

ENGINEERING EVALUATION

Facility ID No. 201621
Google LLC
5093 Disk Dr., San Jose, CA, 95134
Application No. 631966

Background

Google LLC is applying for an Authority to Construct/Permit to Operate for the following equipment:

S-2 Emergency Standby Diesel Generator Set
Make: Cummins Inc., Model: QST30-G5-NR2,
Year: 2021, 1490 bhp, 9.85 MMBtu/hr
Permit Condition Nos. 100072, 100073 and 27503

A-1 Selective Catalytic Reduction: Cummins Inc., CA451-T4i

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-2 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 Off-road standard. The engine will be abated by a selective catalytic reduction. 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 from EPA/CARB Certified Data from S-2

Pollutant	Emission Factor (g/BHP-hr)	Abated Emission Factor (g/BHP-hr)	Maximum Daily Emissions (lb/day)	Emission (lb/yr)	Emission (TPY)
NO _x	4.23	0.50	39.38	68.98	0.034
POC	0.18	0.14	11.03	19.32	0.010
CO	0.52	0.52	40.96	71.74	0.036
¹ PM ₁₀	0.10	0.10	7.88	13.80	0.007
² SO ₂	N/A ²	N/A	0.43	0.76	0.000

Basis:

- Annual emissions: Reliability-related activity 42 hours for S-2
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family MCEXL030.AAD for S-2
- Abated emissions are from the SCR manufacturer
- ¹ Conservative Assumption: All PM emissions are PM2.5
- ² SO₂ emission factor from AP-42 Table 3.4-1, SO₂ (15 ppm) = 0.00809*0.0015 lb SO₂/bhp-hr

Ammonia Slip

The proposed engines will have a SCR installed (A-1) which will control ammonia emissions via catalytic reaction. However, there will be a small amount that will slip by the SCR unreacted. Below are estimated Ammonia emissions for this project.

Table 2. Emissions from Ammonia Slip

Source#	Ammonia Slip ppm @ 15% O ₂	Ammonia Slip ppm @ 0% O ₂	Actual Temp. (°F)	Actual Exhaust Flowrate (acfm)	Dry Standard Exhaust Flowrate (dscfm)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/year)
S-2	10	35	890	7,540	1,350.32	0.127	5.33

Basis:

- Annual emissions: Reliability-related activity 42 hours for S-2.
- It is assumed that the exhaust water content is 12.5% by weight.
- It is assumed that the exhaust is at standard pressure.
- Volumetric concentrations were corrected to 0% O₂ from 15% O₂.
- The exhaust flowrates were corrected to 0% O₂ from 10% O₂.

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 (tons/yr)	Application Emissions (tons/yr)	Cumulative Emissions (tons/yr)
NO _x	0.051	0.034	0.085
POC	0.002	0.010	0.012
CO	0.013	0.036	0.049
PM ₁₀ /PM _{2.5}	0.013	0.007	0.020
SO ₂	0.000	0.000	0.000

Health Risk Assessment (HRA)

All PM₁₀ emissions are considered diesel particulate emissions. The PM₁₀ emissions from this application are summarized in Table 1. There is one related project permitted in the last three 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 because the project is greater than 600 bhp and 9.9 lb/year of PM emissions. In addition, ammonia is a toxic air contaminant and was included in the review.

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 project cancer risk is estimated at 2.2 in a million, the project chronic hazard index is estimated at 0.00062, and the project acute hazard index is estimated at 0.0026. See HRA Report for more details.

TBACT

In accordance with the District's Regulation 2-5-301, this source required Best Available Control Technology for Toxic Air Contaminants (TBACT) because the estimated source cancer risk was greater than 1.0 in a million at a 50 hr/yr reliability operational limit. However, the facility has accepted an annual limit of 42 hr/yr for reliability operations. As a result, the source cancer risk is less than 1.0 in a million. Therefore, TBACT does not apply. BACT and TBACT determinations for compression ignition engines with a rated capacity greater than 1,000 bhp are described in BAAQMD BACT/TBACT Workbook for IC Engines – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.5, Revision 0, dated 12/22/2020 (see Attachment 1).

Project Risk Limits

Since S-1 operating 50 hours/year, S-2 operating 42 hours/year, comply with TBACT, and the estimated project cancer risk does not exceed 10 in a million and the chronic and acute hazard indices do not exceed 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements.

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, ≥1,000 BHP, Document #96.1.5, Revision 0, 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-2 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	0.50 g/bhp-hr	0.50 g/bhp-hr
POC	0.14 g/bhp-hr	0.14 g/bhp-hr
CO	0.52 g/bhp-hr	2.60 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 5. Potential to Emit for FID 201621

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions (TPY) *	Offset Requirement (TPY)	Offset Required
NOx	0.154	0.117	0.271	>10	N
POC	0.006	0.033	0.039	>10	N
CO	0.040	0.121	0.161	-	N
PM ₁₀ /PM _{2.5} ¹	0.040	0.023	0.063	≥100	N
SO ₂	0.000	0.001	0.001	≥100	N

**Annual emissions: Reliability-related activity of 50 hours for S-1, 42 hours for S-2 and emergency operation of 100 hours for 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 (*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, George Mayne Elementary School located at 5030 N 1st St, Alviso, CA 95002, therefore this application is subject to the public notification requirements.

Permit Conditions

Permit Condition #100072 for 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.
- 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 #100073 for S-2

The owner/operator shall not exceed the following limits per year per engine for reliability-related activities:

- 42 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 # 27503 for S-2

1. The owner/operator shall not operate unless the following emergency diesel engine generator sets, are abated by the specified selective catalytic reduction (SCR).

S2 abated by SCR, A1

[Basis: BACT, Cumulative Increase, and Title 17 CCR Section 93115]

2. The owner/operator shall operate the Selective Catalytic Reductions, A1, in accordance with manufacturer specifications to meet the emission limits of Part 3 of this condition. [Basis: BACT, Cumulative Increase, Regulation 2-1-403, and Title 17 CCR Section 93115]
3. The owner/operator shall not exceed the following emission limitations:
 - a. NOx: 0.5 gram/horsepower-hour
 - b. POC: 0.14 gram/horsepower-hour[Basis: BACT]
4. The owner/operator shall ensure that the ammonia (NH₃) slip emissions from the Selective Catalytic Reductions, A1, do not exceed 10 ppmv, dry @ 15% O₂. If deemed necessary, the Air District may require source testing to determine compliance with the emission limit of this part. [Basis: Toxics]
5. Within 60 days from startup, and within a frequency of no less than once every three (3) years after each subsequent source test thereafter, the owner/operator shall conduct ISO 8178 D2 5-Mode Cycle Testing and/or District approved source test methods to determine compliance with the limits in Part 3 of this condition. The owner/operator shall submit the source test results to the District's Source Test Section no later than 60 days after the source test. [Basis: Regulation 2-1-403]
6. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols and projected test dates at least 7 days prior to testing. [Basis: Regulation 2-1-403]
7. Source test apparatuses, sampling ports, and platforms must meet requirements specified in Volume IV of the District's Manual of Procedures. [Basis: MOP Volume IV and Regulation 2-1-403]
8. The owner/operator shall maintain the following records 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 District staff upon request.
 - a. Source Test Notification
 - b. Source Test Report[Basis: Regulation 2-1-403]

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-2 Emergency Standby Diesel Generator Set
Make: Cummins Inc., Model: QST30-G5-NR2,
Year: 2021, 1490 bhp, 9.85 MMBtu/hr
Permit Condition Nos. 100072, 100073 and 27503**

- A1 Selective Catalytic Reduction: Cummins Inc., CA451-T4i**

Prepared by: Isis Virrueta, Air Quality Technician I

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:	0
		Document #:	96.1.5
Class:	≥ 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 ^a 2. 0.14 g/bhp-hr ^b	1. n/s ^a 2. Any engine certified or verified to achieve the applicable standard
NO_x	1. n/s ^a 2. 0.5 g/bhp-hr ^b	1. n/s ^a 2. Any engine certified or verified to achieve the applicable standard
SO₂	1. n/s ^a 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm (wt)	1. n/s ^a 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel)
CO	1. n/s ^a 2. 2.6 g/bhp-hr ^b	1. n/s ^a 2. Any engine certified or verified to achieve the applicable standard
PM₁₀	1. n/s ^a 2. 0.02 g/bhp-hr ^b 3. 0.02 g/bhp-hr	1. n/s ^a 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. Cost effectiveness analysis must be based on lesser of 50 hr/yr or non-emergency operation as limited by District health risk screen analysis.
- b.
 1. BAAQMD Application 27020 San Jose/Santa Clara Water Pollution Control
 2. BAAQMD Application 25115 Sutro Tower, Inc.
 3. Microsoft MWH Data Center, Quincy, Washington
Tier 4-Compliant (Tier 2 engines abated by catalyzed diesel particulate filter and selective catalytic reduction)
<https://ecology.wa.gov/Air-Climate/Air-quality/Data-Centers>
 4. Comments by the California Air Resources Board on the California Energy Commission's Proposed Decision for the Proposed Sequoia Data Center project (19-SPPE-03), Attachment 2: Tier 4 Diesel Emergency Generator Engines