

## DRAFT- ENGINEERING EVALUATION

Facility ID No. 202864  
IQHQ – SPUR PH 1  
580 Dubuque Avenue, South San Francisco, CA 94080  
Application No. 669835

### Background

IQHQ – SPUR PH 1 is applying for an Authority to Construct/Permit to Operate for the following equipment:

**S-1 Emergency Standby Diesel Generator Set**  
**Make: Rolls-Royce Solutions America Inc., Model: 20V4000G74S,**  
**Year: 2022, 4036 bhp, 25.48 MMBtu/hr, abated by A-1 and A-2**  
**Permit Condition Nos. 100072, 100073 and 27785**

**A-1 Selective Catalytic Reduction: EcoCUBE SCR, 5 Series, 9550-H3D28**

**A-2 Diesel Particulate Filter: EcoCUBE DPF, 5 Series, 9550-H3D28**

The criteria pollutants are nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO<sub>2</sub>) and particulate matter (PM<sub>10</sub>). All of these pollutants are briefly discussed on the District's web site at [www.baaqmd.gov](http://www.baaqmd.gov).

S-1 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 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.

S-1 NO<sub>x</sub> and POC emissions will be abated by a Selective Catalytic Reduction (SCR) with an 87% of efficiency by weight. PM emissions will be abated by a Diesel Particulate Filter (DPF) with an abatement efficiency of 70% by weight. The level 3 EPA certification for the DPF is still pending to obtain.

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)	Abated Emission Factor (g/BHP-hr)	Maximum Daily Emissions (lb/day)	Emission (lb/yr)	Emission (TPY)
NO <sub>x</sub>	3.88	0.50	106.68	222.45	0.111

Pollutant	Emission Factor (g/BHP-hr)	Abated Emission Factor (g/BHP-hr)	Maximum Daily Emissions (lb/day)	Emission (lb/yr)	Emission (TPY)
POC	0.88	0.14	29.87	62.29	0.031
CO	1.34	--	285.90	596.16	0.298
<sup>1</sup> PM <sub>10/2.5</sub>	0.09	0.02	4.27	8.90	0.004
<sup>2</sup> SO <sub>2</sub>	N/A <sup>2</sup>	--	1.17	2.44	0.001

**Basis:**

- Annual emissions: Reliability-related activity 50 hours for S-1
- Max daily emissions: 24-hour operation
- Emissions are from EPA Engine Family NMDDL95.4GTZ for S-1.
- NO<sub>x</sub> emissions are abated by A-1 Selective Catalytic Reduction with an efficiency of 87% by weight.
- <sup>1</sup> Conservative Assumption: All PM emissions are PM<sub>2.5</sub>
- <sup>2</sup> SO<sub>2</sub> emission factor from AP-42 Table 3.4-1, SO<sub>2</sub> (15 ppm) = 0.00809\*0.0015 lb SO<sub>2</sub>/bhp-hr
- <sup>3</sup> Abatement efficiency for PM is assumed to be 70% for an uncertified Diesel Particulate Filter.

**Ammonia Slip**

Ammonia Slip The proposed engines will have a SCR installed (A-3) which will use ammonia to control NO<sub>x</sub> emissions via catalytic reaction. However, there will be a small amount of ammonia that will slip through the SCR unreacted. Below are estimated Ammonia emissions for this project.

**Table 3. Emissions from Ammonia Slip**

Source#	Ammonia Slip ppm @ 15% O <sub>2</sub>	Ammonia Slip ppm @ 0% O <sub>2</sub>	Actual Temp. (°F)	Actual Exhaust Flowrate (acfm)	Dry Standard Exhaust Flowrate (dscfm)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/year)
S-1	8	32.50	878	20977	3790.43	0.33	16.33

**Basis:**

- Annual emissions: Reliability-related activity 50 hours for S-3.
- 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% O<sub>2</sub> from 15% O<sub>2</sub>. The exhaust flowrates were corrected to 0% O<sub>2</sub> from 10% O<sub>2</sub>

**Plant Cumulative Increase**

Table 4 summarizes the cumulative increase in criteria pollutant emissions that will result from this application.

**Table 4. Plant Cumulative Emissions Increase, Post 4/5/91**

<b>Pollutant</b>	<b>Existing Emissions Post 4/5/91 (tons/yr)</b>	<b>Application Emissions (tons/yr)</b>	<b>Cumulative Emissions (tons/yr)</b>
NO <sub>x</sub>	0.000	0.111	0.111
POC	0.000	0.031	0.031
CO	0.000	0.298	0.298
PM <sub>10</sub> /PM <sub>2.5</sub>	0.000	0.004	0.004
SO <sub>2</sub>	0.000	0.001	0.001

**Health Risk Assessment (HRA)**

All PM<sub>10</sub> emissions are considered diesel particulate emissions. The PM<sub>10</sub> emissions from this application are summarized in Table 1. There is one related project permitted in the last five years. Since the unabated 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 (S-1) with abatement equipment at this facility. Results from the HRA indicate that the project cancer risk is estimated at 0.39 in a million, the project chronic hazard index (HI) is estimated at 0.00032, and the project acute HI is estimated at 0.0012.

**TBACT**

In accordance with the District's Regulation 2-5-301, S-1 unabated requires TBACT because the estimated source risk, based on unabated diesel PM (DPM) emissions, exceeds a cancer risk of 1.0 in a million (1.8 in a million) and annual DPM emission rate greater than 22.5 pounds requires TBACT. Once the DPF abatement efficiency is considered, the cancer risk and chronic hazard index fall below 1 in a million and 0.20 respectively.

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).

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 in an Overburdened Community, as defined in Regulation 2-1-243.

**Project Risk Limits**

Since S-1, operating at 50 hours/year considering the abatement efficiency of A-1, does not trigger TBACT, the estimated project cancer risk does not exceed 6 in a million and the chronic and acute hazard indices do not exceed 1.0, the 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, NOx, CO, SO2, or PM10.

BACT for S-1 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 NOx, CO, POC and PM10, BACT(2) is the CARB ATCM standard for the respective pollutant at the applicable horsepower rating. The NOx emission factor for S-3 is uncertified after installation of the SCR. Therefore, S-3 will need to verify compliance with the NOx BACT (2) standard through the performance of a source test.

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 satisfies the current BACT(2) standards for the following pollutants which exceed 10 lb/day in Table 1 and 2:

S-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	1.34 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 4. Potential to Emit for FID 202864**

Pollutant	Existing Annual Emissions (TPY)	Application Annual Emissions* (TPY)	Facility Annual Emissions (TPY) *	Offset Requirement (TPY)	Offset Required
NOx	0.000	0.334	0.334	>10	N
POC	0.000	0.093	0.093	>10	N
CO	0.000	0.894	0.894	-	N
PM10/PM2.5 <sup>1</sup>	0.000	0.013	0.013	≥100	N
SO2	0.000	0.004	0.004	≥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<sub>2</sub>*)

Regulation 9-8 (*NO<sub>x</sub> 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 project is subject to California Environmental Quality Act (CEQA) review as set in Regulation 2-1-310. The lead agency is the City of South San Francisco, Planning Division and pursuant to the requirements of the CEQA State Guidelines, after the Initial Study, Negative Declaration was prepared in July 2022.

The Negative Declaration states that the project will not have a significant effect on the environment, however, mitigation measures were made a condition of the approval of the project. All findings were made pursuant to the provisions of CEQA.

Based on the CEQA documents review, the BAAQMD has determined that the project will not have a significant effect on the environment. As the project will not have any significant impacts, the BAAQMD has not imposed any mitigation measures (beyond what the BAAQMD has imposed to ensure compliance with air quality regulations) and therefore has not adopted a mitigation monitoring plan or program.

This project complies with Regulation 2-1-426.2.6 and the application has been deemed complete for CEQA purposes.

### **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 not within 1,000 feet from a K-12 school, but it is within an Overburdened Community (OBC) as defined in Regulation 2-1-243 and required a refined Health Risk Assessment, therefore is subject to the public notification requirements.

**Permit Conditions**

**Permit Condition 100072 for S-1**

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-1**

1. The owner/operator shall not exceed the following limits per year per engine for reliability-related activities:
    - 50 Hours of Diesel fuel.
- [Basis: Cumulative Increase; Regulation 2-5; Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

#### **Permit Condition 27785 for S-1**

1. The owner/operator shall ensure the engine is abated at all times of operation by an approved Selective Catalytic Reduction (SCR) System and Diesel Particulate Filter (DPF) equipped with a backpressure monitor or other approved Diesel Exhaust Particulate Matter Abatement System. The engine, SCR System, and DPF with backpressure monitor or other approved system shall be installed, maintained, and operated in accordance with the manufacturer specifications and/or best modern practices.

[Basis: Cumulative Increase, Title 17 CCR Section 93115.6(a)(3), 40 CFR 1039.101, BACT, TBACT]

2. The owner/operator shall take all corrective actions recommended by the manufacturer in response to backpressure monitor notifications.  
[Basis: Cumulative Increase, Title 17 CCR Section 93115.6(a)(3), 40 CFR 1039.101, BACT, TBACT]
3. The owner/operator shall ensure urea injection commences as soon as the SCR catalyst bed

reaches minimum operating temperature as specified by the manufacturer.

[Basis: Cumulative Increase, Title 17 CCR Section 93115.6(a)(3), 40 CFR 1039.101, BACT, TBACT]

4. The owner/operator shall ensure engine emissions do not exceed an ammonia (NH<sub>3</sub>) slip of 10 ppmv, dry @ 15% O<sub>2</sub> from the SCR system. If deemed necessary to demonstrate compliance with Regulation 2, Rule 5, the Air District may require a source test to determine compliance with this emission limit.

[Basis: Regulation 2, Rule 5]

5. The owner/operator shall ensure engine emissions do not exceed the following limits:

NO<sub>x</sub>: 0.50 g/bhp-hour

POC: 0.14 g/bhp-hour

CO: 2.60 g/bhp-hour

PM: 0.02 g/bhp-hour

[Basis: BACT and Cumulative Increase]

6. To demonstrate compliance with Part 5, the owner/operator shall conduct an initial Air District-approved source test within 60 days of startup and once every three years thereafter at the normal or expected load during emergency operation using Air District approved source test methods. The owner/operator shall document urea usage (gallons per minute) and average kW during all tests, preferable as digital records. The owner/operator shall submit the source test results to the Air District's Source Test Section no later than 60 days after source test completion.

[Basis: BACT and Cumulative Increase]

7. The owner/operator shall comply with all applicable testing, sampling port location and safe access requirements as specified in Volume IV of the Air District's Manual of Procedures. The owner/operator shall notify the Air District's Source Test Section, in writing, of the source test protocols, sampling port locations, layout, access and projected test



dates at least 30 days prior to testing. The following test methods shall be used for each pollutant:

PM(filterable) EPA Method 5 or Air District-approved equivalent

NOx EPA Method 7E or Air District-approved equivalent

POC EPA Method 25A and EPA Method 18 or Air District-approved equivalent

CO EPA Method 10 or Air District-approved equivalent.

[Basis: Regulation 2-1-403]

8. To determine compliance with the above conditions, the owner/operator shall maintain the following records in a Air District-approved log and shall make these records available to Air District staff upon request. All records shall be retained 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 Synthetic Minor Operating Permit). These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable Air District or state regulations.
- a. Source Test Notifications
  - b. All source test reports
  - c. Engine serial number and source number for each source test
  - d. Engine load percentage
  - e. Engine, SCR, and DPF maintenance records
  - f. SCR system owner's manual or manufacturer's specifications
  - g. DPF owner's manual or manufacturer's specifications
  - h. All backpressure and corrective actions
  - i. SCR urea injection rate (gpm)

[Basis: BACT, Cumulative Increase, Recordkeeping]

***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 source will be located within an Overburdened Community and requires an HRA, 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: Rolls-Royce Solutions America Inc., Model: 20V4000G74S,**  
**Year: 2022, 4036 bhp, 25.48 MMBtu/hr, abated by A-1 and A-2**  
**Permit Condition Nos. 100072, 100073 and 27785**
  
- A-1 Selective Catalytic Reduction: EcoCUBE SCR, 5 Series, 9550-H3D28**
- A-2 Diesel Particulate Filter: EcoCUBE DPF, 5 Series, 9550-H3D28**

Prepared by: Isis Virrueta, AQE  
April 2023

## Attachment 1

<b>BAY AREA AIR QUALITY MANAGEMENT DISTRICT</b> <b>Best Available Control Technology (BACT) Guideline</b>
--

### Source Category

<b>Source:</b>	IC Engine-Compression Ignition: Stationary Emergency, non- Agricultural, non-direct drive fire pump	<b>Revision:</b>	0
		<b>Document #:</b>	96.1.5
<b>Class:</b>	≥ 1000 BHP Output	<b>Date:</b>	12/22/2020*

### Determination

Pollutant	<b>BACT</b> 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
<b>POC (NMHC)</b>	1. n/s <sup>a</sup> 2. 0.14 g/bhp-hr <sup>b</sup>	1. n/s <sup>a</sup> 2. Any engine certified or verified to achieve the applicable standard
<b>NOx</b>	1. n/s <sup>a</sup> 2. 0.5 g/bhp-hr <sup>b</sup>	1. n/s <sup>a</sup> 2. Any engine certified or verified to achieve the applicable standard
<b>SO<sub>2</sub></b>	1. n/s <sup>a</sup> 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm (wt)	1. n/s <sup>a</sup> 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel)
<b>CO</b>	1. n/s <sup>a</sup> 2. 2.6 g/bhp-hr <sup>b</sup>	1. n/s <sup>a</sup> 2. Any engine certified or verified to achieve the applicable standard
<b>PM<sub>10</sub></b>	1. n/s <sup>a</sup> 2. 0.02 g/bhp-hr <sup>b</sup> 3. 0.02 g/bhp-hr	1. n/s <sup>a</sup> 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
<b>NPOC</b>	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

DRAFT