

DRAFT
ENGINEERING EVALUATION
City of Brentwood
9100 Brentwood Blvd.
Plant Number: 22380
Application Number: 26176

BACKGROUND

The Applicant has submitted an application for a Permit to Operate the following:

- S-1 Emergency Standby Diesel Engine**
Detroit Model R1237M36, Model Year 2005
984 bhp, 6.83 MMBTU/hr

The engine was installed at the Brentwood Police Department in July of 2005. The

EMISSION CALCULATIONS

Criteria Pollutants

Table 1 summarizes criteria pollutant emissions resulting from the planned operation of S-1

Table 1

Pollutant	Emission Factor	Emmissions		
	(g/hp-hr)	Annual (lb/yr)	Annual (TPY)	Maximum Daily (lb/day)
NOx	5.75	623.13	0.3116	299.10
THC	0.26	28.18	0.0141	13.52
CO	0.60	65.02	0.0325	31.21
PM10	0.09	9.75	0.0049	4.68

From Table 3.4-1 of AP-42 and sulfur content of 15ppmw

	(lb/MMBTU)			
SO2	0.001515	0.52	0.00026	0.25

Basis:

- 984 hp Max Rated Output
- 58 gallons/hr Max Fuel Use Rate = 6.83 MMBTU/hr Max Combustion Capacity
- 50 hr/yr maximum Non-Emergency Operations per the stationary Airborne Toxic Control Measure (ATCM)
- The NO_x, NMHC, CO, and PM10 emission factors are from the Manufacturer's Performance Data Sheet
- The SO₂ emission factor is based on 15ppm sulfur in ULSD fuel derived from EPA AP-42, Table 3.4-1.
- Annual emissions are based on the annual limit (50hr/yr) of operation for testing and maintenance
- Max daily emissions are based on 24hr/day since no daily limits are imposed on emergency operations

Toxic Pollutants

Table 2 summarizes the emissions of all Toxic Air Contaminants listed on Table 2-5-1 resulting from the planned operation of S-1.

Table 2

Toxic Pollutant Emitted	Hourly Emissions (lb/hr)	Acute Trigger Level from Table 2-5-1 (lb/hr)	Annual Emissions (lb/yr)	Chronic Trigger Level from Table 2-5-1 (lb/yr)
Diesel Particulate PM10	0.19	N/A	9.75	0.34

Cumulative Increase

Table 3 summarizes the cumulative increase in criteria pollutants resulting from the planned operation of S-1.

Table 3

Pollutant	Pre-Existing Cumulative Increase (TPY)	Application Emissions Increase (TPY)	Final Cumulative Increase (TPY)
NOx	0	623.13	623.13
POC	0	28.18	28.18
CO	0	65.02	65.02
PM10	0	9.75	9.75
SO ₂	0	0.52	0.52

STATEMENT OF COMPLIANCE:

Regulation 2 - Permits, Rule 1 – General Requirements

Ministerial Projects (Section 2-1-311)

An application that is classified as ministerial is exempt from the CEQA requirement of *Section 2-1-310 Applicability of CEQA*. An application is considered ministerial 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 *Section 2-1-428 Criteria for Approval of Ministerial Permit Applications* and the specific procedures, fixed standards and objective measurements set forth in the District’s Permit Handbook and BACT/TBACT Workbook.

>Chapter 2.3.1 of the District’s Permit Handbook sets forth evaluation guidelines for Stationary Diesel Engines and will be used to evaluate S-1. Section 2 of the District’s BACT/TBACT Workbook covers Combustion Sources and will be used to determine BACT/TBACT compliance for S-1. As such, this application is classified as ministerial and S-1 is exempt from CEQA review.

Public Notice, Schools (Section 2-1-412)

A new or modified source located within 1,000 feet of the outer boundary of a K-12 school site which results in the increase in emissions of a toxic air contaminant in Table 2-5-1 of *Regulation 2, Rule 5 New Source Review of Toxic Air Contaminants* shall prepare and distribute a public notice in accordance with subsections 412.1 and 412.2 of *Regulation 2, Rule1 General Requirements*.

>The outer boundary of the nearest K-12 school, La Paloma High School, is less than 1,000 feet from the proposed location of S-1 and as such, S-1 is subject to the public notification requirements of this regulation. . A public notice will be prepared and sent to all addresses within 1000 feet of the diesel generator set and to parents and guardians of students at La Paloma High School.

Regulation 2 - Permits, Rule 2 – New Source Review

Best Available Control Technology Requirement (Section 2-2-301)

Any new or modified source that has the potential to emit 10.0 pounds or more per highest day of precursor organic compounds (POC), non-precursor organic compounds (NPOC), nitrogen oxides (NOx), sulfur dioxide (SO₂), PM₁₀ or carbon monoxide (CO) is required to use Best Available Control Technology as defined in *Regulation 2-2-206 Best Available Control Technology (BACT)*. S-1 triggers BACT for POC, NOx and CO since proposed maximum daily emissions of these pollutants will exceed 10 lb/day.

>BACT for this source is derived from the CARB ATCM Standards and set forth in the *BAAQMD BACT/TBACT Workbook for IC Engine Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document # 96.1.3, Revision 7 dated 12/22/2010* which establishes BACT 2 as *any engine certified or verified to achieve the applicable CARB ATCM standard*; S-1 is a CARB Certified engine with certificate 5DDXL35.8GRP and as such, meets BACT requirements.

Offset Requirements, POC and NOx (Section 2-2-302)

Federally enforceable emission offsets shall be provided for any new or modified source that emits more than 10 tons/yr of either NOx or POC.

>Based on the emissions as summarized in Table 1, offsets are not required for this application.

Offset Requirement, PM₁₀ and Sulfur Dioxide, NSR (2-2-303)

Regulation 2-2-303 establishes emission offset requirements for PM₁₀ and Sulfur Dioxide from new or modified sources located at a Major Facility.

>Since the facility that S-1 is operating at is not a Major Facility, S-1 is not subject to the offset requirements of *Regulation 2-2-302*.

Prevention of Significant Deterioration (PSD) (Section 2-2-304)

New major facilities and major modifications at major facilities must meet modeling requirements of *Regulation 2-2-304 PSD Requirement*.

>This is not a new major facility; nor is it a major modification of a major facility and therefore PSD modeling is not required for this application.

Regulation 2- Permits, Rule 5 New Source Review of Toxic Air Contaminants**General (2-5-100)**

Regulation 2-5-101 –Description states that any new or modified source of toxic air contaminant (TAC) shall be evaluated for potential public exposure and health risk. *Regulation 2-5-110 Exemption, Low Emission Levels* provides an exemption if, for each toxic air contaminant, the increase in emissions from the project is below the trigger levels listed in Table 2-5-1 of Regulation 2-5.

>The diesel particulate emissions from the operation of S-1 are calculated to be 9.75 lb/year which exceeds the trigger level of 0.34lb/year. Therefore S-1 is subject to the requirements of this regulation and a health risk screening analysis was performed. The analysis estimated the maximum cancer risk to be 2.01 in a million for residents, 1.55 in a million for off-site workers, and 0.48 in a million for students who attend La Paloma High School based on operating the diesel engine 50 hours per year. The hazard quotient for this project is .00071 for residents, 0.011 for off-site workers, and 0.00039 for students who attend La Paloma High School. In accordance with Regulation 2-5, this is an acceptable risk level since it has been demonstrated that the engine will meet the TBACT Standard for diesel PM.

Best Available Control Technology for Toxics (TBACT) Requirement (2-5-301)

TBACT must be applied to any new or modified source of TACs where the risk is a cancer risk greater than 1 in one million, and/or a chronic hazard index greater than 2.0. TBACT for this source is set forth in the *BAAQMD BACT/TBACT Workbook for IC Engine Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document # 96.1.3, Revision 7 dated 12/22/2010* which establishes TBACT for PM₁₀ at 0.15g/bhp-hr.

>S-1 will emit 0.09 g/bhp-hr and as such meets the TBACT requirement.

Regulation 6 - Particulate Matter, Rule 1 - General Requirements**Ringelmann No. 2 Limitation (Section 6-1-303)**

All engines less than 1500 in³ displacement, or any engine used solely as a standby source of motive power must meet the Ringelmann No. 2 Limitations of *Regulation 6-1-303* which states that a person shall not emit from any source for a period or periods aggregating more than three minutes in any hour, a visible emission which 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. Since S-1 has a displacement of 408 in³ it is subject to and expected to comply with *Regulation 6-1-303* pending a regular inspection.

Visible Particles (Section 6-1-305)

A person shall not emit particles which are large enough to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles.

>Since S-1 will emit a very small amount of PM₁₀ it is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with *Regulation 6-1-305* pending a regular inspection.

Particulate Weight Limitation (Section 6-1-310)

No source of particulate matter shall emit in excess of 343 mg/dscm of exhaust gas volume.

>Using the PM emission rate calculated in Table 1 and exhaust flow of 5,055 scfm (4,499 dscfm at standard moisture content of 11%) the particulate loading of the exhaust is calculated to be 11.51 mg/scm.

$$\left[\frac{88.56 \text{ gm PM}}{\text{hr}} \right] \left[\frac{1000 \text{ mg PM}}{\text{gm PM}} \right] \left[\frac{1 \text{ min}}{4,499 \text{ scf}} \right] \left[\frac{35.1 \text{ scf}}{1 \text{ scm}} \right] \left[\frac{1 \text{ hr}}{60 \text{ min}} \right] = 11.51 \frac{\text{mg PM}}{\text{scm}}$$

Therefore, S-1 is in compliance with Regulation 6-1-310.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 1 Sulfur Dioxide

S-1 is subject to the following sections of Regulation 9, Rule 1 and will comply with all sections by burning Ultra Low Sulfur Diesel with a sulfur content of 15ppm.

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

Sulfur Dioxide emissions shall not result in ground level concentrations in excess of 0.5ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes or 0.05ppm averaged over 24 hours.

General Emission Limitation (9-1-302)

A gas stream containing Sulfur Dioxide shall not contain sulfur dioxide in excess of 300ppm (dry).

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

The sulfur content of liquid fuel burned shall not exceed 0.5% by weight.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 8 NOx and CO from Stationary Internal Combustion Engines

Exemptions (Section 9-8-110)

Section 110.5 exempts emergency standby engines from the requirements of Sections 9-8-301 through 305, 501 and 503.

Emergency Standby Engines, Hours of Operation (Section 9-8-330)

S-1 is subject to the requirements of Regulation 9-8-330 which limits reliability related activity to 50 hr/yr.

>Permit Conditions for S-1 will include operating limits that meet this requirement.

Monitoring and Records (9-8-500)

S-1 is subject to the reporting requirements of Sections 502 and 530.

>Permit Conditions for S-1 will include reporting requirements that meet these standards.

Regulation 11 – National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP)

This engine is not subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because it is not located at a major facility for hazardous air pollutants.

Other Regulations

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

The District is charged with enforcing the requirements of California’s Air Toxic Control Measure for Stationary Compression Ignition Engines Title 17, California Code of Regulations, Section 9311 for the purpose of reducing diesel particulate matter (PM) and criteria pollutant emissions from stationary diesel-fueled compression ignition (CI) engines.

Subsection 93115.6(a)(3)(A)(1)(a) sets forth Emission Standards for new stationary emergency standby diesel fueled compression ignition engines with maximum engine power greater than 750 hp installed in 2005. S-1 meets these limits and complies with the requirement of this section of the ATCM as shown in Table 4:

Table 4

Pollutant	Manufacturer’s Performance Data Sheet Emission Rate (g/bhp-hr)	ATCM Emission Standards (g/bhp-hr)
PM	0.09	0.15
THC	0.26	1.3
NOx	5.75	9.2
CO	0.60	11.4

Subsection 93115(a)(3)(A)(1)(b) requires that new stationary emergency standby diesel-fueled engines (>50bhp) be certified to the emission standards as specified in 40 CFR, Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The Manufacturer’s Specification Sheet shows that S-1 has been certified to meet EPA Tier 1 standards and therefore, S-1 complies with this section of the ATCM.

Subsection 93115(a)(3)(A)(1)(c) limits the non-emergency operation of 50 hours/year for maintenance and testing. Permit Conditions for S-1 will limit non-emergency operation of S-1 to 50 hours/year and as such S-1 will comply with this section of the ATCM.

New Source Performance Standards (NSPS)

According to 40 CFR Section 60.4200(a)(1)(i) engines are subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines if they have a displacement of less than 30 liters per cylinder where the model year is 2007 or later, for engines that are not fire pump engines.

>S-1 has a displacement of less than 30 liters per cylinder and is a 2005 model year engine. Therefore S-1 is not subject to Subpart IIII of the NSPS.

CONDITIONS

I recommend the following permit conditions:

COND# 22850 -----

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection(e)(2)(A)(3) or (e)(2)(B)(3)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection(e)(4)(G)(1)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection e)(4)(I), (or, Regulation 2-6-501)]
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, playground, athletic field, or other areas of school property but does not include unimproved school property.
 [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1) or (e)(2)(B)(2)]

RECOMMENDATIONS:

This engineering evaluation has determined 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.

Since the engine will be located within 1000 feet of a school, a public notice of the results of the Health Risk Analysis must be issued per Regulation 2-1-412.6. A final determination on this project will be made after the public notice comments are received and reviewed.

I recommend that the District initiate a public notice of the results for:

- S-1 Emergency Standby Diesel Engine**
Detroit Model R1237M36, Model Year 2005
984 bhp, 6.83 MMBTU/hr

Anne C Werth
Air Quality Engineer

May 21, 2014

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