

DRAFT
ENGINEERING EVALUATION
Peralta Community College District, Plant No. 17864
Application No. 14800

BACKGROUND

Peralta Community College District has applied for a CARB-certified diesel engine that will be used to power a standby generator at the facility at 2050 Center Street in Berkeley.

**S1, Stationary Emergency Standby Generator: Diesel Engine; Make: Cummins;
Model: QSX15-G9; Rated Horsepower: 750 HP**

This engine is located about 450 feet and about 1250 feet from Washington Elementary School. Therefore, Waters Bill notification is triggered in accordance with BAAQMD Regulation 2-1-412. A public notice must be prepared and distributed to the parents or guardians of the children enrolled in the schools and to each address within a radius of 1000 feet of the source, as follows:

- 412.2 Distribute the notice, prepared in accordance with subsection 2-1-412.1 at the expense of the applicant, to the parents or guardians of children enrolled in any school within one-quarter mile of the source and to each address within a radius of 1000 feet of the source. This notice shall be distributed at least 30 days prior to the date final action on the application is to be taken by the APCO. The APCO shall review and consider all comments received during the 30 days after the notice is distributed, and shall include written responses to the comments in the permit application file prior to taking final action on the application.

EMISSIONS

Annual Average Emissions:

- Basis:
- 750 hp output rating
 - 50 hr/yr operation for testing and maintenance (applied for)
 - NOx, VOC, CO and PM10 emission factors from CARB certification data:

| | |
|--------------|-------------|
| NOx and VOC: | 6.3 g/kw-hr |
| CO: | 0.6 g/kw-hr |
| PM10: | 0.1 g/kw-hr |

Kw-hrs are converted to bhp-hrs by multiplying by 0.746. 5% of the combined NOx and VOC emission factor is considered to be VOC; 95% is considered to be NOx.

Therefore, the emission factors in terms of bhp/hr are:

| | |
|-------|-----------------|
| NOx: | 4.465 g/bhp-hr |
| POC: | 0.235 g/bhp-hr |
| CO: | 0.448 g/bhp-hr |
| PM10: | 0.0746 g/bhp-hr |

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):

$$\text{SO}_2: \quad 8.09\text{E-}3(0.05) \text{ lb/hp-hr (454 g/lb)} = 0.184 \text{ g/hp-hr}$$

NO_x: (50 hr/yr)(750 hp)(4.465 g/hp-hr)(lb/454 g) = **368.80 lb/yr = 0.184 TPY**

POC: (50 hr/yr)(750 hp)(0.235 g/hp-hr)(lb/454 g) = **19.411 lb/yr = 0.010 TPY**

CO: (50 hr/yr)(750 hp)(0.446 g/hp-hr)(lb/454 g) = **36.922 lb/yr = 0.018 TPY**

PM₁₀: (50 hr/yr)(750 hp)(0.0746 g/hp-hr)(lb/454 g) = **6.162 lb/yr = 0.0031 TPY**

SO₂: (50 hr/yr)(750 hp)(0.184 g/hp-hr)(lb/454 g) = **15.20 lb/yr = 0.008 TPY**

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 since no daily limits are imposed on intermittent and unexpected operations.

NO_x: (24 hr/day)(755 hp)(4.463 g/hp-hr)(lb/454 g) = **176.94 lb/day**

POC: (24 hr/day)(755 hp)(0.235 g/hp-hr)(lb/454 g) = **9.31 lb/day**

CO: (24 hr/day)(755 hp)(0.447 g/hp-hr)(lb/454 g) = **17.72 lb/day**

PM₁₀: (24 hr/day)(755 hp)(0.0746 g/hp-hr)(lb/454 g) = **2.95 lb/day**

SO₂: (24 hr/day)(755 hp)(0.184 g/hp-hr)(lb/454 g) = **7.30 lb/day**

BACT is triggered for NO_x and CO. The engine complies with BACT because it is a 2005 CARB-certified engine.

PLANT CUMULATIVE INCREASE

| | current (ton/yr) | proposed (ton/yr) | new total (ton/yr) |
|--------------------|---------------------|----------------------|-----------------------|
| NO _x : | 0 | 0.184 | 0.184 |
| POC: | 0 | 0.010 | 0.010 |
| CO: | 0 | 0.018 | 0.018 |
| PM ₁₀ : | 0 | 0.003 | 0.003 |
| SO ₂ : | 0 | 0.008 | 0.008 |

TOXIC RISK SCREENING ANALYSIS

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. Because the proposed emissions exceed the risk screening trigger level for diesel exhaust particulate matter in Table 2-5-1, a risk screening was performed.

Per the attached July 11, 2006 memo from Daphne Chong, District Toxicologist, results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 0.482 in a million to the maximally exposed resident and 1.59 in a million to the maximally exposed worker if the engine were to run up to 50 hours/year for testing. In accordance with the District's Risk Management Policy, this risk level is considered acceptable, since this engine meets current TBACT requirements.

This engine is located about 450 feet and about 1250 feet from Washington Elementary School. In accordance with the California Stationary Diesel Engine ATCM, section 93115, the engine will not be allowed to operate from 7:30 and 3:30 on days when school is in session. Therefore, risk to students is considered to be negligible.

BACT

BACT is triggered for NOx and CO as maximum daily emissions exceed 10 lb/day, as calculated on page 1 (Daily Emissions). BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

| | | | |
|---------|---|-------------|-----------------|
| Source: | IC Engine - Compression Ignition | Revision: | 5 |
| | | Document #: | 96.1.2 |
| Class: | > or = 175 horsepower output rating | Date: | 01/11/02 |

Determination

| POLLUTANT | BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT | TYPICAL TECHNOLOGY |
|-----------|--|--|
| POC | 1. 0.30 g/bhp-hr [62 ppmvd @ 15% O ₂] ^{a,b} 2. 1.5 g/bhp-hr [309 ppmvd @ 15% O ₂] ^{b,c} | 1. Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine ^{a,b} 2. CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine ^{b,c} |
| NOx | 1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] ^{a,b} 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c} 3. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ² | 1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler ^{a,b} 2. Timing Retard ≤ 4° + Turbocharger w/ Intercooler ^{a,b,c} 3. Timing Retard ≤ 4° + Turbocharger w/ Intercooler |

| | | |
|------------------|--|--|
| SO ₂ | 1. n/d 2. fuel oil < 0.05% sulfur ^{a,b} | 1. n/d 2. Fuel Selection ^{a,b} |
| CO | 1. n/s 2. 2.75 g/bhp-hr [319 ppmvd @ 15% O ₂] ^{b,c} | 1. Catalytic Oxidation ^b 2. CARB or EPA (or equivalent) low-CO emitting certified engine ^{b,c} |
| PM ₁₀ | 1. n/d 2. If practical, gas-fueled engine or electric motor. If not, "California Diesel Fuel" (fuel oil w/ < 0.05% by weight sulfur and < 20% by volume aromatic hydrocarbons) ^b 3. 0.1 grams/bhp-hr | 1. Catalyst Guard Bed ^{a,b} 2. Fuel Selection ^{b,d} 3. CARB or EPA (or equivalent) low-particulate matter emitting certified engine, or particulate filter |
| NPOC | 1. n/a 2. n/a | 1. n/a 2. n/a |

References

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| <p>a. CARB/CAPCOA Clearinghouse</p> <p>b. BAAQMD NOTE: IC Engine BACT and TBACT is a low emitting, spark-ignited, gas-fueled engine with lean burn combustion or rich burn with non-selective catalytic reduction, or electric motor. A diesel engine will be permitted only if a gas-fueled engine, or electric motor, is not practical (e.g., a remote location without natural gas availability or electric power, or only a diesel engine will meet the portability and/or power/torque/rpm requirements of the application under review, or the engine is used exclusively for emergency use during involuntary loss of power).</p> <p>c. Timing retard, etc. controls alone may be acceptable only in very limited situations for temporary sources.</p> |
|--|

S1 satisfies the current BACT 2 standards of 6.9 g/hp-hr for NOx and 2.75 g/hp-hr for CO. The more restrictive BACT 1 standard is not applicable to this engine because it will be limited to operation as an emergency standby engine.

Since CARB certification data was used to establish the NOx and CO emission factors, the BACT 2 emission limits have not been incorporated into the permit conditions and are assumed to comply through the design standards demonstrated by the CARB certification testing.

OFFSETS

Offsets are not required for this application since the facility emissions are far below 10 TPY of POC and NOx, and are far below the Major Facility offset thresholds.

STATEMENT OF COMPLIANCE

S1 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S1 is 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, Rule 1 is assured because diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all combustion sources, S1 is 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.

The engine is subject to the State Airborne Toxic Control Measure for Stationary Diesel Engines, which limits the non-emergency hours of operation for this engine to 50 hour/year, since its diesel PM emissions are between 0.01 and 0.15 g/bhp-hr.

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 is not triggered because the facility is not a major facility.

The engine is not subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (NSPS) because Section 60.4200(a)(2)(i) states that the standard applies to engines ordered by July 11, 2005 and manufactured after April 1, 2006 in Section 60.4200(a)(2)(i). The model year is 2005. The engine was on the site on August 25, 2005, according to Paul Miller, the electrical engineer of record; therefore it is not subject to the NSPS.

The engine is not subject to 40 CFR 63, Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because Section 63.6585 states that the standard applies only to major sources of hazardous air pollutants.

PERMIT CONDITIONS

Standard Template Condition #22850

COND# 22850 -----

1. Operating for reliability-related activities is limited to 50 hours per year per engine.

[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 or 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 hours 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 or 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)]

RECOMMENDATION

Issue an Authority to Construct for:

**S1, Stationary Emergency Standby Generator: Diesel Engine; Make: Cummins;
Model: QSX15-G9; Rated Horsepower: 750 HP**

By: _____
Brenda Cabral
Senior Air Quality Engineer

Date: 7/14/06