

ENGINEERING EVALUATION

Facility ID No. 203399
WRTH
5555 Giant Highway, Richmond, CA 94806
Application No. 696353

Background

WRTH, is applying for an Authority to Construct/Permit to Operate for the following equipment:

S-1 Emergency Standby Diesel Generator Set
Make: Cummins Inc., Model: QSX15-G9,
Year: 2023, 755 bhp, 30.1 gal/hr, 4.14 MMBtu/hr

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 www.baaqmd.gov.

S-1 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 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.

This evaluation report will discuss compliance of the proposed project with all applicable rules and regulations.

Emissions

Table 1. Annual and Daily Emissions from EPA/CARB Certified Data for S-1.

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NO _x	4.21	168.03	119.13	0.0596
POC	0.07	2.79	1.98	0.0010
CO	0.45	17.96	12.73	0.0064
PM ₁₀ /PM _{2.5} ¹	0.10	3.99	2.83	0.0014
SO ₂	N/A ²	0.22	0.16	0.0001

Basis:

- Annual emissions: Reliability-related activity 17 hours.
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family PCEXL015.AAJ for S-1
- ¹ Conservative Assumption: All PM emissions are PM_{2.5}
- ² SO₂ emission factor from AP-42 Table 3.4-1, SO₂ (15 ppm) = 0.00809*0.0015 lb SO₂/bhp-hr
- Fuel Consumption 30.1 gallons per hour.

Plant Cumulative Increase

For emergency engines cumulative increase is calculated considering 17 hours of operation for maintenance and reliability per year for each engine pursuant to Air District Regulation 9-8-330.3.

Table 2. Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Existing Emissions Post 4/5/91 (tons/yr)	Application Emissions (tons/yr)	Cumulative Emissions (tons/yr)
NO _x	0.0000	0.0596	0.0596
POC	0.0000	0.0010	0.0010
CO	0.0000	0.0064	0.0064
PM ₁₀ /PM _{2.5}	0.0000	0.0014	0.0014
SO ₂	0.0000	0.0001	0.0001

Health Risk Assessment (HRA)

All PM₁₀ emissions are considered diesel particulate emissions. The PM₁₀ emissions from this application are summarized in Table 1. There were no other related projects permitted in the last five years. Since the diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year, a Health Risk Assessment is required. This application did not qualify for HRA streamlining.

Health Risk Assessment (HRA) Results

This analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from non-emergency operation of a standby diesel engine at this facility based on 17 hours per year of operation for maintenance and reliability. Results from this HRA indicate that the project cancer risk is estimated at 5.8 in a million, and the project chronic hazard index (HI) is estimated at 0.00013.

Receptor	Cancer Risk (chances in a million)	Receptor	Non-cancer Hazard Index
Resident	5.80	Worker	0.00013

Best Available Control Technology for Toxics (TBACT)

In accordance with the District’s Regulation 2-5-301, S-1 requires TBACT because the estimated source cancer risk is more than 1.0 in a million. BACT and TBACT determinations for compression ignition engines with a rated capacity between 50-1000 bhp are described in BAAQMD BACT/TBACT Workbook for IC Engines – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.3, Revision 8. dated 12/22/2020). The proposed engine complies with TBACT by having a certified PM emission rate that is less than or equal to 0.15 g/bhp-hour. The certified PM emission rate for this engine is 0.10 g/bhp-hour.

Project Risk Limits

Since the proposed engine, operating at 17 hours/year for reliability-related testing complies with TBACT, and the estimated project cancer risk does not exceed 10 in a million and the chronic hazard index does not exceed 1.0, this project complies with the District’s Regulation 2-5-302 project risk requirements.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂, or PM₁₀.

As shown in Table 1, emissions of NO_x exceed 10 pounds per day and thus trigger BACT requirements.

Per Section 2-2-202, BACT is defined as an emission limitation, control device, or control technique applied at a source that is the most stringent of:

- the most effective device or technique successfully utilized,
- the most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source,
- the most effective emission control limitation for the type of equipment comprising such a source that is contained in an approved implementation plan of any state, or
- the most effective control device or technique or most stringent emission limitation that is technologically feasible, taking into consideration cost-effectiveness, any ancillary health and environmental impacts, and energy requirements.

These requirements are generally categorized as either technologically feasible and cost-effective (termed “BACT 1”) or achieved-in-practice (termed “BACT 2”).

BACT 2 is either equal to or less stringent than BACT 1. Because achieved-in-practice is required regardless of cost and BACT 1 is more stringent than BACT 2, an evaluation for what has been achieved-in-practice is first conducted.

Achieved-in-Practice.

Achieved-in-practice BACT is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump 50 BHP and < 1000 BHP Output, Document #96.1.3, Revision 8, dated 12/22/2020.

For NO_x and CO, achieved-in-practice BACT has been determined to be meeting the CARB Air Toxics Control Measure (ATCM) standard for the respective pollutant at the applicable horsepower rating.

Technologically Feasible and Cost-Effective.

The following control technologies and mitigation measures have been found technically feasible for abating NO_x emissions from internal combustion engines¹:

- Engine ignition timing retard (achievable NO_x reduction 20 to 30 percent), and
 - Selective catalytic reduction (achievable NO_x reduction of 90 percent)
- Techniques for mitigating CO emissions include:
- Catalytic oxidation, and
 - Good combustion practices (e.g., preventative maintenance, change oil and filter every 500 hours of operation, inspect all hoses, and belts every 500 hours of operation, minimize idling time).

Although Regulation 2-2 does not include a definition for cost-effectiveness, Section 2-2-414 requires the Air District to publish and periodically update a BACT Workbook and that BACT will be determined using the workbook as a guidance document.

Section 1 of the BACT Workbook includes a maximum cost guideline for NO_x emissions of \$17,500 per ton of emissions reduced. The BACT Workbook does not have a maximum cost effectiveness value for CO. However, the South Coast Air Quality Management District lists a maximum cost-effectiveness value of \$801 for CO.

Using these maximum cost effectiveness values and assuming that 90 percent of the emissions in Table 1 could be abated, maximum annualized costs for NO_x controls could not exceed \$6456.6 and \$31.6 for CO controls to be deemed cost-effective.

All NO_x and CO controls are expected to exceed both maximum annualized costs. Therefore, requiring more stringent controls than meeting achieved-in-practice requirements is deemed not cost-effective.

Consequently, S-1 is required to comply with the current achieved-in-practice standards:

S-1	Pollutant	Emission Factor	BACT(2) Standard
	NO _x	4.21 g/bhp-hr	4.56 g/bhp-hr
	CO	0.45 g/bhp-hr	2.6 g/bhp-hr

* The standard is expressed as NMHC+NO_x. NO_x is estimated to be 95% of the combined standard.

Offsets

Offset must be provided for any new or modified source at a facility that will have the potential to emit more than 10 tons per year of NO_x or POC, as specified in Regulation 2-2-302; 100 tons per year or more of PM_{2.5}, PM₁₀ or sulfur dioxide, as specified in Regulation 2-2-303.

Per Air District Regulation 9-8-330.1 emergency operation for diesel engines is not limited, therefore, 100 hours is a reasonable worst-case assumption of the longest a facility may need to operate on backup power in any given year in the event of a major power outage. This presumption of 100 hours per year of emergency operation is consistent with EPA's approach to calculating the Potential to Emit (PTE) of such generators.

Table 3. Potential to Emit for FID 203399

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	PTE (TPY)	Offset Limit (TPY)	Offset Required
NO _x	0.0000	0.4099	0.4099	>10	No
POC	0.0000	0.0068	0.0068	>10	No
PM ₁₀ /PM _{2.5} 1	0.0000	0.0097	0.0097	≥100	No
SO ₂	0.0000	0.0005	0.0005	≥100	No

Since the facility's potential to emit is below the offsets trigger levels specified in Regulation 2-2, offsets are not required.

Statement of Compliance

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

Airborne Toxic Control Measure for Stationary Compression Ignition Engines
ATCM, 5/19/2011, section § 93115, title 17, CA Code of Regulations

District Rules

Regulation 6-1-303 (*Ringelmann No. 2 Limitation*)
Regulation 6-1-310 (*Total Suspended Particulate (TSP)*)

Section 6-1-310 (Total Suspended Particulate (TSP))

Concentration Limits:

6-1-310.1 No person shall emit TSP from any source in excess of 343 mg per dscm (0.15g per dscf) of exhaust gas volume.

6-1-310.2 Effective July 1, 2020, Table 6-1-310.2 emission limits shall apply to any source with a Potential to Emit TSP (as defined in Regulation 2-1-217) greater than 1,000 kg per year. No applicable source shall emit TSP at a concentration in excess of the limit indicated for the source's Exhaust Gas Rate in Table 6-1-310.2.

The engine emits 661.4 kg/yr. Therefore, only section 6-1-310.1 applies to this project.

TSP Concentration can be calculated using the formula below:

$$\frac{\left(\text{Engine PM}_{10} \text{ Hourly Emissions} \left(\frac{g}{hr} \right) \right)}{\text{Dry Engine Maximum Exhaust Flow Rate} \left(\frac{dscf}{hr} \right)} = \text{TSP Concentration} \left(\frac{g}{dscf} \right)$$

Engine Maximum Exhaust Flow Rate: 3105 acfm = 65180.6 dscf/hr

Engine Maximum Exhaust Temperature: 865 F

Water (H2O) Content (%): 12.5%

PM₁₀ abatement for Engine: N/A

Engine PM₁₀ emissions: 75.5 g/hr

TSP Concentration for Engine: 0.001 g/dscf

The TSP Concentration is below the allowable limit of 0.15 g/dscf for the only source in the project.

Regulation 9-1-301 (*Limitations on Ground Level Concentrations of SO₂*)

Regulation 9-8 (*NO_x and CO from Stationary Internal Combustion Engines*)

Section 9-8-110.5 – Limited exemption for emergency standby engines

Section 9-8-330 – Hours of operation for emergency standby engines

Section 9-8-502 – Recordkeeping

California Environmental Quality Act (CEQA)

This permit application is categorically exempt from the California Environmental Quality Act (CEQA). Based on the review of the permit application materials, including the Notice of Determination issued by the County Clerk from the Contra Costa County in July 2015, environmental information form, the project will not have any significant environmental impacts, and cumulative impacts from successive projects of the same type in the same place will not result in significant environmental impacts.

New Source Performance Standards (NSPS)

40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR 63, Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines*)

Prevention of Significant Deterioration (PSD)

This application is not part of a PSD project as defined in Regulation 2-2.

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

Prior to approving an application for an authority to construct or permit to operate, a public notice, fully describing the potential emissions, shall be prepared for the following cases:

- (i) A new or modified source located within 1000 feet of the outer boundary of a K-12 school site and which results in the increase in emissions of any substance into the ambient air which has been identified by the California Air Resources Board or the APCO as a toxic air contaminant or a hazardous air contaminant or which is on the list required to be prepared pursuant to subdivision (a) of Section 25532 or Section 44321 subsections(a) to (f) inclusive of the Health and Safety Code.
- (ii) A new or modified source located within an OBC as defined in Section 2-1-243 and for which a Health Risk Assessment is required pursuant to Section 2-5-401

The proposed source will not operate less than 1,000 feet from a K-12 school, however, the project triggered a refined HRA and it is located within an OBC. Therefore a public notice is required.

Permit Conditions

Permit Condition #100072 for S-1

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]

Permit Condition #100073 for S-1

The owner/operator shall not exceed the following limits per year per engine for reliability-related activities:

- 17 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]

End of Conditions

Recommendation

The Air 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 with a Change of Condition for the equipment listed below. However, the proposed source will be located within 1,000 feet of a K-12 school which triggers the public notification requirements of Regulation 2-1-412. After the comments are received from the public and reviewed, the Air District will make a final determination on the permit.

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

**S-1 Emergency Standby Diesel Generator Set
Make: Cummins Inc., Model: QSX15-G9,
Year: 2023, 755 bhp, 30.1 gal/hr, 4.14 MMBtu/hr
Condition No. 100072 and 100073.**

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