

DRAFT ENGINEERING EVALUATION

Facility ID 14877
County of San Mateo
500 County Center, Redwood City, CA 94063
Application No. 666827

Background

On behalf of the County of San Mateo, ProActive Consulting Group is applying for an Authority to Construct for the following equipment:

S-15 Emergency Standby Diesel Engine
Make: Cummins, Model: QSL9-G7, Model Year: 2021
464 bhp, 3.16 MMBTU/hr
Permit Condition No. 100072, 100073, and 100102
Abated by A-1, Diesel Particulate Filter

A-1 Diesel Particulate Filter (DPF)
Make: Johnson Matthey, Model: JM-CRT(+)-2-N-CS-BISO-10/10-LP

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-15 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard and will be equipped with CARB-verified Diesel Particulate Filter to reduce emissions of Diesel Particulate Matter. 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 from S-15

Pollutant	Unabated Emission Factor (g/bhp-hr)	Abated Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NO _x	2.67	2.67	65.51	136.48	0.068
POC	0.28	0.28	6.77	14.10	7.05E-03
CO	2.46	2.46	60.38	128.80	0.063
PM ₁₀ /PM _{2.5} ^{1,3}	0.142	0.021	0.52	1.09	5.43E-04
SO ₂	N/A ²	N/A ²	0.13	0.28	1.40E-04

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-15
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family MCEXL0540AAB for S-15
- ¹ Conservative Assumption: All PM emissions are PM2.5
- ² SO₂ emission factor from AP-42 Table 3.4-1, SO₂ (15 ppm) = 0.00809*0.0015 lb SO₂/bhp-hr
- ³ Per CARB Executive Order DE-08-009-11, PM emissions are reduced by 85%

Plant Cumulative Increase

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application. S-1 through S-14 at the facility are either Loss-of-Exemption (LOE) engines or registered equipment. Therefore, emissions from S-1 through S-14 are not included in the cumulative increase.

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	0.000	0.068	0.068
POC	0.000	0.007	0.007
CO	0.000	0.063	0.063
PM ₁₀ /PM _{2.5}	0.000	0.001	0.001
SO ₂	0.000	0.000	0.000

Health Risk Assessment (HRA)

HRA was required. The diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year. 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 three years.

Table 3. HRA Results for S-15 operating at 50 hours per year

Receptor	Cancer Risk	Chronic Non-Cancer Hazard Index
Resident	0.15 in a million	0.000040
Worker	0.099 in a million	0.000076

The results from the health risk screening analysis indicate that the maximum project cancer risk (resident) is estimated at 0.15 in a million, and the maximum project chronic hazard index (worker) is estimated at 0.000076.

In accordance with the District's Regulation 2, Rule 5, the HRA results deem the project is in compliance with project risk requirements as recommended, limiting reliability-related activity hours by permit condition to 50 hours per year. See HRA report.

TBACT

In accordance with the District's Regulation 2-5-301, this source does not require TBACT because the estimated source cancer risk does not exceed 1.0 in a million.

Project Risk Limits

Since the proposed engine, operating at 50 hours/year for reliability related testing, does not trigger TBACT, and the estimated project cancer risk does not exceed 10 in a million and the chronic and acute hazard indices 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, NOx, CO, SO2, or PM10.

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 8. dated 12/22/2020. For NOx, CO, POC and PM10, BACT(2) is the CARB ATCM standard for the respective pollutant at the applicable horsepower rating. For SO2, BACT(2) is using fuel with sulfur content not to exceed 0.0015%, or 15 ppm. The more restrictive BACT(1) standards are not applicable to this engine because it will be limited to operation as an emergency standby engine.

S-15 satisfies the current BACT(2) standards for the following pollutants which exceed 10 lb/day in Table 1:

Pollutant	Emission Factor	BACT(2) Standard
NOx	2.67 g/bhp-hr	2.85 g/bhp-hr
CO	2.46 g/bhp-hr	2.60 g/bhp-hr

Offsets

Per Regulation 2-2-302, offsets must be provided if, after a new or modified source is constructed, a facility that has the potential to emit (PTE) more than 10 tons/yr of POC or NOx. The PTE for emergency-use engines will include the hours allowed for test and maintenance, as well as an assumed 100 hours per year for emergencies. Because S-1 through S-14 at the facility are either LOE engines or registered equipment, none of them were considered new or modified sources and their emissions will not be included in the

PTE calculations. Based on the emission calculations in Table 4, offsets are not required for this application.

Table 4. Potential to Emit for Facility ID 14877

Pollutant	Existing Annual PTE Emissions (ton/yr)	Application Annual PTE (ton/yr)	Facility Annual PTE (ton/yr)	Offset Requirement (ton/yr)	Offset Required?
POC	0.000	0.021	0.021	10	N
NOx	0.000	0.205	0.205	10	N
PM ₁₀ /PM _{2.5}	0.000	0.002	0.002	100	N
SO ₂	0.000	0.000	0.000	100	N
CO	0.000	0.189	0.189	-	N

Since the facility permitted levels are below the offset 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 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 project is ministerial under the District Regulation 2-1-311 (Permit Handbook Chapter 2.3) and is therefore not subject to CEQA review.

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 (RICE)*)

Prevention of Significant Deterioration (PSD)

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

Public Notification (Regulation 2-1-412)

This project is not located within 1,000 feet of a K-12 school, however it is located in an overburdened community (OBC) of Redwood City and requires an HRA. Therefore the project is subject to the public notification requirements of Regulation 2-1-412. A public notice will be sent to all addresses within 1,000 feet of the facility. There will be a 30-day public comment period.

Permit Conditions

Permit Condition #100072 for S-15

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-15

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]

Permit Condition #100102 for S-15

1. The owner/operator shall abate the particulate emissions from the emergency diesel engine by the Diesel Oxidation Catalyst/Particulate Filter at all times the engine is in operation. [Basis: Toxics, "ATCM for Stationary Compression Ignition Engines" Section 93115.6(a)(3) or 93115.6(b)(3), title 17, CA Code of Regulations]

2. The owner/operator shall comply with requirements for CARB Executive Order DE-08-009-11. [Basis: CARB Executive Order DE-08-009-11, "ATCM for Stationary Compression Ignition Engines" Section 93115.13(f), title 17, CA Code of Regulations, Toxics, Sections 2700 through 2711 of title 13, CA Code of Regulations]

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/Permit to Operate for the equipment listed below. However, the proposed source will be located in an overburdened community, 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/Permit to Operate for the following source:

S-15 Emergency Standby Diesel Engine

Make: Cummins, Model: QSL9-G7, Model Year: 2021

464 bhp, 3.16 MMBTU/hr

Permit Condition No. 100072, 100073, and 100102

Abated by A-1, Diesel Particulate Filter

A-1 Diesel Particulate Filter (DPF)

Make: Johnson Matthey, Model: JM-CRT(+)-2-N-CS-BISO-10/10-LP

Prepared by: Cameron Fee, Air Quality Engineer I

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guideline

Source Category

Source:	IC Engine-Compression Ignition: Stationary Emergency, non- Agricultural, non-direct drive fire pump	Revision:	8
		Document #:	96.1.3
Class:	➤ 50 BHP and < 1000 BHP Output	Date:	12/22/2020*

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
POC (NMHC)	1. n/s ^c 2. CARB ATCM standard ^a for POC at applicable horsepower rating (see attached Table 1).	1. n/s ^c 2. Any engine certified or verified to achieve the applicable standard. ^a
NOx	1. n/s ^c 2. CARB ATCM standard ^a for NOx at applicable horsepower rating (see attached Table 1).	1. n/s ^c 2. Any engine certified or verified to achieve the applicable standard. ^a
SO₂	1. n/s ^c 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm (wt).	1. n/s ^c 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel)
CO	1. n/s ^c 2. CARB ATCM standard ^a for CO at the applicable horsepower rating (see attached Table 1).	1. n/s ^c 2. Any engine certified or verified to achieve the applicable standard. ^a
PM₁₀	1. n/s ^c 2. 0.15 g/bhp-hr 3. 0.15 g/bhp-hr	1. n/s ^c 2. Any engine or technology demonstrated, certified or verified to achieve the applicable standard. 3. Any engine or technology demonstrated, certified or verified to achieve the applicable standard.
NPOC	1. n/s 2. n/s	1. n/s 2. n/s

* Applies to open permit applications with a complete date on or after 1/1/2020.

References

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| <p>a.</p> <p>b.</p> <p>c.</p> | <p>ATCM standard (listed below): Where NMHC + NOx is listed (with no individual standards for NOx or NMHC) as the standard, the portions may be considered 95% NOx and 5% NMHC. For the purposes of determining BACT NMHC = POC. Any engine which has been certified or demonstrated to meet the current year tier standard may be considered compliant with the certified emission standard for that pollutant.</p> <p>Deleted (no longer applies).</p> <p>Cost- effectiveness analysis must be based on lesser of 50 hr/yr or non-emergency operation as limited by District health risk screen analysis.</p> |
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Table 1: BACT 2 Emission Limits based on CARB ATCM

Emissions Standards for Stationary Emergency Standby Diesel-Fueled CI Engines \geq50 BHP g/Kw-hr (g/bhp-hr)			
Maximum Engine Power	PM	NMHC+NOx	CO
37 \leq KW < 56 (50 \leq HP < 75)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
56 \leq KW < 75 (75 \leq HP < 100)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
75 \leq KW < 130 (100 \leq HP < 175)	0.20 (0.15)	4.0 (3.0)	5.0 (3.7)
130 \leq KW < 225 (175 \leq HP < 300)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
225 \leq KW < 450 (300 \leq HP < 600)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
450 \leq KW \leq 560 (600 \leq HP < 750)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
560 < KW < 750 (750 < HP < 1000)	0.20 (0.15)	6.4 (4.8)	3.5 (2.6)