

ENGINEERING EVALUATION

Facility ID No. 202992
Berkeley Commons
600 Addison Street, Berkeley, CA 94710
Application No. 675219

Background

Berkeley Commons is applying for an Authority to Construct/Permit to Operate for the following equipment:

- S-1 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

- S-2 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

- S-3 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

- S-4 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 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). All of these pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

S-1 through S-4 meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 Off-road standard. 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.

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

Emissions

Emissions for all four engines are identical since all of them belong to the same EPA family engine and have the same model and size. Table 1 shows emissions per single engine and total annual emissions in tons per year in column six.

Table 1. Annual and Daily Emissions from EPA/CARB Certified Data from S-1, S-2, S-3 and S-4

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)	Project Annual Emissions (tons/yr)
NO _x	4.00	161.13	335.99	0.168	0.672
POC	0.07	2.82	5.88	0.003	0.012
CO	1.19	47.94	99.96	0.050	0.200
PM ₁₀ /PM _{2.5} ¹	0.07	2.82	5.88	0.003	0.012
SO ₂	N/A ²	0.22	0.46	0.000	0.001

Basis:

- Annual emissions: Reliability-related activity 50 hours for each engine. (S-1, S-2, S-3 and S-4)
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family NCPXL15.2NZS for S-1, S-2, S-3 and S-4
- 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

Plant Cumulative Increase

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application. Cumulative increase considers 50 hours of operation per year.

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	0.672	0.672
POC	0.000	0.012	0.012
CO	0.000	0.200	0.200
PM ₁₀ /PM _{2.5}	0.000	0.012	0.012
SO ₂	0.000	0.001	0.001

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, an HRA is required. This application did not qualify for HRA streamlining.

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 the HRA indicate that the project cancer risk is estimated at 2.3

in a million, and the project chronic hazard index (HI) is estimated at 0.0011. See HRA Report for more details.

TBACT

In accordance with the District’s Regulation 2-5-301, these sources do not require TBACT because the estimated source cancer risk of each engine is less 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 (see Attachment 1).

Project Risk Limits

Since each one of the proposed engines, operating at 50 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. No additional operating hour restrictions were necessary for this project.

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.

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, 50-1000 bhp, Document #96.1.3, Revision 8, dated 12/22/2020.

For NO_x, 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-1, S-2, S-3 and S-4 satisfy the current BACT(2) standards for the following pollutants which exceed 10 lb/day in Table 1:

Pollutant	Emission Factor	BACT(2) Standard
NO _x *	4.00 g/bhp-hr	4.56 g/bhp-hr
CO	1.19 g/bhp-hr	2.60 g/bhp-hr

Basis: The standard is expressed as 4.8 g/bhp of NMHC+NO_x. NO_x is estimated to be 95% of the combined standard (4.8*0.95 = 4.56 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 3. Potential to Emit for FID 202992

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions (TPY) *	Offset Requirement (TPY)	Offset Required
NO _x	0.000	2.016	2.016	>10	N
POC	0.000	0.035	0.035	>10	N
CO	0.000	0.600	0.600	-	N
PM ₁₀ /PM _{2.5} ¹	0.000	0.035	0.035	≥100	N
SO ₂	0.000	0.003	0.003	≥100	N

Basis: Annual emissions: Reliability-related activity of 50 hours and emergency operation of 100 hours for S-1, S-2, S-3, and S-4.

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 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.

School Notification (Regulation 2-1-412)

The proposed sources are not located within an Overburdened Community as defined in Regulation 2-1-243 and required a refined HRA, however, they will be located less than 1,000 feet from the K-12 school, with more than 12 students enrolled below:

Via Center School, 2126 Sixth St, Berkeley, CA 94710

Therefore, the proposed sources are subject to the public notification requirements of Regulation 2-1-412. A public notice will be prepared and sent to all addresses within 1,000 feet of the proposed sources and parents and guardians of students.

Permit Conditions

Permit Condition #100072 for S-1, S-2, S-3 and S-4

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 #100072 for S-1, S-2, S-3 and S-4

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 sources 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 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 and/or a Permit to Operate for the following equipment:

- S-1 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

**S-2 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

**S-3 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

**S-4 Emergency Standby Diesel Generator Set
Make: Caterpillar Inc., Model: 2506C-E15TAG3,
Year: 2022, 762 bhp, 4.99 MMBtu/hr
Permit Condition Nos. 100072 and 100073**

Prepared by: Isis Virrueta, AQE
May 2023

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

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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 < 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)

