ENGINEERING EVALUATION
State Bar of California
Plant: 21323
Application: 712451

BACKGROUND

State Bar of California (State Bar) has applied for an Authority to Construct for the following source:

S-3 Emergency Standby Diesel Generator Set
Make: Cummins, Model: QSX15-G9, Model Year: 2023
755 bhp, 30.3 gal/hr, 4.15 MMBtu/hr

Abated by:

A-1 Diesel Particulate Filter

The Emergency Standby Diesel Engine Generator Set (S-3) will be located at 180 Howard Street in San Francisco, CA 94105. The engine will be used to provide power to the facility in case of an emergency. The engine for S-3 is certified to meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 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.

EMISSION CALCULATIONS

Criteria Pollutants

Emissions from Source S-3

Pollutant	Emission Factor	Emissions		
	(g/hp-hr)	Annual (lb/yr)	Annual (TPY)	Maximum Daily (lb/day)
NO_x	4.209	349.97	0.1750	167.99
NMHC = POC	0.075	6.21	0.0031	2.98
CO	0.448	37.23	0.0186	17.87
$PM_{2.5}$ = PM_{10} (diesel particulate)	0.015	1.21	0.0006	1.58
SO_2	0.004	0.31	0.00016	0.15

Basis:

- 755 hp Max Rated Output – 30.3 gallons/hr Max Fuel Use Rate;
- The NO_x, NMHC, CO, and PM_{10} emission factors are from the EPA Family Name (PCEXL015.AAJ).
- The SO_2 emission factor is based on 15 ppm sulfur in ULSD fuel derived from EPA AP-42, Table 3.4-1.
- Annual emissions are based on the annual limit (50 hr/yr) of operation for testing and maintenance
- Max daily emissions are based on 24 hr/day since no daily limits are imposed on operations

Per the Distirct's Policy, Calculating Potential to Emit for Emergency Backup Power Generators, emissions resulitng from emergency use of 100 hours per year must be taken into account when determining the Potential to Emit (PTE). This is in addition to the permitted limit for reliabiltiy-related and testing operations of 50 hours per year. The assumption of 100 hours per year of emergency opertions will be used to determine applicability of District permitting regulations, such as New Source Review (Regualtion 2-2) and Title V Major Facility Review (Regulation 2-6). It will not be used to determine the amount of emission offsets required for a project. This policy does not apply for purposes of a New Source Review for Toxic requirements per Regulation 2-5. The PTE emissions for each source is presented in Attachment A. The following is a summary of the potential to emit for this facility:

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Potential to Emit from All Active Sources

Pollutant	Permitted Sources (tpy)	A/N 712451 (tpy)	Total (tpy)
NO_x	0.532	0.525	1.057
POC	0.042	0.009	0.052
CO	0.114	0.056	0.170
PM_{10}	0.025	0.002	0.027
$PM_{2.5}$	0.000	0.002	0.002
SO_2	0.000	0.000	0.001

Toxic Pollutants

The only Toxic Air Contaminant listed on Table 2-5-1 emitted from S-3 is diesel particulate which has a chronic trigger level of 0.26 lb/yr. It is assumed that all of the PM_{10} is diesel particulate. We also assume that all of the PM_{10} is $PM_{2.5}$. Based on the above calculations the annual diesel particulate emissions are 1.21 lb/year. As such, this application requires a Toxics Risk Screening Analysis. Regulation 2-5 requires that the cumulative impacts from all related projects permitted within the last five years be included in the risk screening analysis. The are no related projects in the last five years. The table below tabulates the emissions from this permit application.

Summary of Emissions from Diesel Engine Applications

Application No.	Source No.	A/C Issuance Date	P/O Issuance Date	Max. Rated Output (bhp)	PM_{10} EF (g/bhp-hr)	Annual Operating Hours (hrs/yr)	Diesel Exhaust Particulate Emissions (lb/yr)	TAC Trigger Level (lb/yr)
712451	3	None	None	755	0.015	50	1.21	0.26

Cumulative Increase

The table below summarizes the project's cumulative increase for criteria pollutant emissions:

Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Permitted Emissions, Post 4/5/91 (TPY)		AN 715451 Emissions Increase (TPY)		Plant Cumulative Emissions Increase (TPY)
NO_x	0.175	+	0.175	=	0.350
POC	0.003	+	0.003	=	0.006
CO	0.019	+	0.019	=	0.038
PM_{10}	0.001	+	0.001	=	0.002
$PM_{2.5}$	0.001	+	0.001	=	0.002
SO_2	0.000	+	0.000	=	0.000

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STATEMENT OF COMPLIANCE:

Regulation 2- Permits, Rule 1 – General Requirements

Ministerial Projects (Section 2-1-311)

As per CEQA Article 18, Section 15301, this project qualifies for a categorical exemption as a project with involving negligible or no expansion of use. One of the ways a project can qualify for this categorical exemption is if the addition to existing structures do not result in an increase of more than; "50% of the floor area of the structures before the addition, or 2,500 square feet, whichever is less" or "10,000 square feet if … the area in which the project is not environmentally sensitive". According to the facility's Appendix H form, the project will be approximately 272 square feet. Therefore, this project qualifies for the categorical exemption as per CEQA Article 18, Section 15301.

Public Notice, Schools and Overburdened Communities (Section 2-1-412 and California Health & Safety Code §42301.6)

Pursuant to California Health & Safety Code §42301.6(a), prior to approving an application for a permit to construct or modification of a source, which is located within 1,000 feet from the outer boundary of a school site, the District shall prepare a public notice as detailed in §42301.6. §42301.9(a) defines a "school" as any public or private school used for the purposes of the education of more than 12 children in kindergarten or any grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes. Using the GreatSchools.org website and searching with Google Maps, it has been determined that there is one school located within 1,000 feet of the facility. The "Youth Chance High School" located at 169 Steuart St in San Francisco, is located approximately 687 feet from the facility. Therefore, a public notice is required as per 2-1-412.

Pursuant to District Regulation 2-1-412, prior to approving an application for a permit to construct or modify a source which is located within an Overburdened Community (OBC) and for which a Health Risk Assessment is required pursuant to Regulation 2-5-401, the District shall prepare a public notice as detailed in §42301.6. As per Regulation 2-1-243, an OBC is defined as an area located within a census tract identified by the California Communities Environmental Health Screening Tool (CalEnviroScreen) Version 4.0, as having an overall CalEnviroScreen score at or above the 70th percentile or within 1,000 feet of any such census tract. The facility is not located in an OBC.

Regulation 2- Permits, Rule 2 – New Source Review

PSD Projects (Section 2-2-224)

This section defines a PSD project as one at a facility that has the potential to emit 100 tons or more per year of any PSD pollutant. This facility will not have the potential to emit 100 tons or more of any PSD pollutant therefore, this project is not a PSD project.

Best Available Control Technology Requirement (Section 2-2-301)

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit 10 or more pounds per highest day of POC, non-precursor organic compounds (NPOC), NO_x, CO, SO_2, and/or PM_{10} or $PM_{2.5}$.

Based on the emission calculations provided above in "Emissions from Source S-3", BACT is triggered for NO_x and CO as the maximum daily emissions exceed 10 lbs/day.

The District BACT/TBACT workbook has the following achieved in practice NO_x and CO BACT limits for emergency diesel engines with a capacity between 750 and 1000 hp. For standby diesel engines in this size range, EPA Tier 2 standards are currently the most stringent standards that would qualify as achieved in practice BACT under the District program. The determination has a date of 12/22/20.

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Pollutant	Manufacturer's Performance Data Sheet Emission Rate (g/bhp-hr)	BACT Emission Standards (g/bhp-hr)
NMHC + NO_x	4.28	4.8
CO	0.45	2.6

The engine will meet the above limits.

Offset Requirements, POC and NO_x (Section 2-2-302)

This section establishes emission offset requirements for POC and NO_x at facilities that will have the potential to emit more than 10 tons per year of POC or NO_x. If the facility will have the potential to emit more than 10 tons per year but less than 35 tons per year of NO_x or POC after the new or modified source is constructed, offsets must be provided at a 1:1 ratio for any un-offset cumulative increase in emissions at the facility. These offsets shall be provided by the District's Small Facility Banking Account unless the applicant owns offsets. If the facility emits more than 10 tons of POC and/or NO_x per year, offsets must be provided. Based on potential to emit, the POC and NO_x emissions will not exceed 10 tpy. Therefore, the engine is not subject to the offset requirements of Regulation 2-2-302.

Offset Requirement, $PM_{2.5}$, PM_{10} and SO_x (2-2-303)

Since the potential to emit $PM_{2.5}$, PM_{10} or SO_x at the facility where this engine operates are each below 100 tons per year, this engine is not subject to the offset requirements of *Regulation 2-2-303*.

Regulation 2- Permits, Rule 5 New Source Review of Toxic Air Contaminants

General (2-5-100)

Diesel particulate emissions from the planned operation of S-3 are calculated to be 1.21 lb/year which exceeds the trigger level of 0.26 lb/year. Therefore, S-3 is subject to the requirements of this regulation and a health risk analysis (HRA). As such, this application requires a Toxics Risk Screening Analysis. Regulation 2-5 requires that the cumulative impacts from all related projects permitted within the last five years be included in the risk screening analysis. There are no related projects within the last five years.

The results of the HRA were: a Cancer Risk of **0.50 in a million,** and a Chronic Hazard Index (HI) of **0.00038**. In accordance with the District's Regulation 2-5-301, S-3 is not required to meet TBACT because the source cancer risk does not exceed 1.0 in a million and the chronic HI does not exceed 0.20. Since the estimated project cancer risk does not exceed 10.0 in a million and chronic hazard index does not exceed 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements, for projects not located in an Overburdened Community, as defined in Regulation 2-1-243.

Regulation 6 - Particulate Matter, Rule 1 - General Requirements

Ringelmann No. 2 Limitation (Section 6-1-303)

Since S-3 has a displacement of 912 in^3 it is subject to *Regulation 6-1-303.* The engine is expected to meet this requirement with regular maintenance and inspection.

Visible Particles (Section 6-1-305)

Since S-3 will emit a very small amount of PM_{10} it is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with *Regulation 6-1-305* pending a regular inspection.

Total Suspended Particulate Concentration Limits (Section 6-1-310)

Per *Regulation 6-1-310.2*, a person shall not emit from any source particulate matter in excess of 0.117 grains/dscf of exhaust gas volume if the exhaust gas rate is between 2,649 cfm and 3,531 cfm. The exhaust rate for this engine is 3,105 cfm. The emission rate from S-3 is 0.015 grams/bhp-hr, which results in an outlet grain loading of 0.0023 grains/dscf at 0% O_2. The emission rate is less than the limit 0.117 grains/dscf and is in compliance with *Regulation 6-1-310*.

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Regulation 9 – Inorganic Gaseous Pollutants, Rule 1 Sulfur Dioxide

S-3 is subject to the following sections of Regulation 9, Rule 1 and will comply with all sections by burning Ultra Low Sulfur Diesel with a sulfur content of 15 ppm, which results in less than 1 ppmv of SO_2 in the exhaust gas.

Limitations on Ground Level Concentrations (Section 9-1-301)

Sulfur Dioxide emissions shall not result in ground level concentrations in excess of 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. S-3 is expected to be comply with Regulation 9-1-301

General Emission Limitation (Section 9-1-302)

S-3 is not subject to this requirement because the section does not apply to sources that are subject to Sections 9-1-304 through 9-1-312

Fuel Burning (Liquid and Solid Fuels) (Section 9-1-304)

The sulfur content of liquid fuel burned shall not exceed 0.5% by weight. S-3 will comply with Regulation 9-1-304 because CARB diesel fuel, which is required by the CARB ATCM for Stationary Diesel Engines requires fuel that contains 0.0015% sulfur or less.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 8 NOx and CO from Stationary Internal Combustion Engines

Exemptions (Section 9-8-110)

Section 110.5 exempts emergency standby engines from the requirements of Sections 9-8-301 through 305, 501 and 503.

Emergency Standby Engines, Hours of Operation (Section 9-8-330)

S-3 is subject to the requirements of *Regulation 9-8-330* which limits reliability related operation of the engines to 50 hours per year. Permit Conditions for S-3 will include operating limits that meet this standard.

Federal Requirements

S-3 is considered a new stationary source and is required to comply with *Regulation 10, Standard of Performance for New Stationary Sources* – which is Title 40, Part 60 of the Code of Federal Regulations incorporated by reference. According to 40 CFR Section 60.4200(a)(1)(i) engines are subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines if they have a displacement of less than 30 liters per cylinder where the model year is 2007 or later, for engines that are not fire pump engines. S-3 is a 6-cylinder engine with a total displacement of 15 liters, so each cylinder has a volume less than 30 liters and this engine is subject to NSPS.

Section 60.4205(b) requires that owners and operators of these engines comply with the emission standards in Section 60.4202. As per Section 60.4202(a), for stationary CI engines with a model year 2007 or later, used as an emergency engine with a maximum engine power less than or equal to 3,000 HP and a displacement less than 10 liters per cylinder and is not a fire pump, the engines are subject to the Tier 2 or Tier 3 emission standards as per 40 CFR part 1039, Appendix I, and smoke standards as per 40 CFR 1039.105.

S-3 is subject to the Tier 2 standards for engines >560 kw, as shown in the table below:

Pollutant	Manufacturer's Performance Data (g/kw-hr)	40CFR89.112 Emission Limits (g/kw-hr)
PM	0.13[1]	0.20
NMHC + NO_x	5.7	6.4
CO	0.6	3.5

Note:

1. This represents the unabated PM emission factor from the EPA Engine Family Name.

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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 a cetane index of 40 or a maximum aromatic content of 35 volume percent. The owner/operator is expected to comply with this requirement because CARB allows only ultra-low sulfur diesel to be used in California.

Section 60.4209(a) requires a non-resettable hour meter. S-3 will be subject to standard permit conditions that includes this requirement.

S-3 will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 60 under engine family name PCEXL015.AAJ.

Standard permit conditions limiting operation to 50 hours per year for reliability testing except for operating during emergencies at S-3 ensure that it will comply with the requirement in Section 60.4211(e) which limits such operation to less than 100 hours per year.

S-3 is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE). 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 above in this evaluation.

State Regulations

Airborne Toxic Control Measure (ATCM) for Stationary Emergency Standby Diesel-Fueled CI Engines (>50 bhp)

Subsection 93115.6(a)(3)(A)(1)(a) sets forth Emission Standards for new stationary emergency standby diesel fueled compression ignition engines with maximum engine power greater than 750 bhp. S-3 is subject to and meets the requirements of this section of the ATCM as shown in the table below:

Pollutant	Manufacturer's Performance Data Sheet Emission Rate (g/bhp-hr)	ATCM Emission Standards (g/bhp-hr)
PM	0.015	0.15
NMHC + NO_x	4.28	4.8
CO	0.45	2.6

Subsection 93115(a)(3)(A)(1)(b) requires that new stationary emergency standby diesel-fueled engines (>50 bhp) be certified to the emission standards as specified in *40 CFR, Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*. The Manufacturer's Specification Sheet shows that S-3 has been certified to meet EPA Tier 2 standards and therefore, S-3 complies with this section of the ATCM.

Subsection 93115(a)(3)(A)(1)(c) limits the non-emergency operation of 50 hours/year for maintenance and testing. Permit Conditions for S-3 will limit non-emergency operation to 50 hours/year and as such S-3 will comply with this section of the ATCM.

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CONDITIONS

I recommend the following permit conditions for S-3:

COND# 100072 ----------

1. The owner or 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]
2. 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]
3. 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]
4. 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 or 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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

COND# 100073 ----------

The owner/operator shall not exceed the following limits per year per engine for reliability-related activities: 50 Hours of Diesel fuel (Diesel fuel)
[Basis: Cumulative Increase; Regulation 2-5; Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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RECOMMENDATIONS:

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 a Permit to Operate for the equipment listed below. However, the proposed source will be located within 1,000 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-3 Emergency Standby Diesel Generator Set
Make: Cummins, Model: QSX15-G9, Model Year: 2023
755 bhp, 30.3 gal/hr, 4.15 MMBtu/hr

Abated by:

A-1 Diesel Particulate Filter

_____ ___10/8/24_____
Perry Ng, Senior Air Quality Engineer Date

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Attachment A – PTE Calculations

Plant #21323 - PTE Analysis

AP-42 Factor for S-1 and S-2 (g/bhp-hr)	Emission Factor for S-3 (g/bhp-hr)	Source #	S-1	S-2	S-3	
		Hours of Operation (hrs)	120	134	150	
		Horsepower Rating (hp)	134	136	755	
						Total (tpy)
14.07	4.209	NOx	0.249	0.282	0.525	1.057
1.12	0.075	POC	0.020	0.022	0.009	0.052
3.03	0.448	CO	0.054	0.061	0.056	0.170
0.66	0.015	PM10	0.012	0.013	0.002	0.027
N/A	0.015	PM2.5	0.000	0.000	0.002	0.002
0.001515	0.004	SOx	0.000	0.000	0.000	0.001

Notes:

1. Potential to Emit (PTE) is based on the permitted hours for each engine for reliability related activites and 100 hours of operation for emergency operations.

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