DRAFT ENGINEERING EVALUATION

Facility ID No. 24869
University of Redlands
105 Seminary Road, San Anselmo, CA 94960
Application No. 30933

Background

University of Redlands is applying for an Authority to Construct/Permit to Operate for the following equipment:

S-1 Emergency On-Site Portable Diesel Generator Set
Make: Caterpillar, Model: C4.4,
Year: 2011, 157 bhp, 1.01 MMBtu/hr
Permit Condition No. 22850

The criteria pollutants are nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO_2) and particulate matter (PM_{10}). 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. The equipment will be considered On-site Portable and it will be operated within the Marin Campus of the University of Redlands.

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-1

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NOx	2.77	22.99	47.94	0.024
POC	0.10	0.83	1.73	0.001
CO	1.34	11.12	23.19	0.012
$PM_{10}/PM_{2.5}$[1]	0.15	1.24	2.60	0.001
SO_2	N/A[2]	0.05	0.09	0.000

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-1
- Max daily emissions: 24-hour operation

- Emissions from EPA Engine Family BPKXL04.4NJ1 for S-1
- [1] Conservative Assumption: All PM emissions are PM2.5
- [2] SO_2 emission factor from AP-42 Table 3.4-1, SO_2 (15 ppm) = 0.00809*0.0015 lb SO_2/bhp-hr

Plant Cumulative Increase

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application.

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)
NOx	0.000	0.024	0.024
POC	0.000	0.001	0.001
CO	0.000	0.012	0.012
$PM_{10}/PM_{2.5}$	0.000	0.001	0.001
SO_2	0.000	0.000	0.000

Health Risk Assessment (HRA)

At a maximum rate of 2.60 lbs/year, the diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year. All PM_{10} emissions are considered diesel particulate emissions. There were no other related projects permitted in the last three years.

S-1 is subject to the District's HRA streamlining policy for stationary diesel-fueled combustion engines used for backup power or fire pumps. The included HRA streamlining policy checklist shows that a refined HRA is not required for this permit application. The project is presumed to be in compliance with project risk requirements as recommended, limiting reliability-related activity hours by permit condition.

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, SO_2, or PM_{10}.

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 NOx, CO, POC and PM_{10}, BACT(2) is the CARB ATCM standard for the respective pollutant at the applicable horsepower rating. For SO_2, 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 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*	2.77 g/bhp-hr	3.325 g/bhp-hr
CO	1.34 g/bhp-hr	3.70 g/bhp-hr

* The standard is expressed as 3.0 g/bhp of NMHC+NOx. NOx is estimated to be 95% of the combined standard (3.0*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 NOx or POC, as specified in Regulation 2-2-302; 100 tons per year or more of PM2.5, PM10 or sulfur dioxide, as specified in Regulation 2-2- 303.

Table 3. Potential to Emit for FID 24869

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions (TPY) *	Offset Requirement (TPY)	Offset Required
NOx	0.000	0.072	0.072	>10	N
POC	0.000	0.003	0.003	>10	N
CO	0.000	0.035	0.035	-	N
$PM_{10}/PM_{2.5}$[1]	0.000	0.004	0.004	≥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.*

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 SO_2*)
Regulation 9-8 (*NOx 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)

This project is within 1,000 feet from the K-12 schools:
Wade Thomas Elementary School, 150 Ross Avenue, San Anselmo, CA 94960
St. Anselm School, 40 Belle Avenue, San Anselmo, CA 94960
The Branson School, 39 Fernhill Avenue, Ross, CA 94957
Therefore the project is subject to the public notification requirements.

Permit Conditions

Permit Condition #22850 for S-1

1. Operating for reliability-related activities is limited to 50 hours per year per engine. [Basis: Stationary Diesel Engine ATCM, section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

2. 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 hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited.
[Basis: Stationary Diesel Engine ATCM, section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

3. 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: Stationary Diesel Engine ATCM, section 93115, title 17, CA Code of Regulations, subsection (e)(4)(G)(1)]

4. 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: Stationary Diesel Engine ATCM, section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or Regulation 2-6-501)]

5. 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: Stationary Diesel Engine ATCM, section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

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 within 1,000 feet of at least one 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/Permit to Operate for the following source:

S-1 Emergency On-Site Portable Diesel Generator Set
Make: Caterpillar, Model: C4.4,
Year: 2011, 157 bhp, 1.01 MMBtu/hr
Permit Condition No. 22850

Prepared by: Isis Virrueta, AQE

Attachment 1

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]
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

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 ≤ KW < 56 (50 ≤ HP < 75)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
56 ≤ KW < 75 (75 ≤ HP < 100)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
75 ≤ KW < 130 (100 ≤ HP < 175)	0.20 (0.15)	4.0 (3.0)	5.0 (3.7)
130 ≤ KW < 225 (175 ≤ HP < 300)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
225 ≤ KW < 450 (300 ≤ HP < 600)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
450 ≤ KW ≤ 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)