Draft Engineering Evaluation
City of Santa Clara Park Service
2600 Benton Avenue
Santa Clara, CA 95050
Plant No. 17326
Application No. 31023

Project Description: New Stationary Emergency Diesel Engine-Generator Set

BACKGROUND

City of Santa Clara Park Service is requesting Authorities to Construct (ATC) and Permit to Operate (PTO) for the following equipment:

S-2 Emergency Standby Generator Set: Diesel Engine, Mercedes Benz, Model OM924LA, Model Year 2020, Rated 197 bhp

The stationary emergency diesel engine-generator sets (engine) will be located at 2600 Benton Avenue, Santa Clara, CA 95050. The engine will provide support to facility operations during emergencies as defined by Regulation 9-8-231. The engine will be able to operate unrestricted during emergency use events. However, the annual maintenance and testing hours of the engine will be limited in accordance with the California Air Resources Board (CARB) "*Air Toxic Control Measure for Stationary Compression Ignition Engine"* (ATCM) and District regulation 9-8-330.3. The criteria pollutants associated with the sources are nitrogen oxides (NO_X), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO_2), and particulate matter (PM).

The proposed engine meets the Environmental Protection Agency (EPA) Tier 3 emission standards. The engine will burn commercially available CARB ultra-low sulfur diesel fuel. The sulfur content of the diesel shall not exceed 0.0015% by weight.

EMISSION CALCULATIONS

The applicant has submitted supporting documents, which includes manufacturer specifications. The following table provides a summary of the information provided by the applicant.

Table 1. Engine Specifications and Certified Emission Factors for S-2		
Engine Manufacturer	Mercedes Benz	
Model	OM924LA	
Model Year	2020	
Family Name	LMBXL07.2RJC	
Engine Power Rating, hp	197	
Fuel Consumption, gal/hr	6.1	
Displacement, L	4.8	
	g/kW-hr	g/bhp-hr
Non-Methane Hydrocarbon (NMHC)	0.07	0.05
NO_X	3.23	2.41
CO	1.4	1.04
PM	0.13	0.10

*Manufacturer emission rates converted assuming 1 kW = 1.341 hp and 1 lb = 453.6 g.

Table 2. Source Potential to Emit Review for S-2						
Pollutant	**Emission Rate (g/ bhp-hr)**	**PTE Daily Operating Hours[1] (hr/day)**	**PTE Daily Emissions (lb/day)**	**PTE Annual Operation[2] (hr/yr)**	**PTE Annual Emissions (lb/yr)**	**PTE Annual Emissions (ton/yr)**
POC[3]	0.05	24	0.521	50	1.09	0.000
NO_X	2.41	24	25.120	50	52.33	0.030
CO	1.04	24	10.840	50	22.58	0.010
PM[4]	0.10	24	1.042	50	2.17	0.000
SO_2[5]	-	24	0.031	50	0.06	0.000

[1]Maximum daily operation is assumed to be 24 hours.

[2]Maximum annual operation will only include reliability-related activities as defined in Regulation 9-8-232.

[3]NMHC is assumed to be in the form of POC.

[4]PM is assumed to be in the form of PM with a diameter of less than 10 µm (PM_{10}).

[5] SO_2 emissions are based upon the Permit Handbook. The Permit Handbook suggests the use of EPA AP-42, Table 3.4-1. Assuming a sulfur content of 15 ppm, pursuant to the fuel requirements of CARB, the emission factor equates to 0.0015 lbs SO_2/MMBtu. The following provides the calculations for the daily and annual emission rates of SO_2.

$$\frac{0.0015\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{6.1\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{24\ \cancel{hr}}{day} = 0.031\ lbs\ SO_2/day$$

$$\frac{0.0015\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{6.1\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{50\ \cancel{hr}}{yr} = 0.06\ lbs\ SO_2/yr$$

The following table provides the PTE for the facility.

Table 3. Facility Cumulative Increase

Pollutant	Existing (ton/yr)	New (ton/yr)	Total (ton/yr)
POC	0.000	0.000	0.000
NO_X	0.000	0.030	0.030
CO	0.000	0.010	0.010
PM10	0.000	0.000	0.000
PM2.5	0.000	0.000	0.000
SO_2	0.000	0.000	0.000

Health Risk Assessment

The proposed engine is certified to the Tier 3 standards with a PM emission factor of 0.05 g/bhp-hr. Using the EPA-certified PM emission factor for each engine, a 50 hour per year limit for reliability-related activities, and assuming PM is in the form of diesel exhaust PM, the following annual emission rate for diesel exhaust PM was calculated.

$$\frac{0.10\ \cancel{g}\ PM}{\cancel{bhp} - \cancel{hr}} \times 197\cancel{bhp} \times \frac{lb}{453.6\ \cancel{g}} \times \frac{50\ \cancel{hr}}{yr} = 2.17\ \ lb\ PM/yr$$

Pursuant to Regulation 2-5-110, the application is subject to the provisions of this rule since the increase in diesel exhaust PM emissions from the project is above the trigger level listed in Table 2-5-1 of this regulation.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Each engine has a NOx and CO PTE daily emission rates that exceed 10 lbs. Pursuant to Regulation 2-2-301, the engine is required to apply BACT.

BACT for the engine is presented in the *"BAAQMD BACT Guideline – IC Engine-Compression Ignition: Stationary Emergency, Non-Agricultural, Non-Direct Drive Fire Pump (50 BHP and*

<1000 BHP Output)" (Workbook). The following table provides an analysis of the BACT requirements.

	Table 4. Analysis of BACT Requirements			
Pollutant	**BACT Requirement**	**Engine Type**	**Engine Data**	**In Compliance with Requirement?**
NO_X	CARB ATCM Standard for NO_X at the applicable power rating, which is 3.8 g NO_X/kW-hr for engine rated at or above 100 bhp and less than 175 bhp	197 bhp	3.23 g NO_X/kW-hr	Yes
CO	CARB ATCM Standard for CO at the applicable power rating, which is 5.0 g CO/kW-hr for engine rated at or above 100 bhp and less than 175 bhp		1.4 g NO_X/kW-hr	Yes

According to the Workbook, BACT is the CARB ATCM standard for NO_X and CO at the applicable horsepower rating. Therefore, the engine is expected to satisfy the BACT requirements for NO_X and CO.

OFFSETS

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of POC or NO_X. Furthermore, pursuant to Regulation 2-2-303, offsets must be provided for any new or modified source with a cumulative increase that exceeds 100 tons per year of PM_{10} or SO_2. As shown in Table 3, the facility emissions do not exceed the offset threshold for any pollutant. Therefore, offsets are not triggered for this project.

NEW SOURCES PERFORMANCE STANDARDS (NSPS)

According to §60.4200(a)(2)(i), the engine is subject to the requirements of 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engine."*

In accordance with §60.4202(a)(2), the emission standards must meet those established in 40 CFR 89.112 and 40 CFR 89.113.

Using the conversion factor of 1.341 hp per 1 kW, the rated power for the proposed 197 bhp engine in metric units becomes 568 kW.

Pursuant to 40 CFR 89.112, Tier 3 engines with a rated power at or greater than or equal to 75 kW and less than 130 kW must meet the following emission standards.

Table 4. Standards/Review for Engine Rated 130 kW ≤ x <225 kW		
Pollutant	**NSPS Emission Standard (g/kW-hr)**	**S-2 Certified Emission Rate (g/kW-hr)**
NO_X + NMHC	4.0	3.30
CO	3.5	1.4
PM	0.20	0.13

The aforementioned analysis demonstrates that the engine will meet the emission standards of 40 CFR 89.112. In addition, the engine are expected to meet the following opacity standards identified in 40 CFR 89.113.

Table 5. 40 CFR 89.113 Opacity Standards	
Mode	**Opacity (%)**
Acceleration	20
Lugging	15
Peak (During acceleration or lugging modes)	50

§60.4211(a) requires the owner or operator to maintain and operate the engine according to the manufacturer's written instructions or owner/operator developed procedures approved by the manufacturer for the entire life of the engine. The engine is expected to be maintained and operated in accordance with the requirements of §60.4206 and §60.4211(a).

§60.4207(b) requires diesel fuel consumed after October 1, 2010, to meet the requirements of 40 CFR 80.6.10(b), which is a maximum sulfur content of 15 parts per million (ppm). The fuel consumed is expected to meet this requirement.

§60.4209(a) requires the installation of a non-resettable hour meter. This will be included as a permit requirement.

The engine is certified to the requirements of 40 CFR Part 89 and is expected to comply with §60.4211(c).

According to §60.4211(f), the engine will be allowed to operate unrestricted during emergencies. In addition, the engine will be limited to less than 50 hours per calendar year for maintenance and testing as suggested by the applicant.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

Pursuant to §63.6585, engine located at an area source are subject to the requirements of 40 CFR Part 63 Subpart ZZZZ, *"National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engine."* However, according to §63.6590(a)(1)(iii) & §63.6590(c)(1), diesel engine that commenced construction on June 12,

2006 or later and that operate at a facility that emits or has the potential to emit any single hazardous air pollutant (HAP) at a rate of less than 10 tons per year or any combination of HAPs at a rate of less than 25 tons per year, must comply instead with 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engine."* The engine is expected to meet the requirements of this subpart by meeting the standards of 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engine."*

CARB AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINE

§9314.8 requires any person who purchases a stationary compression ignition engine to meet the requirements of the ATCM.

As of January 1, 2006, owners and operators of new engine are required to consume CARB diesel fuel in accordance with §93115.5.

§93115.6(a)(1) limits the operation of an engine located within 500 feet of school grounds. Since the proposed engine is not located within 500 feet of school grounds, this project is not subject to the requirements of this rule.

Pursuant to §93115.6(a)(3), a new engine must meet the following requirements as of January 1, 2005.

- ATCM *"Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engine"* for same model year and maximum engine power, which is shown below.

Table 6. ATCM *"Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engine"*

Maximum Engine Power	Model Year	PM (g/kW-hr)	$NMHC+NO_X$ (g/kW-hr)	CO (g/kW-hr)
130 kW ≤ x <225 kW	2008+	0.20	4.0	3.5

- After December 31, 2008, be certified to the new non-road compression-ignition engine emission standard for all pollutants for 2007 and later model year engine as specified in 40 CFR, Part 60, Subpart IIII; and,

- Not operate more than 50 hours per year for maintenance and testing purposes, except as provided in §93115.6(a)(3)(A)(2). This regulation does not limit engine operation for emergency use and for emission testing to show compliance with §93115.6(a)(3).

The engine is expected to meet the aforementioned emission requirements and will be limited, through permit condition, to operate unrestricted only for emergencies and a maximum of 50 hours per year for maintenance and testing purposes.

Pursuant to §93115.10(d) (1) a non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed upon engine installation. The owner/operator of the engine shall

keep monthly records of the following for 36 months, with the prior 24 months readily accessible at the site and the prior 25 to 36 months available to the District within 5 working days from the request.

- Emergency use hours of operation
- Maintenance and testing hours of operation
- Hours of operation for emission testing to show compliance with §933115.6(a)(3) and §93115.6(b)(3)
- Initial start-up testing hours
- If applicable, hours of operation to comply with the requirements of NFPA 25
- Hours of operation for all uses other than those specified in §93115.10(g)(1)(A) through (D)
- If applicable, DRP engine hours of operation, and
- The fuel used

STATEMENT OF COMPLIANCE

Regulation 1

The engine is subject to and expected to comply with the requirements of Regulation 1-301 (Public Nuisance).

Regulation 2, Rule 1

Pursuant to Regulation 2-1-114.2.1, internal combustion engine greater than 50 hp are subject to the requirements of Regulation 2-1. According to Regulation 2-1-301, prior to the installation of the equipment, an ATC must be obtained. The facility has submitted this application and is expected to comply with Regulation 2-1.

The proposed engine will not be located within 1,000 feet of the outer boundary of K-12 schools. Therefore, the requirements of the California Health & Safety Code §42301.6 are not applicable.

Regulation 2, Rule 2

Pursuant to Regulation 2-2-301, BACT is required for a new source with PTE emission increases that equal 10.0 lbs or greater of POC, NPOC, NO_X, SO_2, PM_{10}, or CO. The proposed engine is expected to exceed the BACT thresholds for NO_X and CO. However, the engine meets the BACT requirements for NO_X and CO in accordance with BACT Guideline 96.1.3.

Furthermore, pursuant to Regulation 2-2-302, a facility that emits more than 10 tons of POC or NO_X per year is subject to offsets. The facility is not expected to emit more than 10 tons of POC or NO_X per year and will not require the provision of offsets.

Lastly, the facility will not emit greater than 100 tons per year or more of any air pollutant subject to regulation under the Clean Air Act or 10 tons of a single hazardous air pollutant (HAP) or 25 tons of a combination of HAPs per year. The facility is not a major facility and is not required to meet the requirements of Regulation 2-2-303 (Offsets for PM_{10} and SO_X), 2-2-304 (Prevention of Significant Deterioration (PSD)), and 2-2-405 (Publication and Public Comment).

Regulation 2, Rule 5

Pursuant to Regulation 2-5-110, the provisions of this rule are not subject to sources with an increase in emissions less than the trigger levels listed in Table 2-5-1. The engine is expected to exceed the diesel exhaust PM trigger level of 0.26 lbs. per year. The provisions of this rule apply to this project.

Based on 50 hours per year of operation for each engine, the project passed the HRA conducted on July 27, 2021, by the District's Toxics Evaluation Section. The results of the HRA indicate that the project cancer risk is estimated to be 5.0 in one million and the project hazard index is estimated to be 0.0013.

The engine meets toxic best available control technology requirements because the diesel particulate emissions for the engine is less than 0.15 g/bhp-hr. In addition, the project meets the risk requirements of Regulation 2-5-302, which are screening levels of less than ten in a million and a hazard index of less than 1.0.

Regulation 6, Rule 1
Pursuant to Regulation 6-1-303 a person shall not emit, from an internal combustion engine with less than a 25-liter displacement, for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. The proposed engine is expected to meet the requirements of Regulation 6-1-303.

Regulation 9, Rule 1
The engine is subject to the SO_2 limitations of Regulation 9-1-301 (Limitations on Ground Level Concentrations of Sulfur Dioxide), Regulation 9-1-302 (Limitations Sulfur Dioxide Emissions) and 9-1-304 (Burning of Solid and Liquid Fuel).

Pursuant to Regulation 9-1-301, the ground level concentrations of SO_2 shall not exceed 1.6 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Pursuant to Regulation 9-1-302, a person shall not emit from any source, a gas stream containing SO_2 in excess of 300 ppm (dry). Lastly, pursuant to Regulation 9-1-304, a person shall not burn any liquid fuel having a sulfur content in excess of 1.6% by weight. Compliance with Regulation 9-1 is expected due to the use of CARB low sulfur diesel fuel with a sulfur content of 0.0015% by weight.

Regulation 9, Rule 8
This rule limits the emissions of NO_X and CO from stationary internal combustion engine with an output rated by the manufacturer at more than 50 brake horsepower. The engine is intended to operate at a specific site for more than one year and will be attached to a foundation at the site. Therefore, the requirements of this rule apply. In addition, the engine will be used for emergency use and is defined as an emergency standby engine pursuant to Regulation 9-8-230.

According to Regulation 9-8-111.6, emergency standby engine is exempt from the requirements of Regulations 9-8-301 through 305, 9-8-501, and 9-8-503. However, emergency standby

engines are subject to the requirements of Regulation 9-8-330. Pursuant to Regulation 9-8-330, the engine will be allowed to operate 50 hours per calendar year for reliability-related activities. The requirements of the CARB ATCM are equivalent to the allowed annual reliability-related activity hours of this rule.

In accordance with Regulation 9-8-530, the engine shall be equipped with a non-resettable totalizing meter that measures hours of operation or fuel usage. Monthly records for the following shall be kept for at least 2 years and be made available to District staff upon request.

- Total hours of operation
- Emergency hours of operation and,
- The nature of the emergency condition for each emergency

The engine is expected to meet the aforementioned requirements.

California Environmental Quality Act (CEQA) and Regulation 2-1
Pursuant to Regulation 2-1-311, an application for a proposed new or modified source will be classified as ministerial and will accordingly be exempt from the CEQA requirement of Regulation 2-1-310 if the District's engineering evaluation and basis for approval or denial of the permit application for the project is limited to the criteria set forth in Regulation 2-1-428 and to the specific procedures, fixed standards, and objective measurements set forth in the District's Permit Handbook and BACT/TBACT Workbook. The application is ministerial and is not subject to CEQA review.

California Health & Safety Code §42301.6 and Regulation 2-1-412
Pursuant to California Health & Safety Code §42301.6(a), prior to approving an application for a permit to construct or modification of a source, which is located within 1,000 feet from the outer boundary of a school site, the District shall prepare a public notice as detailed in §42301.6. §42301.9(a) defines a "school" as any public or private school used for the purposes of the education of more than 12 children in kindergarten or any grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

<u>Public School Notification</u>
This application proposes a new source of TACs and is located within 1,000 feet of the outer boundary of a school. Therefore, public notification pursuant to Reg. 2-1-412 is required. The school public notice was therefore be distributed on [TBD] to the parents and guardians of the students at the following school as well as to addresses located within 1,000 feet of the site:

- Central Park Elementary School, 2720 Sonoma Pl, Santa Clara, CA 95051

The public notice period ended on [TBD]. The public was informed that the proposed engine complies with all the rules and regulations of Bay Area Air Quality Management District and therefore we will be issuing an authority to construct for the proposed standby diesel generator.

PERMIT CONDITIONS

Standard Permit Condition # 22850 apply to S-2.

COND# 22850 ----------

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing.
   [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engine]

2. The owner/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 Engine]

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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engine]

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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engine]

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/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, 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 Engine]

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.

I recommend that the District issue an Authority to Construct for the following equipment.

S-2 Emergency Standby Generator Set: Diesel Engine, Mercedes Benz, Model OM924LA, Model Year 2020, Rated 197 bhp

By: Date:

Youjin Kim
Air Quality Engineer