

DRAFT
ENGINEERING EVALUATION
SANTA ROSA MEMORIAL HOSPITAL
PLANT 2531
APPLICATION 29938

BACKGROUND

Santa Rosa Memorial Hospital is applying for an Authority to Construct and/or Permit to Operate a new emergency standby generator.

S-14 Emergency Standby Generator Set at Medical Arts Plaza: Diesel Engine, Make Caterpillar/Perkins, Model C7.1, Model Year 2019, 247 BHP.

The generators will be within 1000 feet of the property boundary of Santa Rosa French-American Charter School, so it is subject to the school public notice requirements in the District Regulation 2-1-412.

EMISSIONS SUMMARY

Annual Emissions:

Basis:

- 247 brake horsepower (bhp) output rating for full-load, standby operation for each engine
- 50 hours/year/engine operation for reliability-related activities
- The Perkins engine has an EPA Engine Family Name KPKXL07.0PW1, and is certified to meet the EPA Tier 3 standards. Emission factors were calculated using the manufacturer's emission testing data submitted to EPA for certification.

Pollutant	Emission Factor (g/bhp-hr)
NO _x	2.61
CO	0.75
POC	0.14
PM	0.10

- The emission factor for SO₂ is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors, which is based on full conversion of fuel sulfur to SO₂ and which will therefore be considered applicable to any diesel engine (sulfur content will be assumed to be the California limit of 0.0015 wt% sulfur):

$$\text{SO}_2: 8.09\text{E-}3 (\% \text{ S in fuel oil}) \text{ lb/hp-hr} = 8.09\text{E-}3 (0.0015\% \text{ S}) (454 \text{ g/lb}) = 0.0055 \text{ g/hp-hr}$$

NO _x	=	(	2.61	g/hp-hr)	(	247	hp)	(	50	hr/yr)	(lb/454g)	=	71.00	lb/yr	=	0.035	TPY
CO	=	(	0.75	g/hp-hr)	(	247	hp)	(	50	hr/yr)	(lb/454g)	=	20.29	lb/yr	=	0.010	TPY
POC	=	(	0.14	g/hp-hr)	(	247	hp)	(	50	hr/yr)	(lb/454g)	=	3.85	lb/yr	=	0.0019	TPY
PM ₁₀	=	(	0.10	g/hp-hr)	(	247	hp)	(	50	hr/yr)	(lb/454g)	=	2.84	lb/yr	=	0.0014	TPY
SO ₂	=	(	0.0055	g/hp-hr)	(	247	hp)	(	50	hr/yr)	(lb/454g)	=	0.1496	lb/yr	=	0.000075	TPY

Maximum Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for Best Available Control Technology (10 lb/highest day total source emissions for any class of pollutants). A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

NO _x	=	(	2.61	g/hp-hr)	(	247	hp)	(	24.00	hr/day)	(lb/454g)	=	34.08	lb/day
CO	=	(	0.75	g/hp-hr)	(	247	hp)	(	24.00	hr/day)	(lb/454g)	=	9.74	lb/day
POC	=	(	0.14	g/hp-hr)	(	247	hp)	(	24.00	hr/day)	(lb/454g)	=	1.85	lb/day
PM ₁₀	=	(	0.10	g/hp-hr)	(	247	hp)	(	24.00	hr/day)	(lb/454g)	=	1.36	lb/day
SO ₂	=	(	0.0055	g/hp-hr)	(	247	hp)	(	24.00	hr/day)	(lb/454g)	=	0.07	lb/day

PLANT CUMULATIVE INCREASE (tons/year, post 4/5/1991)

Pollutant	Current	Application Increase	New Total
NO _x	1.135	0.035	1.170
CO	1.699	0.010	1.709
POC	0.115	0.002	0.117
PM10	0.357	0.001	0.358
PM2.5	0.007	0.001	0.008

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, Santa Rosa French-American Charter School, is about 700 feet from the location of the source. This application is subject to the public notification requirements of *Regulation 2-1-412*. Since it 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 will 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 sources, in order to give these parties an opportunity to provide public comments on the proposed actions. A public notice period of 30 days is required, and comments will be considered before making a final decision.

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 since the maximum daily emissions of NO_x are greater than 10 lb/day. BACT for the 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 the engine because it will be limited to operation as emergency standby engine. The BACT 2 emission limit for NO_x is 2.85 g/bhp-hr. According to the emission data submitted to EPA for this engine family, the NO_x emission rate for the engine is 2.61 g/bhp-hr which is below the BACT 2 emission limit.

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 less than 10 tons of NO_x or POC per year, so the engine is not subject to the offset requirements of *Section 2-2-302*.

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.

> The calculated emissions increase of diesel exhaust particulate matter (PM) associated with the engine are in excess of the chronic risk screening trigger as set forth in Regulation 2-5 as show below.

Source	Abated PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)
S-14	0.10	247	50	2.84	0.26

As determined using the District’s HRSA Streamlining Policy Checklist for Stationary Emergency Standby and Fire Pump Diesel Engines, this application qualifies for the District’s May 6, 2015 HRSA Streamlining Policy for Stationary Diesel-Fired IC Engines Used for Backup Power or Fire Pumps. Based on this policy, the District has determined that this project will comply with District TBACT requirements and 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 health risk assessment 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-14 is an EPA certified engine and is expected to emit low 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-14 is an EPA certified engine and is expected to emit low 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-14 is an EPA certified engine, it is expected to emit low amount of PM₁₀ and 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-14 is 0.10 grams/bhp-hr, which results in an outlet grain loading of about 0.006 grains/dscf. The emission rate is much 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-14 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 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-14 is subject to the requirements of *Regulation 9-8-330* which limits reliability related operation of the engines to 50 hours per year per engine.

> Permit Conditions for S-14 will include operating limit that meets this standard.

Monitoring and Records (Section 9-8-500)

S-14 is subject to the reporting requirements of Sections 502 and 530.

> Permit Conditions for S-14 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-14 has an engine with a total displacement of 7 liters, so each cylinder has a volume less than 30 liters and these engines are 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-14 meet the limits for engines between 225 kW and 450 kW, as shown in the table below:

Pollutant	Manufacturer's Performance Data (g/kW-hr)	40CFR89.112 Emission Limits (g/kW-hr)
PM	0.14	0.20
NMHC + NO _x	3.7	4.0
CO	1.0	3.5

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engines 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 engines.

> 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 for stationary engines in California.

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

> S-14 will be subject to standard permit conditions that includes this requirement.

> S-14 will comply with the requirements of Section 60.4211(c) because the source has been certified in accordance with 40 CFR Part 1068 under engine family name KPKXL07.0PW1.

> Standard permit conditions limiting operation to 50 hours per year for reliability testing except for operating during emergencies at S-14 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-14 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. The 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-14 is subject to and meet 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	0.10	0.15
NMHC + NO _x	2.75	4.8
CO	0.75	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*.

> S-14 been certified to meet EPA Tier 3 standards and therefore, they comply 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-14 will limit non-emergency operation to 50 hours/year/engine and as such it will comply with this section of the ATCM.

PERMIT CONDITIONS

S-14 will be subject to Permit Condition Numbers 22850 as shown below.

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 93115.6 (b)(3)(A)(1)(a)]
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 93115.6 (b)(3)(A)(1)(a)]
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 93115.10 (e)(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 93115.10 (g) (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 93115.6 (b)(2)]

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 Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a school, which triggers the school public notification requirements of District Regulation 2-1-412.6. 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 Authority to Construct for the following source:

S-14 Emergency Standby Generator Set: Diesel Engine, Make Caterpillar/Perkins, Model C7.1, Model Year 2019, 247 BHP.

By: _____

Xuna Cai
Senior Air Quality Engineer

Date: _____