ENGINEERING EVALUATION
San Francisco Public Utilities Commission, Plant: 23530
Application: 27909

11772 Main Street
Sunol, CA 94586

BACKGROUND

San Francisco Public Utilities Commission has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

S-1 Emergency Standby Diesel Generator Set, Cummins generator model DSFAD powered by 2016 Cummins engine, Model: QSB5-G3 NR3, 145 BHP, 0.78 MMBTU/hr

The Emergency Diesel Engine Generator Set (S-1) is 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 (NOx), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO_2) and particulate matter (PM_{10}). All of these pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

S-1 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. The engine will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

EMISSIONS

S-1 has been certified by EPA to be a cleaner burning engine. Except for SO_2, the emission factors for this engine are from the EPA Certification for the EPA engine family. The SO_2 emissions were calculated based on the maximum allowable sulfur content (0.0015 wt% S) of the diesel fuel with assumption that all of the sulfur present will be converted to SO_2 during the combustion process.

Basis:

- 145 hp output rating
- 50 hr/yr operation for testing and maintenance
- 5.7 gallons/hr max fuel use rate
- HC, NOx, CO, and PM_{10} emission factors provided by EPA Certification for EPA engine family name of GCEXL0275AAG
- POC is assumed to be 100% of HC
- SO_2 emissions are quantified based on the full conversion of 0.0015 wt% (~ 15 ppm) sulfur in the ULS diesel fuel. The SO_2 emission factor was derived from EPA AP-42, Table 3.4-1.

Annual Average Emissions:
Annual emissions are calculated based on the number of hours per year of operation for testing and maintenance. See Table 1.

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 of operation will be assumed since no daily limits are imposed on intermittent and unexpected operations. See Table 1.

Table 1. Annual and Daily Emissions from EPA Certified Data

Pollutant	Emission Factor (g/hp-hr)	Annual Emissions (lb/yr/engine)	Annual Emissions (TPY per engine)	Max. Daily (lb/day/engine)
NMHC+NOx	2.6	-	-	-
NOx	2.5	39.92	0.0200	19.16
POC	0.1	2.08	0.0010	1.00
CO	0.7	11.18	0.0056	5.37
PM10	0.10	1.60	0.0008	0.77
SO2*	0.0055	0.09	0.00004	0.04

Note: * From Table 3.4-1 of AP-42, 0.0015%S

PLANT CUMULATIVE INCREASE

San Francisco Public Utilities Commission is a new facility. Table 2 summarizes the cumulative increase in criteria pollutant emissions since 4/5/1991 that will result from the operation of S-1.

Table 2. Plant Cumulative Emissions Increase

Pollutant	Existing Emissions, Since 4/5/91 (TPY)	New Increase with This Application (TPY)	Cumulative Emissions (TPY)
NOx	0	0.020	0.020
POC	0	0.001	0.001
CO	0	0.006	0.006
PM_{10}	0	0.001	0.001
SO_2	0	0.0000	0.0000

TOXIC RISK SCREENING ANALYSIS

This application required a Toxics Risk Screening Analysis because the diesel particulate emissions from the operation of S-1 are greater than the toxic trigger level.

Table 3. Diesel Exhaust Particulate Matter Emissions

Toxic Pollutant Emitted	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
PM_{10} (Diesel Particulate)	1.6	0.34

S-1 meets Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.15 g/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. Estimates of residential risk assume exposure to annual average toxic air contaminant concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume exposure occurs 8 hours per day, 245 days per year, for 40 years. Risk estimates for students assume a higher breathing rate, and exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years.

Based on 50 hours per year of operation, the emergency generator set passed the Health Risk Screening Analysis (HRSA) conducted on May 10, 2016 by the District's Toxic Evaluation Section. The source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 6.1 in a million. The hazard indices are less than 1.0. The source is prohibited from being operated for non-emergency use between 7:30am and 3:30pm on days when school is in session since the engine is located within 500 feet of the school grounds. Thus, in accordance with Regulation 2, Rule 5, this source is in compliance with the TBACT and project risk requirements.

Best Available Control Technology (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 or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}.

BACT is triggered for NOx since the maximum daily emissions of this pollutant exceeds 10 lb/day per pollutant per source. Please refer to the discussion on "Daily Emissions" on page 1 of this evaluation. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.3, Revision 7 dated 12/22/2010. For NOx and CO, BACT(2) is the CARB ATCM standards for the respective pollutants at applicable horsepower rating. BACT(1) has not been determined.

S-1 satisfies the current BACT(2) standards for NOx. The more restrictive BACT(1) standards are not applicable to this engine because it will be limited to operation as an emergency standby engine.

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 per Regulation 2, Rule 2, Section 302. The District may provide offsets from the Small Facility Banking Account for a facility with emissions between 10 and 35 tons per year of POC or NOx, provided that facility has no available offsets or that the Small Facility Banking Account has not been exhausted.

San Francisco Public Utilities Commission is a new facility. The facility does not have any permitted emissions prior to 4/5/1991. Therefore, the total increase in criteria pollutant emissions (both pre and since 4/5/1991) that will result at the facility from the operation of S-1 is summarized and displayed in Table 2. As shown in Table 2, POC or NOx offset requirements are not triggered.

San Francisco Public Utilities Commission is not a major facility for criteria pollutants of PM_{10} and SO_2.

New Source Performance Standards (NSPS)

The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

S-1 engine has a total displacement of 4.5 liters and has 4 cylinders. Therefore, each cylinder has a volume of less than 10 liters. The engine is 2016 model year engine and is not a fire pump. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, which refers to 40CFR89.112 and 40CFR89.113 for all pollutants.

For engines greater than or equal to 100 hp and less than 175 hp, these standards are:
NMHC+NOx: 3.0 g/hp-hr
CO: 3.7 g/hp-hr
PM: 0.15 g/hp-hr

According to the EPA Certification for EPA engine family name of GCEXL0275AAG, S-1 will comply with the standards.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the

engine manufacturer, over the entire life of the engine. The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a sulfur content of 15 parts per million (ppm) maximum, and the same cetane index or aromatic content as above. The owner/operator is expected to comply with this requirement because CARB diesel is required to be used in California.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is already in the standard permit conditions.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing, and the prohibition of running for any reason other than emergency operation, maintenance, and testing because it is limited by permit condition to 50 hours per year for reliability testing and otherwise may only operate for emergencies.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

Section 60.4214 states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engine does not have a diesel particulate filter, the owner/operator is not subject to Section 60.4214(c).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. The owner/operator is expected to comply with this requirement.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

This engine is subject to the emission or operating limitations in 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. Per 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE located at an area source must meet the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines. This engine is in compliance with the requirements of 40 CFR part 60 subpart IIII, as shown in the "NSPS" section of this evaluation.

California Air Resources Board Stationary Diesel Engine Airborne Toxic Control Measure

The State Office of Administrative Law approved the Airborne Toxic Control Measure (ATCM) on November 8, 2004. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Effective January 1, 2005, there is a prohibition on the operation of new diesel emergency standby engines greater than 50 bhp unless the following operating requirements and emission standards are met:

"Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations.
Emissions Standards and Hours of Operating Requirements for New Stationary Emergency Standby Diesel-Fueled Engines (>50 bhp):

a. meet the applicable emission standards for all pollutants for the same model year and maximum horsepower rating as specified in Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines, in effect on the date of acquisition or submittal, as defined in section 93115.4, and

Table 1: Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines g/bhp-hr (g/kW-hr)				
Maximum Engine Power	**Model year(s)**	**PM**	**NMHC+NOx**	**CO**
50 ≤ HP < 75 (37 ≤ kW < 56)	2007	0.15 (0.20)	5.6 (7.5) 3.5 (4.7)	3.7 (5.0)
	2008+			
75 ≤ HP < 100 (56 ≤ kW < 75)	2007	0.15 (0.20)	5.6 (7.5) 3.5 (4.7)	3.7 (5.0)
	2008+			
100 ≤ HP < 175 (75 ≤ KW < 130)	2007	0.15 (0.20)	3.0 (4.0)	3.7 (5.0)
	2008+			
175 ≤ HP < 300 (130 ≤ kW < 225)	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
	2008+			
300 ≤ HP < 600 (225 ≤ kW < 450)	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
	2008+			
600 ≤ HP < 750 (450 ≤ kW < 560)	2007	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
	2008+			
HP > 750 (kW > 560)	2007	0.15 (0.20)	4.8 (6.4)	2.6 (3.5)
	2008+			

1. May be subject to additional emission limitations as specified in current applicable district rules, regulations or policies.

b. after December 31, 2008, be certified to the new nonroad compression-ignition (CI) engine emission standards for all pollutants for 2007 and later model year engines as specified in 40 CFR, PART 60, Subpart IIII-Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006); and

c. not operate more than 50 hours per year for maintenance and testing purposes, except as provided in 93115.6(a)(3)(A)2. This subsection does not limit engine operation for emergency use and for emission testing to show compliance with 93115.6(a)(3).

Emergency standby diesel engine S-1 (1) meets the emission standards for all pollutants set in Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines, (2) is subject to and in compliance with the EPA Tier 3 off-road CI engine standards, and (3) will operate for no more than 50 hours per year for maintenance and reliability testing per engine. Therefore, the diesel engine is in compliance with the above ATCM requirements.

STATEMENT OF COMPLIANCE

Source S-1 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (*Public Nuisance*), Regulation 6-1-303 (*Particulate Matter and Visible Emissions*), Regulation 9-1 (*Sulfur Dioxide*) and Regulation 9-8 (*NOx and CO from Stationary Internal Combustion Engines*). In order to ensure compliance with the requirements of these regulations, the facility will be conditionally permitted to meet the requirements.

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

S-1 is subject to the limitations of Regulation 6-1-303 (*Particulate Matter*). Regulation 6, Rule 1, Section 303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. This low PM_{10} emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6-1 pending a regular inspection.

S-1 is also subject to the SO_2 limitations of Regulation 9-1-301 (*Limitations on Ground Level Concentrations of Sulfur Dioxide*), Regulation 9-1-302 (*Limitations Sulfur Dioxide Emissions*) and 9-1-304 (*Burning of Solid and Liquid Sulfur Dioxide Fuel*). From Regulation 9-1-301, the ground level concentrations of SO_2 will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9, Rule 1, Section 304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with Regulation 9, Rule 1 is expected since diesel fuel with a 0.0015% by weight sulfur is mandated for use in California.

From Regulation 9, Rule 8 (*NOx and CO from Stationary Internal Combustion Engines*), Section 110.5 (*Emergency Standby Engines*), S-1 is exempt from the requirements of Regulations 9-8-301 (*Emission Limits on Fossil Derived Fuel Gas*), 9-8-302 (*Emission Limits on Waste Derived Fuel Gas*), 9-8-303 (*Emissions Limits – Delayed Compliance, Existing Spark-Ignited Engines, 51 to 250 bhp or Model Year 1996 or Later*), 9-8-304 (*Emission Limits – Compression-Ignited Engines*), 9-8-305 (*Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later*), 9-8-501 (*Initial Demonstration of Compliance*) and 9-8-503 (*Quarterly Demonstration of Compliance*). However, it is subject to the monitoring and record keeping procedures described in Regulation 9-8-530 (*Emergency Standby Engines, Monitoring and Recordkeeping*). The requirements of this Regulation are included in the permit conditions below.

S-1 is also subject to and expected to comply with Regulation 9-8-330 (*Emergency Standby Engines, Hours of Operation*) since non-emergency hours of operation will be limited in the permit conditions to 50 hours per year.

This application is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to California Environmental Quality Act (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 2.3.1 (Stationary Diesel Engines).

Prevention of Significant Deterioration (PSD) is not triggered.

This facility is located within 1,000 feet from the nearest school (Sunol Glen Elementary) and therefore is subject to the public notification requirements of Regulation 2-1-412.

PERMIT CONDITIONS

CONDITION 22850----------

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing. [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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, athletic field, or other areas of school property but does not include unimproved school property.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

End of Conditions

RECOMMENDATION

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following source:

S-1 Emergency Standby Diesel Generator Set, Cummins generator model DSFAD powered by 2016 Cummins engine, Model: QSB5-G3 NR3, 145 BHP, 0.78 MMBTU/hr

Prepared by: _____ **Date:** _____
Kathleen Truesdell
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