

DRAFT
Engineering Evaluation
Prometheus Real Estate Group, Inc.
Application # 17076
Plant # 18824

BACKGROUND

Prometheus Real Estate Group, Inc. has applied for an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

S-1 Standby Diesel Generator Set, Engine Manufacturer: Detroit Diesel, Model Series 60, Rated at 685 bhp, 4.74 MMBtu/hr

The generator set will be used to provide emergency power in the event of a blackout.

EMISSIONS

Annual Average Emissions:

- Basis:
- 685 bhp output rating for full-load, standby operation
 - 50 hr/yr operation for testing and maintenance
 - NO_x, VOC, CO and PM₁₀ emission factors from CARB certification data (Executive Order U-R-007-0103):
 - NO_x: 2.76 g/hp-hr
 - POC: 0.15 g/hp-hr
 - CO: 0.90 g/hp-hr
 - PM₁₀: 0.13 g/hp-hr
 - SO₂ emission factor is from EPA AP-42, Table 3.4-1 ("Large Stationary Diesel and Dual-Fuel Engines"), which is based on full conversion of fuel sulfur to SO₂ and which will therefore be considered applicable to any diesel engine (sulfur content will be assumed to be the California limit of 0.05 wt% sulfur):
SO₂: 8.09E-3(0.05) lb/hp-hr (454 g/lb) = 0.18 g/hp-hr

NO_x: (50 hr/yr)(685 hp)(2.76 g/hp-hr)(lb/454 g) = **208 lb/yr = 0.104 tpy**

POC: (50 hr/yr)(685 hp)(0.15 g/hp-hr)(lb/454 g) = **11.0 lb/yr = 0.006 tpy**

CO: (50 hr/yr)(685 hp)(0.90 g/hp-hr)(lb/454 g) = **69.4 lb/yr = 0.035 tpy**

PM₁₀: (50 hr/yr)(685 hp)(0.13 g/hp-hr)(lb/454 g) = **9.81 lb/yr = 0.005 tpy**

SO₂: (50 hr/yr)(685 hp)(0.18 g/hp-hr)(lb/454 g) = **13.5 lb/yr = 0.007 tpy**

Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day operation will be assumed.

NO_x: (24 hr/day)(685 hp)(2.76 g/hp-hr)(lb/454 g) = **99.9 lb/day**

POC: (24 hr/day)(685 hp)(0.15 g/hp-hr)(lb/454 g) = **5.4 lb/day**

CO: (24 hr/day)(685 hp)(0.90 g/hp-hr)(lb/454 g) = **32.6 lb/day**

PM₁₀: (24 hr/day)(685 hp)(0.13 g/hp-hr)(lb/454 g) = **4.7 lb/day**

SO₂: (24 hr/day)(685 hp)(0.18 g/hp-hr)(lb/454 g) = **6.5 lb/day**

PLANT CUMULATIVE INCREASE

Prometheus Real Estate Group, Inc. (550 Moreland Apartments) is a new facility. Therefore, the District's database does not contain information on existing emissions at the plant. Table 1 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 18824 from the operation of S-1.

Table 1

Pollutant	Current plant emissions (TPY)	Increase in plant emissions associated with this application (TPY)	Cumulative emissions (Current + Increase) (TPY)
NO _x	0	0.104	0.104
POC	0	0.006	0.006
CO	0	0.035	0.035
PM ₁₀	0	0.005	0.005
SO ₂	0	0.007	0.007

TOXIC RISK SCREENING ANALYSIS

A Toxics Risk Screening Analysis was required for diesel engine exhaust. A risk screening analysis was performed for estimated emissions from 50 hours of operation per year. The maximum cancer risk was found to be 3.2 in a million. In accordance with the District's Risk Management Policy, this risk level is considered acceptable since the engine meets TBACT.

BACT

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 per highest day of POC, NO_x, CO, SO₂, or PM₁₀. Based on the above emission calculations, the owner/operator of S-1 is subject to BACT for NO_x and CO emissions. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

***BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guideline***

Source Category

Source: <i>IC Engine - Compression Ignition</i>	Revision:	5
	Document #:	96.1.2
Class: <i>> or = 175 horsepower output rating</i>	Date:	01/11/02

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
POC	1. 0.30 g/bhp-hr [62 ppmvd @ 15% O ₂] ^{a,b}	1. Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine ^{a,b}
	2. 1.5 g/bhp-hr [309 ppmvd @ 15% O ₂] ^{b,c}	2. CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine ^{b,c}
NO _x	1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] ^{a,b}	1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler ^{a,b}
	2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c}	2. Timing Retard ≤ 4° + Turbocharger w/ Intercooler ^{a,b,c}
	3. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c}	3. Timing Retard ≤ 4° + Turbocharger w/ Intercooler ^{a,b,c}
SO ₂	1. n/d	1. n/d
	2. fuel oil < 0.05% sulfur ^{a,b}	2. Fuel Selection ^{a,b}
CO	1. n/s	1. Catalytic Oxidation ^b
	2. 2.75 g/bhp-hr [319 ppmvd @ 15% O ₂] ^{b,c}	2. CARB or EPA (or equivalent) low-CO emitting certified engine ^{b,c}
PM ₁₀	1. n/d	1. Catalyst Guard Bed ^{a,b}
	2. If practical, gas-fueled engine or electric motor. If not, "California Diesel Fuel" (fuel oil w/ < 0.05% by weight sulfur and < 20% by volume aromatic hydrocarbons) ^b	2. Fuel Selection ^{b,d}
	3. 0.1 grams/bhp-hr	3. CARB or EPA (or equivalent) low-particulate matter emitting certified engine, or particulate filter
NPOC	1. n/a	1. n/a
	2. n/a	2. n/a

References

- a. CARB/CAPCOA Clearinghouse
b. BAAQMD NOTE: IC Engine BACT and TBACT is a low emitting, spark-ignited, gas-fueled engine with lean burn combustion or rich burn

with non-selective catalytic reduction, or electric motor. A diesel engine will be permitted only if a gas-fueled engine, or electric motor, is not practical (e.g., a remote location without natural gas availability or electric power, or only a diesel engine will meet the portability and/or power/torque/rpm requirements of the application under review, or the engine is used exclusively for emergency use during involuntary loss of power).

c. Timing retard, etc. controls alone may be acceptable only in very limited situations for temporary sources.

The more restrictive BACT 1 levels do not apply for engines used exclusively for emergency use during involuntary loss of power per the BACT workbook, document 96.1.2 of the BAAQMD BACT Guidelines for IC engines. The engine will meet BACT 2 limits.

PSD, NSPS, NESHAPs do not apply to this application.

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

PERMIT CONDITIONS

Conditions for S-1, Emergency Diesel Generator Set
Application #17076, Plant #18824

COND# 22850

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing.
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]
2. The owner/operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]
3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations,

subsection(e)(4)(G)(1)]

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

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

5. At School and Near-School Operation:
If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:
The owner/operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:
 - a. Whenever there is a school sponsored activity (if the engine is located on school grounds)
 - b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session. "School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

RECOMMENDATION

Issue Authority to Construct to Prometheus Real Estate Group, Inc. for:

- S-1 Standby Diesel Generator Set, Engine Manufacturer: Detroit Diesel, Model Series 60, Rated at 685 bhp (EPA Engine Family Name: 5DDXL14.OVLD).

by: _____ Date: 1/14/08 _____

Faye Bruno
Air Quality Engineer I