

DRAFT
ENGINEERING EVALUATION
Verizon Wireless (Travis Air Force Base)
P#16913-A#12138
2851 Dobe Lane
Fairfield, CA 94533

BACKGROUND

Verizon Wireless (Travis Air Force Base) is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Emergency Standby Generator Set: Diesel Engine; Make: John Deere; Model: 5030HF270; Rated Horsepower: 94 HP

This Generator Set will be used at 2851 Dobe Lane, Fairfield, CA 94533. The generator set will provide emergency electrical power in the event of a blackout at the Travis Air Force Base. This emergency engine must be periodically tested to ensure that they will generate when needed. Since generator set S-1 will be located at a distance of approximately 500 feet from the Windsor High school boundary line, the engine will not be allowed to operate between the hours of 7:30 a.m. and 3:30 p.m. on days when school is in session.

EMISSIONS SUMMARY

Annual Emissions:

The 94 HP diesel engine at S-1 was tested per ISO8178-D2 and the emission factors are listed below.

Table (1)

Emission Factors		
Component	Emission (g/kw·hr)	Emission (g/bhp·hr)
NOx	6.79	5.065
CO	negligible	negligible
POC	0.46	0.343
PM₁₀	0.12	0.089
SO₂*	0.25	0.184

**The value for CO was obtained from CARB certified data, while all other emissions values (besides SO₂), tested under the ISO-8178 D2 cycle were provided by the engine manufacturer submitted by the applicant.*

***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. SO₂ 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.184 g/hp-hr*

CARB certification is based on tests conducted on several different engines within the same family with slightly different designs. Because the certified emissions are intended to represent the entire family, CARB certified emissions reflect the data from the engine in the family with the highest emissions.

The applicant has provided the District with a copy of its application for CARB certification. It has demonstrated that one of the engines tested is identical in make and model to the engine that is the subject of this application. The emission from this engine is as follows:

Maximum Emissions in Tons per year:

Table (2)

Maximum Emissions in Tons per year			
NO _x	= (5.070 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g)	= 34.64 lb/yr	= 0.017 TPY
CO	= (negligible g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g)	= 0.00 lb/yr	= 0.000 TPY
POC	= (0.343 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g)	= 2.35 lb/yr	= 0.001 TPY
PM ₁₀	= (0.089 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g)	= 0.61 lb/yr	= 0.000 TPY
SO ₂	= (0.184 g/bhp-hr)(96 hp)(33 hrs/yr)(1lb/453.6g)	= 1.28 lb/yr	= 0.001 TPY

The APCO had determined that emissions for this application are better represented by data from the identical engine from the certified family. However, since the emissions are not certified by CARB, the permit condition will limit emissions to the factors used in the analysis.

Maximum Daily Emissions:

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

Table (3)

Maximum Daily Emissions			
NO _x	= (5.070 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g)	= 25.19 lb/day	
CO	= (negligible g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g)	= 0.00 lb/day	
POC	= (0.343 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g)	= 1.71 lb/day	
PM ₁₀	= (0.089 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g)	= 0.45 lb/day	
SO ₂	= (0.184 g/bhp-hr)(96 hp)(24 hrs/day)(1lb/453.6g)	= 0.93 lb/day	

Plant Cumulative Increase: (tons/year)

Table (4)

Plant Cumulative Increase(tons/yr.)			
Pollutant	Existing	New	Total
NO_x	0	0.017	0.017
CO	0	0.000	0.000
POC	0	0.001	0.001
PM₁₀	0	0.000	0.000
SO₂	0	0.001	0.001
NPOC	0	0.000	0.000

Toxic Risk Screening:

The toxic emission of diesel particulate does not exceed the District Risk Screening Trigger, as shown in Table (5) below. The applicant has accepted a permit condition of 33 hours of operation for maintenance and reliability testing per letter dated September 24, 2004. Because emissions are below the trigger level, the toxic emissions are deemed insignificant. No further review is required

Table (5)

Toxic Emission Of Diesel Particulate						
Source:	PM₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.089	94	33	0.615	0.64	NO

Calculation:

$$\begin{aligned}
 \text{PM}_{10} \text{ from CARB Certified levels } &= 0.12 \text{ (g/kW-hr) / 1.341 (hp/kW) } = 0.089 \text{ (g/hp-hr)} \\
 \text{Diesel Exhaust Particulate Emission (lb/yr.)} &= \text{PM}_{10} \text{ (g/hp-hr) * HP * Annual Usage (hr/yr)} \\
 &= 0.089 * 94 * 33 \\
 &= 279.18 \text{ g/yr / 453.6 g/lb} \\
 &= 0.615 \text{ lb/yr}
 \end{aligned}$$

STATEMENT OF COMPLIANCE

S-1 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 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 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). These engines are not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to be in compliance with Regulation 6 pending a regular inspection.

This application is considered to be ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) 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.

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 Golden Middle School. It will

also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

Best Available Control Technology:

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, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: NOx. 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 presented below.

Table (6)

BACT 2 Limits		
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	1. <i>Catalytic Oxidation and CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine</i> ^{a,b} 2. <i>CARB or EPA (or equivalent) low-total hydrocarbon emitting certified engine</i> ^{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]	1. <i>Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler</i> ^{a,b} 2. <i>Timing Retard ≤ 4° + Turbocharger w/ Intercooler</i> ^{a,b,c} 3. <i>Timing Retard ≤ 4° + Turbocharger w/ Intercooler</i>
CO	1. <i>n/s</i> 2. 2.75 g/bhp-hr [319 ppmvd @ 15% O ₂] ^{b,c}	1. <i>Catalytic Oxidation</i> ^b 2. <i>CARB or EPA (or equivalent) low-CO emitting certified engine</i> ^{b,c}

For NOx, the emission limits set by BACT 2 are met, as shown in Table (7) below.

Table (7)

Analysis of BACT2 Limits			
Pollutant	Engine Emission Factors with Catalyst (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
POC	0.343	1.5	YES
NOx	5.065	6.9	YES
CO	negligible	2.75	YES

Therefore, S-1 is determined to comply with the BACT 2 limits for NOx.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Plant #: 16913; Application #: 12138; Company Name: Verizon Wireless (Travis Air Force Base), Inc Condition: #22279; For S-1

1. The owner/operator of emergency generator S-1 shall use only diesel fuel having sulfur content no greater than 0.05% by weight. The fuel oil vendor shall certify the sulfur content of the fuel oil.
(Basis: Cumulative Increase)
2. The owner/operator of S-1 shall only operate this engine to mitigate emergency conditions or for reliability-related activities. Operation for reliability-related activities shall not exceed 33 hours in any calendar year. 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 shall provide this engine with either:
(Basis: Regulation 9-8-530)

- a. a non-resettable totalizing meter that measures and records the hours of operation for the engine
 - b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.
4. The owner/operator shall not exceed the following emission rates NO_x as 5.065 g/bhp-hr; CO as negligible; POC as 0.343 g/bhp-hr; PM₁₀ as 0.089 g/bhp-hr; and SO₂ as 0.184 g/bhp-hr.
 5. The owner/operator shall not operate the emergency standby engine(s) for testing or maintenance between 7:30 AM and 3:30 PM on days when schools are in session.
[Basis: ATCM]
 6. The owner/operator of S-1 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.

RECOMMENDATION

Issue an Authority to Construct to Verizon Wireless (Travis Air Force Base). Located at 2851 Dobe Lane, Fairfield, CA 94533:

EXEMPTIONS

None.

By: Madhav Patil

Date: 5/25/2005

Air Quality Engineering Intern

Acronyms:			
S-1	Source one	NPOC	Non- Precursor Organic Compound
HP	Horse Power	TBACT	Best Available Control Technology for Toxics
CARB	California Air Resource Board	BACT	Best Available Control Technology
NOx	Oxides of Nitrogen as NO ₂	BAAQMD	Bay Area Air Quality Management District
CO	Carbon Monoxide	IC Engines	Internal Combustion Engines
POC	Precursor Organic Compound	EPA	Environmental Protection Agency
HC	Hydrocarbons	SCR	Selective Catalytic Reduction
PM ₁₀	Particulate Matter	PSD	Prevention of Significant Deterioration
SO ₂	Sulfur Dioxide	NSPS	New Source Performance Standard
O ₂	Oxygen	NESHAPS	National Emission Standard for Hazardous Air Pollutants
ppmv	parts per million by volume	CEQA	California Environmental Quality Act
ATCM	Airborne Toxic Control Measure		