

DRAFT

ENGINEERING EVALUATION

City College of San Francisco
Application #9219 - Plant #9365

50 Phelan Ave.
San Francisco, CA 94112

I. BACKGROUND

City College of San Francisco has applied for an Authority to Construct/Permit to Operate for the following equipment:

- S-4 Emergency Generator, Cummins 150 DGFA, 1.62 MMbtu/Hr, 317 BHP.**
- S-5 Emergency Generator, Cummins 150 DGFA, 1.62 MMbtu/Hr, 317 BHP.**

The Emergency Diesel Engine Generator Sets (S-4 and S-5) are equipped with the best available control technology (BACT) for minimizing the release of air borne criteria pollutants and harmful air toxins due to fuel combustion. The criteria pollutants are nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO₂) and particulate matter (PM₁₀). All of these pollutants are briefly discussed on the District's web site at baaqmd.gov.

These engines have a control module, turbocharger, charge air cooler and direct diesel fuel injection. Engines, S-4 and S-5, meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 1 Mobile Off-Highway standard. These engines will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.05% by weight. The operation of these engines, S-4 and S-5, should not pose any health threat to the surrounding community or the public at large.

II. EMISSION CALCULATIONS

Sources S-4 and S-5 Diesel Engines have been certified by CARB to be cleaner burning engines. Except for SO₂, the emission factors for these engines are from the CARB Certification (CARB Executive Order # U-R-2-174). The SO₂ emissions were calculated based on the maximum allowable sulfur content (0.05 wt% S) of the diesel fuel with assumption that all of the sulfur present will be converted to SO₂ during the combustion process. The POC emission factor is assumed to be 3% of the total CARB's certified NO_x and POC factor. This was based on the data from AP-42, Table 3.4-1 for Large IC Engine. The engine, S-1, passed the toxic screening analysis at 100 hr/yr with 2 in a million risk. The emissions calculation is as follows:

Emissions from S-4 or S-5:

Hours of Operation = 100 hr/yr

Diesel Heat Capacity = 19,300 BTU/lb

Fuel Consumption = 11.8 gal/hr

Estimated Fuel Usage = 11.8 gal/hr X 100 hr/yr = 1180 gal/yr.

NO_x = 4.1 gr/bhp-hr (317 hp)(1 lb/454 g)(100 hr/yr) = 286 lb/yr or 0.143 TPY

CO = 0.45 gr/bhp-hr (317 hp)(1 lb/454 g)(100 hr/yr) = 31.4 lb/yr or 0.016 TPY

POC = 0.12 gr/bhp-hr (317 hp)(1 lb/454 g)(100 hr/yr) = 8.6 lb/yr or 0.004 TPY

PM₁₀ = 0.07 gr/bhp-hr (317 hp)(1 lb/454 g)(100 hr/yr) = 4.88 lb/yr or 0.002 TPY

SO_x = (11.8 gal/hr)(7.1 lb/gal)(0.0005S)(64 lb SO₂/32 lb S)(100 hr/yr) = 8.38 lb/yr or 0.004 TPY

III. PLANT CUMULATIVE INCREASE AFTER 4/5/91

	<u>Current</u> Ton/yr	<u>New</u> Ton/yr	<u>New Total</u> Lbs/yr	<u>Tons/yr</u>
POC =	1.694	0.004	3,396	1.698
NO _x =	0.00	0.143	286	0.143
SO ₂ =	0.00	0.004	8.38	0.004

CO =	0.00	0.016	31.4	0.016
NPOC =	1.694	0.000	3,388	1.694
PM₁₀ =	0.00	0.002	8.38	0.002

IV. TOXIC SCREENING ANALYSIS

This application required a Toxics Risk Screening because the diesel particulate emissions are greater than the toxic trigger level.

<u>Toxic Pollutant Emitted</u>	<u>Emission Rate for S-4 or S-5 (lb/yr)</u>	<u>Risk Screening Trigger (lb/yr)</u>
PM 10 (Diesel Particulate)	5.8 each	0.6

S-4 and S-5 meet Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.1 gr/bhp-hr. For an engine that meets the TBACT requirement, it must also pass the toxic risk screening level of less than ten in a million. The cancer risk is conservative. It assumes a constant exposure of the ultra sensitive population (young people, the elderly, and the infirm, etc...) at 24 hours for a 70 years life.

These emergency generators passed the Health Risk Screening Analysis (HRA) conducted on March 15, 2003 by the District's Toxic Evaluation Section. The sources pose no significant toxic risk, since the risks to the maximally exposed residential and industrial receptors are 1.4 and 0.98 in a million, respectively. The hazard index for resident receptors is less than 0.0012, based on 100 hours operation per year. The level of risk for students at school Riordan High School, within a quarter of a mile, is 0.3 in a million. Thus, in accordance with the risk management policy, the screen passes, since the engines meet the TBACT requirement of 0.1 gr/BHP-hr limitation for particulate emission (see attached Risk Management Policy for Diesel Engines dated Jan 11, 2002).

V. BEST AVAILABLE CONTROL TECHNOLOGY

S-4 and S-5 from this facility triggers BACT since the emission rate of NOx from these sources are more than 10 pounds of emission per highest day per Regulation 2-2-301. The use of post emission filtration devices or a Selective Catalytic Reduction (SCR) System to meet BACT(1) is not required because it is not cost effective for a unit that will be used only during emergency and reliability-related activities. Sources S-4 and S-5 will comply with BACT(2) because it is CARB certified at the level below the BACT(2) requirements. BACT(2) requirements can be found on the District's web site under BACT/TBACT Handbook, Section 2 – Combustion Sources for I.C. Engine – Compression Ignition ≥ 175 HP, Document # 96.1.2.

	<u>S-4 or S-5 CARB certified</u>	<u>BACT(2)</u>
NOx	4.1 gr/bhp-hr	6.9 gr/bhp-hr
CO	0.45 gr/bhp-hr	2.75 gr/bhp-hr
POC	0.12 gr/bhp-hr	1.5 gr/bhp-hr
PM10-diesel	0.07 gr/bhp-hr	0.1 gr/bhp-hr

VI. OFFSETS

Offsets are not required since the facility's POC and NOx emissions are each less than 15 ton/yr per Regulation 2-2-302.

VII. STATEMENT OF COMPLIANCE

Sources S-4 and S-5 are subject to and expected to be in compliance with the requirements of District Regulation 1-301 "Public Nuisance", District Regulation 6 "Particulate Matter and Visible Emissions", Regulation 9-8 "NOx and CO from Stationary Internal Combustion Engines" and Regulation 9-1 "Sulfur Dioxide". In order to ensure compliance with the requirements of these regulations, the facility will be conditionally permitted to meet the requirements.

This 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 emission factors in accordance with Permit Handbook Chapter 2.3.

The project is within 1000 feet of the nearest school and therefore the owner/operator is subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and sent on -- -04/---/04. The public notices were sent to:

All addresses within 1000 feet of the diesel generator.
Parents and guardians of students at Riordan High School.

At the end of the comment period that lasted for more than 30 days, there were --- written comments, --- phone-mail messages and ----- e-mail messages were received from parents of students at Riordan High School.

The email messages were concerned about the ----.

Offsets, PSD, NSPS, and NESHAPS are not triggered.

VIII. CONDITIONS

Permit condition for S-4 and S-5, Emergency Generators, 317 HP each, City College of San Francisco; Plant # 9365; Application # 9219.

1. The engines for emergency generators S-4 and S-5 shall be fired exclusively on diesel fuel having a sulfur content no greater than 0.05% by weight. The sulfur content of the fuel oil shall be certified by the fuel oil vendor. [Basis: Cumulative Increase]
2. S-4 and S-5 shall only be operated to mitigate emergency conditions or for reliability-related activities. Operation for reliability-related activities shall not exceed 100 hours each in any calendar year at these engines. Operation while mitigating emergency conditions is unlimited. [Basis: Regulation 9-8-330, Cumulative Increase]

"Emergency Conditions" is defined as any of the following: [Basis: Regulation 9-8-231]

- 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.

"Reliability-related activities" is defined as any of the following: [Basis: Regulation 9-8-232]

- 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.
3. S-4 and S-5 shall be equipped with either: [Basis: Regulation 9-8-530]
 a non-resettable totalizing meter that measures the hours of operation for the engine
OR
 a non-resettable fuel usage meter; the following factors shall be used to convert fuel usage to hours of operation:
 S-4: 11.8 gal/hr.
 S-5: 11.8 gal/hr.
4. The following monthly records shall be maintained in a District-approved log for at least 2 years for S-4 and S-5 and shall be made available for District inspection upon request:
 [Basis: Regulations 9-8-530, 1-441]
- a. Total hours of operation for each engine
 - b. Hours of operation under emergency conditions for each engine and a description of the nature of each emergency condition
 - c. Fuel usage for S-4 and S-5 separately.

IX. RECOMMENDATION

Waive the Authority to Construct and Issue conditional Permit to Operate to City College of San Francisco, for the following equipment:

- S-4 Emergency Generator, Cummins 150 DGFA, 1.62 MMbtu/Hr, 317 BHP.**
- S-5 Emergency Generator, Cummins 150 DGFA, 1.62 MMbtu/Hr, 317 BHP.**

Thu H. Bui
Air Quality Engineer II
Permit Services Division

Date: _____

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