

Draft

ENGINEERING EVALUATION Classic Residence by Hyatt; PLANT 16345 APPLICATION 10574

BACKGROUND

Classic Residence by Hyatt has applied for an Authority to Construct and Permit to Operate two emergency standby generators.

S-1 Emergency Generator: Diesel Engine; Make: AB Volvo Penta; Model: TAD1031GE; Rated Horsepower: 394 hp

S-2 Emergency Generator: Diesel Engine; Make: Caterpillar; Model: 3512; Rated Horsepower: 2155 hp

These generators will be located at 600/620 Sand Hill Road in Palo Alto, CA. They will provide emergency power (in the event of a blackout) for all essential electrically powered equipment at the Classic Residence Skilled Nursing Facility. These emergency engines must be periodically tested to ensure that they will generate when needed. Testing or maintenance may not be conducted between 7:30 a.m. and 3:30 p.m. on days when school is in session.

EMISSIONS

Annual Average Emissions:

- Basis:
- S-1 has 394 bhp output rating for full-load, standby operation
 - S-2 has 2155 bhp output rating for full-load standby operation
 - 50 hrs/yr operation for S-1 and 10 hrs/yr operation for S-2 for testing and maintenance
 - NO_x, VOC, and CO, PM₁₀ emission factors per ISO 8178-D2 for S-1 and per CARB Certification data (U-R-001-0174) for S-2

Pollutant	S-1 Emission factor (g/hp-hr)	S-2 Emission factor (g/hp-hr)
NO _x	3.58	6.26
VOC	0.32	0.30
CO	0.89	1.27
PM10	0.1	0.134

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):

SO₂: $8.09E-3(0.05) \text{ lb/hp-hr} (454 \text{ g/lb}) = 0.18 \text{ g/hp-hr}$

S-1

NO_x: $(50 \text{ hr/yr})(394 \text{ hp})(3.58 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0777 \text{ ton/year}}$

POC: $(50 \text{ hr/yr})(394 \text{ hp})(0.32 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0069 \text{ ton/year}}$

CO: $(50 \text{ hr/yr})(394 \text{ hp})(0.89 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0193 \text{ ton/year}}$

PM10: $(50 \text{ hr/yr})(394 \text{ hp})(0.1 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0022 \text{ ton/year}}$

$$\text{SO}_2: (50 \text{ hr/yr})(394 \text{ hp})(0.18 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0039 \text{ ton/year}}$$

S-2

$$\text{NO}_x: (10 \text{ hr/yr})(2155 \text{ hp})(6.26 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.149 \text{ ton/year}}$$

$$\text{POC: } (10 \text{ hr/yr})(2155 \text{ hp})(0.30 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0302 \text{ ton/year}}$$

$$\text{CO: } (10 \text{ hr/yr})(2155 \text{ hp})(1.27 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.00713 \text{ ton/year}}$$

$$\text{PM}_{10}: (10 \text{ hr/yr})(2155 \text{ hp})(0.134 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0032 \text{ ton/year}}$$

$$\text{SO}_2: (10 \text{ hr/yr})(2155 \text{ hp})(0.18 \text{ g/hp-hr})(\text{lb}/454\text{g})(\text{ton}/2000 \text{ lb}) = \mathbf{0.0043 \text{ ton/year}}$$

Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day operation will be assumed.

S-1

$$\text{NO}_x: (24 \text{ hr/day})(394 \text{ hp})(3.6 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{74.57 \text{ lb/day}}$$

$$\text{POC: } (24 \text{ hr/day})(394 \text{ hp})(0.3 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{6.62 \text{ lb/day}}$$

$$\text{CO: } (24 \text{ hr/day})(394 \text{ hp})(0.9 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{18.54 \text{ lb/day}}$$

$$\text{PM}_{10}: (24 \text{ hr/day})(394 \text{ hp})(0.10 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{2.08 \text{ lb/day}}$$

$$\text{SO}_2: (24 \text{ hr/day})(394 \text{ hp})(0.18 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{1.02 \text{ lb/day}}$$

S-2

$$\text{NO}_x: (24 \text{ hr/day})(2155 \text{ hp})(6.3 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{713 \text{ lb/day}}$$

$$\text{POC: } (24 \text{ hr/day})(2155 \text{ hp})(0.3 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{145 \text{ lb/day}}$$

$$\text{CO: } (24 \text{ hr/day})(2155 \text{ hp})(1.3 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{34 \text{ lb/day}}$$

$$\text{PM}_{10}: (24 \text{ hr/day})(2155 \text{ hp})(0.134 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{15 \text{ lb/day}}$$

$$\text{SO}_2: (24 \text{ hr/day})(2155 \text{ hp})(0.18 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{21 \text{ lb/day}}$$

PLANT CUMULATIVE INCREASE

	current (ton/yr)	proposed		new total (ton/yr)
		S-1 (ton/yr)	S-2 (ton/yr)	
POC:	0.0	0.0069	0.0302	0.0371
NO_x:	0.0	0.0777	0.149	0.227
SO₂:	0.0	0.0039	0.0043	0.0082
CO:	0.0	0.0193	0.00713	0.0264
NPOC:	0.0	0	0	0
PM₁₀:	0.0	0.0022	0.0032	0.0054

Toxic Risk Screening for S-1 and S-2:

The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (1) and Table (2) below, and a Risk Screening Analysis has been performed.

Table 1

Source:	PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year) ¹	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.1	394	50	8.68	0.64	Yes

Table 2

Source:	PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year) ¹	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
2	0.134	2155	10	63.6	0.64	Yes

In order for these engines to meet the risk level set by the District's Risk Management Policy, the applicant has requested that S-1's and S-2's hours of operation, excluding periods when operation is required due to emergency conditions, be limited to no more than 50 hours per year and 10 hours per year, respectively. (See attached letter by Classic Residence by Hyatt dated December 7, 2004)

BACT

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-1 and S-2 are subject to BACT for the following pollutant: POC, NO_x, CO, SO₂, and PM₁₀. BACT 1 levels do not apply for engines used exclusively for emergency use during involuntary loss of power as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet the BACT 2 limits.

As a standby generator, S-1 and S-2 are subject to the current BACT 2 standards of 6.9 g/hp-hr for NO_x, 1.5 g/hp-hr for POC, 2.75 g/hp-hr for CO, 0.15 g/hp-hr for PM₁₀, and using fuel oil with less than 0.05% sulfur for SO₂.

The owner/operator meets BACT 2 standards for SO₂ since California Diesel Fuel of <0.05% by weight sulfur will be used and permit condition part 1 has been inserted to insure this.

¹ Annual Usage based on 100 hours per year of operation for reliability-related activities as defined in Regulation 9-8-330 ("Emergency Standby Engines, Hours of Operations").

For NO_x, POC, CO, PM₁₀, and SO₂ the emission limits set by BACT 2 are met, as shown in Table (3) below.

Table (3)

Pollutant	S-1 Engine Emission Factors (g/hp-hr)	S-2 Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NO _x	3.58	6.26	6.9	Yes
POC	-	0.30	1.5	Yes
CO	0.89	1.27	2.75	Yes
PM ₁₀	-	0.134	0.15	Yes

Therefore, S-1 and S-2 are determined to be in compliance with the BACT 2 limits for NO_x, POC, CO, PM₁₀, and SO₂.

Since ISO 8178-D2 testing data and CARB certification data was used to establish the emission factors for S-1 and S-2, respectively, the BACT 2 emission limits have not been incorporated into the permit conditions. S-1 and S-2 are assumed to comply with the design standards demonstrated by the ISO 8178-D2 and CARB certification testing.

OFFSETS

Offsets are not required because permitted emissions are each expected to be less than 15 ton/yr.

PUBLIC COMMENT

The project is within a thousand feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. The public notice will be posted on the internet and mailed to all Parents or Guardians with children enrolled at The Children's Health Council: The Esther B. Clark School. It will also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

STATEMENT OF COMPLIANCE

S-1 and S-2 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NO_x and CO from Stationary Internal Combustion Engines"). S-1 and S-2 are subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO₂ limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is very likely since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all combustion sources, S-1 and S-2 are subject to Regulation 6 ("Particulate and Visible Emissions"). This engine 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 pending a regular inspection.

Since S-1 and S-2 are located within 500 feet of school grounds, no owner or operator shall operate S-1 and S-2 for non-emergency use, including maintenance and testing, between 7:30 a.m. and 3:30 p.m. on days when school is in session.

This application is considered to be ministerial under the District's 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.

PSD, NSPS and NESHAPS are not triggered.

PERMIT CONDITIONS

APPLICATION 10574; CLASSIC RESIDENCE BY HYATT; PLANT 16345
CONDITIONS FOR S-1; S-2
PC# 21781

1. The owner/operator of emergency generator S-1 and S-2 shall use only diesel fuel having a sulfur content no greater than 0.05% by weight. The sulfur content of the fuel oil shall be certified by the fuel oil vendor.
(Basis: Cumulative Increase)

2. The owner/operator of S-1 and S-2 shall only operate these engines to mitigate emergency conditions or for reliability-related activities. Operation for reliability-related activities shall not exceed 50 hours in any calendar year for S-1. Operation for reliability-related activities shall not exceed 10 hours in any calendar year for S-2. Operation while mitigating emergency conditions is unlimited.
(Basis: Regulation 9-8-330, Cumulative Increase, Toxic Risk Screening)

“Emergency Conditions” is defined as any of the following:

(Basis: Regulation 9-8-231)

- a. Loss of regular natural gas supply
- b. Failure of regular electric power supply
- c. Flood mitigation
- d. Sewage overflow mitigation
- e. Fire
- f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor

“Reliability-related activities” is defined as any of the following:

(Basis: Regulation 9-8-232)

- a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
- b. Operation of an emergency standby engine during maintenance of a primary motor

3. The owner/operator of S-1 and S-2 shall provide these engines with either:
(Basis: Regulation 9-8-530)
 - a. a non-resettable totalizing meter that measures and records the hours of operation for each engine
 - b. a non-resettable fuel usage meter for each engine, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

4. The owner/operator of S-1 and S-2 shall maintain the following monthly records. These records shall be kept in a District-approved log for at least 2 years and shall be made available for District inspection upon request:
(Basis: Regulations 9-8-530, 1-441)
 - a. Total hours of operation
 - b. Hours of operation under emergency conditions and a description of the nature of each emergency condition
 - c. Fuel usage

5. Since S-1 and S-2 are located within 500 feet of school grounds, the owner or operator shall not operate S-1 and S-2 for non-emergency use, including maintenance and testing, between 7:30 a.m. and 3:30 p.m. on days when school is in session.
(Basis: California Code of Regulations: Section 93115, Title 17)

RECOMMENDATION

Issue Classic Residence by Hyatt an Authority to Construct for the following equipments:

- S-1 Emergency Generator: Diesel Engine; Make: AB Volvo Penta; Model: TAD1031GE; Rated Horsepower: 394 hp**
- S-2 Emergency Generator: Diesel Engine; Make: Caterpillar; Model: 3512; Rated Horsepower: 2155 hp**

By _____

Date: _____

**Henry Leung
Air Quality Engineering Intern**