DRAFT

ENGINEERING EVALUATION
California Pacific Medical Center – Davies Hospital
PLANT NO. 11924
APPLICATION NO. 11752

BACKGROUND

The California Pacific Medical Center – Davies Hospital of San Francisco, California is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-13 Stationary Standby Generator: Diesel Engine; Make: Caterpillar; Model: 3508B; Rated Horsepower: 1480 HP

The standby generator is located at 45 Castro Street, San Francisco, California 94114. It is within 1000 feet of McKinley Elementary School, so the public notification procedure will be triggered. Since it is powered by a diesel engine, this source is subject to the District's Airborne Toxics Control Measure (ATCM) regulation.

EMISSIONS SUMMARY

Annual Emissions:
The CARB-certified emission factors for S-13 (1480 HP- diesel engine) are listed below:

Pollutant	**Emission Factors (g/hp-hr)**
	S-13
NOx	5.9
CO	0.4
POC	0.2
PM10	0.10
SO2*	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.*

SO2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr

NOx	=	(5.9 g/hp-hr)	(1480 hp)	(50 hr/yr)	(lb/454g)	=	962 lb/yr	= 0.481 TPY
CO	=	(0.4 g/hp-hr)	(1480 hp)	(50 hr/yr)	(lb/454g)	=	65.2 lb/yr	= 0.033 TPY
POC	=	(0.2 g/hp-hr)	(1480 hp)	(50 hr/yr)	(lb/454g)	=	32.6 lb/yr	= 0.016 TPY
PM10	=	(0.10 g/hp-hr)	(1480 hp)	(50 hr/yr)	(lb/454g)	=	16.3 lb/yr	= 0.008 TPY
SO2	=	(0.184 g/hp-hr)	(1480 hp)	(50 hr/yr)	(lb/454g)	=	30.0 lb/yr	= 0.015 TPY

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

For S-13:

NOx	=	(5.9 g/hp-hr)	(1480 hp)	(24 hr/day)	(lb/454g)	=	462 lb/day
CO	=	(0.4 g/hp-hr)	(1480 hp)	(24 hr/day)	(lb/454g)	=	31.3 lb/day
POC	=	(0.2 g/hp-hr)	(1480 hp)	(24 hr/day)	(lb/454g)	=	15.6 lb/day
PM10	=	(0.10 g/hp-hr)	(1480 hp)	(24 hr/day)	(lb/454g)	=	7.82 lb/day
SO2	=	(0.184 g/hp-hr)	(1480 hp)	(24 hr/day)	(lb/454g)	=	14.4 lb/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New S-13	Total
NOx	0	0.481	0.481
CO	0	0.033	0.033
POC	0	0.016	0.016
PM10	0	0.008	0.008
SO2	0	0.015	0.015
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-13

Source:	PM10 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)
S-13	0.10	1480	50	16.3	0.64	Yes

Per the attached 5/16/2005 memo from Catherine Fortney, results from the health risk screening analysis indicate that the cancer risk for the maximally exposed residential receptor is 1.03 in a million for 50 hours of operation per year, excluding periods when operation is required due to emergency conditions. The maximum risk increase for students at McKinley Elementary School is 0.12 in a million. Thus, in accordance with the District's Toxic Risk Management Policy, the screen passes.

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. Off-site workers estimates assume exposure occurs for 46 years out of a 70-year lifetime. The off-site worker adjustment factor is:

[1] Annual Usage based on 50 hours per year of operation for reliability-related activities as prescribed by Subsection (E)(2)(A) of section 93115, title 17, California Code of Regulations.

(46 years/70 years) = 0.657 * residential risk

Estimates of risk to students assume exposure occurs at a higher breathing rate of 581 L/kg-day compared to 286 L/kg-day for residents during 180 school days per year out of 261 weekdays per year and for 9 years out of a 70-year lifetime. The student adjustment factor is:

(581 L/kg-day / 286 L/kg-day) / (180 days / 261 days) * (9 years / 70 years) = 0.180 * residential risk

PUBLIC COMMENT

The project is within 1000 feet of the site of a large school, McKinley Elementary School, and is therefore subject to the public notification requirements of Reg. 2-1-412. The public notice will be posted on the Internet and mailed to all Parents or Guardians with children enrolled at the aforementioned school(s). It will also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

STATEMENT OF COMPLIANCE

The owner/operator of S-13 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-13 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 engine is subject to the Airborne Toxic Control Measure (ATCM) for stationary compression ignition engines and is considered a new stationary emergency standby diesel engine since it was 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)

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, NOx, CO, SO2 or PM10.

Based on the emission calculations above, the owner/operator of S-13 is subject to BACT for the following pollutants: POC, NOx, CO, and SO2. 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 the meet BACT 2 limits presented below.

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]* 2. *1.5 g/bhp-hr [309 ppmvd @ 15% O_2] [b,c]*	1. *Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine [a,b]* 2. *CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine [b,c]*
NOx	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]*	1. *Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler [a,b]* 2. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler [a,b,c]* 3. *Timing Retard $\leq 4^o$ + Turbocharger w/ Intercooler*
SO_2	1. *n/d* 2. *fuel oil < 0.05% sulfur [a,b]*	1. *n/d* 2. *Fuel Selection [a,b]*
CO	1. *n/s* 2. 2.75 *g/bhp-hr [319 ppmvd @ 15% O2] [b,c]*	1. *Catalytic Oxidation [b]* 2. *CARB or EPA (or equivalent) low-CO emitting certified engine [b,c]*

The POC, NOx, and CO emission limits set by BACT 2 are met, as shown in Table (2).

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?
POC	0.2	1.5	YES
NOx	5.9	6.9	YES
CO	0.4	2.75	YES

Since this engine will use California diesel oil, it meets BACT for SO2 emissions because California diesel oil contains less than 0.05% sulfur. Therefore, S-13 is determined to be in compliance with the BACT 2 limits for POC, NOx, CO, and SO2.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. 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-13 Emergency Generator, Diesel Engine
Application #11752, Plant #11924, California Pacific Medical Center – Davies Hospital:

PC 21911

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 50 hours per any calendar year.
   [Basis: Regulation 9-8-330]

   "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 the California Pacific Medical Center – Davies Hospital for:

S-13 Stationary Standby Generator: Diesel Engine; Make: Caterpillar; Model: 3508B; Rated Horsepower: 1480 HP

EXEMPTIONS
None.

By:_____ Date:_____
Roy Lo
Air Quality Engineering Intern