for review and the coordinator will forward the updates for the Director's approval.

APPLICATION REVIEW
DIESEL-FIRED EMERGENCY IC ENGINES

ATC APPLICATION REVIEW
Diesel-Fired Emergency IC Engine

Processing Engineer:
Lead Engineer (if applicable):
Date:

Facility Name:
Mailing Address:

Contact Name:
Phone:

Project Number:
Permit Number:

I. PROPOSAL

Applicant is requesting an Authority to Construct to install a [*size*] horsepower diesel-fired emergency IC engine driving an [*equipment*].

II. APPLICABLE RULES

Rule 2201 New and Modified Stationary Source Review (June 15, 1995)
Rule 4101 Visible Emissions (December 17, 1992)
Rule 4102 Nuisance (December 17, 1992)
Rule 4201 Particulate Matter Concentration (December 17, 1992)
Rule 4701 Stationary Internal Combustion Engines (December 19, 1996)
Rule 4801 Sulfur Compounds (December 17, 1992)
California Health & Safety Code 41700

III. PROJECT LOCATION

The project is located at [*street address*] in [*city name*], California. The site is [*not*] located within 1000 feet of a school. [*optional: ( ) quarter section of Sec. ( ), T. ( )S, R. ( )E*]

IV. PROCESS DESCRIPTION

[*Enter description of engine and equipment engine serves.*] Other than emergency operation, the engine may be operated up to 200 hours per year for maintenance and testing purposes.

V. EQUIPMENT LISTING

[*Permit Number*]: [*engine power rating*] hp [*manufacturer name & model*] emergency diesel-fired IC engine driving a [*equipment*]

The engine is equipped with (check all that apply):

_____ turbocharger
_____ intercooler/aftercooler
_____ 4° injection timing retard (or equivalent per District Policy SSPP 16-1)
_____ positive crankcase ventilation (PCV)
_____ 90% efficient control device for crankcase emissions
_____ particulate filter

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

The emission control devices/technologies and their effect on diesel engine emissions are detailed below [1].

[Delete if equipment/technology is not proposed or required:]*

The turbocharger reduces the NO_X emission rate from the engine by approximately 10% by increasing the efficiency and promoting more complete burning of the fuel.

The intercooler/aftercooler functions in conjunction with the turbocharger to reduce the inlet air temperature. By reducing the inlet air temperature, the peak combustion temperature is lowered, which reduces the formation of thermal NO_X. NO_X emissions are reduced by approximately 15% with this control technology.

Retarding the fuel injection timing by 4° from standard lowers the peak combustion temperature and reduces the formation of thermal NO_X. NO_X emissions are reduced by approximately 15% with this control device. [*The injection timing retard requirement may be expressed as '...with the timing advanced no greater than sixteen degrees before top dead center (BTDC)' consistent with District Policy SSPP 16-1, "Determination of Injection Timing Retard for Diesel IC Engines", dated 8/14/96.*]

The PCV system reduces crankcase VOC and PM_{10} emissions by at least 90% over an uncontrolled crankcase vent.

The particulate filter reduces exhaust stack PM_{10} emissions by at least 90%.

The use of low sulfur (0.05% by weight sulfur maximum) diesel fuel reduces SO_X emissions by approximately 90% from standard diesel fuel.

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[1] From "Non-catalytic NO_X Control of Stationary Diesel Engines", by Don Koeberlein, CARB.

VI. EMISSION CONTROL TECHNOLOGY EVALUATION (continued)

A. BACT Applicability:

Pursuant to Rule 2201 subsections 4.1.1 and 4.1.1.1, BACT is required for all criteria pollutants emitted by a new emissions unit which result in an increase in permitted emissions greater than 2 lb/day, except for carbon monoxide emissions in attainment areas if the stationary source's New Source Review (NSR) balance is less than or equal to 550 lbs/day.

> [* *Three equipment rating ranges and thus three SJVUAPCD BACT Guidelines apply to diesel-fired emergency IC engines driving electrical generators; < 117 hp, Guideline 3-2; ≥ 117 hp but < 400 hp, Guideline 3-6; and ≥ 400 hp, Guideline 3-7. BACT Guideline 3-11 for CO emissions applies to all three rating ranges. BACT Guideline 3-9 applies to diesel-fired emergency IC engines driving fire water pumps of all rating ranges. Delete the sections which do not apply*.]

Generally, new diesel-fired emergency IC engines will trigger BACT requirements for all pollutants due to an increase in permitted emissions greater than 2 lb/day for all criteria air pollutants.

[Delete the following if not applicable:]*

In this case, BACT is not triggered for CO because the location is in a designated CO-attainment area and the NSR balance is less than or equal to 550 lb/day.

The facility is a small emitter per District Policy BACT 1; less than 2 tons per year of each affected pollutant, or less than all of the following: 30 lb-VOC/day, 40 lb-NO_X/day, 30 lb-PM_{10}/day, 30 lb-SO_X/day, 220 lb-CO/day. Therefore, alternate basic equipment and technologically feasible BACT are not required. Only achieved-in-practice BACT is required.

BACT for toxic emissions control (T-BACT) is not required for this project because, as explained in the CH&SC 41700 discussion of the Compliance section below, the health risk assessment shows that the risk is below the District acute, chronic and cancer risk thresholds in the Risk Management Policy TOX-1 (6/23/97).

VI. EMISSION CONTROL TECHNOLOGY EVALUATION (continued)

B. BACT Guidance:

[Enter the appropriate paragraph:]*

[* Engines < 117 hp]
SJVUAPCD BACT Clearinghouse Guideline 3-2 [*quarter, year*] covers emergency power generation (with diesel-fired IC engine less than 117 hp). For CO emissions, BACT Guidelines 3-11 applies.

[* Engines greater than or equal to 117 hp but less than 400 hp]
SJVUAPCD BACT Clearinghouse Guideline 3-6 [*quarter, year*] covers emergency power generation (with diesel-fired IC engine greater than or equal to 117 hp but less than 400 hp). For CO emissions, BACT Guideline 3-11 applies.

[* Engines greater than or equal to 400 hp]
SJVUAPCD BACT Clearinghouse Guideline 3-7 [*quarter, year*] for emergency power generation (with diesel-fired IC engine greater than or equal to 400 hp) provides the BACT options listed below. For CO emissions, BACT Guideline 3-11 applies.

[* Engines driving fire water pump]
SJVUAPCD BACT Clearinghouse Guideline 3-9 [*quarter, year*] for emergency fire water pump provides the BACT options listed below.

C. Top-Down BACT Analysis:

[Enter the appropriate paragraph.]*

[* For engines used for emergency power generation]
The applicant is proposing to use [*specify proposed control equipment*]. Per the Top-Down analysis in Attachment II, this proposed equipment is achieved in practice BACT and there is no other control technique identified as technologically feasible. Therefore the proposed equipment satisfies the BACT requirements.

[* For engines driving fire water pump]
The applicant is proposing to use [*specify proposed control equipment*]. Per the Top-Down analysis in Attachment II, this proposed equipment is achieved in practice BACT and the technologically feasible control technology is not cost effective for this option. Therefore the proposed equipment satisfies the BACT requirements.

VII. CALCULATIONS

A. Assumptions:

operating schedule:	24 hours/day, 200 hours/year (maximum non-emergency use)
density of diesel fuel:	7.1 lb/gal
EPA F-factor:	9190 dscf/MMBtu
fuel heating value:	137,000 Btu/gal
BHP to Btu/hr conversion:	2542.5 Btu/hp-hr
thermal efficiency of engine	commonly ≈ 35%
fuel rate:	( ) gal/hr @ 100% load

If not provided, maximum fuel rate can be calculated as follows:

$$\text{Fuel rate} = \frac{\text{(Btu rating)(BHP to Btu/hr conversion)}}{\text{(Fuel heating value)(thermal efficiency of engine)}}$$

B. Emission factors:

The emissions factors listed below are identified by the engine manufacturer:

[List emission factors. If not available, use the applicable AP-42 emission factors below:]*

Uncontrolled CO and VOC emission factors listed below are from EPA publication AP-42 (10/96) A Compilation of Air Pollutant Emission Factors. Emission factors for engines less than or equal to 600 BHP are located in table 3.3-1.

CO	3.03 g/hp-hr
VOC	1.12 g/hp-hr

Or

CO and VOC emission factors listed below are from EPA publication AP-42 (10/96) A Compilation of Air Pollutant Emission Factors. Emission factors for engines greater than 600 BHP are located in table 3.4-1.

CO	2.40 g/hp-hr
VOC	0.33 g/hp-hr

And

For all engine sizes:

SO_X	mass balance - use 0.05%w S for low-sulfur fuel
PM_{10}	Emission factor should be equal or less than the value calculated in Compliance - Rule 4201.

VII. CALCULATIONS (continued)

For engines rated < 117 BHP with a turbocharger and 4 degrees timing retard, or for engines rated ≥ 117 BHP and < 400 BHP with a turbocharger and intercooler/aftercooler and 4 degrees timing retard assume:

NO_X : 10.0 g/BHP-hr (based on Achieved in Practice technologies from BACT guidelines 3-2 and 3-6)

Or

For engines rated ≥ 400 BHP with a turbocharger and intercooler/aftercooler and 4 degrees timing retard, or for engines driving an emergency fire pump with a turbocharger and intercooler/aftercooler and 4 degrees timing retard assume:

NO_X : 10.0 g/BHP-hr (based on Achieved in Practice technologies from BACT guidelines 3-7 and 3-9)

For all other combinations of control equipment, sum the appropriate control efficiencies from the Emission Control Technology Evaluation section above.

C. Emission Calculations:

1. Potential to Emit (PE):

The potential to emit for the emergency IC engine is based on the maximum operating capacity of the engine for 24 hours per day. The following calculation for NO_X emissions is representative of emission calculations for all pollutants except SO_X. Emission calculations for SO_X are detailed below.

NO_X:
(emission factor) g/hp-hr x *(engine power output)* hp x lb/453.6 g x *(1- % total control efficiency)*

NO_X: ( ) lb/hr, ( ) lb/day
CO: ( ) lb/hr, ( ) lb/day
VOC: ( ) lb/hr, ( ) lb/day
PM_{10}: ( ) lb/hr, ( ) lb/day

SO_X:
(% sulfur in fuel) x 1/100 x 7.1 lb fuel/gal fuel x (2 lb SO_2 in exhaust/1 lb S in fuel) x *(fuel rate)* gal/hr

SO_X: ( ) lb/hr, ( ) lb/day

VII. CALCULATIONS (continued)

2. Best Available Control Technology (IPE):

As the IC engine represents a new source, the increase in permitted emissions (IPE) for the IC engine is equal to the increase in permitted emissions calculated above.

[Modify the following section as necessary if the IPE for a pollutant is not greater than 2.0 lb/day. If the engine is located in a CO attainment area, where the NSR balance is less than 550 lb/day, state that BACT is not triggered for CO per section 4.1.1.1.]*

The increase in permitted emissions is greater than 2.0 lb/day for NO_X, CO, VOC, PM_{10} and SO_X. Therefore BACT is required for these pollutants pursuant to Rule 2201, subsection 4.1.1.

3. New Source Review (NSR) Balance:

As emergency equipment is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2, there is no contribution to the facility NSR balance from this project. Therefore, the NSR Balance for this facility will remain unchanged.

4. Stationary Source Potential to Emit (SSPE):

Emergency equipment limited to no more than 200 hours per year of non-emergency use is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2. Therefore, there is no contribution to the Stationary Source Potential to Emit from the IC engine.

VII. CALCULATIONS (continued)

5. Other Emission Calculations:

Calculations of annual emissions from the engine are required only to determine the amount exempt from offsets. This amount is to be entered into the network ATC status records.

Expected operating time for emergency IC engines is assumed to be evenly distributed at 50 hours per quarter based upon permitted 200 hours of non-emergency operation per year.

Using the hourly emission rates calculated above and 50 non-emergency operating hours per quarter yield the following values in pounds:

Annual PE = (PE , lb/hr) x (200 hr)
Quarterly PE = (PE, lb/hr) x (50 hr)

	NO_X	CO	VOC	PM_{10}	SO_X
Annual PE					
Quarterly PE					

6. Quantity of Offsets Required:

Emergency equipment limited to no more than 200 hours per year of non-emergency use is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2. Therefore, offsets are not required.

7. Actual Emissions Reductions:

The project involves the installation of new equipment only. There are no emission reductions.

8. Major Source/Title I Modification:

Annual emissions from the IC engine are less than major source or Title I Modification threshold values. Therefore, notification for new major source or Title I Modification is not required.

[If other permitted units exist at the facility, SQEGEE #14 guidelines may be used to determine if the modification will result in a new major source or Title I modification.]*

VII. CALCULATIONS (continued)

9. Public Notice:

[Delete the section that does not apply.]*

[* For CO attainment]

	VOC	NO_X	CO	PM_{10}	SO_X
IPE [lb/day]					
NSR Balance	N/A	N/A			
Public Notice Threshold [lb/day]	NSR IPE > 100	NSP IPE > 100	NSR balance ≥ 550 + increase	NSR balance ≥ 70 + increase	NSR balance ≥ 70 + increase

[* For CO non-attainment]

	VOC	NO_X	CO	PM_{10}	SO_X
IPE [lb/day]					
NSR Balance	N/A	N/A	N/A		
Public Notice Threshold [lb/day]	NSR IPE > 100	NSP IPE > 100	NSR IPE > 100	NSR balance ≥ 70 + increase	NSR balance ≥ 70 + increase

[Delete the section that does not apply.]*

Per the table above, this project will not result in emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is not required.

Or

Per the table above, this project will result in NOx emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is required.

10. Daily Emission Limits (DELs):

DELs are required to enforce the applicability of BACT. For emergency IC engines, DELs are stated in the form of emission factors, the maximum engine rating, and the maximum operational time.

VIII. COMPLIANCE

Rule 2201 New and Modified Stationary Source Review

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
BACT is satisfied with the use of an turbocharger, four degree fuel injection timing retard, low-sulfur diesel fuel, and positive crankcase ventilation (PCV) system. Engines certified at 10.0 g/hp-hr or less are not required to have a turbocharger & 4 degree fuel injection timing retard (or equivalent per District Policy SSPE 16-1).

[* Engines greater than or equal to 117 hp but less than 400 hp]
BACT is satisfied with the use of an turbocharger, intercooler/aftercooler and positive crankcase ventilation (PCV) system. BACT is also satisfied by retarding the fuel injection timing four degrees and by using low sulfur fuel. Engines certified at 10.0 g/hp-hr or less are not required to have a turbocharger, intercooler/aftercooler, & 4 degree fuel injection timing retard (or equivalent per District Policy SSPE 16-1).

[* Engines greater than or equal to 400 hp]
BACT is satisfied with the use of an turbocharger, intercooler/aftercooler and positive crankcase ventilation (PCV) system. BACT is also satisfied by retarding the fuel injection timing four degrees and by using low sulfur fuel. Engines certified at 7.2 g/hp-hr or less are not required to have a turbocharger, intercooler/aftercooler, & 4 degree fuel injection timing retard (or equivalent per District Policy SSPE 16-1).

[* Engines driving an emergency fire pump]
BACT is satisfied with the use of an turbocharger, intercooler/aftercooler and [*catalytic oxidizer (if cost effective) or positive crankcase ventilation (PCV) system*]. BACT is also satisfied by retarding the fuel injection timing four degrees and by using low sulfur fuel. Engines certified at 7.2 g/hp-hr or less are not required to have a turbocharger, intercooler/aftercooler, & 4 degree fuel injection timing retard (or equivalent per District Policy SSPE 16-1).

And
DELs are required to enforce the applicability of BACT. For emergency IC engines, DELs may be stated in the form of emission factors, the maximum engine rating, and the maximum operational time. The following condition will also serve as DELs for this unit.

a) *Emissions shall not exceed any of the following: NO_X, xxx; CO, xxx; VOC, xxx; PM10, xxx; or SO_X, xxx.*

And
Pursuant to subsection 4.2.1.2, offsets are not required for emergency IC engines when annual non-emergency operating time is limited to 200 hours. Emergency IC engine emissions are not included in the NSR balance as the equipment is exempt from offsets.

VIII. COMPLIANCE (continued)

And
[Delete the section that does not apply.]*

Per calculations above, this project will not result in emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is not required.

Per calculations above, this project will result in NOx emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is required. A public notice describing the project will be published in a newspaper of general circulation. The public will be allowed 30 days to comment on the proposed issuance of the Authority to Construct. Any comments will receive due consideration prior to the final decision.

Rule 4101 Visible Emissions

Based on experience with similar operations, compliance with visible emission limits is expected under normal operating conditions.

Rule 4102 Nuisance

Nuisance conditions are not expected provided the engine operates within the permitted emission and opacity limits. Based on the health risk assessment prioritization score, no significant health risk is expected.

California Health & Safety Code 41700 (Health Risk Analysis)

Pursuant to District's Risk Management Policy TOX-1 (6/23/97), for any sources with increases in toxic air emissions, the health risks resulting from such projects must be evaluated. The health risk evaluation process begins with prioritization using CAPCOA Facility Prioritization Guidelines. If the project cumulative prioritization score increase is equal to or less than one, no further assessment will be required. The prioritization and health risk evaluation are cumulative for all new and modified units at the stationary source.

[Verify the following is true, and notify Technical Services that the Risk Prioritization Score chart has been utilized.]*
Using the Risk Prioritization score chart in Attachment IV, the risk prioritization score for this engine is less than 1 based on the fuel flow rate and the distance to the nearest receptor. Therefore, further health risk screening is not required.

[If the chart indicates a Risk Prioritization Score for this unit of greater than one, or if the stationary source includes other permit units which have had health risk screenings performed in the past, a new Risk Prioritization Analysis/Health Risk Analysis for this specific emissions unit must be done.]*

(Attach Risk Prioritization or Health Risk Analysis as Attachment IV.)

VIII. COMPLIANCE (continued)

Rule 4201 Particulate Matter Concentration

Particulate matter emissions from the engine will be less than the rule limit of 0.1 grain per cubic foot of gas at dry standard conditions as shown by the following:

$$\text{PM Conc.} = \frac{\text{(Emission rate)(g to gr conversion)(BHP rating)}}{\text{(Fuel consumption rate)(Fuel Btu content)(F factor)}}$$

[Verify that PM concentration < 0.1 gr/dscf.]*

Therefore, compliance with this rule is expected.

Or

The maximum particulate matter factor for this engine that results in compliance with the particulate matter concentration of 0.1 grain per cubic foot of gas at dry standard conditions can be calculated as follows:

$$\text{g/BHP-hr} = \frac{\text{(0.1 gr/dscf)(Fuel consumption rate, gal/hr)(Fuel Btu content)(F factor)}}{\text{(g to gr conversion: 15.432 gr/g)(BHP rating)}}$$

Based on similarly equipped engines, the actual emissions are expected to be equal or less than ____ g/BHP-hr. Therefore, compliance is expected.

Rule 4701 Stationary Internal Combustion Engines

Emergency standby engines that do not operate more than 200 hours per year for non-emergency use are exempt from this rule per section 4.2.1. Therefore, the diesel-fired emergency IC engine is exempt from the requirements of this rule.

VIII. COMPLIANCE (continued)

Rule 4801 Sulfur Compounds

Sulfur compound emissions (as SO_2) are not expected to exceed 0.2% by volume since the fuel sulfur content shall not exceed 0.05% by weight. Calculations are shown below:

lb-SO_2/gallon: (0.05%) x (7.1 lb/gallon) x (64 lb-SO_2/32 lb-S) = 0.007 lb-SO_2/gallon

lb-SO_2/exhaust volume: (lb-SO_2/gallon) ÷ [(F factor) x (fuel heating value)]
= (0.007 lb-SO_2/gal.) ÷ [(9190 dscf/MMBtu) x (0.137 MMBtu/gal.)]
= 5.6×10^{-6} lb-SO_2/dscf

Volume SO_2 = nRT/P
where: n = moles SO_2 = $(5.6 \times 10^{-6}$ lb-SO_2/dscf)(lbmol/64 lb-SO_2) = 8.8×10^{-8} lbmol/dscf
T (standard temperature) = 60 ^{o}F = 520 ^{o}R
R (universal gas constant) = 10.73 psi-ft^3/lbmol-^{o}R
Volume SO_2 = $(8.8 \times 10^{-8}$ lbmol/dscf) x (10.73 psi-ft^3/lbmol-^{o}R) x (520 ^{o}R)/14.7 psi
= 3.3×10^{-5} dscf/dscf exhaust = 33 ppmv << 2000 ppmv

Therefore the engine is expected to operate in compliance with Rule 4801.

IX. RECOMMENDATION

Issue Authority to Construct subject to the permit conditions on the attached draft Authority to Construct.

X. BILLING INFORMATION

PERMIT NUMBER	FEE SCHEDULE	FEE DESCRIPTION
X-XXXX-XX-X	3020-10-X	

APPLICATION REVIEW
GAS-FIRED EMERGENCY IC ENGINES

ATC APPLICATION REVIEW
Gas-Fired Emergency IC Engine

Processing Engineer:
Lead Engineer (if applicable):
Date:

Facility Name:
Mailing Address:

Contact Name:
Phone:

Project Number:
Permit Number:

I. PROPOSAL

Applicant is requesting an Authority to Construct to install a [*size*] horsepower [*natural gas, LPG, or propane*]-fired emergency IC engine driving [*equipment*].

II. APPLICABLE RULES

Rule 2201 New and Modified Stationary Source Review (June 15, 1995)
Rule 4101 Visible Emissions (December 17, 1992)
Rule 4102 Nuisance (December 17, 1992)
Rule 4201 Particulate Matter Concentration (December 17, 1992)
Rule 4701 Stationary Internal Combustion Engines (December 19, 1996)
Rule 4801 Sulfur Compounds (December 17, 1992)
California Health & Safety Code 41700

III. PROJECT LOCATION

The project is located at [*street address*] in [*city name*], California. The site is [*not*] located within 1000 feet of a school. [*optional: ( ) quarter section of Sec. ( ), T. ( )S, R. ( )E*]

IV. PROCESS DESCRIPTION

[*Enter description of engine and equipment engine serves.*] Other than emergency operation, the engine may be operated up to 200 hours per year for maintenance and testing purposes.

V. EQUIPMENT LISTING

[*Permit Number*]*:* [*engine power rating*] hp [*manufacturer name & model*] emergency natural gas (LPG, or propane)-fired IC engine driving a [*equipment*]

The engine is equipped with (check all that apply):

_____ non-selective catalytic reduction (NSCR)
- NO_X, CO, and VOC (3-way) exhaust catalyst
_____ positive crankcase ventilation (PCV)

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

The emission control devices and their effect on gaseous fuel-fired engine emissions are detailed below.

[Delete if equipment is not proposed or required:]*

Non-selective catalytic reduction decreases NO_X, CO, and VOC emissions by using a precious metal catalyst to promote the chemical reduction of NO_X to N_2, CO_2, and H_2O, and the oxidation of VOCs and CO to CO_2 and H_2O.

The fuel/air mixture controller (O_2 controller) is used in conjunction with non-selective catalytic reduction to maintain the NO_X reduction efficiency.

The PCV system reduces crankcase VOC and PM_{10} emissions by at least 90% over an uncontrolled crankcase vent[2].

A. BACT Applicability:

Pursuant to Rule 2201 subsections 4.1.1 and 4.1.1.1, BACT is required for all criteria pollutants emitted by a new emissions unit which result in an increase in permitted emissions greater than 2 lb/day, except for carbon monoxide emissions in attainment areas if the stationary source's NSR balance is less than or equal to 550 lbs/day.

[Two equipment rating ranges and thus two SJVUAPCD BACT Guidelines apply to gaseous fuel-fired emergency IC engines; < 132 hp, Guideline 3-20, and ≥ 132 hp, Guideline 3-5. Delete the section which does not apply.]*

[* Engines < 132 hp]
Generally, new gas-fired emergency IC engines with ratings less than 132 hp will trigger BACT requirements only for NOx and CO emissions due to an increase in permitted emissions greater than 2 lb/day for these pollutants.

[2] Generally accepted minimum control efficiency

VI. EMISSION CONTROL TECHNOLOGY EVALUATION (continued)

[* Engines ≥ 132 hp]
New gas-fired emergency IC engines with ratings greater than or equal to 132 hp generally will trigger BACT requirements for all pollutants due to an increase in permitted emissions greater than 2 lb/day for all criteria air pollutants.

[Delete the following if not applicable.]*

In this case, BACT is not triggered for CO because the location is in a designated CO-attainment area and the NSR balance is less than or equal to 550 lb/day.

The facility is a small emitter per District Policy BACT 1; less than 2 tons per year of each affected pollutant, or less than all of the following: 30 lb-VOC/day, 40 lb-NO_X/day, 30 lb-PM_{10}/day, 30 lb-SO_X/day, 220 lb-CO/day. Therefore, alternate basic equipment and technologically feasible BACT are not required. Only achieved-in-practice BACT is required.

BACT for toxic emissions control (T-BACT) is not required for this project because, as explained in the CH&SC 41700 discussion of the Compliance section below, the health risk assessment shows that the risk is below the District acute, chronic and cancer risk thresholds in the Risk Management Policy TOX-1 (6/23/97).

B. BACT Guidance:

[Enter the appropriate paragraph:]*

[* Engines < 132 hp]
SJVUAPCD (*quarter, year*) BACT Clearinghouse Guideline 3-20 covers emergency power generation (with gas-fired IC engine less than 132 hp).

[* Engines ≥ 132 hp]
SJVUAPCD (*quarter, year*) BACT Clearinghouse Guideline 3-5 for emergency power generation (with gas-fired IC engine greater than or equal to 132 hp) provides the BACT options addressed below.

C. Top-Down BACT Analysis:

[Enter the appropriate paragraph.]*

The applicant is proposing to use [*specify proposed control equipment*]. Per the Top-Down analysis in Attachment II, this proposed equipment is achieved in practice BACT and there is not a more effective technologically feasible control. Therefore the proposed equipment satisfies the BACT requirements.

The applicant is proposing to use [*specify proposed control equipment*]. Per the Top-Down analysis in Attachment II, [*specify the most effective ranked controls*] is not cost effective for this application. Therefore the proposed equipment satisfies the BACT requirements.

VII. CALCULATIONS

A. Assumptions:

operating schedule:	24 hours/day, 200 hours/year maximum of non-emergency use
natural gas fuel rate:	___ scf/hr @ 100% load
LPG/propane fuel rate:	___ gal/hr @ 100% load

B. Emission factors:

The emissions factors listed below are identified by the engine manufacturer:

[List emission factors. If not available, use AP-42 emission factors below for those unknown & delete the following sections which do not apply.)*

Natural Gas Combustion

Uncontrolled NO_X, CO, and VOC emission factors for natural gas-fired IC engines listed below are from EPA publication AP-42 (10/96) A Compilation of Air Pollutant Emission Factors, table 3.2-1.

NO_X:	0.022 lb/hp-hr
CO:	0.019 lb/hp-hr
VOC:	0.0003 lb/hp-hr

PM_{10} and SO_X emission factors are from EPA publication 450-4-90-003, AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing For Criteria Pollutants, section: Natural Gas Commercial I.C. Engines:

PM_{10}:	10.0 lb/MMscf fuel
SO_X:	0.6 lb/MMscf fuel

LPG/Propane Combustion

NO_X, CO, and VOC emissions from LPG/propane-fired IC engines are based on EPA emission factors for natural gas-fired IC engines. The emission factors are adjusted for differences in the combustion of the fuels using tables presented in Update on Emissions, Sorge, 1991, Waukesha Engine Division, Dressler Industries . VOC emissions are much higher with LPG/propane-fired IC engines as LPG/propane contains only hydrocarbons heavier than ethane and is therefore all VOC per District definition (see Rule 2010), whereas natural gas contains approximately 95% methane, which is not a VOC per District definition. Approximate amount of adjustment is as follows:

Pollutant	Adjustment from NG
NO_X	+10%
CO	+20%
VOC	+600%

VII. CALCULATIONS (continued)

Uncontrolled NO_X, CO, and VOC emission factors for LPG/propane-fired IC engines are:

NO_X:	0.0242 lb/hp-hr
CO:	0.0228 lb/hp-hr
VOC:	0.0019 lb/hp-hr

PM_{10} and SO_X emission factors are from EPA publication 450-4-90-003, AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing For Criteria Pollutants, section: LPG Commercial IC Engines:

PM_{10}:	5.0 lb/1000 gal fuel
SO_X:	0.35 lb/1000 gal fuel

Emission Factor Adjustment for Control Devices

With an NSCR system, NO_X, CO, and VOC emission are reduced by the following amounts (Update on Emissions, Sorge)

Pollutant	Control Efficiency
NO_X	90%
CO	80%
VOC	50%

A positive crankcase ventilation (PCV) system will not reduce *exhaust* PM_{10} or VOC emissions. The amount of emissions from the crankcase vent are significantly less than exhaust emissions and are considered insignificant for calculation purposes. Therefore, no further adjustment for control efficiency is required.

C. Emission Calculations:

1. Potential to Emit (PE):

The potential to emit for the emergency IC engine is based on the maximum operating capacity of the engine for 24 hours per day. The following calculation for NO_X emissions is representative of emission calculations for all pollutants except PM_{10} and SO_X. The following calculation for PM_{10} emissions is representative of emission calculations for SO_X as well.

VII. CALCULATIONS (continued)

NO_X:
(emission factor) lb/hp-hr x *(engine power output)* hp x *(1- total control efficiency)* x 24 hr/day

NO_X: ( ) lb/hr, ( ) lb/day
CO: ( ) lb/hr, ( ) lb/day
VOC: ( ) lb/hr, ( ) lb/day

PM_{10}:
(emission factor) lb/MMscf or lb/1000 gal x *(fuel rate)* MMscf/hr or 10^3 gal/hr x 24 hr/day

PM_{10}: ( ) lb/hr, ( ) lb/day
SO_X: ( ) lb/hr, ( ) lb/day

2. Best Available Control Technology (IPE):

As the IC engine represents a new source, the increase in permitted emissions (IPE) for the IC engine is equal to the increase in permitted emissions calculated above.

[Modify the following section as necessary if the IPE for a pollutant is not greater than 2.0 lb/day. If the engine is located in a CO attainment area, where the NSR balance is less than or equal to 550 lb/day, state BACT not triggered for CO per section 4.1.1.1.]*

The increase in permitted emissions is greater than 2.0 lb/day for NO_X, CO, VOC, PM_{10} and SO_X. Therefore BACT is required for these pollutants pursuant to Rule 2201, subsection 4.1.1.

3. New Source Review (NSR) Balance:

As emergency equipment is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2, there is no contribution to the facility NSR balance from this project. Therefore, the NSR Balance for this facility will remain unchanged.

4. Stationary Source Potential to Emit (SSPE):

Emergency equipment limited to no more than 200 hours per year of non-emergency use is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2. Therefore, there is no contribution to the Stationary Source Potential To Emit from the IC engine.

VII. CALCULATIONS (continued)

5. Other Emission Calculations:

Calculations of annual potential to emit from the engine is required only to determine the amount of emissions exempt from offsets. This amount is to be entered into the network ATC status records.

Expected operating time for emergency IC engines is assumed to be evenly distributed at 50 hours per quarter based upon permitted 200 hours of non-emergency operation per year.

Using the hourly emission rates calculated above and 50 non-emergency operating hours per quarter yield the following values in pounds:

Annual PE = (PE, lb/hr) x (200 hr)
Quarterly PE = (PE, lb/hr) x (50 hr)

	NO_X	CO	VOC	PM_{10}	SO_X
Annual PE					
Quarterly PE					

6. Quantity of Offsets Required:

Emergency equipment limited to no more than 200 hours per year of non-emergency use is exempt from offsets pursuant to Rule 2201, subsection 4.2.1.2. Therefore, offsets are not required.

7. Actual Emissions Reductions:

The project involves the installation of new equipment only. There are no emission reductions.

8. Major Source/Title I Modification:

Annual emissions from the IC engine are far less than major source or Title I Modification threshold values. Therefore, notification for new major source or Title I Modification is not required.

[If other permitted units exist at the facility, SQEGEE #14 guidelines may be used to determine if the modification will result in a new major source or Title I modification.]*

VII. CALCULATIONS (continued)

9. Public Notice:

[Delete the section that does not apply.]*

[* For CO attainment]

	VOC	NO_X	CO	PM_{10}	SO_X
IPE [lb/day]					
NSR Balance	N/A	N/A			
Public Notice Threshold [lb/day]	NSR IPE > 100	NSR IPE > 100	NSR balance ≥ 550 + increase	NSR balance ≥ 70 + increase	NSR balance ≥ 70 + increase

[* For CO non-attainment]

	VOC	NO_X	CO	PM_{10}	SO_X
IPE [lb/day]					
NSR Balance	N/A	N/A	N/A		
Public Notice Threshold [lb/day]	NSR IPE > 100	NSR IPE > 100	NSR IPE > 100	NSR balance ≥ 70 + increase	NSR balance ≥ 70 + increase

[Delete the section that does not apply.]*

Per the table above, this project will not result in emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is not required.

Or
Per the table above, this project will result in NOx emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is required.

10. Daily Emission Limits (DELs):

DELs are required to enforce the applicability of BACT. For emergency IC engines, DELs are stated in the form of emission factors, the maximum engine rating, and the maximum operational time.

VIII. COMPLIANCE

Rule 2201 New and Modified Stationary Source Review

[Delete or modify the following sections as required.]*

[* Engines < 132 hp]

BACT is satisfied with the use of a non-selective catalytic reduction and a positive crankcase ventilation (PCV) system.

[* Engines ≥ 132 hp]

BACT is satisfied with the use of non-selective catalytic reduction, a positive crankcase ventilation (PCV) system, and natural gas, LPG, or propane fuel.

And

DELs are required to enforce the applicability of BACT. For emergency IC engines, DELs may be stated in the form of emission factors, the maximum engine rating, and the maximum operational time. The following condition will also serve as DELs for this unit.

a) *Emissions shall not exceed any of the following: NO_X, xxx; CO, xxx; VOC, xxx; PM10, xxx; or SO_X, xxx.*

And

Pursuant to subsection 4.2.1.2, offsets are not required for emergency IC engines when annual non-emergency operating time is limited to 200 hours. Emergency IC engine emissions are not included in the NSR balance as the equipment is exempt from offsets.

Per calculations above, this project will not result in emission increases in excess of Rule 2201, section 5.1.3.4 limits. Therefore, public noticing pursuant to section 5.1.3 is not required.

Rule 4101 Visible Emissions

Based on experience with similar operations, compliance with visible emission limits is expected under normal operating conditions.

VIII. COMPLIANCE (continued)

Rule 4102 Nuisance

Nuisance conditions are not expected provided the engine operates within the permitted emission and opacity limits. Based on the health risk assessment, no significant health risk is expected.

California Health & Safety Code 41700 (Health Risk Analysis)

Pursuant to District's Risk Management Policy TOX-1 (6/23/97), for any sources with increases in toxic air emissions, the health risks resulting from such projects must be evaluated. The health risk evaluation process begins with prioritization using CAPCOA Facility Prioritization Guidelines. If the project cumulative prioritization score increase is equal to or less than one, no further assessment will be required. The prioritization and health risk evaluation are cumulative for all new and modified units at the stationary source. District's Technical Services determined the prioritization score for this new engine to be less than one; therefore, no further screening level risk assessment is required. In addition, there are no requirements for T-BACT. See health risk evaluation in the appendix for details.

[Attach Risk Prioritization or Health Risk Analysis as Attachment IV.]*

Rule 4201 Particulate Matter Concentration

Particulate matter emissions from the engine will be less than 0.1 grain per cubic foot of gas at dry standard conditions. Compliance is expected.

Rule 4701 Stationary Internal Combustion Engines

Emergency standby engines that do not operate more than 200 hours per year for non-emergency use are exempt from this rule per section 4.2.1. Therefore, the emergency natural gas (LPG, or propane) IC engine is exempt from the requirements of this rule.

Rule 4801 Sulfur Compounds

[*Natural gas/LPG/Propane*] combustion is not expected to result in sulfur compound emissions (as SO_2) in excess of 0.2% by volume.

IX. RECOMMENDATION

Issue Authority to Construct subject to the permit conditions on the draft Authority to Construct in Appendix III.

X. BILLING INFORMATION

PERMIT NUMBER	FEE SCHEDULE	FEE DESCRIPTION
X-XXXX-XX-X	3020-10-X	

ATTACHMENT I
SUPPLEMENTAL FORMS

San Joaquin Valley Unified Air Pollution Control District
Supplemental Application Form

GASEOUS FUELED
INTERNAL COMBUSTION ENGINES

This form must be accompanied by a completed Application for Authority to Construct and Permit to Operate form.

PERMIT TO BE ISSUED TO:
LOCATION WHERE THE EQUIPMENT WILL BE OPERATED:

PROCESS DESCRIPTION

Type of Use	[ ] Full Time (not limited to any operating schedule) [ ] Low Use (limited to <1000 hrs/yr for all operations, including maintenance and testing) [ ] Standby Emergency (limited to non-utility electric power generation or other emergency use as approved by the APCO, except for up to 200 hrs/yr for maintenance and testing) Will this equipment be used in an electric utility rate reduction program? [ ] YES [ ] NO	
Process Data	Process the Engine Serves:	
	Electrical Power	Generator Make and Model:
	Generation Only	Power Output: kW

EQUIPMENT DESCRIPTION

Engine Data	Manufacturer:	Number of Cylinders:	
	Model Number:	Serial Number:	
	Maximum Rated Power Output		BHP
	[ ] Rich burn (exhaust O_2 concentration < 4% by vol) [ ] Lean burn (exhaust O_2 concentration ≥ 4% by vol)	Automatic air/fuel ratio controller? [ ] YES [ ] NO	
Fuel Data	Type: [ ] Natural Gas [ ] LPG/Propane [ ] Other (please specify):		
	Higher Heating Value: BTU/scf	Sulfur Content: gr/100 scf	
	Fuel Consumption at Rated Output: scf/hr	Fuel Flow Meter? [ ]YES [ ]NO	

Engine Design and Emission Control Equipment ***(Check all applicable boxes)***

- [ ] Lean fuel mixture and multi-chamber cylinder head
- [ ] Rich Burn Engine with Non-Selective Catalytic Reduction
- [ ] Lean Burn Engine with Selective Catalytic Reduction
- [ ] Catalytic Convertor - Manufacturer:
  _____ % VOC Control _____ % NOx Control _____ % CO Control _____ Other:
- [ ] Positive Crankcase Ventilation System
- [ ] 90% Efficient Control Device for Crankcase Emissions
- [ ] Other (please specify):

Please Continue on Reverse Side

Exhaust Emission Data (at maximum rated power output) *(If corrected to other than 15% O_2, dry basis, indicate at right)*			O_2, dry: %
	Nitrogen Oxides (as NO_2)	ppmvd	g/BHP-hr
	Carbon Monoxide	ppmvd	g/BHP-hr
	Volatile Organic Compounds (as CH_4)	ppmvd	g/BHP-hr
	Particulate Matter Emissions	gr/dscf	g/BHP-hr
	Sulfur Oxides (as SO_2)	ppmvd	g/BHP-hr
Source of Emission Factor	[ ] Emission Tests [ ] Manufacturer's Guarantee [ ] Other:		

ADDITIONAL INFORMATION

1. Normal Operating Schedule: (for emergency equipment, identify normal testing and maintenance schedule)

_____Hours per day _____Days per week _____Weeks per year.

2. Nearest Receptor:

	Receptor Description	Distance from Stack to Receptor (ft)	Hours of Operation per Day (Optional)
Offsite Business 1			
Sensitive Receptor 2			

1 Examples of Offsite Businesses include, but are not limited to, office buildings, guard posts, and factories.
2 Examples of Sensitive Receptors include, but are not limited to, schools, day care centers, hospitals, apartments, and other places of residence.

3. Stack Parameters: Height _____ feet Inside diameter _____ inches
Exhaust temperature _____ °F Stack gas velocity _____ dscfm
Is a rain cap (not a flapper) present on exhaust stack? [ ] Yes [ ] No
Direction of exhaust from structure or device: [ ] Vertical [ ] Horizontal

4. Facility Location: [ ] Urban (area of dense population) [ ] Rural (area of sparse population)

5. If available, include the manufacturer's specifications of the engine and documented exhaust emissions data for the proposed engine.

San Joaquin Valley Unified Air Pollution Control District
Supplemental Application Form

LIQUID FUELED
INTERNAL COMBUSTION ENGINES

This form must be accompanied by a completed Application for Authority to Construct and Permit to Operate form.

PERMIT TO BE ISSUED TO:
LOCATION WHERE THE EQUIPMENT WILL BE OPERATED:

PROCESS DESCRIPTION

Type of Use	[ ] Full Time (not limited to any operating schedule) [ ] Low Use (limited to <1000 hrs/yr for all operation, including maintenance and testing) [ ] Standby Emergency (limited to non-utility electric power generation or other emergency use as approved by the APCO, except for up to 200 hrs/yr for maintenance and testing) Will this equipment be used in an electric utility rate reduction program? [ ] YES [ ] NO	
Process Data	Process the Engine Serves:	
	Electrical Power	Generator Make and Model:
	Generation Only	Power Output: kW

EQUIPMENT DESCRIPTION

Engine Data	Manufacturer:	Number of Cylinders:	
	Model Number:	Serial Number:	
	Maximum Rated Power Output BHP		
Fuel Data	Type: [ ] Diesel [ ] Gasoline [ ] Other (please specify):		
	Higher Heating Value: BTU/gal	Sulfur Content: % by Weight	
	Fuel Consumption at Rated Output: gals/hr	Fuel Flow Meter? [ ]YES [ ]NO	

Engine Design and Emission Control Equipment ***(Check all applicable boxes)***

- [ ] Turbocharger
- [ ] Intercooler/Aftercooler
- [ ] Injection Timing Retarded Relative to Standard Timing: degrees
- [ ] Positive Crankcase Ventilation System
- [ ] Exhaust Particulate Control Device: Specify what type _____
- [ ] Oxidation Catalyst (VOC & CO Reduction) ____ % VOC control _____ % CO control
- [ ] Reduction Catalyst (NOx Reduction) _____ % NOx control
- [ ] Other (please specify): _____

Please Continue on Reverse Side

Exhaust Emission Data (at maximum rated power output) *(If corrected to other than 15% O_2, dry basis, indicate at right)*			O_2, dry: %
	Nitrogen Oxides (as NO_2)	ppmvd	g/BHP-hr
	Carbon Monoxide	ppmvd	g/BHP-hr
	Volatile Organic Compounds (as CH_4)	ppmvd	g/BHP-hr
	Particulate Matter Emissions	gr/dscf	g/BHP-hr
	Sulfur Oxides (as SO_2)	ppmvd	g/BHP-hr
Source of Emission Factor	[ ] Emission Tests [ ] Manufacturer's Guarantee [ ] Other:		

ADDITIONAL INFORMATION

1. Normal Operating Schedule: (for emergency equipment, identify normal testing and maintenance schedule)

   _____Hours per day _____Days per week _____Weeks per year.

2. Nearest Receptor:

	Receptor Description	Distance from Stack to Receptor (ft)	Hours of Operation per Day (Optional)
Offsite Business 1			
Sensitive Receptor 2			

1 Examples of Offsite Businesses include, but are not limited to, office buildings, guard posts, and factories.
2 Examples of Sensitive Receptors include, but are not limited to, schools, day care centers, hospitals, apartments, and other places of residence.

3. Stack Parameters: Height _____ feet Inside diameter _____ inches
   Exhaust temperature _____ °F Stack gas velocity _____ dscfm
   Is a rain cap (not a flapper) present on exhaust stack? [ ] Yes [ ] No
   Direction of exhaust from structure or device: [ ] Vertical [ ] Horizontal

4. Facility Location: [ ] Urban (area of dense population) [ ] Rural (area of sparse population)

5. If available, include the manufacturer's specifications of the engine and documented exhaust emissions data for the proposed engine.

ATTACHMENT II-A:
BACT ANALYSIS
DIESEL-FIRED EMERGENCY IC ENGINES

(Updated on --/--/--)

I. BACT Analysis for NO_X Emissions:

Oxides of nitrogen (NO_X) are generated from the high temperature combustion of the diesel fuel. A majority of the NO_X emissions are formed from the high temperature reaction of nitrogen and oxygen in the inlet air. The rest of the NO_X emissions are formed from the reaction of fuel-bound nitrogen with oxygen in the inlet air.

a. Step 1 - Identify All Possible NO_X Control Technologies

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-2 identifies achieved-in-practice BACT as certified NO_X emissions of 10.0 g/hp-hr or less, or turbocharger and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1). No technologically feasible alternatives are listed.

[* Engines greater than or equal to 117 hp but less than 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-6 identifies achieved-in-practice BACT as certified NO_X emissions of 10.0 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1). No technologically feasible alternatives are listed.

[* Engines greater than or equal to 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-7 identifies achieved-in-practice BACT as certified NO_X emissions of 7.2 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1). No technologically feasible alternatives are listed.

[* Engines driving fire water pump]
The SJVUAPCD BACT Clearinghouse Guideline 3-9 identifies achieved-in-practice BACT as certified NO_X emissions of 7.2 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1). No technologically feasible alternatives are listed.

b. Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
Certified NO_X emissions of 10.0 g/hp-hr or less, or turbocharger and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1).

[* Engines greater than or equal to 117 hp but less than 400 hp]
Certified NO_X emissions of 10.0 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1).

[* Engines greater than or equal to 400 hp]
Certified NO_X emissions of 7.2 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1).

[* Engines driving fire water pump]
Certified NO_X emissions of 7.2 g/hp-hr or less, or turbocharger with intercooler/aftercooler and fuel injection timing retarded 4° relative to standard setting (or equivalent per District Policy SSPE 16-1).

d. Step 4 - Cost Effectiveness Analysis

The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

e. Step 5 - Select BACT

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a diesel-fired IC engine with NO_X emissions certified by the manufacturer equal to or less than 10.0 g/hp-hr. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

The applicant is proposing a diesel-fired IC engine with a turbocharger and 4° fuel injection timing retard (or equivalent per District Policy SSPE 16-1). As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

[* (Engines greater than or equal to 117 hp but less than 400 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a diesel-fired IC engine with NO_X emissions certified by the manufacturer equal to or less than 10.0 g/hp-hr. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

The applicant is proposing a diesel-fired IC engine with a turbocharger, intercooler/aftercooler, and 4° fuel injection timing retard (or equivalent per District Policy SSPE 16-1). As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

[* Engines greater than or equal to 400 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a diesel-fired IC engine with NO_X emissions certified by the manufacturer equal to or less than 7.2 g/hp-hr. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

The applicant is proposing a diesel-fired IC engine with a turbocharger, intercooler/aftercooler, and 4° fuel injection timing retard (or equivalent per District Policy SSPE 16-1). As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

[* Engines driving fire water pump]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a diesel-fired IC engine with NO_X emissions certified by the manufacturer equal to or less than 7.2 g/hp-hr. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

The applicant is proposing a diesel-fired IC engine with a turbocharger, intercooler/aftercooler, and 4° fuel injection timing retard (or equivalent per District Policy SSPE 16-1). As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

II. BACT Analysis for CO Emissions:

Carbon monoxide (CO) emissions are generated from the incomplete combustion of the diesel fuel.

a. Step 1 - Identify All Possible Control Technologies

[Enter the appropriate paragraph.]*

[* Engines used for power emergency generation]
The SJVUAPCD BACT Clearinghouse Guideline 3-11 identifies technologically feasible BACT as non-selective catalytic reduction.

**** (Engines driving fire water pump)***
The SJVUAPCD BACT Clearinghouse Guideline 3-9 identifies technologically feasible BACT as non-selective catalytic reduction.

b. Step 2 - Eliminate Technologically Infeasible Options

The above control is technologically feasible.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. non-selective catalytic reduction (60% control [3])

d. Step 4 - Cost Effectiveness Analysis

A cost effectiveness analysis is performed for the highest control efficiency technology first.

Assumptions:

- An emergency engine operates 200 hours per year for non-emergency purposes
- CO emission rate (AP-42, uncontrolled) - [*3.03 g/hp-hr (for engines ≤ 600 BHP), or 2.4 g/hp-hr (for engines > 600 BHP)*]
- Cost of non-selective catalytic reduction (CO catalyst)for diesel IC engines $10-$20 per horsepower. Annualized cost using an interest rate of 10% and a life of 10 years is $1.63/hp-yr.

Using a conservative control system cost of $10 per horsepower hour, the annual cost per the amount of CO reduced is calculated as follows:

[3] Emission Control Technology for Stationary Internal Combustion Engines, Manufacturers of Emission Controls Association, October 1995

For engines ≤ 600 BHP:
$1.63/hp-yr x 1 hp-hr/3.03 grams CO x 1/60% x 454 grams CO/1 lb CO x 1 yr/200 hr x 2000 lb/1 ton = $4,071/ton CO

Or
For engines > 600 BHP:
$1.63/hp-yr x 1 hp-hr/2.40 grams CO x 1/60% x 454 grams CO/1 lb CO x 1 yr/200 hr x 2000 lb/1 ton = $5,139/ton CO

As the cost effectiveness of a non-selective catalytic reduction system for diesel-fired emergency IC engines is over the District accepted value of $350/ton CO, the control technology is not cost effective for this class and category of source.

e. Step 5 - Select BACT

Therefore, there are no additional control requirements for BACT for CO emissions for the diesel-fired emergency IC engine.

III. BACT Analysis for VOC Emissions:

Volatile organic compounds are emitted from the crankcase of the engine as a result of piston ring blow-by.

a. Step 1 - Identify All Possible Control Technologies

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-2 identifies achieved-in-practice BACT as a positive crankcase ventilation (PCV) system. No technologically feasible alternatives are listed.

[* Engines greater than or equal to 117 hp but less than 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-6 identifies achieved-in-practice BACT as positive crankcase ventilation (PCV). No technologically feasible alternatives are listed.

[* Engines greater than or equal to 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-7 identifies achieved-in-practice BACT as positive crankcase ventilation (PCV). No technologically feasible alternatives are listed.

[* Engines driving fire water pump]
The SJVUAPCD BACT Clearinghouse Guideline 3-9 identifies achieved-in-practice BACT as positive crankcase ventilation (PCV) unless it voids the Underwriters' Laboratories (UL) certification. Catalytic oxidation is listed as a technologically feasible control technology.

b. Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[* Engines used for power emergency generation]
1. PCV

Or
[* Engines driving fire water pump]
1. Catalytic oxidation
2. PCV

d. Step 4 - Cost Effectiveness Analysis

[* Engines used for power emergency generation]
The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

Or
[* Engines driving fire water pump]
A cost effectiveness analysis is performed for the highest control efficiency technology first.

Assumptions:

- An emergency engine operates 200 hours per year for non-emergency purposes
- VOC emission rate (AP-42, uncontrolled) - [*1.12 g/hp-hr (for engines ≤ 600 BHP), or 0.33 g/hp-hr (for engines > 600 BHP)*]
- Cost of non-selective catalytic reduction (VOC catalyst)for diesel IC engines $10-20 per horsepower . Annualized cost using an interest rate of 10% and a life of 10 years is $1.63/hp-yr.

Using a conservative control system cost of $10 per horsepower hour, the annual cost per the amount of VOC reduced is calculated as follows:

[* For engines ≤ 600 BHP:]
$1.63/hp-yr x 1 hp-hr/1.12 grams VOC x 1/60% x 454 grams VOC/1 lb-VOC x 1 yr/200 hr x 2000 lb/1 ton = $11,012/ton VOC

Or
[* For engines > 600 BHP:]
$1.63/hp-yr x 1 hp-hr/0.33 grams VOC x 1/60% x 454 grams VOC/1 lb-VOC x 1 yr/200 hr x 2000 lb/1 ton = $37,375/ton VOC

As the cost effectiveness of a non-selective catalytic reduction system for diesel-fired emergency IC engines is over the District accepted value of $5000/ton VOC, the control technology is not cost effective for this class and category of source.

The only remaining control technology alternative in the ranking list from Step 3 has been achieved in practice.

PCV (unless voids UL certification)

e. Step 5 - Select BACT

Therefore, BACT for VOC emissions is a PCV system.

IV. BACT Analysis for PM_{10} and SO_X Emissions:

Particulate matter (PM_{10}) and sulfur oxide (SO_X) emissions occur from the reaction of various elements in the diesel fuel. Sulfur compound emissions are directly related to the sulfur content of the diesel fuel. PM_{10} emissions depend on the sulfur content and the combustion characteristics of the engine.

a. Step 1 - Identify All Possible Control Technologies

[Enter the appropriate paragraph.]*

[* Engines < 117 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-2 identifies achieved-in-practice BACT as low-sulfur fuel (0.05% by weight) and positive crankcase ventilation (PCV) or crankcase control device. No technologically feasible alternatives are listed.

[* Engines greater than or equal to 117 hp but less than 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-6 identifies achieved-in-practice BACT as low-sulfur fuel (0.05% by weight) and positive crankcase ventilation (PCV) or crankcase control device. No technologically feasible alternatives are listed.

[* Engines greater than or equal to 400 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-7 identifies achieved-in-practice BACT as low-sulfur fuel (0.05% by weight) and positive crankcase ventilation (PCV) or crankcase control device. No technologically feasible alternatives are listed.

[* Engines driving fire water pump]
The SJVUAPCD BACT Clearinghouse Guideline 3-9 identifies achieved-in-practice BACT as low-sulfur fuel (0.05% by weight). No technologically feasible alternatives are listed.

b. Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[Enter the appropriate paragraph.]*

[* Engines used for power emergency generation]
low-sulfur fuel (0.05% by weight)
PCV or crankcase control device

[* Engines driving fire water pump]
low-sulfur fuel (0.05% by weight)

d. Step 4 - Cost Effectiveness Analysis

The only control technology alternative in the ranking list from Step 3 has been achieved in practice. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

e. Step 5 - Select BACT

[Enter the appropriate paragraph.]*

[* Engines used for power emergency generation]
Therefore, BACT for PM_{10} and SO_X emissions for diesel-fired emergency IC engines is the use of low sulfur diesel fuel, and a PCV system or equivalent crankcase control device.

[* Engines driving fire water pump]
Therefore, BACT for PM_{10} and SO_X emissions for diesel-fired emergency IC engines is the use of low sulfur diesel fuel.

ATTACHMENT II-B
BACT ANALYSIS
GAS-FIRED EMERGENCY IC ENGINES

(Updated on --/--/--)

I. BACT Analysis for NO_X Emissions:

Oxides of nitrogen (NO_X) are generated from the high temperature combustion of the fuel. Essentially all of the NO_X emissions are formed from the high temperature reaction of nitrogen and oxygen in the inlet air. Insignificant amounts of NO_X emissions are formed from the reaction of fuel-bound nitrogen with oxygen in the inlet air.

a. Step 1 - Identify All Possible NO_X Control Technologies

[Enter the appropriate paragraph.]*

[* Engines < 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-20 (*quarter, year*) identifies technologically feasible BACT as the use of a NO_X catalyst. There are no control alternatives identified as alternate basic equipment for this class and category of source.

[* Engines ≥ 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 (*quarter, year*) identifies technologically feasible BACT as the use of a NO_X catalyst and natural gas, LPG, or propane as fuel. There are no control alternatives identified as alternate basic equipment for this class and category of source. The use of natural gas, LPG, or propane as fuel is listed as achieved-in-practice BACT.

b. Step 2 - Eliminate Technologically Infeasible Options

The above controls are technologically feasible.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[* Engines < 132 hp]
The only control technology identified is the use of a NO_X catalyst.

[* Engines ≥ 132 hp]
The only control technology identified as technologically feasible is the use of a NO_X catalyst and natural gas, LPG, or propane as fuel. Achieved-in-practice BACT is less effective than technologically feasible BACT and is listed as the use of natural gas, LPG, or propane as fuel.

d. Step 4 - Cost Effectiveness Analysis

[Delete whichever paragraph does not apply.]*

The only control technology option in the ranking list from Step 3 has been proposed by the applicant. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

The facility is classified as a small emitter as emissions are less than 40 lbs/day for NO_X, 220 lbs/day for CO, and 30 lbs/day each for VOC, PM_{10}, and SO_X. Therefore, technologically feasible BACT and a cost effectiveness analysis are not required.

Because the facility is not classified as a small emitter per District Policy BACT 1, a top-down BACT cost effectiveness analysis is required to evaluate the economic feasibility of the technologically feasible control options. *[* Perform a Cost Effectiveness Analysis.]*

e. Step 5 - Select BACT

[* Engines < 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing the use of non-selective catalytic reduction which includes a NO_X catalyst. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. There are no controls or technologies which are achieved-in-practice for this class and category of source. Therefore, no additional controls for the emergency IC engine are required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine meets District NO_X BACT requirements.

[* Engines ≥ 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing the use of non-selective catalytic reduction which includes NO_X catalyst and natural gas, LPG, or propane as fuel. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for NO_X are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. However, achieved-in-practice BACT, which is the use of natural gas, LPG, or propane as fuel is required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine meets District NO_X BACT requirements.

II. BACT Analysis for CO Emissions:

Carbon monoxide (CO) emissions are generated from the incomplete combustion of the fuel.

a. Step 1 - Identify All Possible Control Technologies

[* Engines < 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-20 (*quarter, year*) identifies technologically feasible BACT as the use of a CO catalyst. There are no control alternatives identified as alternate basic equipment for this class and category of source.

[* Engines ≥ 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 (*quarter, year*) identifies technologically feasible BACT as the use of a CO catalyst and natural gas, LPG, or propane as fuel. There are no control alternatives identified as alternate basic equipment for this class and category of source. The use of natural gas, LPG, or propane as fuel is listed as achieved-in-practice BACT.

b. Step 2 - Eliminate Technologically Infeasible Options

The above controls are technologically feasible..

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[* Engines < 132 hp]
The only control technology identified is the use of a CO catalyst.

[* Engines ≥ 132 hp]
The only control technology identified as technologically feasible is the use of a CO catalyst and natural gas, LPG, or propane as fuel. Achieved-in-practice BACT is less effective than technologically feasible BACT and is listed as the use of natural gas, LPG, or propane as fuel.

d. Step 4 - Cost Effectiveness Analysis

[Delete whichever paragraph does not apply.]*

The only control technology option in the ranking list from Step 3 has been proposed by the applicant. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

The facility is classified as a small emitter as emissions are less than 40 lbs/day for NO_X, 220 lbs/day for CO, and 30 lbs/day each for VOC, PM_{10}, and SO_X. Therefore, technologically feasible BACT and a cost effectiveness analysis are not required.

Because the facility is not classified as a small emitter per District Policy BACT 1, a top-down BACT cost effectiveness analysis is required to evaluate the economic feasibility of the technologically feasible control options. *[* Perform a Cost Effectiveness Analysis.]*

e. Step 5 - Select BACT

[* Engines < 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing the use of non selective catalytic reduction which includes CO catalyst. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for CO are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. There are no controls or technologies which are achieved-in-practice for this class and category of source. Therefore, no additional controls for the emergency IC engine are required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine meets District CO BACT requirements.

[* Engines ≥ 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing the use of non selective catalytic reduction which includes CO catalyst and natural gas, LPG, or propane as fuel. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for CO are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. However, achieved-in-practice BACT, which is the use of natural gas, LPG, or propane as fuel is required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine meets District CO BACT requirements.

III. BACT Analysis for VOC Emissions:

Volatile organic compounds are emitted from the crankcase of the engine as a result of piston ring blow-by.

a. Step 1 - Identify All Possible Control Technologies

[Delete whichever paragraph does not apply.]*

[* Engines < 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-20 *(quarter, year)* identifies technologically feasible BACT as a VOC catalyst and a positive crankcase ventilation (PCV) system. There are no control alternatives identified as alternate basic equipment for this class and category of source. A PCV system is listed as achieved-in-practice BACT.

[* Engines ≥ 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 (*quarter, year*) identifies technologically feasible BACT as a VOC catalyst, positive crankcase ventilation (PCV) system, and the use of natural gas, LPG, or propane as fuel. There are no control alternatives identified as alternate basic equipment for this class and category of source. A PCV system and the use of natural gas, LPG, or propane as fuel is listed as achieved-in-practice BACT.

b. Step 2 - Eliminate Technologically Infeasible Options

The above controls are technologically feasible.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[* Engines < 132 hp]
The only control technology identified as technologically feasible is a VOC catalyst and positive crankcase ventilation (PCV) system. Achieved-in-practice BACT is less effective than technologically feasible BACT and is listed as a PCV system.

[* Engines ≥ 132 hp]
The only control technology identified as technologically feasible is a VOC catalyst, positive crankcase ventilation (PCV) system, and the use of natural gas, LPG, or propane as fuel. Achieved-in-practice BACT is less effective than technologically feasible BACT and is listed as a PCV system and the use of natural gas, LPG, or propane as fuel.

d. Step 4 - Cost Effectiveness Analysis

[Delete whichever paragraph does not apply.]*

The only technologically feasible control option in the ranking list from Step 3 has been proposed by the applicant. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

The facility is classified as a small emitter as emissions are less than 40 lbs/day for NO_X, 220 lbs/day for CO, and 30 lbs/day each for VOC, PM_{10}, and SO_X. Therefore, technologically feasible BACT and a cost effectiveness analysis are not required.

Because the facility is not classified as a small emitter per District Policy BACT 1, a top-down BACT cost effectiveness analysis is required to evaluate the economic feasibility of the technologically feasible control options. *[* Perform a Cost Effectiveness Analysis.]*

e. Step 5 - Select BACT

[* Engines < 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a VOC catalyst and positive crankcase ventilation (PCV) system. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for CO are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. However, achieved-in-practice BACT, which is a PCV system is be required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine with PCV system meets District VOC BACT requirements.

[* Engines ≥ 132 hp]
[Delete whichever paragraph does not apply.]*

The applicant is proposing a VOC catalyst, positive crankcase ventilation (PCV) system, and the use of natural gas, LPG, or propane as fuel. As the applicant is proposing the most effective control technology listed in Step 1 above, BACT requirements for CO are met.

Technologically feasible BACT and alternate basic equipment are not required as the facility is a small emitter. However, achieved-in-practice BACT, which is a PCV system and the use of natural gas, LPG, or propane as fuel is be required. The applicant's proposal of a natural gas, LPG, or propane-fired emergency IC engine with PCV system meets District VOC BACT requirements.

IV. BACT Analysis for PM_{10} Emissions:

Particulate matter emissions result from the incomplete combustion of various elements in the fuel. A small portion of the particulates is emitted through the crankcase vent.

a. Step 1 - Identify All Possible Control Technologies

[* Engines < 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 identifies achieved-in-practice BACT as a positive crankcase ventilation (PCV) system. No technologically feasible options are listed.

[* Engines ≥ 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 (*quarter, year*) identifies achieved-in-practice BACT as a positive crankcase ventilation (PCV) system and the use of natural gas, LPG, or propane fuel. No technologically feasible options are listed.

b. Step 2 - Eliminate Technologically Infeasible Options

The above controls are technologically feasible.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

[* Engines < 132 hp]
The only option identified is a positive crankcase ventilation (PCV) system. This option is achieved-in-practice for this class and category of source.

[* Engines ≥ 132 hp]
The only option identified is a positive crankcase ventilation (PCV) system and the use of natural gas, LPG, or propane fuel. This option is achieved-in-practice for this class and category of source.

d. Step 4 - Cost Effectiveness Analysis

The only control technology option in the ranking list from Step 3 is achieved-in-practice. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The only control technology option in the ranking list from Step 3 is achieved-in-practice and must be used. The applicant is proposing achieved-in-practice BACT with a positive crankcase ventilation (PCV) system and the use of natural gas, LPG, or propane fuel. Therefore, BACT requirements for PM_{10} are met.

V. BACT Analysis for SO_X Emissions:

Sulfur compound emissions result from the chemical reaction of sulfur in the fuel with oxygen during the combustion process.

a. Step 1 - Identify All Possible Control Technologies

[* Engines < 132 hp]
Current BACT Guideline 3-20 does not include control technologies for SO_X. In practice, gas-fired IC engines with ratings less than 132 hp will seldom trigger BACT for SO_X. If BACT is triggered for SO_X, a new top-down BACT analysis will be required.

[* Engines ≥ 132 hp]
The SJVUAPCD BACT Clearinghouse Guideline 3-5 (*quarter, year*) identifies achieved-in-practice BACT as the use of natural gas, LPG, or propane fuel. No technologically feasible options are listed.

b. Step 2 - Eliminate Technologically Infeasible Options

There are no technologically feasible options which are not considered achieved-in-practice.

c. Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only option identified is the use of natural gas, LPG, or propane fuel. This option is achieved-in-practice for this class and category of source.

d. Step 4 - Cost Effectiveness Analysis

The only control technology option in the ranking list from Step 3 is achieved-in-practice. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

e. Step 5 - Select BACT

The only control technology option in the ranking list from Step 3 is achieved-in-practice and must be used. The applicant is proposing achieved-in-practice BACT with the use of natural gas, LPG, or propane fuel. Therefore, BACT requirements for SO_X are met.

ATTACHMENT III-A:
STANDARD ATC CONDITIONS
DIESEL-FIRED IC ENGINES

The following conditions shall be used for emergency diesel IC engines:

1. {118} No air contaminant shall be released into the atmosphere which causes a public nuisance. (Rule 4102)

2. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is dark or darker than Ringelmann 1 or equivalent to 20% opacity. (Rule 4101)

* 3. The engine shall be operated with the timing retarded four degrees from the manufacturer's standard recommended timing. (Rule 2201)

Note: The injection timing retard requirement may be expressed as '...with the timing advanced no greater than sixteen degrees before top dead center (BTDC)' consistent with District Policy SSPE 16-1, "Determination of Injection Timing Retard for Diesel IC Engines", dated 8/14/96

* 4. Engine shall be equipped with a turbocharger. (Rule 2201)

* 5. Engine shall be equipped with an aftercooler or intercooler. (Rule 2201)

** Condition 5 is not required for engines less than 117 hp. Additionally, engines less than 117 hp with NO_x emissions certified at less than or equal to 10.0 grams per horsepower-hour do not require conditions 3 and 4. The permit for these engines should contain an additional condition limiting NO_x emissions instead of conditions 3 and 4.*

** Engines greater than or equal to 117 hp but less than 400 hp with NO_x emissions certified at less than or equal to 10.0 grams per horsepower-hour do not require conditions 3, 4, and 5 above. The permit for these engines should contain an additional condition limiting NO_x emissions instead of these conditions*

** Engines greater than or equal to 400 hp with NO_x emissions certified at less than or equal to 7.2 grams per horsepower-hour do not require conditions 3, 4, and 5 above. The permit for these engines should contain an additional condition limiting NO_x emissions instead of these conditions.*

6. {311} The engine shall be equipped with a positive crankcase ventilation (PCV) system or a crankcase emissions control device of at least 90% control efficiency. (Rule 2201)

7. Emissions shall not exceed any of the following: NO_X, xxx; CO, xxx; VOC, xxx; PM10, xxx; or SO_X, xxx. (Rule 2201)

8. This engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. Operation of the engine for maintenance and testing purposes shall not exceed 200 hours per year. (Rules 2201 & 4701)

9. {313} The sulfur content of the diesel fuel used shall not exceed 0.05% by weight. (Rule 2201)

10. The permittee shall maintain records of hours of non-emergency operation and of the sulfur content of the diesel fuel used and shall make such records readily available to District staff upon request. (Rules 2201 & 4701)

11. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. (Rule 4201)

*** If the diesel-fired emergency IC engine serves a municipal drinking water system exclusively, the engine is allowed visible emissions up to but not including Ringlemann 2 or 40% opacity when operated under emergency circumstances, or operated not more than 30 minutes each week, or two hours each month, under non-emergency circumstances per California State Assembly Bill 1855, referenced in CH&SC 41701.6. For diesel-fired emergency IC engines which serve a drinking water system exclusively, add conditions 12 and 13, or if applicant chooses, add conditions 12 through 14 and remove conditions 2 and 8.*

** 12. This engine shall be used exclusively to operate a drinking water system. (CH&SC 41701.6)

** 13. Visible emissions from this engine, when operated under emergency circumstances, shall not exceed Ringelmann 2. (CH&SC 41701.6)

** 14. Visible emissions from this engine shall not exceed Ringlemann 2, provided that operation of the engine for testing and maintenance purposes does not exceed 30 minutes per week, or 2 hours per month. (CH&SC 41701.6)

ATTACHMENT III-B
STANDARD ATC CONDITIONS
GAS-FIRED IC ENGINES

The following conditions shall be used for gas-fired emergency IC engines:

1. {118} No air contaminant shall be released into the atmosphere which causes a public nuisance. (Rule 4102)

2. Only PUC quality natural gas, or LPG shall be used as fuel. (Rule 2201)

* *Delete conditions 3 and/or 4 if not proposed or required*

* 3. {311} The engine shall be equipped with a positive crankcase ventilation (PCV) system or a crankcase emissions control device of at least 90% control efficiency. (Rule 2201)

* 4. The engine shall be equipped with an operational catalytic converter installed on the exhaust outlet. (Rule 2201)

5. Emissions shall not exceed any of the following: NO_X, xxx; CO, xxx; VOC, xxx; or PM_{10}, xxx. (Rule 2201)

6. This engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. (Rules 2201 & 4701)

7. Operation of the engine for maintenance and testing purposes shall not exceed 200 hours per year. (Rules 2201 & 4701)

8. The permittee shall maintain records of hours of non-emergency operation and shall make such records readily available to District staff upon request. (Rules 2201 & 4701)

ATTACHMENT IV:
GENERAL HEALTH RISK PRIORITIZATION SCORE CHART
FOR DIESEL-FIRED IC ENGINES

Hourly Fuel Usage for Emergency Diesel IC Engines with Corresponding Prioritization Score

FUEL USAGE	RECEPTOR DISTANCE (m)						
Gallons/hr	0-99	100-249	250-499	500-999	1000-1499	1500-1999	2000+
1	0.363	0.091	0.015	0.004	0.001	0.001	0.000
2	0.726	0.181	0.029	0.008	0.002	0.001	0.001
2.75	**0.998**	0.250	0.040	0.011	0.003	0.002	0.001
4	1.452	0.363	0.058	0.016	0.004	0.003	0.001
8	2.903	0.726	0.116	0.032	0.009	0.006	0.003
10	3.629	0.907	0.145	0.040	0.011	0.007	0.004
11	3.992	**0.998**	0.160	0.044	0.012	0.008	0.004
20	7.258	1.815	0.290	0.080	0.022	0.015	0.007
30	10.887	2.722	0.435	0.120	0.033	0.022	0.011
40	14.516	3.629	0.581	0.160	0.044	0.029	0.015

*Based on 1995 Ventura County Emission Factors for Diesel Fired IC Engines.

BIBLIOGRAPHY

Rules and Regulations		
Rule Number	Title	Last Updated
District Rule 2010	Permits Required	12/17/1992
District Rule 2201	New and Modified Stationary Source Review Rule	6/15/1995
District Rule 4101	Visible Emissions	12/17/1992
District Rule 4102	Nuisance	12/17/1992
District Rule 4201	Particulate Matter Concentration	12/17/1992
District Rule 4701	Stationary Internal Combustion Engines	12/19/1996
District Rule 4801	Sulfur Compounds	12/17/1992
CH&SC 41700	California Health and Safety Code Section 41700	1997

Best Available Control Technology (BACT) Guidelines		
Guideline Number	Title	Last Updated
3-2	Emergency Diesel I.C. Engine (< 117 hp)	10/1/1995
3-5	Emergency Gaseous Fueled I.C. Engine (≥ 132 hp)	10/1/1995
3-6	Emergency Diesel I.C. Engine (≥ 117 and < 400 hp)	10/1/1995
3-7	Emergency Diesel I.C. Engine (≥ 400 hp)	10/1/1995
3-9	Emergency Diesel I.C. Engine Driving a Fire Pump	9/10/1996
3-20	Gaseous Fueled Emergency I.C. Engine (Rich Burn)	11/27/1996

District Policies		
Policy Number	Title	Last Updated
TOX 1	Risk Management Policy for Permitting New and Modified Sources	6/23/1997
SSPP 16	Determination of Injection Timing Retard for Diesel I.C. Engines	8/14/1996
BACT 1	Best Available Control Technology (BACT) Policy	4/18/1995

Electronic Documents		
Document Name	Title	Last Updated
G:/per/gear/emgcy-ic	Standard Application Review for Emergency Internal Combustion Engines	11/20/1997

Reference Materials		
Document Name	Title	Last Updated
AP-42 Table 3.3-1	Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines	10/1996
AP-42 Table 3.4-1	Gaseous Emission Factors for Large Stationary Diesel and All Stationary Duel-Fuel Engines	10/1996
AP-42 Table 3.2-1	Criteria Emission Factors for Uncontrolled Natural Gas Prime Movers	10/1996
EPA publication 450/4-90-003	AIRS Facility Subsystem Source Classification Codes and Emission Factors Listing For Criteria Air Pollutants	3/1990

Miscellaneous		
Item	Title	Last Updated
Supplemental Form	Supplemental Application Form for Gaseous Fueled Internal Combustion Engines	10/97
Supplemental Form	Supplemental Application Form for Liquid Fueled Internal Combustion Engines	10/97
General Conditions	General Condition #s 14, 15, 118, 311, 313	11/20/97