DRAFT ENGINEERING EVALUATION
Sonoma State University, Plant: 1810
1801 East Cotati Avenue, Rohnert Park, CA 94928
Application: 20560

BACKGROUND

Sonoma State University is applying for an Authority to Construct and/or Permit to Operate a Standby Emergency Generator.

S15 Stationary Standby Generator Set: Diesel Engine; Make: Caterpillar; Model: C9; Model Year; 2008; Rated Horsepower: 398 HP

The standby generator will be located at the above address.

EMISSIONS CALCULATIONS

Annual Emissions:

The CARB certified (CARB Executive Order U-R-001-0322) emission factors for S15 (398 HP diesel engine) are shown below.

Pollutant	Emission Factors (g/bhp-hr)
NOx	2.347
CO	0.67
POC	0.124
PM10	0.131
SO2	0.000055

**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.*

SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.0015% S) (454 g/lb) = 0.000055 g/hp-hr

S15

NOx	=	(2.347 g/hp-hr)	(398 hp)	(50 hr/yr)	(lb/454g)	=	102.88 lb/yr	= 0.05 TPY
CO	=	(0.67 g/hp-hr)	(398 hp)	(50 hr/yr)	(lb/454g)	=	29.37 lb/yr	= 0.015 TPY
POC	=	(0.124 g/hp-hr)	(398 hp)	(50 hr/yr)	(lb/454g)	=	5.44 lb/yr	= 0.003 TPY
PM10	=	(0.131 g/hp-hr)	(398 hp)	(50 hr/yr)	(lb/454g)	=	5.74 lb/yr	= 0.003 TPY
SO2	=	(0.000055g/hp-hr)	(398 hp)	(50 hr/yr)	(lb/454g)	=	0.002 lb/yr	= 0.000 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

S15

NOx	=	(2.347 g/hp-hr)	(398 hp)	(24 hr/day)	(lb/454g)	=	49.38 lb/day
CO	=	(0.67 g/hp-hr)	(398 hp)	(24 hr/day)	(lb/454g)	=	14.1 lb/day
POC	=	(0.124 g/hp-hr)	(398 hp)	(24 hr/day)	(lb/454g)	=	2.61 lb/day
PM10	=	(0.131 g/hp-hr)	(398 hp)	(24 hr/day)	(lb/454g)	=	2.76 lb/day
SO2	=	(0.000055g/hp-hr)	(398 hp)	(24 hr/day)	(lb/454g)	=	0.001 lb/day

Toxic Risk Screening:
The toxic emissions of diesel particulate exceed the District Risk Screening Trigger, as shown in Table (1) below. Therefore, a Risk Screening Analysis is necessary.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S15

Source:	PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Regulation 2-5 Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
15	0.131	398	50	5.74	0.58	Yes

Per the attached 7/20/2009 memo from Ted Hull, results from the health risk screening analysis show that the maximally exposed industrial receptor is 14 in a million for 50 hours of operation per year. In accordance with Regulation 2-5, this is not an acceptable risk level. Sources that meet TBACT must have a cancer risk of 10 in a million or less. In order to achieve a cancer risk at or below 10 in a million, S15 will be limited to 36 hours of operation per year for reliability-related activities.

BACT/TBACT REVIEW

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, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S15 is subject to BACT for the following pollutants: NOx and CO. 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 the meet BACT 2 limits presented below.

The BACT standard was modified on April 13, 2009. For NOx, the engine has to meet the current BACT 2 standard, which is the current tier standard for NOx at the applicable horsepower rating. For CO, the engine has to meet the current BACT 2

standard, which is the more stringent of either 2.75 g/bhp-hr (319 ppmvd @ 15% O) or the current tier standard for CO at the applicable horsepower rating. The current tier standard for CO for this engine is 2.6 g/bhp-hr, more stringent than 2.75 g/bhp-hr.

The NOx and CO emission limits set by BACT 2 are met, as shown in Table (2) for S15.

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NOx	2.347	3.0	YES
CO	0.67	2.6	YES

Therefore, S15 is determined to be in compliance with the BACT 2 limits for NOx and CO.

PLANT CUMULATIVE INCREASE AND OFFSETS
(since April 5, 1991)

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New S-15	Total
NOx	4.925	0.05	4.975
CO	6.623	0.015	6.638
POC	0.502	0.003	0.505
PM10	1.435	0.003	1.438
SO2	0.11	0	0.110

The pre-4/5/91 cumulative increase was 2.737 TPY POC, 0.693 TPY SO2, and zero for all other criteria pollutants. Assuming that the total of the pre- and post-4/5/91 cumulative increase (3.242 TPY POC and 4.975 TPY NOx) represents the Potential to Emit (PTE) of the facility, the facility is not subject to the requirement for offsets for POC and NOx because the PTE for each pollutant is under 10 TPY, pursuant to Regulation 2-2-302.

STATEMENT OF COMPLIANCE

The owner/operator of S15 shall comply with Regulation 6-1 (Particulate Matter and Visible Emissions Standards). Since this engine meets TBACT for PM10 (<0.15 g/hp-hr), it is expected to comply with Regulation 6-1.

The owner/operator of S15 shall comply with Regulation 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.05% wt% sulfur, per Regulation 9-1.

Because S15 is an emergency standby generator, it is exempt pursuant to Regulation 9-8-110.5 from the requirements of Sections 9-8-301 and 302 (emission standards) and 9-8-502 (recordkeeping requirements). Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 are included in the Permit Conditions below.

This diesel engine is subject to the Stationary Diesel Airborne Toxics Control Measure (ATCM) and is considered a new stationary emergency standby diesel engine since it will be installed after January 1, 2005 and is larger than 50 HP. The requirements of the ATCM will be included in the permit conditions.

The project is considered to be ministerial under the District's CEQA 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 emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is within 1000 feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and posted on the Internet. The public notice was distributed to all Parents or Guardians with children enrolled at Rancho Cotate High School and all residential and business neighbors located within 1000 feet of the proposed new source of pollution.

This generator is also governed by the California Air Resources Board's Air Toxic Control Measure for Stationary Compression Ignition Engines, CCR Title 17, Section 93115. The explicit annual equipment usage limitation of 50 hours per year except for operation under emergency conditions (Reg 9-8-330) will be included as part of the permit conditions.

The generator is also governed by the provisions of Regulation 2, Rule 5, "New Source Review for Toxic Air Contaminants."

NSPS: The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 8.8 liters. Each cylinder has a volume of less than 10 liters. The engine is a 2008 engine. Section 60.4205(b) requires these engines to comply with the standards in Section 60.4202 for all pollutants for the same model year and maximum engine power. Section 60.4202(a)(ii) requires that engines over 50 hp must meet the EPA standards in 40 CFR 89.112 and 40 CFR 89.113.

For engines between 300 and 600 hp, these standards are:

- NOX and HC: 3.0 g/HP-hr
- CO: 2.6 g/HP-hr
- PM: 0.15 g/HP-hr
- 20% opacity during acceleration
- 15% opacity during lugging

- 50% opacity during peaks in acceleration or lugging

According to CARB Executive Order U-R-001-0322, the engine will comply with these standards.

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.

Section 60.4207(a) requires that by October 1, 2007, the owner/operator must use fuel that complies with 40 CFR 80.510(a). This means that the fuel must have a sulfur content of 500 parts per million (ppm) maximum, a cetane index of 40 or a maximum aromatic content of 35 volume percent.

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 the same cetane index or aromatic content.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is already in the standard permit conditions.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing, and the prohibition of running for any reason other than emergency operation, maintenance, and testing because they are limited by permit condition to 50 hours per year for reliability testing and otherwise may only operate for emergencies.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

Section 60.4214 states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engine does not have a diesel particulate filter, it is not subject to Section 60.4214(c).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions.

***NESHAP*:** This engine is not subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because it is not located at a major facility for hazardous air pollutants.

PSD does not apply.

PERMIT CONDITIONS

Application 20560: Sonoma State University: Plant 1810:
Conditions for S15 (Condition #22836)

1. **Operating for reliability-related activities is limited to 36 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 to Sonoma State University for:

S15 Stationary Standby Generator Set: Diesel Engine; Make: Caterpillar; Model: C9; Model Year; 2008; Rated Horsepower: 398 HP

EXEMPTIONS
None.

By:_____ Date: 7/6/09

Jimmy Cheng
Air Quality Engineer