

DRAFT
ENGINEERING EVALUATION
City and County of San Francisco
PLANT NO. 16635
APPLICATION NO. 11270

BACKGROUND

The City and County of San Francisco is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 4BTA3.9 G-5; Rated Horsepower: 99 HP

The standby generator will be located at the 205 Baltimore Way (Crocker Amazon Pump Station), Daly City, CA 94015. Based on the attached risk screen, this source will be limited to no more than 30 hours per year.

This generator set will provide emergency power (in the event of a blackout) for all essential electrically power at the Crocker Amazon Pump Station. The genset must be periodically tested to ensure that it will generate electricity when needed. The source is more than 500 feet from a school boundary, and not limited to be tested during non-school hours.

EMISSIONS SUMMARY

Annual Emissions:

The CARB certified (U-R-002-251) emission factors for S-1 (99 HP- diesel engine) are listed below:

| Pollutant | Emission Factors |
|-------------------|-------------------------|
| | (g/hp-hr) |
| | <i>S-1</i> |
| NO _x | 4.82 |
| CO | 0.37 |
| POC | 0.24 |
| PM10 | 0.15 |
| SO ₂ * | 0.184* |

**The emission factor for SO₂ is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

$$SO_2 \quad 8.09E-3 (\% S \text{ in fuel oil}) \text{ lb/hp-hr} = 8.09E-3 (0.05\% S) (454 \text{ g/lb}) = 0.184 \text{ g/hp-hr}$$

For S-1:

NOx = (4.821 g/hp-hr) (99 hp) 30 hrs/yr (lb/454g) = 31.56 lb/year
 CO = (0.37 g/hp-hr) (99 hp) 30 hrs/yr (lb/454g) = 2.42 lb/year
 POC = (0.24 g/hp-hr) (99 hp) 30 hrs/yr (lb/454g) = 1.57 lb/year
 PM10 = (0.15 g/hp-hr) (99 hp) 30 hrs/yr (lb/454g) = 0.98 lb/year
 SO2 = (0.184 g/hp-hr) (99 hp) 30 hrs/yr (lb/454g) = 1.20 lb/year

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

For S-1:

NOx = (4.61 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 24.1 lb/day
 CO = (0.87 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 4.53 lb/day
 POC = (0.41 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 2.15 lb/day
 PM10 = (0.15 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 0.76 lb/day
 SO2 = (0.184 g/hp-hr) (99 hp) (24 hr/day) (lb/454g) = 0.96 lb/day

Plant Cumulative Increase: (tons/year)

| Pollutant | Existing | New S-1 | Total |
|-----------|----------|---------|-------|
| NOx | 0 | 0.020 | 0.020 |
| CO | 0 | 0.001 | 0.001 |
| POC | 0 | 0.001 | 0.001 |
| PM10 | 0 | 0.000 | 0.000 |
| SO2 | 0 | 0.001 | 0.001 |
| NPOC | 0 | 0.000 | 0.000 |

Toxic Risk Screening:

The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (1) below, and a Risk Screening Analysis has been performed.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S-1

| Source: | PM ₁₀ Emission Factor (g/HP-hr) | HP | Annual Usage (Hours/year) ¹ | Diesel Exhaust Particulate Emissions (lb/year): | Trigger Level (lb/yr) | Risk Screen Required? (Yes/No) |
|---------|--|----|--|---|-----------------------|--------------------------------|
| 1 | 0.15 | 99 | 50 | 1.64 | 0.64 | Yes |

Per the attached 2/07/05 memo from Glen Long, results from the health risk screening analysis indicate that the cancer risk for the maximally exposed residential receptor is 16.2 in a million for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions. Thus, in accordance with the District's Toxic Risk Management Policy, the screen risk failed. To bring the risk down to an acceptable level of

¹ Annual Usage based on 200 hours per year of operation for reliability-related activities as defined in Regulation 9-8-330 ("Emergency Standby Engines, Hours of Operations").

ten in a million cancer for sources that meet TBACT, the number of hours of operation, excluding period when operation is required due to emergency conditions, source will be limited to no more than 30 hours per year.

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Since this engine meets TBACT for PM10 (<0.15 g/hp-hr), it is expected to comply with Reg. 6. Low sulfur diesel (0.05wt%) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Internal Combustion Engines) exempts the requirements for emission limits of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below.

This diesel engine is subject to the Stationary Diesel Engine Airborne Toxics Control measure (ATCM) and is considered a new stationary emergency standby diesel engine since it will be installed after January 1, 2005 and is larger than 50 Hp. The requirements of the ATCM will be included in the permit conditions.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is within 1000 feet from the nearest school and therefore subject to the public notification requirements of Reg. 2-1-412.

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutant: NO_x. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet BACT 2 limits presented below.

| POLLUTANT | BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT | TYPICAL TECHNOLOGY |
|-----------------|---|--|
| NO _x | 1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] ^{a,b} 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c} 3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O ₂] ₂ | 1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler ^{a,b} 2. Timing Retard $\leq 4^{\circ}$ + Turbocharger w/ Intercooler ^{a,b,c} 3. Timing Retard $\leq 4^{\circ}$ + Turbocharger w/ Intercooler |

The NO_x limit set by BACT 2 is met, as shown in Table (2) on the next page.

Table (2)

| Pollutant | Engine Emission Factors (g/hp-hr) | Emission Factor Limits as set by BACT 2 (g/hp-hr) | Have the limits been met? |
|-----------------|-----------------------------------|---|---------------------------|
| NO _x | 4.82 | 6.9 | YES |

Therefore, S-1 is determined to be in compliance with the BACT 2 limit for NO_x.

Since CARB certification data was used to establish the NO_x emission factor, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed to be in compliance with through the design standards demonstrated by the CARB certification testing.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NO_x. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for S-1 Emergency Diesel Generator
Application #11270, Plant #16635, City and County of San Francisco:

PC

1. Hours of Operation: The owner/operator shall operate the emergency standby engine(s) only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities is limited to 30 hours per any calendar year.
[Basis: Regulation 9-8-331]

"Emergency Conditions" is defined as any of the following:

- a. Loss of regular natural gas supply.
- b. Failure of regular electric power supply.
- c. Flood mitigation.
- d. Sewage overflow mitigation.
- e. Fire.
- f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

[Basis: Regulation 9-8-231]

"Reliability-related activities" is defined as any of the following:

- a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
- b. Operation of an emergency standby engine during maintenance of a primary motor.

[Basis: Regulation 9-8-232]

2. The owner/operator shall equip the emergency standby engine(s) with either:
 - a. a non-resettable totalizing meter that measures the hours of operation for the engine; or
 - b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

[Basis: Regulation 9-8-530]

3. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make the log available for District inspection upon request:
 - a. Hours of operation (total).
 - b. Hours of operation (emergency).
 - c. For each emergency, the nature of the emergency condition.
 - d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.

[Basis: Regulations 9-8-530 and 1-441]

RECOMMENDATION

Issue an Authority to Construct to Daly City for:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 4BTA3.9 G5; Rated Horsepower: 99 HP

EXEMPTIONS

None.

By: _____ Date: _____

William Chung
Air Quality Engineering Intern