

ENGINEERING EVALUATION

Facility ID No. 203384
University of California San Francisco – Peninsula Outpatient Center
225 California Drive, Burlingame, CA 94010
Application No. 695966

Background

University of California San Francisco – Peninsula Outpatient Center is applying for an Authority to Construct/ Permit to Operate for the following equipment:

S-1 Emergency Standby Diesel Generator Set

Make: Caterpillar, Model: C13 GCABR, Model Year: 2023
609 BHP, 3.82 MMBtu/hr

Abated by

A-1 Diesel Particulate Filter

Make: Johnson Matthey, Model: JM-CRT(+)-3-N-CS-BITO-10/10-LP, 400 kw

S-2 Emergency Standby Natural Gas Generator Set (with Integral Three-Way Catalyst)

Make: Power Solutions International, Model: 53L, Model Year: 2022
1408 BHP, 12.02 MMBtu/hr

The criteria pollutants are nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC), 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 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.

S-2 is EPA certified and will burn commercially available natural gas fuel.

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

Emissions Calculations

S-1: Emergency Standby Diesel Generator Set

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

Pollutant	Abated E.F. (g/bhp-hr)	Max Daily Emissions (lb/day)	Abated Emissions (lb/yr)	Abated Emissions (TPY)
NO _x	2.70	86.92	181.09	0.091
POC	0.15	0.15	10.06	0.005
CO	2.00	64.39	134.14	0.067
PM ₁₀ /PM _{2.5}	0.018	0.58	1.21	0.001
SO ₂	N/A ²	0.00	0.00	0.000

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-1
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family PCPXL12.5NYS for S-1
- Conservative assumption: All PM₁₀ emissions are PM_{2.5}. PM₁₀/PM_{2.5} emission is abated by A-1 (Diesel Particulate Matter) with efficiency of 85%, verified by CARB (Verification Letter DE-08-009-12).
- SO₂ emission factor from AP-42 Table 3.4-1, SO₂ (15 ppm) = 0.00809*0.0015 lb SO₂/bhp-hr

S-2: Emergency Standby Natural Gas Generator Set

Emission factors for nitrogen oxides (NO_x) and carbon monoxide (CO) were the averaged values of four EPA certification tests for Part 60 Subpart JJJJ Table 1. As the average emission factor for precursor organic compounds (POC) from the four EPA certification tests was 0 g/Hp-hr, emission data from the manufacturer was chosen. Particulate matter (PM₁₀/PM_{2.5}) and sulfur dioxide (SO₂) emission factors are based on AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 3.2.4.1 Control Techniques for 4-Cycle Rich-Burn Engines and Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines.¹ All emission factors for criteria pollutants are abated with integrated emission control technologies such as engine control module, oxygen sensor, mixer, three-way catalyst, turbocharger, and charge air cooler. The engine will operate for emergencies and will be limited to a maximum of 50 hours per year for maintenance and testing.

Table 2. Emissions Summary from S-2

Pollutant	Abated Emission Factor (g/hp-hr)	Maximum Daily Emissions (lb/day)	Annual Emissions (lb/year)	Annual Emissions (TPY)
NO _x	0.28	20.47	42.64	0.021
POC	0.07	5.21	10.85	0.005
CO	0.28	20.47	42.64	0.021
PM ₁₀ /PM _{2.5}	0.037	2.74	5.71	0.003
SO ₂	0.0023	0.17	0.35	0.000

Basis:

- 1,408 bhp Max Rated Output
- Natural gas High heating value = 1050 (BTU/scf)
- 11,450 scf/hr Max fuel use rate = 12.02 MMBTU/hr
- NO_x and CO emission factors are certified by EPA for Engine Family NPSIB52.3NGP. Certification tests are: NPSIBM0057898, NPSIBM0057905, NPSIBM0057900, and NPSIBM0057906.
- POC emission factor is the post-catalyst steady state emission rate from the manufacturer's data.
- The PM₁₀/PM_{2.5} emission factor is only the filterable particulates.
- Annual Emissions are based on an annual limit (50 hours/year) for testing and maintenance.
- Max daily emissions are based on 24 hours/day since no daily limits are imposed on emergency operations.

Toxic Risk Screen Analysis

Regulation 2, Rule 5 is the Air District's new source review rule for toxic air contaminants (TACs). It establishes health risk assessment (HRA) requirements and health risk limits for proposed new

¹ SO₂ Emission Factor = 5.88 E-04 lb/MMBtu; calculations assume 100% of fuel sulfur conversion with the content in natural gas = 2000 gr/10⁶scf. PM₁₀/PM_{2.5} fuel input emission factor = 9.50E-03 lb/MMBtu (filterable); aerodynamic particle diameter =< 1 μm, for the purposes of filterable emissions PM₁₀= PM_{2.5}. These emissions are expected to be negligible but included for completeness.

or modified sources. As defined in Regulation 2-5-216, a “project” includes all new or modified sources in an application and any related applications at a facility that have been permitted within the last five years. This project does not have any related applications and includes the proposed sources, S-1 and S-2, in this application.

If a proposed project has toxic emissions that exceed an acute or chronic trigger level listed in Table 2-5-1 “Toxic Air Contaminant Trigger Levels” of this regulation, the project is required to have an HRA pursuant to Regulation 2-5-401. As explained below, this project has TAC emissions that exceed one or more Table 2-5-1 trigger levels; therefore, an HRA is required for this application.

Diesel exhaust particulate matter, or diesel PM, is a toxic air contaminant. It is used as a surrogate to represent all toxic air contaminant emissions from diesel-fueled compression-ignition internal combustion engines. All PM₁₀ emissions from S-1 are considered diesel exhaust particulate matter emissions. From Table 1, PM₁₀ and diesel PM emissions are 1.21 lbs/year, which exceeds the chronic toxic trigger level of 0.26 lbs/year from Table 2-5-1.

In addition, as shown in Table 3 below, the TAC emissions of acrolein, benzene, and formaldehyde from this project also exceed a Table 2-5-1 trigger level. The TAC emission factors for S-2 are based on either the California Air Toxics Emission Factors (CATEF) database or Compilation of Air Pollutant Emissions Factor: AP-42. CATEF emission factors are preferentially chosen over AP-42 factors. If the AP-42 emission factor is based on the detection limit from a source test, the emission factor will be equal 1/2 of the AP-42 emission factor. All TAC emission factors are conservatively assumed to have no control efficiencies.

Table 3. Toxic Air Contaminant Review for S-2

Compound	Emission Factor (lb/MMBtu)	Basis	Hourly Emission Rate (lb/hour)	Acute Trigger Level (lb/hour)	Annual Emission Rate (lb/year)	Chronic Trigger Level (lb/year)	Exceeds Acute or Chronic Trigger Level?
1,1,2,2-Tetrachloroethane	2.53E-05	AP-42	3.0E-04	None	1.5E-02	1.4E+00	No
1,1,2-Trichloroethane	1.53E-05	AP-42	1.8E-04	None	9.2E-03	5.0E+00	No
1,1-Dichloroethane	1.13E-05	AP-42	1.4E-04	None	6.8E-03	5.0E+01	No
1,2-Dichloroethane	1.13E-05	AP-42	1.4E-04	None	6.8E-03	4.0E+00	No
1,3-Butadiene	9.90E-05	CATEF	1.2E-03	2.9E-01	6.0E-02	4.8E-01	No
Acetaldehyde	8.41E-04	CATEF	1.0E-02	2.1E-01	5.1E-01	2.9E+01	No
Acrolein	5.21E-04	CATEF	6.3E-03	1.1E-03	3.1E-01	1.4E+01	Yes
Benzene	1.82E-03	CATEF	2.2E-02	1.2E-02	1.1E+00	2.9E+00	Yes
Carbon Tetrachloride	1.77E-05	AP-42	2.1E-04	8.4E-01	1.1E-02	1.9E+00	No
Chlorobenzene	1.29E-05	AP-42	1.6E-04	None	7.8E-03	3.9E+04	No
Chloroform	1.37E-05	AP-42	1.6E-04	6.6E-02	8.2E-03	1.5E+01	No
Ethylbenzene	1.10E-05	CATEF	1.3E-04	None	6.6E-03	3.3E+01	No
Ethylene Dibromide	2.13E-05	AP-42	2.6E-04	None	1.3E-02	1.1E+00	No
Formaldehyde	2.24E-03	CATEF	2.7E-02	2.4E-02	1.3E+00	1.4E+01	Yes

Compound	Emission Factor (lb/MMBtu)	Basis	Hourly Emission Rate (lb/hour)	Acute Trigger Level (lb/hour)	Annual Emission Rate (lb/year)	Chronic Trigger Level (lb/year)	Exceeds Acute or Chronic Trigger Level?
Methanol	3.06E-03	AP-42	3.7E-02	1.2E+01	1.8E+00	1.5E+05	No
Methylene Chloride	4.12E-05	AP-42	5.0E-04	6.2E+00	2.5E-02	8.2E+01	No
Naphthalene	7.29E-05	CATEF	8.8E-04	None	4.4E-02	2.4E+00	No
PAH equiv. as B(a)p	1.73E-07	CATEF	2.1E-06	None	1.0E-04	3.3E-03	No
Propylene	1.52E-02	CATEF	1.8E-01	None	9.2E+00	1.2E+05	No
Styrene	1.19E-05	AP-42	1.4E-04	9.3E+00	7.2E-03	9.0E+02	No
Toluene	1.02E-03	CATEF	1.2E-02	2.2E+00	6.1E-01	1.6E+04	No
Vinyl Chloride	7.18E-06	AP-42	8.6E-05	8.0E+01	4.3E-03	1.1E+00	No
Xylene	6.27E-04	CATEF	7.5E-03	9.7E+00	3.8E-01	2.7E+04	No

HRA Results

This analysis estimates the incremental health risk resulting from all TAC emissions from non-emergency operation of one new standby generator diesel engine (S-1) and one new standby generator natural gas engine (S-2) at this facility. Results from this HRA indicate that the maximum project cancer risk is estimated at 0.26 in a million, the project chronic hazard index (HI) is estimated at 0.0011, and the project acute HI is estimated at 0.077. The HRA results for the highest impacted receptors are summarized in Table 4. A detailed HRA report is available upon request.

Table 4. Health Risk Assessment Results

Maximally Exposed Receptor	Maximum Cancer Risk (chances in a million)	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
Residential	0.11	0.00013	--
Off-site worker	0.26	0.0011	--
Student (St. Catherine of Siena School)	0.0072	0.000015	--
Student (Lydian Academy)	0.013	0.000025	--
Point of Maximum Impact 1-hour	--	--	0.077

TBACT

In accordance with the District's Regulation 2-5-301, best available control technology for toxic emissions, or TBACT, is required for a source if the estimated source risk exceeds a cancer risk of 1.0 in a million or a chronic HI of 0.20. As shown in Table 3, the total project risk does not exceed either of these TBACT trigger levels. Therefore, the source risks cannot exceed these TBACT trigger levels, and TBACT is not required for S-1 or S-2.

Project Risk Limits

This project is subject to a project cancer risk limit of 10 in a million, because this facility is not located within an overburdened community. All projects, regardless of location, are subject to non-

cancer chronic HI of 1.0 and an acute HI of 1.0. From Table 4, maximum project risks are 0.26 in a million cancer risk, 0.0011 chronic HI, and 0.077 acute HI. Since the project risk does not exceed a cancer risk of 10 in a million and/or acute and chronic hazard indices of 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements. No additional operating hour restrictions were necessary for this project.

Best Available Control Technology (BACT)

Regulation 2, Rule 2 contains the Air District's new source review requirements for criteria pollutant emissions from new or modified sources. Pursuant to Regulation 2-2-301, Best Available Control Technology (BACT) shall apply to each new or modified source with a Potential to Emit (PTE) equal to or greater than 10 pounds per highest day of POC, NPOC, NO_x, CO, SO₂, or PM₁₀.

S-1: Emergency Standby Diesel Generator Set

As shown in Table 1, maximum daily NO_x and CO emissions from S-1 will exceed 10 pounds per day and will trigger BACT for these pollutants. Emissions of POC, PM₁₀/PM_{2.5}, and SO₂ from S-1 are not subject to BACT.

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 (see Attachment 1). BACT for S-1 cannot be any less stringent than the BACT(2)/Achieved in Practice emission standards is this BACT guideline.

For NO_x and CO, BACT(2) is the CARB ATCM standard for the respective pollutant at the applicable horsepower rating. There are no more restrictive BACT(1) standards specified in the BACT guideline for NO_x or CO emissions from diesel engines between 600-750 bhp. Further reductions in NO_x and CO emission rates would require add-on controls that are not expected to be cost-effective for this engine because it will be limited to operation as an emergency standby engine.

S-1 satisfies BACT by meeting the current BACT(2) standards for the following pollutants:

Pollutant	Emission Factor	BACT(2) Standard
NO _x	2.7 g/bhp-hr	2.85 g/bhp-hr
CO	2.0 g/bhp-hr	2.6 g/bhp-hr

* The standard is expressed as 3.0 g/bhp of NMHC+NO_x. NO_x is estimated to be 95% of the combined standard (3.0*0.95 = 2.85 g/bhp-hr)

S-2: Emergency Standby Natural Gas Generator Set

As shown in Table 2, maximum daily NO_x and CO emissions from S-2 will exceed 10 pounds per day and will trigger BACT for these pollutants. Emissions of POC, PM₁₀/PM_{2.5}, and SO₂ from S-2 are not subject to BACT.

BACT and TBACT determinations for spark ignition natural gas emergency engines with a rated capacity greater than 50 bhp are described in BAAQMD BACT/TBACT Workbook for IC Engines – Spark Ignition, Natural Gas Fired Emergency Engine, Document #96.3.4, Revision 1 dated

05/07/2003 (see Attachment 2). BACT for S-2 cannot be any less stringent than the BACT(2)/Achieved in Practice emission standards is this BACT guideline.

For NO_x and CO from emergency standby natural gas-fired engines, the BACT(2) standards may be achieved by using lean burn technology without controls or using rich-burn technology with a three-way catalyst. There are no more restrictive BACT(1) standards specified in the BACT guideline for NO_x or CO emissions from emergency standby natural gas-fired engines. Further reductions in NO_x and CO emission rates would require add-on controls that are not expected to be cost-effective for this engine because it will be limited to operation as an emergency standby engine.

S-2 is integrated with various emission control technologies such as engine control module, oxygen sensor, mixer, three-way catalyst, turbocharger, and charge air cooler. Engine control module, oxygen sensor, and mixer adjust the fuel-air mixture and optimize combustion, while integrated three-way catalyst reduces emissions of NO_x, CO, and POC. Therefore, S-2 satisfies BACT by meeting the current BACT(2) standards for the following pollutants:

Pollutant	Emission Factor	BACT(2) Standard
NO _x	0.28 g/bhp-hr	1.0 g/bhp-hr
CO	0.28 g/bhp-hr	2.75 g/bhp-hr

Plant Cumulative Increase

Table 5 summarizes the cumulative increase in criteria pollutant emissions that will result from this operation.

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

Pollutant	Existing Emissions Post 4/5/91 (ton/year)	Application Emissions (ton/year)	Cumulative Emissions (ton/year)
POC	0.000	0.010	0.010
NO _x	0.000	0.112	0.112
PM ₁₀ /PM _{2.5}	0.000	0.003	0.003
SO ₂	0.000	0.000	0.000
CO	0.000	0.088	0.088

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.

Table 5. Potential to Emit for Facility #203384

Pollutant	Existing Annual Emissions (ton/year)	Application Annual Emission (ton/year)	Facility Annual Emissions (ton/year)	Offset Requirement (ton/year)	Offsets Required?
POC	0	0.031	0.031	>10	N
NO _x	0	0.336	0.336	>10	N
PM ₁₀ /PM _{2.5}	0	0.010	0.010	≥100	N
SO ₂	0	0.001	0.001	≥100	N

CO	0	0.265	0.265	-	N
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*Annual emissions: Reliability-related activity of 50 hours and emergency operation of 100 hours each for S-1 and S-2.

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 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 includes an internal spark ignited natural gas engine and an internal combustion diesel engine that will power emergency backup generators that may be employed to mitigate unforeseen loss of power events and prevent or reduce damage to life, health, and property at an existing facility.

A Notice of Exemption was filed on July 21, 2022 by the University of California. The Categorical Exemption (Sec. 15301 for existing facilities with negligible or no expansion of use) is applicable as the existing building is approved to be used as medical office space, and no change of use is proposed. The proposed project would renovate the interior of an existing building, and no expansion of the building is proposed. None of the exceptions to the use of categorical exemptions identified under CEQA Guidelines Section 15300.2 would apply.

New Source Performance Standards (NSPS)

S-1: 40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

S-2: 40 CFR 60, Subpart JJJJ (*Stationary Spark Ignition Internal Combustion Engines*)

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

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

Public Notification (Regulation 2-1-412)

This project is not located within an overburdened community. However, there are two K-12 schools located within 1,000 feet of this facility:

1. St. Catherine of Siena Elementary School, located at Address: 1300 Bayswater Avenue, Burlingame, CA 94010
2. Lydian Academy, located at Address: 205 Park Road, Burlingame, CA 94010

It is therefore subject to the public notification requirements under the California Health & Safety Code and District Regulation 2, Rule 1, Section 412 due to the increase in the emissions from this project.

Before this project can be approved, a 30-day public comment period will be held. Notice describing the project and announcing the public comment period will be mailed to the parents of students attending the above school(s) and residential and business neighbors within 1,000 feet of the facility. The cost of preparing and distributing this notice will be paid by the applicant. All comments received will be summarized in this evaluation report.

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. 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:

- 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 #23112 for S-2

1. The owner or operator shall operate the stationary emergency standby engine, only to mitigate emergency conditions or for reliability-related activities (maintenance and testing). Operating while mitigating emergency conditions and while emission testing to show compliance with this part is unlimited. Operating for reliability related activities is limited to 50 hours per year.

(Basis: Emergency Standby Engines, Hours of Operation Regulation 9-8-330)

2. The Owner/Operator shall equip the emergency standby engine(s) with a non-resettable totalizing meter that measures hours of operation or fuel usage.

(Basis: Emergency Standby Engines, Monitoring and Recordkeeping 9-8-530)

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 (maintenance and testing).
- b. Hours of operation for emission testing.
- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage for engine.

(Basis: Emergency Standby Engines, Monitoring and Recordkeeping 9-8-530)

End of Condition

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 within 1,000 feet of two schools, 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.

S-1 Emergency Standby Diesel Generator Set

**Make: Caterpillar, Model: C13 GCABR, Model Year: 2023
609 BHP, 3.82 MMBtu/hr**

Abated by**A-1 Diesel Particulate Filter**

Make: Johnson Matthey, Model: JM-CRT(+)-3-N-CS-BITO-10/10-LP, 400 kw

S-2 Emergency Standby Natural Gas Generator Set (with Integral Three-Way Catalyst)

**Make: Power Solutions International, Model: 53L, Model Year: 2022
1408 BHP, 12.02 MMBtu/hr**

Prepared By: Leo Ly, Air Quality Engineer

May 15, 2024

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
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

- | | |
|-------------------------------|---|
| <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 ≥ 50 BHP g/Kw-hr (g/bhp-hr)			
Maximum Engine Power	PM	NMHC+NOx	CO
37 \leq KW < 56 (50 < HP < 75)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
56 \leq KW < 75 (75 < HP < 100)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
75 \leq KW < 130 (100 < 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 < HP < 600)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
450 \leq KW \leq 560 (600 < 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)



Attachment 2

Source Category

Source:	IC Engine – Spark Ignition, Natural Gas Fired Emergency Engine	Revision:	1
		Document #:	96.3.4
Class:	>= 50 HP	Date:	5/7/03

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. n/d 2. 1.0 g/bhp-hr ^a	1. n/d 2. lean burn technology ^a
NOx	1. n/d 2. 1.0 g/bhp-hr ^a	1. n/d 2. lean burn technology ^a
SO ₂	1.n/a 2.n/s	1. n/a 2. natural gas ^a
CO	1. n/d 2. 2.75 g/bhp-hr ^a	1. n/d 2. lean burn technology ^a
PM ₁₀	1. n/d 2. n/s	1. n/d 2. natural gas ^a
NPOC	1. n/a 2. n/a	1. n/a 2. n/a

References

a. 1993 BACT 2 levels for IC Engine-Spark Ignition, Nat. Gas >_ 250 HP (3/19/93) without the need for post-combustion controls (not considered to be cost effective for emergency only applications).

