

DRAFT
ENGINEERING EVALUATION
Veterans Affairs Palo Alto Health Care System
3801 Miranda Ave, Palo Alto, CA 94304
Plant: 450
Application: 29077

BACKGROUND

Veterans Affairs Palo Alto Health Care System has applied to obtain an Authority to Construct for the following equipment:

S-38 Emergency Standby Diesel Generator Set (Bldg 603)
2015 Caterpillar Model: 3516C
3633 bhp, 23.69 MMBtu/hr abated by

A-38 Johnson Matthey CRT Particulate Filter System

The Emergency Diesel Engine Generator Set (S-38) will be located at 3801 Miranda Ave., Bldg. 603, Palo Alto, CA 94304. The engine will be abated particulate filter system with a reduction efficiency at least 85%.

S-38 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.

EMISSION CALCULATIONS

Criteria Pollutants

Pollutant	Emission Factor	Abatement Factor	Abated Emissions		
	(g/hp-hr)	% wt reduction	Annual (lb/yr)	Annual (TPY)	Maximum Daily (lb/day)
NO _x	3.78	0	1512.83	0.756	726.16
NMHC	0.19	0	76.04	0.038	36.50
CO	0.70	0	280.15	0.140	134.47
PM _{2.5} = PM ₁₀ (diesel particulate)	0.09	85	5.40	0.003	2.59
SO ₂	0.004	0	1.79	0.001	0.86

Basis:

- 3633 hp Max Rated Output – 173.5 gallons/hr Max Fuel Use Rate; 23.69 MMBTU/hr Max Combustion Capacity
- The NO_x, NMHC, CO, and PM₁₀ emission factors are from the manufacturer’s performance data
- The SO₂ emission factor is based on 15 ppm sulfur in ULSD fuel derived from EPA AP-42, Table 3.4-1.
- Annual emissions are based on the annual limit (50 hr/yr) of operation for testing and maintenance
- Max daily emissions are based on 24 hr/day since no daily limits are imposed on emergency operations

Toxic Pollutants

The only Toxic Air Contaminant listed on Table 2-5-1 emitted from S-38 is diesel particulate which has a chronic trigger level of 0.26 lb/yr. It is assumed that all of the PM₁₀ is diesel particulate. We also assume that all of the PM₁₀ is PM_{2.5}. Based on the above calculations the annual diesel particulate emissions are 5.40 lb/year. As such, this application requires a Toxics Risk Screening Analysis. Regulation 2-5 requires that the

cumulative impacts from all related projects permitted within the last three years be included in the risk screening analysis. There were no other projects permitted at the facility within the last three years.

Cumulative Increase

The table below summarizes the cumulative increase in criteria pollutants that will result from the operation of S-38:

Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Permitted Emissions, Post 4/5/91 (TPY)		Project Cumulative Emissions Increase (TPY)		Plant Cumulative Emissions Increase (TPY)
NO _x	11.110	+	0.756	=	11.866
POC	0.969	+	0.038	=	1.007
CO	4.160	+	0.140	=	4.300
PM ₁₀	4.283	+	0.003	=	4.286
PM _{2.5}	0.000	+	0.003	=	0.003
SO ₂	0.293	+	0.001	=	0.294

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.

> Section 2.3.1 of the District's Permit Handbook, which sets forth evaluation guidelines for Stationary Diesel Engines, was used to evaluate this engine. As such, this application is classified as ministerial and this engine is exempt from CEQA review with respect to air quality.

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, Rule 1 General Requirements*.

> The outer boundary of the nearest K-12 school, Henry M. Gunn High School, is 830 feet from the location of this engine. This engine is subject to the public notification requirements of *Regulation 2-1-412*. Since the engine is greater than 500 feet from the school boundary, the hours of operation for this engine will not be limited to school time hours of operations are described in the permit conditions. Notification of the proposed new source must be mailed to the parents or guardians of all children enrolled in any school within on-quarter mile of the sources, and to each address within a radius of 1,000 feet of the source, in order to give these parties an opportunity to provide public comments on the proposed actions. All comments received within 30 days of the publication of this notice will be reviewed and considered in the final evaluation and approval or denial of the application.

Regulation 2 - Permits, Rule 2 – New Source Review

PSD Project (Section 2-2-224)

This section defines a PSD project as one at a facility that has the potential to emit 100 tons or more per year of any PSD pollutant.

> This facility will not have the potential to emit 100 tons or more of any PSD pollutant therefore, this project is not a PSD project.

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

Any new source is required to use Best Available Control Technology (BACT) to control emissions of any District BACT pollutants [precursor organic compounds (POC), non-precursor organic compounds (NPOC), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), PM₁₀, PM_{2.5}, and/or carbon monoxide (CO)] that have the potential to emit 10 or more pounds on any day.

> Based on the emission calculations, BACT is triggered for NO_x, POC, and CO since the maximum daily emissions of each pollutant are greater than 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*. The more restrictive BACT 1 standard is not applicable to this engine because it will be limited to operation as an emergency standby engine. The BACT 2 emission limit for NO_x and CO is 4.56 g NO_x/bhp-hr and 2.60 g CO/bhp-hr, respectively. According to the engine’s Compliance Statement the NO_x and CO emission rates for this engine are 3.78 g NO_x/bhp-hr and 0.70 g CO/bhp-hr, respectively which are below the BACT 2 emission limits.

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

This section establishes emission offset requirements for POC and NO_x at facilities that will have the potential to emit more than 10 tons per year of POC or NO_x. If the facility will have the potential to emit more than 10 tons per year but less than 35 tons per year of NO_x or POC after the new or modified source is constructed, offsets must be provided at a 1:1 ratio for any un-offset cumulative increase in emissions at the facility. These offsets shall be provided by the District’s Small Facility Banking Account unless the applicant owns offsets.

> The facility has the potential to emit 11.866 tons of NO_x per year which exceeds the 10 ton per year limit, but is less than 35 tons per year. This project results in an emission increase of POC and NO_x are 0.038 and 0.756 tons per year. The NO_x emissions will need to be offset. Since the facility does not have a banking certificate, NO_x will be offset at a ratio of 1:1 from the Small Facility Bank.

Offset Requirement, PM_{2.5}, PM₁₀ and Sulfur Dioxide (2-2-303)

This section establishes emission offset requirements for PM_{2.5}, PM₁₀ and Sulfur Dioxide from new or modified sources located at facility with the potential to emit 100 tons per year of PM_{2.5}, PM₁₀ or Sulfur Dioxide

> Since the potential to emit PM_{2.5}, PM₁₀ or Sulfur Dioxide at the facility where this engine operates are each below 100 tons per year, this engine is not subject to the offset requirements of *Regulation 2-2-303*.

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.

> Diesel particulate emissions from the planned operation of S-38 are calculated to be 5.40 lb/year which exceeds the trigger level of 0.26 lb/year. Therefore, S-38 is subject to the requirements of this regulation and a health risk screening analysis (HRSA) was performed for this project. As determined using the District’s May 14, 2015 HRSA Streamline Policy Checklist for Stationary Emergency Standby and Fire Pump Diesel Engines, this application qualifies for the HRSA Streamlining Policy. Based on this policy, the District has determined that this project will comply with District TBACT requirements. This project will result in health impacts of less than 10 in a million cancer risk and less than 1.0 chronic hazard index based on conservative HRSA screening procedures. Therefore, this project will comply with Regulation 2, Rule 5, Section 301 and 302. A refined HRSA is not required for this application.

Regulation 6 - Particulate Matter, Rule 1 - General Requirements

Ringelmann No. 1 Limitation (6-1-301)

Except as provided in Sections 6-1-303, 6-1-304 and 6-1-306, 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. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree.

> Since S-38 will emit a very small amount of PM₁₀ it is expected to comply with *Regulation 6-1-301* pending a regular inspection.

Opacity Limitation (6-1-302)

Except as provided in Sections 6-1-303, 6-1-304 and 6-1-306, a person shall not emit from any source for a period or periods aggregating more than three minutes in any hour an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such device is required by District regulations.

> Since S-38 will emit a very small amount of PM₁₀ it is expected to comply with *Regulation 6-1-302* 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-38 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)

A person shall not emit from any source particulate matter in excess of 0.15 grains/dscf of exhaust gas volume.

> The emission rate from S-38 is 0.0135 grams/bhp-hr, which results in an outlet grain loading of 0.0035 grains/dscf at 0% O₂. The emission rate is less than the limit 0.15 grains/dscf and is in compliance with *Regulation 6-1-310*.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 1 Sulfur Dioxide

S-38 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 15 ppm, which results in less than 1 ppmv of SO₂ in the exhaust gas.

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

Sulfur Dioxide emissions shall not result in ground level concentrations in excess of 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.

General Emission Limitation (Section 9-1-302)

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

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

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

Regulation 9 – Inorganic Gaseous Pollutants, Rule 8 NO_x 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-38 is subject to the requirements of *Regulation 9-8-330* which limits reliability related operation of the engines to 50 hours per year.

> Permit Conditions for S-38 will include operating limits that meet this standard.

Monitoring and Records (Section 9-8-500)

S-38 is subject to the reporting requirements of Sections 502 and 530.

> Permit Conditions for S-38 will include reporting requirements that meet this standard.

Regulation 10 – Standards of Performance for New Stationary Sources

New Source Performance Standards (NSPS)

Any new or modified source is required to comply with *Regulation 10, Standard of Performance for New Stationary Sources* – which is Title 40, Part 60 of the Code of Federal Regulation incorporated by reference. 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-38 is a 4-cylinder engine with a total displacement of 78 liters, so each cylinder has a volume less than 30 liters and this engine is subject to NSPS

Section 60.4205(b) requires that owners and operators of these engines comply with the emission standards in Section 60.4202, which refers to 40CFR89.112 and 40CFR89.113 for all pollutants.

> S-38 meets the limits for engines greater than 750 HP, as shown in the table below:

Pollutant	Manufacturer's Performance Data (g/bhp-hr)	40CFR89.112 Emission Limits (g/bhp-hr)
PM	0.09	0.15
NMHC + NO _x	4.00	4.8
CO	0.70	2.6

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

> The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a sulfur content of 15 parts per million (ppm) maximum, and a cetane index of 40 or a maximum aromatic content of 35 volume percent.

> The owner/operator is expected to comply with this requirement because CARB allows only ultra-low sulfur diesel to be used in California.

Section 60.4209(a) requires a non-resettable hour meter.

> S-38 will be subject to standard permit conditions that includes this requirement.

> S-38 will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 1068 under engine family FCPXL18.1NZS-002.

> Standard permit conditions limiting operation to 50 hours per year for reliability testing except for operating during emergencies at S-38 ensure that it will comply with the requirement in Section 60.4211(e) which limits such operation to less than 100 hours per year.

Regulation 11 – National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP)

S-38 is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE). Per 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE located at an area source must meet the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines. This engine is in compliance with the requirements of 40 CFR part 60 subpart IIII, as shown in the “NSPS” section of this evaluation.

Other Regulations

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 93115* for the purpose of reducing diesel particulate matter (PM) and criteria pollutant emissions from stationary diesel-fueled compression ignition (CI) engines.

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

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.

> S-38 is subject to and meets the requirement of this section of the ATCM as shown in the table below:

Pollutant	Manufacturer's Performance Data Sheet Emission Rate (g/bhp-hr)	ATCM Emission Standards (g/bhp-hr)
PM	0.09	0.15
NMHC + NO _x	4.00	4.8
CO	0.70	2.6

Subsection 93115(a)(3)(A)(1)(b) requires that new stationary emergency standby diesel-fueled engines (>50 bhp) 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-38 has been certified to meet EPA Tier 2 standards and therefore, S-38 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-38 will limit non-emergency operation to 50 hours/year and as such S-38 will comply with this section of the ATCM.

CONDITIONS

I recommend the following permit condition for S-38:

COND# 22850 -----

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing.
 [Basis: "Regulation 2-5]

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, 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]

RECOMMENDATIONS:

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/Permit to Operate for the equipment listed below. However, the proposed source will be located within 1,000 feet of a school, which triggers the public notification requirements 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 issuance of an Authority to Construct/Permit to Operate for the following source:

S-38 Emergency Standby Diesel Generator Set (Bldg 603)
2015 Caterpillar Model: 3516C
3633 bhp, 23.69 MMBtu/hr abated by

A-38 Johnson Matthey CRT Particulate Filter System

Loi Chau, Air Quality Engineer

Date