Engineering Evaluation
General Services Administration
Application # 22664
Plant # 20446

BACKGROUND

The General Services Administration has applied for an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following existing equipment:

S-1 Standby Diesel Generator, Engine: Cummins QSX15G9-NR2, Rated at 755 bhp, 5.36 MMBtu/hr

The engine will be located at 50 United Nations Plaza, San Francisco, CA 94102. It will be used to provide emergency power in the event of a blackout. The emergency engine must be periodically tested to ensure that it will generate electricity when needed.

EMISSIONS

For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (THC) is equivalent to the emission value of POC.

Annual Average Emissions:

Basis:
- 755 bhp output rating for full-load, standby operation
- 50 hr/yr operation for testing and maintenance
- NO_X, VOC, CO and PM_{10} emission factors from CARB certification data (Executive Order U-R-002-0533):
  - NO_X: 4.04 g/hp-hr
  - POC: 0.21 g/hp-hr
  - CO: 0.52 g/hp-hr
  - PM_{10}: 0.10 g/hp-hr
- SO_2 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 SO_2 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):
  SO_2: 8.09E-3(0.0005) lb/hp-hr (454 g/lb) = 0.0018 g/hp-hr

NO_X: (50 hr/yr)(755 hp)(4.04 g/hp-hr)(lb/454 g) **= 335.9 lb/yr = 0.168 tpy**

POC: (50 hr/yr)(755 hp)(0.21 g/hp-hr)(lb/454 g) **= 17.7 lb/yr = 0.009 tpy**

CO: (50 hr/yr)(755 hp)(0.52 g/hp-hr)(lb/454 g) **= 43.4 lb/yr = 0.022 tpy**

PM_{10}: (50 hr/yr)(755 hp)(0.10 g/hp-hr)(lb/454 g) **= 8.06 lb/yr = 0.004 tpy**

SO_2: (50 hr/yr)(755 hp)(0.0018 g/hp-hr)(lb/454 g) **= 0.15 lb/yr = 0.000 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)(755 hp)(4.04 g/hp-hr)(lb/454 g) **= 161.2 lb/day**

POC: (24 hr/day)(755 hp)(0.21 g/hp-hr)(lb/454 g) **= 8.49 lb/day**

CO: (24 hr/day)(755 hp)(0.52 g/hp-hr)(lb/454 g) **= 20.8 lb/day**

PM_{10}: (24 hr/day)(755 hp)(0.10 g/hp-hr)(lb/454 g) **= 3.87 lb/day**

SO_2: (24 hr/day)(755 hp)(0.0018 g/hp-hr)(lb/454 g) **=0.072 lb/day**

PLANT CUMULATIVE INCREASE

Table 1 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 723 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	9.247	0.168	9.415
POC	2.288	0.009	2.297
CO	0.355	0.022	0.377
PM_{10}	0.156	0.004	0.160
SO_2	0.230	0.000	0.230

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 for S-1. The maximum cancer risk was found to be 1.11 in a million. In accordance with the District's Regulation 2-5, this risk level is considered acceptable as both engines meet current TBACT requirements.

PUBLIC NOTIFICATION

The project is within 1000 feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and posted on the Internet. The public notice will be mailed to all Parents or Guardians with children enrolled at De Marillac Academy, and all residential and business neighbors located within 1000 feet of the proposed new source of pollution.

OFFSETS

Offsets are not required.

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, NOx, CO, SO_2, or PM_{10}. Based on the above emission calculations, the owner/operator of S-1 is subject to BACT for NOx 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:	**IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump**	**Revision:**	**6**
		Document #:	**96.1.3**
Class:	**> 50 BHP Output**	**Date:**	**04/13/2009**

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. n/s[d] 2. Current tier[a,b] standard for POC at applicable horsepower rating.	1. n/s[d] 2. Any engine certified or verified to achieve the applicable standard.[a,b]
NOx	1. n/s[d] 2. Current tier[a,b] standard for NOx at applicable horsepower rating.	1. n/s[d] 2. Any engine certified or verified to achieve the applicable standard.[a,b]
SO_2	1. n/s[d] 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm.	1. n/s[d] 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel).
CO	1. n/s[d] 2. The more stringent of either 2.75 g/bhp-hr [319 ppmvd @ 15% O_2][c] or the current Tier[a,b] standard.	1. n/s[d] 2. Any engine certified or verified to achieve the applicable standard.
PM_{10}	1. n/s[d] 2. More stringent of either 0.15 g/bhp-hr or the current Tier standard. 3. TBACT: The more stringent of either 0.15 g/bhp-hr or the current Tier standard.	1. n/s[d] 2. Any engine or technology demonstrated, certified or verified to achieve the applicable standard. 3. Any engine or technology demonstrated, certified or verified to achieve the applicable standard.
NPOC	1. n/s 2. n/s	1. n/s 2. n/s

References

a. Current tier standard (listed on reverse side): The current CARB or EPA off-road tier standard for the pollutant of concern within the appropriate horsepower range. Where NMHC + NOx is listed (with no individual standards for NOx or NMHC) as the standard, the portions may be considered 95% NOx and 5% NMHC. For the purposes of determining BACT NMHC = POC. Any engine which has been certified or demonstrated to meet the current year tier standard may be considered a current certified engine for that pollutant.

b. For pollutants NOx, POC and CO, an engine which does not meet the current EPA or CARB off-road tier standard may represent BACT2, providing 1) the engine met the most stringent EPA Tier Standard in effect at the time of installation (Tier 1 minimum) or 2) the engine met the most stringent EPA Tier Standard in effect prior to the Tier change for that horsepower rating with the permit application submitted within 6 months of the effective date of the Tier change. [Source: California Health & Safety Code Section 93116.3(b)(7)]

c. Previous BACT determination dated 01/11/02.

d. Cost effectiveness analysis must be based on lesser of 50 hr/yr or as limited by toxic risk screen.

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.

STATEMENT OF COMPLIANCE

S-1 will be operated as an emergency standby engine and, therefore, is not subject to the emission rate limits in Regulation 9, Rule 8 (NOx and CO from Stationary Internal Combustion Engines). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO_2 limitations of Reg. 9-1-301 (ground level concentration) and Reg. 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 (Particulate and Visible Emissions). This engine is not expected to produce visible emissions or fallout in violation of this regulation and is assume to be in compliance with Regulation 6 pending regular inspection.

The project is considered to be ministerial under 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 emission factors (MOP Chapter 2.3) and therefore is not discretionary as defined by CEQA.

PERMIT CONDITIONS

Conditions for S-1, Emergency Diesel Generator Set
Application #22664, Plant #20446

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 the General Services Administration for:

S-1 Standby Diesel Generator, Engine: Cummins QSX15G9-NR2, Rated at 755 bhp, 5.36 MMBtu/hr

by: _____ Date: _____

Faye Bruno
Air Quality Engineer II