DRAFT

ENGINEERING EVALUATION REPORT

Plant Name:	**SISTERS OF MERCY**
Application Number:	**14440**
Plant Number:	**17719**

Background:

The applicant is applying for an Authority to Construct for one new Emergency Stand-By Diesel Power Generator, one Emergency Standby Diesel Generator initially operated during the interim period of May 17, 2000 – September 1, 2001, and one Emergency Standby Diesel Generator previously exempt from permitting. The applicant is requesting an Authority to Construct/Permits to Operate for the following equipment:

S-1 Emergency Stand-By Diesel Generator; Cummins Model DGCB/ 4BTA3.9-G5, 99 BHP

S-2 Emergency Stand-By Diesel Generator; Cummins Model DGDB/ 6BT5.9-G6, 170 BHP (Interim Installation)

S-3 Emergency Stand-By Diesel Generator; Cummins Model DGDB/ 6BT5.9-G6, 170 BHP (Loss of Exemption)

Source S-3 was installed before May 17, 2000, when Regulation 1 and Regulation 2-1 were modified to require engines greater than 50 HP to require a Permit to Operate. As such, S-3 constitutes a Loss-Of-Exemption source not subject to Regulations 2-1-301 or 2-1-302 ("new" and "modified sources"), and therefore is not subject to public notification under the Waters Bill [California Health & Safety Code § 42301.6(g)]. As such, the Risk Screening Assessment for this application is restricted to Sources S-1 and S-2 only.

CUMULATIVE EMISSION CALCULATIONS

These engines have been certified by the California Air Resources Board. For calculating emissions from these engines, CARB certified emission factors were used for all criteria pollutants except SO2. They are as follows:

	S-1	S-2	S-3	
PM	0.149	0.1	0.1	g/bhp-hr
NOx	4.697	6.6	6.6	g/bhp-hr
CO	0.373	0.6	0.6	g/bhp-hr
TOC	0.374	0.3	0.3	g/bhp-hr
SO2	0.93	0.93	0.93	g/bhp-hr

The applicant requested operations for 50 hrs/year non-emergency use for each engine. This restriction is consistent with the California Air Resources Board Final Regulatory Order 17 CFR 93115, Air Toxic Control Measure for Stationary Compression Ignition Engines (December 4, 2004). The ATCM restricts operation of stationary emergency standby engines with diesel pm emission rates of 0.15 g/bhp-hr or less to no more than 50 hr/yr for maintenance and testing purposes (see Attachment 1).

BACT/TBACT REVIEW

Under Regulation 2, Rule 2, any new source which results in an increase of criteria pollutants must be evaluated for adherence to BACT control technologies. A BACT review is required if the engine emits more than 10 lbs/day of any criteria pollutant. Since NOx emissions exceed the trigger level of 10 lbs/day, a BACT review is required. For compression ignition I.C. engines, this means the engines must be fired on "California Diesel Fuel" (fuel oil with less than 0.05% by weight sulfur content, and less than 20% by volume aromatic hydrocarbons). BACT also requires that the engines emit no more than 6.9 g/bhp-hr of NOx. The proposed engines meet BACT requirements.

TBACT requires that the engines emit no more than 0.15 g/bhp-hr. The engines under consideration engine meet TBACT, as their PM emissions are 0.149 and 0.1 g/bhp-hr respectively

TOXIC RISK MODELING

An ISCST3 model for diesel PM10 exposure was run using SCREEN3 meteorological data for Sources S-1 and S-2. Residential risk is based on a continuous 70-year exposure to annual average pollutant concentrations. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Since the closest non-residential site is located more than 3000 feet away, only residential and school site risks were considered in both urban and rural terrain settings. Total risk is assumed to be the sum of the separate risks due to each of the two engines.

The proposed generators are within 1000 feet of a school, Mercy High School. The highest ground level concentrations of PM10 were calculated over the entire school site. For students, the modeling assumptions include an increased breathing rate of approximately 10.5 m^3 per day, and exposures that are for 36 weeks per year over a 9-year period. The projected carcinogenic and non-carcinogenic risk levels at those points was determined to be significantly less than 1 in a million.

PROJECT RISK BASED ON 50 HRS/YEAR OPERATION

SOURCE #1 – NEW ENGINE

Health Risk Estimates:

Receptor	Max. Annual Emission Rate		Max. Annual Avg. Chi/Q (ug/m^3 per g/sec)	Annual Average Exposure Concentration (ug/m^3)	Inhalation Dose (mg/kg-day)	Diesel PM: Inhalation Cancer Potency Factor (CPF) $(mg/kg\text{-}day)^{-1}$	Diesel PM: Inhalation Reference Exposure Level (REL) (ug/m^3)	***Max. Cancer Risk (per million)***	***Max. Non-cancer Hazard Quotient***
	(lb/yr)	(g/sec)							
Resident	1.63	2.3E-05	147.2	3.5E-03	1.0E-06	1.1E+00	5.0E+00	***1.15***	***6.9E-04***
Student	1.63	2.3E-05	119.8	2.8E-03	1.5E-07	1.1E+00	5.0E+00	***0.17***	***4.0E-04***

SOURCE #2 – INTERIM ENGINE

Health Risk Estimates:

Receptor	Max. Annual Emission Rate		Max. Annual Avg. Chi/Q (ug/m^3 per g/sec)	Annual Average Exposure Concentration (ug/m^3)	Inhalation Dose (mg/kg-day)	Diesel PM: Inhalation Cancer Potency Factor (CPF) $(mg/kg\text{-}day)^{-1}$	Diesel PM: Inhalation Reference Exposure Level (REL) (ug/m^3)	***Max. Cancer Risk (per million)***	***Max. Non-cancer Hazard Quotient***
	(lb/yr)	(g/sec)							
Resident	1.87	2.7E-05	105.9	2.8E-03	8.6E-07	1.1E+00	5.0E+00	***0.95***	***5.7E-04***
Student	1.87	2.7E-05	106.5	2.9E-03	1.5E-07	1.1E+00	5.0E+00	***0.17***	***4.1E-04***

RISK SUMMARY

Receptor	***Source S-1 Max Cancer Risk (per million)***	***Source S-2 Max Cancer Risk (per million)***	***Total Max Cancer Risk (per million)***	***Source S-1 Max Non-cancer Hazard***	***Source S-2 Max Non-cancer Hazard***	***Total Max Non-cancer Hazard***
Resident	***1.15***	***0.95***	***2.10***	***6.90E-04***	***5.70E-04***	***1.26E-03***
Student	***0.17***	***0.17***	***0.34***	***4.00E-04***	***4.10E-04***	***8.10E-04***

The total maximum calculated carcinogenic risk is below 10 in a million and the total maximum calculated non-cancer hazard index is less than 1.0, and so the generators as proposed is acceptable under Regulation 2, Rule 5.

At 50 hours per year per generator, total criteria pollutant emissions are as follows:

		PM10	NOX	CO	ORG	SO2*
SOURCE	BHP	G/BHP-HR	G/BHP-HR	G/BHP-HR	G/BHP-HR	G/BHP-HR
S-1 (NEW)	99	0.149	4.697	0.373	0.374	0.983
S-2 (INTERIM)	170	0.100	6.600	0.600	0.300	0.983
S-3 (LOE)	170	0.100	6.600	0.600	0.300	0.983
TOTAL G/HR		49	2,709	241	139	432
TOTAL LB/HR		0.11	5.97	0.53	0.31	0.95
TOTAL LB/DAY		2.58	143.33	12.75	7.36	22.83
TOTAL LB/50 HR		5.38	298.6	26.6	15.3	47.6
TOTAL TPY		0.003	0.149	0.013	0.008	0.024

COMPLIANCE DETERMINATION

These generators are covered under ministerial exemption, Chapter 2.3 of the BAAQMD Permit Handbook. CEQA is not triggered for emergency stand-by generators under this provision.

The generators are governed by the **California Air Resources Board's Air Toxic Control Measure for Stationary Compression Ingition Engines, CCR Title 17, Section 93115.** The explicit annual equipment usage limitation of 50 hours per year per generator except for operation under emergency conditions (Reg 9-8-330) will be included as part of the permit conditions.

The generators are also governed by the provisions of **Regulation 2, Rule 5, "New Source Review for Toxic Air Contaminants."**

The generators are exempt from emission limitations of District **Regulation 9, Rule 8-301 and 8-302**, "Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines," since it meets the provisions of **Regulation 9, Rule 8-111.1**, (operation of less than 200 hours per year and firing rate at or below 1000 BHP).

Visible emissions will be required to meet Ringelmann 2.0 limitation per **Regulation 6-303.1**.

Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.05% bw sulfur, per Regulation **9-1**.

These are new sources, and no sources are proposed to be closed in connection with this application. The facility will not emit more than 1 TPY of PM10 or SO2 or 15 TPY of POC or nitrogen oxides. Therefore, the facility is not subject to emission offset requirements under Regulation 2-2-302 or 2-2-303.

Conditions:

Condition #23044, setting out the operating conditions and recordkeeping requirements for operations at Sources S-1, S-2 and S-3 shall be made part of the sources' authority to construct/permit to operate.

Recommendation:

I recommend that an Authority to Construct be issued for the following sources:

S-1 Emergency Stand-By Diesel Generator; Cummins Model DGCB/4BTA3.9-G5, 99 BHP

S-2 Emergency Stand-By Diesel Generator; Cummins Model DGDB/6BT5.9-G6, 170 BHP (Interim Installation)

And an Authority to Construct be waived and a Permit to Operate be issued for

S-3 Emergency Stand-By Diesel Generator; Cummins Model DGDB/6BT5.9-G6, 170 BHP (Loss of Exemption)

subject to Condition #23044.

By _____ **Date** _____

PSD Evaluator

COND# 23044 ----------

1. Emergency stand-by generators S-1, S-2, and S-3 shall be fueled exclusively by diesel fuel having a sulfur content no greater than 0.05% by weight. [Reg 9-1-304]

2. Emergency stand-by generators S-1, S-2, and S-3 shall not exceed the opacity and particulate emissions set out in Regulation 6, "Particulate and Visual Emissions". [Reg 6]

3. Emergency stand-by generators S-1, S-2, and S-3 shall only be operated to mitigate emergency conditions or for reliability-related operations. Operations for reliability-related activities shall be limited to 50 hours per generator in any consecutive 12-month period. Operation while mitigating emergency conditions is unlimited. [Reg 9-8-330]

4. Emergency conditions are defined as any of the following:
   a. Loss of regular natural gas supply
   b. Failure of regular 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 [Reg 9-8-231]

5. Reliability-related activities are defined as any of the following:
   a. Operation of an emergency stand-by engine to test its ability to perform for an emergency use
   b. Operation of an emergency stand-by engine during maintenance of a primary motor [Reg 9-8-232]

6. The emergency stand-by engine shall be equipped with a non-resettable totalizing meter that measures and records the hours of operation for the engine. [Reg 9-8-530]

7. The following monthly records shall be maintained in a District-approved log for at least 2 years and shall be made available to the District upon request:
   a. Total hours of operation for each generator
   b. Total hours of operation under emergency conditions for each generator, and a description of the nature of the emergency condition
   c. Total fuel usage for each generator [Reg 9-8-530]

ATTACHMENT 1

FINAL REGULATION ORDER

AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINES

(DECEMBER 4, 2004)

TABLE 1: SUMMARY OF THE EMISSION STANDARDS AND OPERATING REQUIREMENTS FOR NEW STATIONARY EMERGENCY STANDBY DIESEL-FUELED CI ENGINES > 50 BHP (SEE SUBSECTION (e)(2)(A)3.)

DIESEL PM				OTHER POLLUTANTS
DIESEL PM STANDARDS (g/bhp-hr)	MAXIMUM ALLOWABLE ANNUAL HOURS OF OPERATION FOR ENGINES MEETING DIESEL PM STANDARDS			HC, NOx, NMHC+NOx, AND CO STANDARDS (g/bhp-hr)
	Emergency Use	Non-Emergency Use		
		Emission Testing to show compliance[2]	Maintenance & Testing (hours/year)	
≤0.15[1]	Not Limited by ATCM[3]	Not Limited by ATCM[3]	50	Off-Road CI Engine Certification Standards for an off-road engine of the same model year and horsepower rating, or Tier 1 standards for an off-road engine of the same maximum rated power.[4]

1. Or off-road certification standard (title 13 CCR section 2423) for an off-road engine with the same maximum rated power, whichever is more stringent
2. Emission testing limited to testing to show compliance with subsections (e)(2)(A)3.
3. May be subject to emission or operational restrictions as defined in current applicable district rules, regulations, or policies.
4. The option to comply with the Tier 1 standards is available only if no off-road engine certification standards have been established for an off-road engine of the same model year and maximum rated power as the new stationary emergency standby diesel-fueled CI engine.