

ENGINEERING EVALUATION

Facility ID No. 203341
Broadway Plaza
1501 Broadway Plaza, Redwood City, CA 94063
Application No. 689807

Background

Broadway Plaza is applying for an Authority to Construct/Permit to Operate for the following equipment:

- S-1 Emergency Standby Diesel Generator**
Make: John Deere, Model: 6068HF285K, Model Year: 2023
237 bhp, 1.60 MMBtu/hr
Permit Condition Nos. 100072 and 100073
- S-2 Emergency Standby Diesel Generator**
Make: John Deere, Model: 4045HF285H, Model Year: 2023
133 bhp, 0.95 MMBtu/hr
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 and PM_{2.5}). All these pollutants are briefly discussed on the District's website at www.baaqmd.gov.

S-1 and S-2 meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standards. The engines will burn commercially available California low-sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

Although this project will emit toxic air contaminants that have the potential to cause or contribute to adverse health impacts, the Air District has evaluated the permit application and has made a preliminary determination that the project is expected to comply with all applicable Air District, state, and federal air quality-related laws and regulations, including health protective limits for toxic air contaminant emissions.

Emissions

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-1
- Max daily emissions: 24-hour operation
- Emissions from EPA Carryover Engine Family CJDXL06.8120 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 * 454 gr/lb = 0.006 g/bhp-hr

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

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/year)	Annual Emissions (ton/year)
NO _x	2.83	35.4	73.8	0.037
POC	0.09	1.1	2.3	0.001
CO	0.90	11.2	23.4	0.012
PM ₁₀	0.09	1.1	2.3	0.001
PM _{2.5}	0.09	1.1	2.3	0.001
SO ₂	0.006	0.1	0.2	0.000

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-2
- Max daily emissions: 24-hour operation
- Emissions from EPA Carryover Engine Family CJDXL09.0114 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 * 454 gr/lb = 0.006 g/bhp-hr

Table 2. Annual and Daily Emissions from EPA/CARB Certified Data from S-2

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lbs/year)	Annual Emissions (ton/year)
NO _x	2.59	18.2	37.9	0.019
POC	0.13	0.9	2	0.001
CO	0.82	5.8	12	0.006
PM ₁₀	0.10	0.7	1.5	0.001
PM _{2.5}	0.10	0.7	1.5	0.001
SO ₂	0.006	0.0	0.1	0.000

Plant Cumulative Increase

Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result from this application.

Table 3. 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)
NO _x	0.000	0.056	0.056
POC	0.000	0.002	0.002
CO	0.000	0.018	0.018
PM ₁₀	0.000	0.002	0.002
PM _{2.5}	0.000	0.002	0.002
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 and 2. 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, an HRA is required. This application does not qualify for the HRA streamlining because the closest receptor is less than 121 feet from the source.

The project is in compliance with project risk requirements as recommended, limiting reliability-related activity hours by permit condition. See HRA report.

HRA Results

This analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from non-emergency operation of a standby generator diesel engine at this facility. Results from this HRA indicate that the maximum project cancer risk is estimated at 0.52 in a million, and the maximum project chronic hazard index is estimated at 0.00040. See HRA Report for more details.

Table 4. Risk Screening Results

Maximally Exposed Receptor	Maximum Cancer Risk	Maximum Chronic Hazard Index
Residential	0.47 chances in a million	0.00013
Off-site worker	0.52 chances in a million	0.00040

TBACT

In accordance with the District’s Regulation 2-5-301, these sources do not require TBACT because each source risk is less than 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 project complies with the District’s Regulation 2-5-302 project risk requirements for projects located within an Overburdened Community as defined in Regulation 2-1-243.

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 and CO exceed 10 pounds per day and thus trigger BACT requirements for S-1. Table 2 shows NO_x emissions exceeding 10 pounds per day for S-2.

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 NOx 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 NOx emissions from internal combustion engines¹:

- Engine ignition timing retard (achievable NOx reduction 20 to 30 percent), and
- Selective catalytic reduction (achievable NOx 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.

¹ United States Environmental Protection Agency. Control Techniques Guidelines for Alternative Control Techniques Document – NOx Emissions from Stationary Reciprocating Internal Combustion Engines. EPA-453/R-93-032. July 1993. Updated September 2000.

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 \$807 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 \$1,745 and \$26 for CO controls to be deemed cost-effective for S-1. For S-2, maximum annualized costs for NO_x controls could not exceed \$897 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:

Pollutant	Emission Factor	BACT(2) Standard
NO _x	2.83 g/bhp-hr	2.85 g/bhp-hr
CO	0.90 g/bhp-hr	2.60 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 ($3.0 \times 0.95 = 2.85$ g/bhp-hr).

S-2 is required to comply with the current achieved-in-practice standards:

Pollutant	Emission Factor	BACT(2) Standard
NO _x	2.59 g/bhp-hr	2.85 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 ($3.0 \times 0.95 = 2.85$ g/bhp-hr).

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 FID 203341

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions* (TPY)	Offset Requirement (TPY)	Offset Required
NO _x	0.000	0.168	0.168	>10	N
POC	0.000	0.006	0.006	>10	N
CO	0.000	0.053	0.053	-	N
PM ₁₀	0.000	0.006	0.006	≥100	N

PM _{2.5}	0.000	0.006	0.006	≥100	N
SO ₂	0.000	0.000	0.000	≥100	N

**Annual emissions: Reliability-related activity of 50 hours and emergency operation of 100 hours for S-1 and S-2 for a total of 150 hours.*

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 6-1-305 (*Visible Particles*)
- Regulation 6-1-310 (*Total Suspended Particulate (TSP) Concentration Limits*)

Sections 6-1-310.1 and 6-1-310.2 limit TSP emissions to 0.15 grains/dscf of exhaust gas volume or less depending on the exhaust gas rate (see Table 6-1-310.2 for the corresponding TSP concentration limit). The certified particulate emission rate from S-1 is 0.09 grams per bhp-hour, which results in an outlet grain loading of 0.014 grains per dscf. The certified particulate emission rate from S-2 is 0.10 grams per bhp-hour, which results in an outlet grain loading of 0.017 grains per dscf. Since these emission rates are less than the limit in Section 6-1-310, compliance with this section is expected.

- 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)

The reconstructed facility on which the generator will be installed and operated is a mixed-use development consisting of affordable housing market-rate housing, office space, commercial/retail space, and childcare facilities on two sites. The addition of two new engines will only be used to provide power to the facility in the event of an emergency.

The 2024 California Environmental Quality Act (CEQA) Statutes and Guidelines lists classes of projects in Section 15300, which have been determined not to have a significant effect on the environment and which shall, therefore, be exempt from the provisions of CEQA.

Section 15302 lists Class 2 projects that involve replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced. This includes the replacement of a commercial structure with a new structure of substantially the same size, purpose, and capacity. The previous existing structure was a 441,000 square feet commercial/retail building. The new building will have the same 441,000 square feet footprint that includes 420,000 square feet of office space, 11,000 square feet of commercial/retail space, and 10,000 square feet that will be used for childcare facilities. The definition of “commercial” includes but is not limited to apartments, land, retail properties, churches, theme parks, schools, marinas, self-storage facilities, government real estate, industrial properties, and office spaces. The existing building was a commercial property; the new building will be a commercial property. Therefore, the new building has the same size, purpose, and capacity as the previously existing building.

Further, based on the review of the permit application materials, including Appendix H, 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. The Air District does not expect there to be successive projects similar to this one at this same place, since these engines will satisfy the need for emergency backup power throughout the facility.

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 over 1,000 feet from the nearest K-12 school and is therefore not subject to the school public notification requirements. This project is in an Overburdened Community (OBC) and requires an HRA. Therefore, this project is subject to the public notification requirements.

A 30-day public notice will be sent to all residents and businesses within 1,000 feet of the facility.

Permit Conditions

Permit Condition #100072 for S-1 and S-2

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 and S-2

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 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 the Air 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 is within an OBC and requires an HRA which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received 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 before taking any final action on the issuance of an Authority to Construct/Permit to Operate for the following sources:

S-1 Emergency Standby Diesel Generator
Make: John Deere, Model: 6068HF285K, Model Year: 2023
237 bhp, 1.60 MMBtu/hr
Permit Condition Nos. 100072 and 100073

S-2 Emergency Standby Diesel Generator
Make: John Deere, Model: 4045HF285H, Model Year: 2023
133 bhp, 0.95 MMBtu/hr
Permit Condition Nos. 100072 and 100073

Prepared By: Bao Trinh, Air Quality Engineer

Date: 08/13/2024

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
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

- 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 < 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 \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)

