**DRAFT ENGINEERING EVALUATION**

**Plant No. 21734**
**Eastern Park Apartments**
**711 Eddy Street, San Francisco, CA 94109**
**Application No. 31578**

## Background

**Eastern Park Apartments** has applied to obtain an Authority to Construct for the following equipment:

**S-4 Stationary Emergency Diesel Engine - Generator Set**
**Make: Caterpillar Model: 2806C-E18TAG3, Model Year: 2020**
**909 BHP, 5.67 MMBTU/Hr**
**Engine Family: LCPXL18.1NYS**

The engine will operate unrestricted during emergency-use events. Annual maintenance and testing hours will be limited to 50 hours per year. The criteria pollutants are nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide ($SO_2$) and particulate matter 10 microns in size ($PM_{10}$), and particulate matter 2.5 microns in size ($PM_{2.5}$). All these pollutants are briefly discussed on the District's web site at www.baaqmd.gov. S-4 meets the Environmental Protection Agency (EPA) and California Air Resources Board (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.

This evaluation report will discuss compliance of the proposed project with all applicable rules and regulations.

## EMISSIONS CALCULATIONS

The applicant has submitted supporting documents, which include engine manufacturer specifications and engine emissions data. The following table provides a summary of the information provided by the applicant.

| Table 1. Engine Specifications and Certified Emission Factors | |
|---|---|
| **Engine Manufacturer** | Caterpillar |
| **Model** | 2806C-E18TAG3 |
| **Model Year** | 2020 |
| **Family Name** | LCPXL18.1NYS |
| **Engine Power Rating (hp)** | 909 |
| **Fuel Consumption[1] (gal/hr)** | 41.4 |
| **Maximum Input Heat Rating[1] (MMBtu/hr)** | 5.67 |
| **Engine Displacement[2] (cu in)** | 1,106 |
| **Engine Displacement[2] (L)** | 18 |
| **NOx + NMHC (g/hp-hr)** | 4.3 |
| **NOx (g/hp-hr)** | 4.21 |
| **NMHC[3] (g/hp-hr)** | 0.08 |
| **CO (g/hp-hr)** | 0.60 |
| **PM[4] (g/hp-hr)** | 0.08 |

[1] The energy content of diesel fuel is 137,000 Btu per gallon.

[2] 1 Liter = 61.0237 $in^3$

[3] Non-methane hydrocarbon (NMHC) = POC

[4] Particulate Matter (PM) = $PM_{10}$ = $PM_{2.5}$

Using the submitted information, the emission rate for each pollutant was determined. The following tables provide the potential to emit (PTE) and cumulative increase. The annual PTE is based on an assumed 100 hours for emergency events, plus allowable hours for maintenance and testing. The cumulative increase is based on allowable hours for maintenance and testing.

**Table 2. Potential to Emit Source Emissions**

| Pollutant | Hourly Emission Rate (lbs/hr) | Daily Emission Rate[1] (lbs/day) | Annual Emission Rate[2] (lbs/yr) | Annual Emission Rate[2] (tons/yr) |
|---|---|---|---|---|
| NOx | 8.44 | 202.61 | 1,266.32 | 0.633 |
| POC | 0.16 | 3.84 | 24.03 | 0.012 |
| CO | 1.20 | 28.69 | 179.30 | 0.090 |
| $PM_{10}$ | 0.16 | 3.84 | 24.03 | 0.012 |
| $PM_{2.5}$ | 0.16 | 3.84 | 24.03 | 0.012 |
| SO2[3] | 0.01 | 0.26 | 1.65 | 0.001 |

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

[2] For the PTE, the maximum annual operation will include reliability-related activities as defined in Regulation 9-8-232 and 100 hours for emergency events.

[3] $SO_2$ 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 0.001515 lbs $SO_2$/MMBtu.

**Table 3. Cumulative Increase Source Emissions**

| Pollutant | Hourly Emission Rate (lbs/hr) | Daily Emission Rate (lbs/day) | Annual Emission Rate[1] (lbs/yr) | Annual Emission Rate (tons/yr) |
|---|---|---|---|---|
| $NO_X$ | 8.44 | 202.61 | 422.11 | 0.211 |
| POC | 0.16 | 3.84 | 8.01 | 0.004 |
| CO | 1.20 | 28.69 | 59.77 | 0.030 |
| $PM_{10}$ | 0.16 | 3.84 | 8.01 | 0.004 |
| $PM_{2.5}$ | 0.16 | 3.84 | 8.01 | 0.004 |
| $SO_2$ | 0.01 | 0.26 | 0.55 | 0.000 |

[1] For the cumulative increase, the maximum annual operation will only include reliability related activities as defined in Regulation 9-8-232.

## TOXIC RISK SCREENING ANALYSIS

Pursuant to Regulation 2-5-110, this project is subject to the provisions of this rule since the increase in TAC emissions from new/modified sources exceed trigger levels listed in Table 2-5-1 of Regulation 2-5. The project includes TAC emissions from New Source Review Application #30587 since the application was reviewed within a 3-year time period from when this application was deemed complete. A health risk assessment (HRA) was completed for this project.

The project has a maximum cancer risk of 9.6 in a million, and maximum chronic hazard index of 0.0026 respectively. Since the project is below a cancer risk of 10 in a million and a chronic hazard index of 1.0, the project risk is acceptable. The cancer risk and chronic hazard index from S-4 at the maximum exposed individual receptor are 2.0 in a million and 0.00054, respectively. S-4 has a cancer risk greater than 1.0 in a million. Therefore, Best Available Control Technology for toxics (TBACT) applies. The following table provides a summary of the TBACT requirements:

**Table 4. TBACT for Emergency Diesel Engines (750 < HP < 1000)**

| Sources | Pollutant | TBACT Requirement (g/hp-hr) | Engine Emission Factor (g/hp-hr) | Compliant with TBACT Requirement? |
|---|---|---|---|---|
| S-4 | $PM_{10}$ | 0.15 | 0.08 | Yes |

The project meets the risk requirements and S-4 meets the requirements of TBACT. Therefore, the project meets the requirements of Regulation 2-5.

## BEST AVAILABLE CONTROL TECHNOLOGY

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit of 10 pounds or more per highest day of POC, non-precursor organic compounds (NPOC), NOx, CO, $SO_2$, $PM_{10}$, or $PM_{2.5}$. Based on the emission calculations above, the owner/operator of S-4 is subject to BACT for NOx and CO. BACT for "IC Engine - Compression Ignition: Stationary Emergency > 50 bhp and <1000 hp" are addressed in the BACT Guideline, Document # 96.1.3, Revision 8, dated December 22, 2020.

The following table provides a summary of the BACT requirements.

| Table 5. BACT for Emergency Diesel Engines (750 < HP < 1000) | | | |
|---|---|---|---|
| **Pollutant** | **BACT Requirement (g/hp-hr)** | **Engine Emission Factor (g/hp-hr)** | **Compliant with BACT Requirement?** |
| NOx | 4.56 | 4.21 | Yes |
| CO | 2.6 | 0.6 | Yes |

[1] BACT for NOx is a combined emission factor with NMHC and is 4.8 g/bhp-hr. The portions are considered 95% NOx and 5% NMHC.

## 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 at a major facility with a cumulative increase that exceeds 1.0 ton per year of $PM_{10}$, $PM_{2.5}$, or $SO_2$. For purposes of Regulation 2-2-303, a major facility is defined as a facility that is permitted to emit 100 tons per year or more of $PM_{10}$, $PM_{2.5}$, or $SO_2$.

The following table provides a summary of the facility's PTE.

| Table 6. Facility Potential to Emit | | | |
|---|---|---|---|
| **Pollutant** | **Existing (tons/year)** | **New (tons/year)** | **Total (ton/year)** |
| NOx | 0.090 | 0.633 | 0.723 |
| POC | 0.008 | 0.012 | 0.020 |
| CO | 0.039 | 0.090 | 0.129 |
| $PM_{10}$ | 0.005 | 0.012 | 0.017 |
| $PM_{2.5}$ | 0.005 | 0.012 | 0.017 |
| $SO_2$ | 0.000 | 0.001 | 0.001 |

Eastern Park Apartments has a PTE less than 10 tons per year of POC and $NO_X$. Therefore, the facility is not subject to the offset requirements of Regulation 2-2-302. Furthermore, the facility is not a major facility for $PM_{10}$, $PM_{2.5}$, or $SO_2$. Therefore, the facility is not subject to the offset requirements of Regulation 2-2-303.

## NEW SOURCES PERFORMANCE STANDARDS

The engine is subject to the following New Source Performance Standards (NSPS).

### 40 CFR Part 60, Subpart IIII

According to §60.4200(a)(1)(i), the engine is subject to the requirements of this subpart. Pursuant to §60.4205(b), owners or operators of 2007 model year and later stationary emergency diesel engine-generator sets with a displacement of less than 30 liters must comply with §60.4202. In accordance with §60.4202(a)(2), the emission standards must meet those

established in 40 CFR part 1039, Appendix I for all pollutants and the smoke standards established in 40 CFR 1039.105.

Pursuant to §60.4202(a)(2), engines must meet the most stringent of the Tier 2 or Tier 3 emission standards listed in 40 CFR 1039, Appendix I, for the rated power category. The following are the emission standards.

| Table 7. NSPS Emission Standard (KW>560) | |
|---|---|
| **Pollutant** | **NSPS Emission Standard (g/kw-hr)** |
| $NO_X$ + NMHC | 6.4 |
| CO | 3.5 |
| PM | 0.20 |

In addition, the engine is expected to meet the following opacity standards identified in 40 CFR 1039.105.

| Table 8. 40 CFR 1039.105 Opacity Standards | |
|---|---|
| **Mode** | **Opacity (%)** |
| Acceleration | 20 |
| Lugging | 15 |
| Peak (During acceleration or lugging modes) | 50 |

Since the engines have been certified by EPA, they will comply with the above standards

§60.4206 and §60.4211(a) require 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 these requirements.

§60.4207(b) requires diesel fuel consumed after October 1, 2010 to meet the requirements of 40 CFR 80.510(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 1039, Appendix I and is expected to comply with §60.4211(c).

Per §60.4211(f), the engine will be allowed to operate unrestricted during emergencies. In addition, the engine will be limited to less than 100 hours per calendar year for maintenance and testing. However, the requirements of the CARB Airborne Toxic Control Measure (ATCM) may further limit the maintenance and testing hours.

## NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The engine is subject to the following National Emission Standards for Hazardous Air Pollutants (NESHAP).

**40 CFR Part 63, Subpart ZZZZ**

Pursuant to §63.6585(c), engines located at an area source of hazardous air pollutants (HAP) are subject to the requirements of this subpart.

However, according to §63.6590(a)(1)(iii) & §63.6590(c)(1), compression ignition engines 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 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 Engines."* 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 Engines."*

## CALIFORNIA AIR RESOURCES BOARD AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINES

§93115.2 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 engines are required to consume CARB diesel fuel in accordance with §93115.5.

According to §93115.6(a)(1), an engine located within 500 feet of school grounds shall not operate for non-emergency use between 7:30 A.M. and 3:30 P.M. on days when school is in session. §93115.6(a)(1) does not apply if the engine emits no more than 0.01 g/bhp-hr of diesel PM. However, the source is located within 500 feet of school grounds and emits more than 0.01 g/bhp-hr and will be subject to this requirement.

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 Engines"* for same model year and maximum engine power, which is shown below;

**Table 9. ATCM *"Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines"***

| Maximum Engine Power | Model Year | PM (g/bhp-hr) | NMHC+$NO_X$ (g/bhp-hr) | CO (g/bhp-hr) |
|---|---|---|---|---|
| HP > 750 (KW > 560) | 2008+ | 0.15 | 4.8 | 2.6 |

- 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 engines 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. In addition, the permit will include near-school operating provisions that meet the requirements of §93115.6(a)(1).

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 a minimum of 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 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 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 Sulfur Dioxide Fuel). Pursuant to Regulation 9-1-301, the ground level concentrations of $SO_2$ shall not exceed 0.5 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 0.5% 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 engines 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.

Per Regulation 9-8-110.5, emergency standby engines are 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 requirements of this regulation.

**California Environmental Quality Act 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 California Environmental Quality Act (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 evaluation of the proposed project was performed in accordance with comparable criteria set forth in Chapter 2.3.1 of the Permit Handbook and is considered ministerial.

**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.

The applicant has proposed to install the engine within 1,000 feet from the outer boundary of the following school site(s) identified in the following table.

**Table 10. School Sites Located Within 1,000 Feet of the Equipment**

| School Name | School Location | Grades | Description |
|---|---|---|---|
| Tenderloin Community | 627 Turk Street, San Francisco, CA 94102 | K-5 | Public |
| S.F. County Civic Center Secondary | 727 Golden Gate Avenue, San Francisco, CA 94102 | 6-12 | Public |
| Sacred Heart Cathedral Preparatory | 1055 Ellis Street, San Francisco, CA, 94109 | 9-12 | Private |

The District will be required to prepare a public notice as detailed in §42301.6. The public notice will be distributed to the addresses within 1,000 feet of the source and to the parents or guardians of children attending schools within a quarter (¼) mile of the source. The following schools are within a quarter mile of the source.

**Table 11. School Sites Located Within (¼) mile of the Equipment**

| School Name | School Location | Grades | Description |
|---|---|---|---|
| Tenderloin Community | 627 Turk Street, San Francisco, CA 94102 | K-5 | Public |
| S.F. County Civic Center Secondary | 727 Golden Gate Avenue, San Francisco, CA 94102 | 6-12 | Public |
| Sacred Heart Cathedral Preparatory | 1055 Ellis Street, San Francisco, CA, 94109 | 9-12 | Private |

## PERMIT CONDITIONS

**Permit Condition #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 Engines]

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 Engines]

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 Engines]

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 Engines]

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 Engines]

***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 proposal of the new, modified, and altered sources listed below. However, the proposed source will be located within 1,000 feet of a school, which triggers the public notification requirement of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the district initiate a public notice and consider any comments received prior to taking any final action on the issuance of an Authority to Construct for the following equipment:

**S-4 Stationary Emergency Diesel Engine - Generator Set**
**Make: Caterpillar, Model: 2806C-E18TAG3, Model Year: 2020**
**909 BHp, 5.67 MMBtu/Hr**
**Engine Family: LCPXL18.1NYS**

By: _____ Date: _____

Osvaldo Zacarias
Air Quality Engineer