DRAFT ENGINEERING EVALUATION

Facility ID No. 14025
Spear Street Corridor LLC c/o JLL
150 Spear Street, San Francisco, CA 94105
Application No. 673565

Background

Spear Street Corridor LLC c/o JLL is applying for an Authority to Construct for the following equipment:

S-4 Emergency Standby Diesel Fire Pump Engine
Make: Cummins, Model: CFP7E-F10, Model Year: 2021
174 bhp, 1.34 MMBTU/hr
Permit Condition No. 100072, 100073, and 100076

The proposed source (S-4) is a new emergency standby diesel fire pump engine that will provide the facility access to fire suppression equipment in the event of an emergency. The new source, S-4, is intended to replace the existing emergency standby diesel fire pump (S-1) at the facility.

S-4 meets the Environmental Protection Agency (EPA) and California Air Resources Board (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. No abatement devices are proposed.

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.

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-4

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (tons/yr)
NOx	2.69	24.76	51.63	0.026
POC	0.201	1.85	3.86	1.93E-03
CO	1.19	10.97	22.88	0.011
$PM_{10}/PM_{2.5}$[1]	0.149	1.37	2.86	1.43E-03
SO_2	N/A[2]	0.051	0.11	5.26E-05

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-4
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family MCEXL0409AAB for S-4
- [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. The three existing sources at this facility (S-1, S-2, and S-3) are not considered new or modified sources. Therefore, the emissions from these sources are not included in the facility's cumulative increase. S-1 and S-2 at this facility are both Loss-of-Exemption (LOE) engines, and S-3 is a registered boiler.

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	0.026	0.026
POC	0.000	0.002	0.002
CO	0.000	0.011	0.011
$PM_{10}/PM_{2.5}$	0.000	0.001	0.001
SO_2	0.000	0.000	0.000

Health Risk Assessment (HRA)

An HRA was required for this project because the project diesel particulate matter emissions are greater than the toxic trigger level of 0.26 lb/year. All PM_{10} emissions are considered diesel particulate emissions. The PM_{10} emissions from this application are summarized in Table 1. There were no other related projects permitted in the last five years.

Table 3. HRA Results for S-4 operating at 50 hours per year

Receptor	Cancer Risk	Chronic Non-Cancer Hazard Index
Resident	0.24 in a million	0.000064
Worker	0.83 in a million	0.00064
Student	0.0090 in a million	0.000014

The HRA results indicate that the maximum project cancer risk (worker) is estimated at **0.83 in a million**, and the maximum project chronic hazard index (worker) is estimated at **0.00064**.

In accordance with Air District Regulation 2, Rule 5, the HRA results deem the project is in compliance with project risk requirements as recommended, limiting reliability-related activity hours by permit condition to 50 hours per year. See HRA report.

Best Available Control Technology for Toxics (TBACT)

In accordance with the District's Regulation 2-5-301, this source does not require TBACT because the estimated source cancer risk does not exceed 1.0 in a million.

Project Risk Limits

Since the proposed engine, 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.

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}.

Based on the emission calculations in Table 1, BACT is triggered for NOx and CO because the maximum daily emissions exceed 10 lbs/day.

Per Air District Regulation 2-2-202, BACT is defined as the most stringent emissions limitation, control device, or control technique that (1) has been achieved in practice at other similar sources and/or (2) is technologically feasible and cost-effective. To determine

what level of control constitutes BACT for the emergency standby diesel engine, the BAAQMD reviewed available control technologies that can be effective at controlling NOx and CO from these sources.

Control Technology Review

Several control technologies can reduce NOx and CO emissions from emergency standby diesel engines. These technologies have been divided into three categories: Clean Fuels, Combustion Technologies, and Post-Combustion Technologies.

Clean Fuel Technology

The use of diesel fuel with a low nitrogen content reduces the amount of NOx formed during combustion. The less nitrogen available in the fuel, the less that can be converted to NOx upon combustion. Diesel fuel producers are not required to remove nitrogen from the fuel specifically for NOx reduction purposes. However, they are required to remove sulfur to comply with regulatory mandates, and the hydro-treating technique they use to remove the sulfur also removes most of the nitrogen. As a result, using ultra-low-sulfur diesel fuel (ULSD) will provide benefits in reducing NOx emissions as well as reducing sulfur dioxide emissions. ULSD is required to be used by the California Air Resources Board (CARB) and is therefore achieved in practice for this engine.

Combustion Technologies

NOx and CO emissions can be minimized by optimizing the engine's combustion process using techniques such as injection timing retard, preignition chamber combustion, air-to-fuel ratio adjustments, and derating. These combustion characteristics are determined by the design of the engine, which is dictated by the manufacturer and cannot be controlled by the end user. The end user can reduce emissions by using the cleanest engines available, however. Engines are certified to meet progressively more stringent emissions performance standards using EPA's "Tier" system, with higher-tier engines representing more stringent levels of emissions control. For the size of engine that will be used for this project, the most stringent level of emissions control that can be achieved using combustion controls is Tier 3.[1] Therefore. the use of a Tier 3 engine is achieved in practice.

Post-Combustion Technologies

Currently, the most effective and prevalent post combustion technologies used to abate NOx and CO rely on the use of catalysts. For NOx reduction, catalytic technology can come in the form of a selective catalytic reduction unit, lean-NOx catalyst, or NOx adsorber. For CO, reduction is typically achieved through an oxidation catalyst. For each of these technologies, the catalyst is used to lower the heat of reaction that is required for the breakdown and/or conversion of the target pollutants. For emergency standby engines, the catalyst would not reach its effective temperature during short-duration operations

[1] EPA's diesel emission tiers range from Tier 0 through Tier 4. The Tier 4 standards require catalytic control devices, which are addressed below. For diesel engines with a rated power output of at least 100 bhp and less than 175 bhp, the next most stringent set of standards for this size category is Tier 3. See California Air Resources Board, Non-Road Diesel Engine Certification Tier Chart, available at: https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart-pdf. The most stringent tier that can be achieved with combustion controls only is therefore Tier 3 for this size category.

associated with periodic testing and maintenance, which is primarily how these engines will be operated.

BACT Analysis for S-4

The first step in the BACT analysis is to determine what level of emissions control has been achieved in practice for the source at issue. When considering post-combustion technologies that have been achieved in practice for smaller emergency standby engines like S-4, the BAAQMD consulted BACT clearinghouses and guidelines published by US EPA, CARB, and other Air Districts. We are unaware of any engines in this size range that are operating under any more stringent standards than Tier 3 that would qualify as achieved in practice BACT under our BAAQMD program. Because S-4 is certified to achieve Tier 3 standards without post-combustion control, post-combustion catalytic control technologies are not considered BACT for S-4.

The second step in the BACT analysis is to determine whether there is any more stringent level of control, beyond what has been achieved in practice, that is technologically feasible and cost-effective for the source under review. The BAAQMD therefore considered whether catalytic control devices would be technologically feasible and cost-effective for S-4.

Catalytic control devices only become effective when the engines are operated for longer periods in the case of a power outage. Emergency operation will be infrequent and is not expected to last for a significant amount of time when it does occur. As a result, the emission reduction benefit from having a catalytic control device would be less than optimal and would not be cost-effective under the BAAQMD's BACT regulations given the costs involved. Studies that have evaluated the additional costs and emission reduction benefits that would be involved in implementing catalytic control technologies on emergency standby engines have shown that the cost would be in the range of $68,000 to $682,000 per ton of emission reduction benefit.[2] This cost per ton greatly exceeds the BACT cost-effectiveness threshold of $17,500 per ton for NOx, which is set forth in BAAQMD's BACT Policy & Implementation Procedure. Pursuant to the BACT Policy & Implementation Procedure, a cost-effectiveness threshold for CO is not determined. However, since catalytic control devices are not cost-effective for NOx, they are therefore not considered technologically feasible and cost-effective for this source.

From the analysis of the various technologies that could be implemented to reduce NOx and/or CO, the BAAQMD has concluded that the use of ULSD fuel and an EPA Tier 3 certified engine are achieved-in-practice control technologies. These control technologies are therefore required as BACT for S-4. S-4 is certified to meet the EPA Tier 3 emissions standard, and the applicant will be required by CARB regulations to use ULSD fuel.

[2] See Sacramento Metropolitan Air Quality Management District BACT Determination No. 281 (June 4, 2021), available at: http://www.airquality.org/StationarySources/Documents/IC%20Engine%20Compression%20Standby%20Diesel%20Fired%20BACT%20281.pdf; California Air Resources Board, Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Proposed Amendments to the Airborne Toxic control Measure for Stationary Compression Ignition Engines (Sept. 2010), available at www.arb.ca.gov/regact/2010/atcm2010/atcmisor.pdf.

Therefore, S-4 complies with the BACT requirements under Regulation 2-2-301 for all applicable pollutants.

According to the emission data submitted to EPA for the engine family for S-4, the NOx and CO emission rates are below the applicable BACT emission limits shown below.

Table 4. BACT Analysis Summary: S-4

BACT Pollutant Triggered	BACT Limit Tier 3 for Engines 100 ≤ HP < 175 (g/bhp-hr)	Engine Emission Rates (g/bhp-hr)
NOx	2.85	2.69
CO	3.7	1.19

Offsets

Per Regulation 2-2-302, offsets must be provided if, after a new or modified source is constructed, a facility that has the potential to emit (PTE) more than 10 tons/yr of POC or NOx. The PTE for emergency-use engines will include the hours allowed for test and maintenance, as well as an assumed 100 hours per year for emergencies. Emissions from the LOE diesel-fired engines (S-1 & S-2) and the natural gas-fired boiler (S-3) are included in the existing PTE for the facility. AP-42 emission factors were used to estimate emissions from these sources. For the diesel engines, the emission factors in Chapter 3.3 (Diesel Industrial Engines) were conservatively preferred because they are higher than the emission factors in Chapter 3.4 (Large Stationary Diesel Engines). However, because the SO_2 emission factor in Chapter 3.4 is the standard for estimating SO_2 emissions from diesel engines, the Chapter 3.4 emission factor was used for SO_2. Additionally, S-1 and S-2 are emergency engines, therefore an extra 100 hours per year of operation for those two sources are included in the existing PTE calculation. For the registered boiler, the emission factors in Chapter 1.4 (Natural Gas Combustion) for small boilers (<100 MMBTU/hr) were used. Based on the emission calculations below in Table 5, offsets are not required for this application.

Table 5. Potential to Emit for Facility ID 14025

Pollutant	Existing Annual PTE Emissions (ton/yr)	Application Annual PTE (ton/yr)	Facility Annual PTE (ton/yr)	Offset Requirement (ton/yr)	Offset Required?
POC	0.135	0.006	0.140	10	N
NOx	2.034	0.077	2.111	10	N
$PM_{10}/PM_{2.5}$	0.150	0.004	0.154	100	N
SO_2	0.007	0.000	0.007	100	N
CO	1.134	0.034	1.168	-	N

Since the facility permitted levels are below the offset 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

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.

California Environmental Quality Act (CEQA)

The installation and operation of S-4, Emergency Standby Diesel Fire Pump Engine, is for the purpose of providing critical fire suppression equipment to the facility in the event of an emergency. Because S-4 is subject to BACT, the Air District does not consider this project approval to be ministerial. However, pursuant to the statutory exemption set forth in Article 18, Section 15269(c) of the 2023 CEQA Statutes and Guidelines, the installation and operation of S-4 is exempt from CEQA requirements because it is a specific action necessary to prevent or mitigate an emergency. Per Air District Regulation 2-1-312.9, any project which is exempt from CEQA review pursuant to the State CEQA Guidelines is exempt from CEQA review. Therefore, CEQA review is not required for this project.

Public Notification (Regulation 2-1-412)

This project is not located within an overburdened community, but is located within 1,000 feet of Youth Chance High School (Grades 9-12) at 169 Steuart Street, San Francisco, CA 94105. Therefore, the project is subject to the public notification requirements of

Regulation 2-1-412. No other schools are located within a quarter-mile of the proposed source. A public notice will be sent to all parents/guardians of the above-mentioned school, and all addresses within 1,000 feet of the facility. There will be a 30-day public comment period.

Permit Conditions

Permit Condition #100072 for 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 #100073 for 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]

Permit Condition #100076 for S-4

The owner/operator shall operate this emergency standby engine only when directly coupled to pump(s) exclusively used in water-based fire protection system(s).

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

End of Conditions

Recommendation

The Air 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 a K-12 school, which triggers the public

notification requirements of Air District Regulation 2-1-412. After the comments are received and reviewed, the Air District will make a final determination on the permit.

I recommend that the Air 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-4 Emergency Standby Diesel Fire Pump Engine
Make: Cummins, Model: CFP7E-F10, Model Year: 2021
174 bhp, 1.34 MMBTU/hr
Permit Condition No. 100072, 100073, and 100076

Prepared by: Cameron Fee, Air Quality Engineer I

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)