

ENGINEERING EVALUATION REPORT
City of Suisun City, Plant No. 19647
APPLICATION No. 20563

BACKGROUND

City of Suisun City submitted an application to obtain an Authority to Construct and/or Permit to Operate for the following source:

S-1 Emergency Generator, Detroit Diesel, Model Series 60, Engine Family 9DDXL14.0VLD, 550 BHP

The proposed generator will be used at the City Hall and the Police Station of the City of Suisun City. City Hall and the Police Station are essentially the same building, although they are separated physically approximately 14 feet apart. The new engine will be for emergency use only to ensure public safety during times when there is no power to City Hall/Police Station, especially during a major emergency event. The Police Station houses the dispatch center for which it is paramount that they have electricity at all times and the ability to contact in a very timely manner the City Fire Department, Public Works Department, ambulances, the County Emergency Operations Center and the other emergency responders.

Pursuant to Regulation 2, Rule 1, Section 232 and the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines, S-1 is considered a new source.

EMISSIONS

Basis:

The proposed engine is an EPA and CARB certified engine (CARB Executive Order No. U-R-007-0112). Annual emissions from S-1, assuming 50 hr/yr of total operation (to comply with ATCM requirements) and 550 bhp, will be calculated using the CARB Executive Order U-R-002-0380 emission factors. For hydrocarbon emissions, 5% of the NMHC + NOx factor is assumed. The SO2 emission factor is from EPA AP-42, Table 3.4-1 ("Large Stationary Diesel and Dual-Fuel Engines"), 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 0.05 wt% sulfur):

$$\text{SO}_2 = 27 \text{ gals/hr} (7 \text{ lb/gal})(15 \times 10^{-6}) \times 2 \text{ mole SO}_2/\text{S} = 0.0057 \text{ lb/hr}$$

$$\text{SO}_2 = 0.0057 \text{ lb/hr} \times (454 \text{ g/lb}) / 550 \text{ hp} = 0.005 \text{ g/bhp-hr}$$

$$\text{NMHC} = 5\% (3.8 \text{ g/kw-hr})(0.742 \text{ kw/hp}) = 0.14 \text{ g/bhp-hr}$$

$$\text{NO}_x = 95\% (3.8 \text{ g/kw-hr})(0.742 \text{ kw/hp}) = 2.67 \text{ g/bhp-hr}$$

$$\text{CO} = 1.1 \text{ g/kw-hr}(0.742 \text{ kw/hp}) = 0.82 \text{ g/bhp-hr}$$

$$\text{PM}_{10} = 0.18 \text{ g/kw-h}(0.742 \text{ kw/hp}) = 0.13 \text{ g/bhp-hr}$$

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Pollutant	Emission Factor (g/bhp-hr)	Maximum Annual Emissions (Cumulative Increase)¹ (TPY)	Maximum Daily Emissions per Engine² (lb/day)
NO _x	2.67	0.08	78
CO	0.82	0.02	24
PM ₁₀	0.13	0.004	4
POC	0.14	0.004	4
SO ₂	0.005	0.0002	1

Best Available Control Technology (BACT) Review

As per Regulation 2, Rule 2, Section 301, BACT is triggered for S-1, because NO_x and CO emissions are in excess of the 10-lb/highest day trigger level for BACT. Document number 96.1.2 of the District's BACT/TBACT Workbook gives BACT guidelines for the source category of IC Engines-Compression Ignition at or above 175 hp output rating.

The BACT guidelines per this section follow on the next page.

For the engine size, the following is the most current Tier standards:

HP	NMHC + NO _x	CO	PM	Years
300 < 600 HP	3.0 g/bhp-hr	2.6 g/bhp-hr	0.15 g/bhp-hr	2006-2010
225 < 450 KW	4.0 g/kw-hr	3.5 g/kw-hr	0.20 g/kw-hr	2006-2010

According to the CARB Executive Order No. U-R-007-0112, the engine is certified to meet the following emissions:

HP	NMHC + NO _x	CO	PM	Years
550 HP	3.8 g/kw-hr	1.1 g/kw-hr	0.18 g/kw-hr	2009

The source (S-1) meets BACT requirements.

¹ Emissions are determined by the following calculation:

$$\text{lb/yr} = (50 \text{ hr/yr}) (550\text{bhp}) (\text{Emission Factor [=]} \text{ g/bhp-hr}) (1 \text{ lb}/453.6 \text{ g})(1 \text{ T}/2000 \text{ lb})$$

² Maximum daily emissions based on 24 hours per day. Emissions are determined by the following calculation:

$$\text{lb/day} = (24 \text{ hr/day}) (550 \text{ bhp}) (\text{Emission Factor [=]} \text{ g/bhp-hr}) (1\text{lb}/453.6 \text{ g})$$

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT Best Available Control Technology (BACT) Guideline
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Source Category

Source:	IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump	Revision:	6
		Document #:	96.1.3
Class:	> 50 BHP Output	Date:	04/13/2009

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Archived in Practice	TYPICAL TECHNOLOGY
POC	<ol style="list-style-type: none"> 1. n/s^d 2. Current tier^{a,b} standard for POC at applicable horsepower rating. 	<ol style="list-style-type: none"> 1. n/s^d 2. Any engine certified or verified to achieve the applicable standard.^{a,b}
NOx	<ol style="list-style-type: none"> 1. n/s^d 2. Current tier^{a,b} standard for NOx at applicable horsepower rating. 	<ol style="list-style-type: none"> 1. n/s^d 2. Any engine certified or verified to achieve the applicable standard.^{a,b}
SO₂	<ol style="list-style-type: none"> 1. n/s^d 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm. 	<ol style="list-style-type: none"> 1. n/s^d 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel).
CO	<ol style="list-style-type: none"> 1. n/s^d 2. The more stringent of either 2.75 g/bhp-hr [319 ppmvd @ 15% O₂]^c or the current Tier^{a,b} standard. 	<ol style="list-style-type: none"> 1. n/s^d 2. Any engine certified or verified to achieve the applicable standard.
PM₁₀	<ol style="list-style-type: none"> 1. n/s^d 2. More stringent of either 0.15 g/bhp-hr or the current Tier standard. 3. TBACT: The more stringent of either 0.15 g/bhp-hr or the current Tier standard. 	<ol style="list-style-type: none"> 1. n/s^d 2. Any engine or technology demonstrated, certified or verified to achieve the applicable standard. 3. Any engine or technology demonstrated, certified or verified to achieve the applicable standard.
NPOC	<ol style="list-style-type: none"> 1. n/s 2. n/s 	<ol style="list-style-type: none"> 1. n/s 2. n/s



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OFFSETS

Pursuant to Regulation 2, Rule 2, Section 302, offsets are NOT triggered for POC or NOX emissions, because both facility emissions of these two pollutants will not exceed 10 TPY. Moreover, offsets are not required for PM₁₀ and SO₂ emissions as the facility is not a major facility as defined in Regulation 2, Rule 2, Section 303.

TOXIC RISK SCREEN ANALYSIS

Per the attached May 7, 2009 Risk Screening Assessment from the District's Toxics Evaluation Section, a risk screening analysis was performed on this application because emissions of diesel particulate were estimated to exceed the risk screening trigger level (0.6 lb/yr). The cancer risk is calculated based on the emission rate of diesel exhaust particulate matter. Diesel exhaust particulate matter is used as a surrogate for all toxic contaminants found in diesel exhaust. The District's Regulation 2, Rule 5 requires that the cumulative impacts from all related projects be evaluated in the risk screen.

For 50 hours of operation per year, excluding periods when operation is required due to emergency conditions, the maximum cancer risk was calculated to be 10 chances in a million, and the maximum project chronic hazard quotient is 0.006. For off-site workers, the increased maximum cancer risk is 4.49 chances in a million and the hazard quotient is 0.0032. For the students who attend Crystal Middle School, the increased maximum cancer risk is 0.108 in a million and a hazard quotient of 0.00026. These health risk values meet the criteria for acceptable levels established in the Regulation 2, Rule 5.

STATEMENT OF COMPLIANCE

S-1, standby engine is subject to the Ringelmann No. 2 limitations of Regulation 6-303 (emissions opacity limitations). Per Regulation 6, Section 303, a person shall not emit 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. Properly operated and maintained engines are expected to meet this requirement.

S-1 is also subject to the SO₂ limitations of Regulation 9-1-302 (ground level concentration) and 9-1-304 (0.5% by weight in fuel). Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). Additionally, per Regulation 9, Rule 1, Section 304, a person shall not burn any liquid fuel having a sulfur content in excess of 0.5% by weight. Compliance with both Regulations 9-1-302 and 9-1-304 is likely since California law mandates using diesel fuel with a 0.05% by weight sulfur.

Since the source is a emergency standby engine, S-1 is not subject to the requirements of Regulations 9-8-301, 9-8-302, and 9-8-502 per Regulation 9, Rule 8, Section 110.4.

9-8-110 Exemptions: The requirements of Sections 9-8-301, 302, and 502 shall not apply to the following:
110.4 Emergency standby engines.

The proposed project is subject to the monitoring and record keeping procedures described in Regulation 9-8-530. The requirements of this Regulation are included in the proposed permit conditions.

This application is considered to be ministerial under the District's CEQA guidelines (Regulation 2-1-311) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

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Pursuant to the results of the Toxic Risk Screening Analysis and the ATCM for stationary diesel engines, S-1 is limited to 50 hours per year of operation for reliability-related activities and it meets the emission limits for new engines of 0.15 g/bhp-hr.

PSD, NSPS, and NESHAPS are not triggered.

This engine emissions data is derived from CARB certified report (CARB Executive Order No. U-R-007-0112) and thus is not subject to source testing conditions to demonstrate compliance. Hence, no further source testing is required.

The facility is located within 1000 feet of Crystal Middle School. As a result, school public noticing requirements are triggered.

PERMIT CONDITIONS

I recommend Condition # 22850 for S-1:

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

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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)]

End of Conditions

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RECOMMENDATION

Waive Authority to Construct and issue Permits to Operate to City of Suisun City for the following:

- S-1 Emergency Generator, Detroit Diesel, Model Series 60, Engine Family 9DDXL14.0VLD, 550 BHP

BY: M.K. Carol Lee 05/28/2009
M.K. Carol Lee, Senior AQ Engineer Date

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