

ENGINEERING EVALUATION

Plant No. 203115
BGOGC 2197/2225 Bayshore Owner LLC
2225 East Bayshore Road, Palo Alto, CA 94303
Application No. 704575

BACKGROUND

BGOGC 2197/2225 Bayshore Owner LLC has applied for an Authority to Construct/Permit to Operate for the following equipment:

S-2 Emergency Standby Diesel Generator
Engine Make: Iveco, Model: F4HE9685A*J, Engine Family: RFPXL06.7DGS,
Carryover Engine Family: JFPXL06.7DGS
Model Year: 2024, 279 BHP, 211 kW, 1.870 MMBtu/hour

S-2 is a Tier 3 engine whose diesel exhaust particulate matter (DEPM) emissions will not be abated. 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 will emit the following pollutants:

Oxides of nitrogen (NOx), Precursor organic compounds (POC), Carbon monoxide (CO), Particulate matter with aerodynamic diameter smaller than or equal to a nominal 10 microns (PM10), Particulate matter with aerodynamic diameter smaller than or equal to a nominal 2.5 microns (PM2.5), and Sulfur dioxide (SO2).

EMISSIONS

Table 1. Annual and Daily Unabated Emissions from S-2

Pollutant	Emission Factor ⁽¹⁾	Max Daily Emissions	Abatement	Annual Emissions	Annual Emissions
	(g/bhp-hour)	(pounds/day)		(pounds/year)	(tons/year)
NOx	2.62	38.66	-	80.54	0.040
POC	0.14	2.03	-	4.24	0.002
CO	0.82	12.10	-	25.20	0.013
PM ₁₀	0.06	0.88	-	1.83	0.001
PM _{2.5}	N/A ⁽²⁾	0.88	-	1.83	0.001
SO ₂	N/A ⁽³⁾	0.071	-	0.148	0.000

Basis:

- Annual emissions: Reliability-related activity set at 50 hours for S-2
- Maximum daily emissions: 24-hour operation
- ¹Emission factors for EPA engine family RFPXL06.7DGS were not available so they were calculated from the EPA certified Carryover family JFPXL06.7DGS
- ²PM_{2.5} = PM₁₀
- ³SO₂ emission factor calculated based on the following:
 - Complete conversion of sulfur in fuel to SO₂ and a maximum sulfur content of 15 ppm.
 - Density of Ultra Low Sulfur Diesel Fuel = 7.31 lb/gal

- Fuel Consumption Rate = 13.5 gal/hr
- MW(SO₂)=64.066 g/mole, MW(S)=32.065 g/mol
- $E_{SO_2} = \left(\frac{15 \text{ lb S}}{10E+06 \text{ lb fuel}}\right) \left(7.31 \frac{\text{lb fuel}}{\text{gal fuel}}\right) \left(13.5 \frac{\text{gal fuel}}{\text{hr}}\right) \left(\frac{64.066 \text{ g/mol}}{32.065 \text{ g/mol}}\right) \left(50 \frac{\text{hr}}{\text{yr}}\right)$
 $E_{SO_2} = 0.071 \text{ lb/day} = 0.148 \text{ lb/yr} = 0.000 \text{ ton/yr}$

CUMULATIVE INCREASE

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application assuming S-2 will operate for 50 hours/year for reliability related testing.

Table 2. Cumulative Emissions Increase, Post 4/5/91

Pollutant	Pre-application Cumulative Emissions Post 4/5/91 (tons/year)	S-2 Emissions (tons/year)	Post-application Cumulative Emissions (tons/year)
NO _x	0.168	0.040	0.208
POC	0.004	0.002	0.006
CO	0.006	0.013	0.019
PM ₁₀	0.000	0.001	0.001
PM _{2.5}	0.000	0.001	0.001
SO ₂	0.000	0.000	0.000

HEALTH RISK ASSESSMENT (HRA)

The proposed engine will emit diesel exhaust particulate matter, which is a toxic air contaminant (TAC) listed in Table 2-5-1 of Air District Regulation 2, Rule 5. Air District Regulation 2, Rule 5 specifies that diesel exhaust particulate matter will be used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines, as this is the principal driver of the health risk associated with this type of equipment. All PM₁₀ emissions are considered diesel particulate emissions. The PM₁₀ emissions from this application are summarized in Table 1. Because the diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year, a refined HRA is required. This application did not qualify for HRA streamlining because receptors are located less than 300 feet from the proposed location of the engine.

HRA Results

This analysis estimates the incremental health risk resulting from TAC emissions from non-emergency operation of one new standby diesel engine (S-2) at this facility. Another diesel engine (S-1; Application # 678704) was permitted at this facility within the past five years. Per Regulation 2-5-216, S-1's emissions were also included as part of this project. Results from this HRA indicate that the maximum project cancer risk is estimated at 0.21 in a million, and the maximum project chronic hazard index is estimated at 0.00016. Since the estimated project cancer risk does not exceed 6.0 in a million and project chronic hazard index does not exceed 1.0, this project complies with the Air District's Regulation 2-5-302 project risk requirements for projects located in an Overburdened Community, as defined in Air District Regulation 2, Rule 1, Section 243. See HRA Report dated July 19, 2024, for more details.

Table 3: Risk Assessment Results

Maximally Exposed Receptor	Maximum Cancer Risk	Maximum Chronic Hazard Index
Resident	0.16 chances in a million	0.000043
Student	0.098 chances in a million	0.000053
Off-site Worker	0.21 chances in a million	0.00016

TBACT

In accordance with Air District Regulation 2, Rule 5, Section 301, S-2 does not require TBACT because the estimated source cancer risk is less than or equal to 1.0 in a million and/or the chronic hazard index is less than or equal to 0.20.

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, SO₂, PM₁₀, or PM_{2.5}.

As seen in Table 1, NOx and CO emissions from S-2 exceed 10 pounds per day. Therefore, S-2 triggers BACT for NOx and CO emissions.

Per Regulation 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 applicable for the source category
 - the most effective emission control limitation for the source category that is contained in an approved State Implementation Plan, 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 requirement.
- These requirements are generally categorized as either technologically feasible and cost effective (BACT 1) or achieved-in-practice (BACT 2)

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 conducted first.

Achieved-in-Practice

Achieved-in-practice BACT for S-2 is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, for engines greater than or equal to 50 bhp and less than 1,000 bhp: Document #96.1.3, Revision 8, dated 12/22/2020.

For NOx and CO, achieved-in-practice BACT is EPA Tier 3 standards at the applicable horsepower range.

Technologically Feasible and Cost-Effective

The following control technologies and mitigation measures have been found to be technologically 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, Regulation 2-2-414 requires the District to publish and periodically update a BACT Workbook and that BACT will be determined using the workbook as a guidance document.

Section 1 of the BACT Workbook includes a maximum cost guideline for NOx emissions of \$17,500. 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 \$801 for CO.

Using the maximum cost-effectiveness value and assuming that 90 percent of the emissions in Table 1 could be abated for S-2, the maximum annualized costs for NOx controls must not exceed \$634² per ton of NOx emissions reduced and the maximum annualized costs for CO controls must not exceed \$9³ per ton of CO emissions reduced in order to be deemed cost-effective. NOx and CO controls are expected to exceed the maximized annualized costs estimated above. Therefore, requiring more stringent controls than achieved-in-practice is deemed to not be cost-effective.

As discussed above, NOx and CO controls will not be cost-effective. However and as proposed, S-2 will comply with the current achieved-in-practice standards (EPA Tier 3 final engine standards) listed in Table 4 below.

Table 4: BACT (2) Emission Limits based on CARB ATCM

Pollutant	Emission Factor	BACT (2) Standard
NOx	2.62 g/bhp-hr	2.85 g/bhp-hr
CO	0.82 g/bhp-hr	2.6 g/bhp-hr

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.

² \$634 = 17,500 x (0.040 x 0.90)

³ \$9 = 801 x (0.013 x 0.90)

OFFSETS

In accordance with the District's Policy for Calculating Potential to Emit (PTE) of Emergency Generators, the Potential to Emit for S-2 was estimated assuming 150 hours of operation/year as shown in Table 5.

Table 5. Offsets

Pollutant	Pre-Application PTE (tons/year)	S-2's PTE (tons/year)	Facility PTE (tons/year)	Offset Triggers	Offsets Required (Yes/No)
NOx	0.504	0.121	0.625	>10	No
POC	0.013	0.006	0.018	>10	No
CO	0.018	0.038	0.056	N/A	N/A
PM ₁₀	0.001	0.003	0.004	>100	No
PM _{2.5}	0.001	0.003	0.004	>100	No
SO ₂	0.001	0.000	0.001	>100	No

It can be seen from Table 5 that the facility's PTE after S-2 is permitted is below the Air District Regulation 2, Rule 2 offset trigger levels. Therefore, offsets are not required.

STATEMENT OF COMPLIANCE

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

Regulation 6-1 (Particulate Matter – General Requirements)

S-2 is subject to Regulation 6, Rule 1. Opacity and visible emissions from S-2 is limited by Regulation 6-1-303.2 (engine used solely as a standby source of motive power) to an opacity of No. 2 on the Ringelmann chart.

Regulation 6-1-305 prohibits emission of particles from any operation in sufficient number to cause annoyance to any other person where the particles are large enough to be visible as individual particles at the emission point, or of such size and nature as to be visible individually as incandescent particles. S-2 is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with Regulation 6-1-305.

S-2's compliance with Regulation 6, Rule 1 will be confirmed by the District's Compliance & Enforcement staff during their routine inspections.

Regulation 9-1-301 (Limitations on Ground Level Concentrations)

S-2 is subject to and is expected to comply with the applicable SO₂ limitations in Regulation 9, Rule 1 ("Inorganic Gaseous Pollutants – Sulfur Dioxide"). Because SO₂ emissions from S-2 are negligible (0.15 pounds per year), it is unlikely the APCO will require BGOGC 2197/2225 Bayshore Owner LLC to conduct ground level monitoring.

Regulation 9-1-304 – Fuel Burning (Liquid and Solid Fuels)

Section 9-1-304 states “A person shall not burn any liquid fuel having a sulfur content in excess of 0.5% by weight”. The California Air Resources Board (CARB) requires all diesel engines to burn Ultra Low Sulfur Diesel with a sulfur content of 15 ppm by weight or less (\leq 0.0015% by wt.), which is less than 0.5% by wt. requirement in Section 9-1-304. The proposed permit conditions will require S-2 to exclusively burn CARB diesel and S-2 will comply with 9-1-304.

Regulation 9-8 (Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines)

S-2 will be operated as an emergency standby engine and is therefore not subject to the emission rate limits in Regulation 9, Rule 8 ("Inorganic Gaseous Pollutants – NO_x and CO from Stationary Internal Combustion Engines"). S-2 is exempt from the requirements of Sections 9-8-301 through 305, 501, and 503 per Reg. 9-8-110.5 (Emergency Standby Engines). S-2 is subject to and is expected to comply with 9-8-330.3 (Emergency Standby Engines, Hours of Operation) since non-emergency hours of operation will be limited in the permit conditions to 50 hours per year. S-2 is also subject to and is expected to comply with monitoring and record keeping requirements of Regulations 9-8-502.1 and 9-8-530, which are incorporated into the proposed permit conditions.

Airborne Toxic Control Measure (ATCM) for Emergency Standby Diesel-Fueled CI Engines (>50 bhp)

The Air District is charged with enforcing the requirements of California’s Air Toxic Control Measure for Stationary Compression Ignition Engines in Title 17, California Code of Regulations, Sections 93115 *et seq.* (ATCM)

Subsection 93115.6(a)(3)(A)(1)(a) requires S-2 to meet the emissions standards specified in Table 6 below. (These emissions standards expressed as g/bhp-hour are essentially the same as EPA’s Tier 3 standards, which are expressed as g/kW-hour.⁴) S-2 will have emission rates that comply with these requirements as shown in Table 6.

Table 6. Engine Emission Rates vs. ATCM Emission Standards (g/bhp-hour)

Pollutant	Emissions Rate S-2	ATCM Emission Standards
PM	0.06	0.15
NMHC + NO _x (NMHC: Non-methane hydrocarbon)	2.76	3.0
CO	0.82	2.6

Subsection 93115.6(a)(3)(A)(1)(b) requires that the generator be certified to meet EPA’s Tier 3 emission standards as required under the NSPS discussed below. The generator meets EPA Tier 3 standards.

⁴ The conversion factor for converting engine output in horsepower to kilowatts is 1.341 bhp/kw. Applying this conversion factor to the ATCM standards shows that they are essentially identical to EPA’s Tier 3 standards.

Subsection 93115.6(a)(3)(A)(1)(c) limits the non-emergency operation of the engine to 50 hours/year for maintenance and testing. Permit Condition 100073 will limit non-emergency operation of S-2 to 50 hours/year and hence will comply with this subsection.

California Environmental Quality Act (CEQA)

This project is for an emergency standby diesel engine, S-2, that may operate during testing and maintenance and without restrictions during emergency-use events. S-2 may be employed to prevent or reduce damage to life, health, and property at an existing facility.

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 15301 lists Class 1 projects that involve negligible or no expansion of use. This includes additions to existing structures provided that the addition will not result in an increase of more than 50 percent of the floor area of the structures before the addition, or 2,500 square feet, whichever is less, as listed in Section 15301(e)(1). The floor area in this situation is the facility which equates to approximately 170,000 square feet. 50% of this would be 85,000 square feet.

The proposed enclosure for the generator is going to be approximately 200 feet long and 125 feet wide for a total of 25,000 square feet. Since the combined footprint of the emergency standby diesel generator is not expected to exceed 50 percent of the floor area of the existing structure, or 2,500 square feet, this project is categorically exempt from CEQA under CEQA Guidelines Section 15300 to 15333, specifically 15301. Additionally, this project is categorically exempt from CEQA because the project has no potential for causing a significant adverse environmental impact.

Additionally, the applicant has completed Form Appendix H (Environmental Information Form) in accordance with Regulation 2-1-426 and it has been reviewed by the Air District, as required for categorical CEQA exemptions. In making the determination that this application is categorically exempt: 1) the Air District reviewed the CEQA-related information from the applicant indicating that there is no potential for a significant adverse environmental impact from the project; 2) a formal health risk assessment was approved by the Air District; and 3) the Air District determined there are no unusual circumstances, or that the cumulative impacts from successive projects of the same type in the same place do not result in significant adverse environmental impacts.

New Source Performance Standards (NSPS)

40 CFR 60, Subpart IIII (NSPS IIII), Standards of Performance for Stationary Compression Ignition Internal Combustion Engines applies to non-fire pump engines such as S-2 that are manufactured after April 1, 2006. Per §60.4205(b), S-2 is subject to the Tier 2 or Tier 3 emissions standards in 40 CFR 1039, Appendix I for all pollutants.

Applicable emission Tier 3 standards found in Appendix I of 40 CFR 1039 that apply to S-2 are: NMHC + NO_x = 4.0 gram/kW-hour (3.0 gram/bhp-hour); CO = 3.5 gram/kW-hour (2.6 gram/bhp-hour); and PM = 0.20 gram/kW-hour (0.15 gram/bhp-hour).

Emission rates for the above pollutants summarized in Tables 1 and 6 in this evaluation shows that S-2 complies with the emission standards in NSPS IIII.

40 CFR 89.113 (a) sets forth the following smoke emission standards for non-road CI engines:

- 20% during the acceleration mode;
- 15% during the lugging mode; and
- 50% during the peaks in either the acceleration or lugging modes.

The opacity standards in 40 CFR 89.113 it appears, apply to mobile (and not stationary) non-road CI engines. Therefore, S-2 is not subject to the above standards. Instead, S-2 is subject to the opacity standards in Regulation 6, Rule 1, which was discussed above.

Per §60.4207(b), S-2 is subject to the following diesel fuel requirements in 40 CFR 80.510(c):

- Sulfur content \leq 15 ppm
- Minimum Cetane index = 40 or maximum aromatic content of 35% by volume

Diesel fuel sold in California meets the above standards. Therefore, S-2 complies with the diesel fuel requirements in NSPS IIII.

National Emissions Standards for Hazardous Air Pollutants (*NESHAP*)

S-2 is subject to 40 CFR 63, Subpart ZZZZ (MACT ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines because the engine will be constructed (~installed) on/after June 12, 2006. Per §63.6590(c)(1), "new" sources such as S-2 are required to meet the requirements in MACT ZZZZ by meeting the requirements in NSPS IIII. As previously discussed, S-2 will comply with NSPS IIII and therefore, will comply with MACT ZZZZ as well.

Prevention of Significant Deterioration (*PSD*)

PSD does not apply to this application.

School Notification (*Regulation 2-1-412*)

The proposed installation and subsequent operation of S-2 will result in an increase in diesel exhaust particulate matter, a toxic air contaminant identified in Regulation Table 2-5-1 of Regulation 2, Rule 5. Because S-2 is located within 1,000 feet of the outer boundary of two K-12 school sites: Fusion Academy Palo Alto located at 2191 E Bayshore Road Suite 100, Palo Alto, CA 94303 and Silicon Valley International School located at 151 Laura Ln., Palo Alto, CA 94303, it is subject to the public notification requirements of Regulation 2-1-412.

Overburdened Communities Notification (*Regulation 2-1-412*)

S-2 is located within an Overburdened Community as defined in Regulation 2-1-243 and a Health Risk Assessment for S-2 is required pursuant to Regulation 2, Rule 5, Section 401. Therefore, S-2 is subject to the public notification requirements of Regulation 2-1-412.

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:

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 #100384 for S-2

The owner/operator shall fire S-2 exclusively with CARB diesel fuel having a sulfur content no more than 15 parts per million by weight. [Basis: Cumulative Increase, § 93115.4]

End of Conditions

DRAFT

RECOMMENDATION

The Air District has evaluated the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable District, state, and federal air quality-related regulations, including the health risks resulting from toxic air contaminant emissions. The preliminary recommendation is to issue a permit for this project. After considering all comments received, the Air District will make a final determination.

I recommend that the Air District initiate the public comment period and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following source:

- S-2 Emergency Standby Diesel Generator**
Engine Make: Iveco, Model: F4HE9685A*J, Engine Family: RFPXL06.7DGS,
Carryover Engine Family: JFPXL06.7DGS
Model Year: 2024, 279 BHP, 211 kW, 1.870 MMBtu/hour

Chris Thompson
AQ Engineer I

Date: _____

