

DRAFT ENGINEERING EVALUATION

Plant No. 20248
SOF-XI WFO Harrison Owner, LLC
1901 Harrison Street,
Oakland, CA 94612
Application No. 710388

BACKGROUND

SOF-XI WFO Harrison Owner, LLC intends to use this emergency engine to provide emergency power when electricity is interrupted or anticipated to be interrupted. The facility has applied for an Authority to Construct/Permit to Operate for the following equipment:

S-3 Emergency Backup Diesel Generator
Engine Make: Caterpillar, Model: C9, Family: RCPXL08.8NZS; Year: 2024
398 BHP; 2.62 MMBtu/hour (19.1 gal/hour); Tier 3

Permit Condition Nos. 100072 and 100073

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-3 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.

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

EMISSIONS

Table 1. Annual and Daily Emissions for S-3

Pollutant	Emission Factors	Max Daily Emissions	Annual Emissions	Annual Emissions
	(g/bhp-hour)	(pounds/day)	(pounds/year)	(tons/year)
NO _x	2.550	53.65	111.87	0.056
POC	0.179	3.77	7.85	0.004
CO	0.969	20.39	42.51	0.021
PM ₁₀	0.104	2.19	4.56	0.002
PM _{2.5}	0.104	2.19	4.56	0.002
*SO ₂	0.006	0.12	0.24	0.00012

Basis:

- Annual emissions: Reliability-related activity set at 50 hours.
- For the purposes of quantifying emissions in this report, PM is assumed to be equal to PM₁₀ and PM_{2.5}.
- Maximum daily emissions: 24-hour operation
- Emission factors as per engine family name RCPXL08.8NZS
- *SO₂ emission factor from AP-42 Table 3.4-1 assuming the complete conversion of sulfur in fuel to SO₂ and a maximum sulfur content of 15 ppm.

$$SO_2 \text{ Emission Factor } \left(\frac{g \text{ SO}_2}{bhp-hr} \right) = \frac{[8.09 \times 10^{-3} \times 0.0015] \frac{lbs}{bhp-hr}}{454 \frac{g}{lbs}} = 0.006 \frac{g \text{ SO}_2}{bhp-hr}$$

CUMULATIVE INCREASE

In accordance with the Air District’s Policy for Calculating Potential to Emit of Emergency Generators, Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application assuming S-3 will operate for 50 hours/year for reliability related testing.

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

Pollutant	Existing Emissions Post 4/5/91 (tons/year)	S-3 Emissions (tons/year)	Cumulative Emissions (tons/year)
NO _x	0.024	0.056	0.080
POC	0.002	0.004	0.006
CO	0.011	0.021	0.032
PM ₁₀	0.001	0.002	0.003
PM _{2.5}	0.001	0.002	0.003
SO ₂	0	0.00012	0.00012

HEALTH RISK ASSESSMENT (HRA)

In accordance with the District’s Policy for Calculating Potential to Emit for Emergency Generators, Table 3 summarizes the calculated emissions and the acute and chronic trigger levels for the Regulation 2-5 toxic air contaminants emitted by S-3, assuming they will operate for 50 hours/year for reliability related testing.

Table 3. Hourly and Annual Project TAC Emissions

Pollutant	Hourly	Annual	Acute Trigger (lbs/hr)	Chronic Trigger (lbs/yr)	Exceeds Acute Trigger?	Exceeds Chronic Trigger?
	lbs/hr	lbs/year				
Diesel PM	0.09	4.56	N/A	0.26	NO	YES

It can be seen from Table 3 that the diesel exhaust particulate matter emissions from S-3, estimated at 4.56 pounds/year, assuming the engine operates for 50 hours/year, are greater than the Regulation 2, Rule 5 chronic toxic trigger level of 0.26 pounds/year. Hence an HRA was required.

HRA Results

This analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from non-emergency operation of standby generator diesel engines at this facility. Results from this HRA indicate that the maximum project cancer risk is estimated at 0.39 in a million, and the maximum project chronic hazard index is estimated at 0.00017. See HRA Report for more details.

Table 4. Risk Screening Results

Maximally Exposed Receptor	Cancer Risk	Chronic Hazard Index
Residential	0.39 chances in a million	0.00010
Off-Site Worker	0.22 chances in a million	0.00017
Student (Envision Academy of Arts & Technology)	0.0031 chances in a million	0.0000017

TBACT

In accordance with the District’s Regulation 2-5-301, this source does not require TBACT because the estimated source risk does not exceed a cancer risk of 1.0 in a million, and/or chronic hazard index of 0.20. Since the estimated project cancer risk does not exceed 6.0 in a million and hazard indices do not exceed 1.0, this proposed project complies with the District’s Regulation 2-5-302 project risk requirements, for projects located in an Overburdened Community, as defined in Regulation 2-1-243.

BACT and TBACT determinations for compression ignition engines with a rated capacity engines greater than 50 bhp and less than 1,000 bhp are described in BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, for engines greater than 50 bhp and less than 1,000 bhp: *Document #96.1.3, Revision 8. dated 12/22/2020.* (see Attachment 1).

Project Risk Limits

Since the proposed engine, operating at 50 hours/year for reliability related testing, does not require TBACT, and the estimated project cancer risk does not exceed 6.0 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. The certified PM emission rate for this engine is 0.104 PM10 g/bhp-hour. No additional operating hour restrictions were necessary for this project.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Per Regulation 2-2-301, an Authority to Construct and/or Permit to Operate for a new source shall require BACT to control emissions of a District BACT pollutant as defined in Regulation 2-2-210 if the source will have the potential to emit that pollutant in an amount of 10.0 or more pounds on any day, as defined in Regulation 2-2-301.1. Per Table 1, S-3 triggers BACT for NOx and CO. POC and PM emissions are below the BACT trigger so S-3 will be in compliance.

BACT for S-3 is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, for engines greater than 50 bhp and less than 1,000 bhp: *Document #96.1.3, Revision 8, dated 12/22/2020*. For NOx+ NMHC, CO and PM, BACT(2) is 3.0 g/bhp-hour, 2.6 g/bhp-hour, and 0.15 g/bhp-hour, respectively.

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. S-3 satisfies these current BACT standards.

Table 5. BACT check

Pollutant	Emission Factor	BACT (2) Standard
NOx	2.55 g/bhp-hour	2.85 g/bhp-hour
CO	0.969 g/bhp-hour	2.6 g/bhp-hour

Where NMHC + NOx is considered 95% NOx and 5% NMHC. NMHC = POC.

OFFSETS

In accordance with the District's Policy for Calculating Potential to Emit (PTE) of Emergency Generators, the Potential to Emit for S-3 was estimated assuming 150 hours of operation/year as shown in Table 6.

Table 6. Potential to Emit for Plant 20248

Pollutant	Existing Annual Emissions⁺ (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions (TPY)	Offset Requirement (TPY)	Offset Required
NO _x	0.444	0.168	0.612	>10	N
POC	0.0327	0.012	0.044	>10	N
CO	0.1131	0.064	0.177	-	N
PM ₁₀	0.0324	0.007	0.039	≥100	N
PM _{2.5}	0.0324	0.007	0.039	≥100	N
SO ₂	0.0003	0.0004	0.001	≥100	N

⁺ Existing annual emissions based on PTE of engine application 27666 and 21994.

*Annual PTE emissions: Reliability-related activity of 50 hours and emergency operation of 100 hours for S-3.

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:

Regulation 6-1 (*Particulate Matter – General Requirements*)

S-3 is subject to Regulation 6, Rule 1. Opacity and visible emissions from S-3 are limited by Regulation 6-1-303.2 (engine used solely as a standby source of motive power) to Ringelmann 2.

Regulation 6-1-305 prohibits emission of particles from any operation in sufficient number to cause annoyance to any other person where the particles are large enough to be visible as individual particles at the emission point, or of such size and nature as to be visible individually as incandescent particles. S-3 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.

Regulation 6-1-310 limits emissions from any source of particulate matter in excess of 343 mg per dscm (0.15 gr. per dscf) of exhaust gas volume. S-3 is expected to comply with this requirement.

S-3's compliance with Regulation 6, Rule 1 will be confirmed by the District's Compliance & Enforcement staff during their routine inspections.

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

S-3 is subject to and is expected to comply with the applicable SO₂ limitations in Regulation 9, Rule 1 ("Inorganic Gaseous Pollutants – Sulfur Dioxide because the sulfur content of the diesel fuel is 15 ppm).

Regulation 9-8 (*Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines*)

S-3 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 ("Inorganic Gaseous Pollutants – NO_x and CO from Stationary Internal Combustion Engines"). S-3 is exempt from the requirements of Sections 9-8-301 through 305, 501, and 503 per Reg. 9-8-110.5 (Emergency Standby Engines). S-3 is subject to and expected to comply with 9-8-330.3 (Emergency Standby Engines, Hours of Operation) since non-emergency hours of operation will be limited in the permit conditions to 50 hours per year. S-3 is also subject to and expected to comply with monitoring and record keeping requirements of Regulations 9-8-502.1 and 9-8-530, which are incorporated into the proposed permit conditions.

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

The Air District is charged with enforcing the requirements of California’s Air Toxic Control Measure for Stationary Compression Ignition Engines in Title 17, California Code of Regulations, Sections 93115 *et seq.* (ATCM).

Subsection 93115.6(a)(3)(A)(1)(a) require S-3 to meet the emissions standards specified in Table 6 below. The generators will have emission rates that comply with these requirements as indicated in Table 6.

Table 6. ATCM Emission Standards for engines 300<hp >600 (g/bhp-hour)

Pollutant	ATCM Emission Standards
PM	0.15
NMHC + NO _x	3.0
CO	2.6

Subsection 93115.6(a)(3)(A)(1)(b) requires that the generator be certified to meet EPA’s Tier 2 emission standards as required under the NSPS discussed below. The engine is certified to meet EPA Tier 3 standards.

Subsection 93115.6(a)(3)(A)(1)(c) limits the non-emergency operation of the engine to 50 hours/year for maintenance and testing. Permit Condition 100072 and 100073 will limit non-emergency operation of S-3 to 50 hours/year and hence will comply with this subsection.

California Environmental Quality Act (CEQA)

Pursuant to Regulation 2-1-311, an application for a proposed new or modified source will be classified as ministerial and will accordingly be exempt from the California Environmental Quality Act (CEQA) requirement of Regulation 2-1-310 if the District’s engineering evaluation and basis for approval or denial of the permit application for the project is limited to the criteria set forth in Regulation 2-1-428 and to the specific procedures, fixed standards, and objective measurements set forth in the District’s Permit Handbook and BACT/TBACT Workbook. This project does triggers Best Available Control Technology (BACT), therefore the permit approval is not a ministerial action.

This project, however, is categorically exempt from CEQA as per CEQA Article 18 section 15301 and section 15303 since the project is a new and small installation at an existing facility involving negligible or no expansion of use. The state CEQA exemptions were written primarily for land use planners and this project does not involve additional floorspace at the facility once S-2 is installed. As required under Regulation 2-1-426.1, Appendix H has been completed and provided to the District by the applicant.

New Source Performance Standards (NSPS)

40 CFR 60, Subpart IIII (NSPS IIII), Standards of Performance for Stationary Compression Ignition Internal Combustion Engines applies to non-fire pump engines such as S-3 that are manufactured after April 1, 2006. Per §60.4205(b), S-3 is subject to the Tier 2 emissions standards in 40 CFR 1039, Appendix I for all pollutants.

Applicable emission standards found in Appendix I of 40 CFR 1039 that apply to S-3 are: NMHC + NO_x = 6.4 gram/kW-hour (4.77 gram/bhp-hour); CO = 3.5 gram/kW-hour (2.61 gram/bhp-hour); and PM = 0.20 gram/kW-hour (0.15 gram/bhp-hour).

The opacity standards in 40 CFR 89.113 it appears, apply to mobile (and not stationary) non-road CI engines. Therefore, S-3 is not subject to the above standards. Instead, S-3 is subject to the opacity standards in Regulation 6, Rule 1, which were discussed above.

Per §60.4207(b), S-3 is subject to the following diesel fuel requirements in 40 CFR 80.510(c):

- Sulfur content \leq 15 ppm
- Minimum Cetane index = 40 or maximum aromatic content of 35% by volume

Diesel fuel sold in California meets the above standards. Therefore, S-3 will comply with the diesel fuel requirements in NSPS IIII.

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

S-3 is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines because the engine will be constructed (~installed) on/after June 12, 2006. Per §63.6590(c)(1), “new” sources such as S-3 are required to meet the requirements in Subpart ZZZZ by meeting the requirements in NSPS IIII. As previously discussed, S-3 complies with NSPS IIII and therefore, will comply with MACT ZZZZ as well.

Prevention of Significant Deterioration (PSD)

This application is not part of a PSD project as defined in Regulation 2-2. Therefore, PSD does not apply to this application.

Public Notice, Schools & Over-Burdened Communities (Regulation 2-1-412)

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. Pursuant to Regulation 2-1-412, prior to approving an application for a permit to construct or modification of a source, which is located within an Overburdened Community 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 Overburdened Community 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 confirmed that the site is located in an Overburdened Community (OBC) and this engine is within ¼ mile of a school i.e., Envision Academy of Arts & Technology located at 1515 Webster Street, Oakland, CA 94612. Thus, a public notification is required.

PERMIT CONDITIONS

Permit Condition #100072 for S-3

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. I For each emergency, the nature of the emergency condition. 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-3

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]

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 an Overburdened Community and within 1000 ft 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:

- S-3 Emergency Backup Diesel Generator**
Engine Make: Caterpillar, Model: C9, Family: RCPXL08.8NZS; Year: 2024
398 BHP; 2.62 MMBtu/hour (19.1 gal/hour); Tier 3

Mark Kiffe
AQ Engineer

Date: _____

Attachment 1

BAY AREA AIR QUALITY MANAGEMENT DISTRICT Best Available Control Technology (BACT) Guideline
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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
NO _x	1. n/s ^c 2. CARB ATCM standard ^a for NO _x at applicable horsepower rating (see attached Table 1).	1. n/s ^c 2. Any engine certified or verified to achieve the applicable standard. ^a
SO ₂	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
PM ₁₀	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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|----|---|
| a. | 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. |
| b. | Deleted (no longer applies). |
| c. | Cost- effectiveness analysis must be based on lesser of 50 hr/yr or non-emergency operation as limited by District health risk screen analysis. |

Table 1: BACT 2 Emission Limits based on CARB ATCM

Emissions Standards for Stationary Emergency Standby Diesel-Fueled CI Engines ≥ 50 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 \leq 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)

