

DRAFT
Engineering Evaluation
Verizon Wireless
Application No. 25993
Plant No. 22279

BACKGROUND

Verizon Wireless has applied for an Authority to Construct and/or a Permit to Operate the following equipment:

- S-1 Emergency Standby Natural Gas Generator Set, with built-in 3-way catalyst
Generac, Model: SG035, Model Year: 2013
82 bhp, 0.70 MMBtu/hr**

The equipment will be located at 2923 Webster Street, Oakland, CA 94609

The natural gas fired generator set (S-1) will provide emergency standby power in the event of a disruption to power service. S-1 is equipped with a three-way (oxidation-reduction) catalytic converter, which is an integral part of the source, to reduce exhaust emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and precursor organic compounds (POC). Because the three-way catalytic converter is an integral part of S-1, the abatement device will be permitted as part of the source and will not be assigned any abatement device number. The criteria pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

The engine is subject to attached condition no. 23107.

EMISSIONS CALCULATIONS

The emission factors used to estimate NO_x, POC, and CO emissions are based on engine manufacturer's abated emissions data. Total hydrocarbons emission rates are assumed to be equal to POC emission rates. The engine will operate during emergency use and for a maximum of 50 hours per year for maintenance and testing. See Table 1.

The emission factors used to estimate SO₂ and PM₁₀ emissions are based on AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-burn Engines.

Table 1: Annual and daily criteria pollutants emissions

Pollutant	Abated Emission Factor (g/BHP-hr)	Abated Emission (lb/hr)	Abated Emission (lb/day)	Abated Emission (lb/yr)	Abated Emission (TPY)
NO _x	0.22	0.040	0.954	1.987	0.001
POC	0.380	0.069	1.648	3.433	0.002
CO	0.640	0.116	2.775	5.781	0.003
SO ₂	0.001	0.000	0.003	0.006	0.000
PM ₁₀	0.022	0.004	0.097	0.202	0.000

TOXIC RISK SCREENING ANALYSIS

To estimate Hazardous Air Pollutants (HAPs) or Toxic Air Contaminants (TACs) emissions from S-1, the higher emission factors of those from EPA AP-42 Table 3.2-3 for natural gas fired 4-stroke rich burn engines and California Air Resources Board (CARB) California Air Toxics Emission Factors (CATEFs) for natural gas fired 4-stroke rich burn engines with less than 650 hp are used.

The HAP emission estimates are based on uncontrolled emission factors and assume a conservative abatement efficiency of 50% removal of organic HAP compounds. The abatement efficiency assumption is based on the fact that the engine is being permitted with a Catalytic Converter and an air/fuel ratio controller.

As shown in Tables 2 and 3 below, no TACs exceed the District's Risk Screening trigger levels. Therefore, a Health Risk Screening Analysis (HRSA) is not required.

Table 2. HAP emissions, based on AP-42

Compound	E.F. (lb/MMBtu)	Abated Emissions (lb/hr)	Acute Trigger Level (lb/hr)	HRSA Triggered? (Y/N)	Abated Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Y/N)
1,1,2,2-Tetrachloroethane	2.53E-05	8.80E-06	None	NO	4.40E-04	1.90E+00	NO
1,1,2-Trichloroethane	1.53E-05	5.32E-06	None	NO	2.66E-04	6.60E+00	NO
1,1-Dichloroethane	1.13E-05	3.93E-06	None	NO	1.97E-04	6.60E+01	NO
1,2-Dichloroethane	1.13E-05	3.93E-06	None	NO	1.97E-04	5.30E+00	NO
1,2-Dichloropropane	1.30E-05	4.52E-06	None	NO	2.26E-04	None	NO
1,3-Butadiene	6.63E-04	2.31E-04	None	NO	1.15E-02	6.30E-01	NO
1,3-Dichloropropene	1.27E-05	4.42E-06	None	NO	2.21E-04	None	NO
Acetaldehyde	2.79E-03	9.70E-04	1.0E+00	NO	4.85E-02	3.80E+01	NO
Acrolein	2.63E-03	9.15E-04	5.5E-03	NO	4.57E-02	1.40E+01	NO
Benzene	1.58E-03	5.50E-04	2.9E+00	NO	2.75E-02	3.80E+00	NO
Butyr/isobutyraldehyde	4.86E-05	1.69E-05	None	NO	8.45E-04	None	NO
Carbon Tetrachloride	1.77E-05	6.16E-06	4.2E+00	NO	3.08E-04	2.50E+00	NO
Chlorobenzene	1.29E-05	4.49E-06	None	NO	2.24E-04	3.90E+04	NO
Chloroform	1.37E-05	4.77E-06	3.3E-01	NO	2.38E-04	2.00E+01	NO
Ethane	7.04E-02	2.45E-02	None	NO	1.22E+00	None	NO
Ethylbenzene	2.48E-05	8.63E-06	None	NO	4.31E-04	4.30E+01	NO
Ethylene Dibromide	2.13E-05	7.41E-06	None	NO	3.70E-04	1.50E+00	NO
Formaldehyde	2.05E-02	7.13E-03	1.2E-01	NO	3.57E-01	1.80E+01	NO
Methanol	3.06E-03	1.06E-03	6.2E+01	NO	5.32E-02	1.50E+05	NO
Methylene Chloride	4.12E-05	1.43E-05	3.1E+01	NO	7.17E-04	1.10E+02	NO
Naphthalene	9.71E-05	3.38E-05	None	NO	1.69E-03	3.20E+00	NO
PAH	1.41E-04	4.90E-05	None	NO	2.45E-03	6.90E-03	NO
Styrene	1.19E-05	4.14E-06	4.6E+01	NO	2.07E-04	3.50E+04	NO
Toluene	5.58E-04	1.94E-04	8.2E+01	NO	9.70E-03	1.20E+04	NO
Vinyl Chloride	7.18E-06	2.50E-06	4.0E+02	NO	1.25E-04	1.40E+00	NO
Xylene	1.95E-04	6.78E-05	4.9E+01	NO	3.39E-03	2.70E+04	NO

Table 3. HAP emissions, based on CATEFs

SUBSTANCE	E.F. MEAN (lbs/MMcf)	Abated Emissions (lb/hr)	Acute Trigger Level (lb/hr)	HRSA Triggered? (Y/N)	Abated Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Y/N)
1,3-Butadiene	1.04E-01	3.55E-05	None	NO	1.77E-03	6.30E-01	NO
Acenaphthene	1.94E-03	6.62E-07	None	NO	3.31E-05	None	NO
Acenaphthylene	1.45E-02	4.94E-06	None	NO	2.47E-04	None	NO
Acetaldehyde	8.83E-01	3.01E-04	1.00E+00	NO	1.51E-02	3.80E+01	NO
Acrolein	5.47E-01	1.87E-04	5.50E-03	NO	9.33E-03	1.40E+01	NO
Anthracene	1.84E-03	6.27E-07	None	NO	3.14E-05	None	NO
Benzene	1.91E+00	6.51E-04	2.90E+00	NO	3.26E-02	3.80E+00	NO
Benzo(a)anthracene	2.94E-04	1.00E-07	None	NO	5.01E-06	None	NO
Benzo(a)pyrene	1.15E-04	3.92E-08	None	NO	1.96E-06	None	NO
Benzo(b)fluoranthene	2.37E-04	8.08E-08	None	NO	4.04E-06	None	NO
Benzo(g,h,i)perylene	1.95E-04	6.65E-08	None	NO	3.32E-06	None	NO
Benzo(k)fluoranthene	1.03E-04	3.51E-08	None	NO	1.76E-06	None	NO
Chrysene	3.10E-04	1.06E-07	None	NO	5.29E-06	None	NO
Dibenz(a,h)anthracene	1.25E-05	4.26E-09	None	NO	2.13E-07	None	NO
Ethylbenzene	1.16E-02	3.96E-06	None	NO	1.98E-04	4.30E+01	NO
Fluoranthene	9.95E-04	3.39E-07	None	NO	1.70E-05	None	NO
Fluorene	6.91E-03	2.36E-06	None	NO	1.18E-04	None	NO
Formaldehyde	2.35E+00	8.01E-04	1.2E-01	NO	4.01E-02	1.80E+01	NO
Indeno(1,2,3-cd)pyrene	1.69E-04	5.76E-08	None	NO	2.88E-06	None	NO
Naphthalene	7.65E-02	2.61E-05	None	NO	1.30E-03	3.20E+00	NO
Phenanthrene	7.07E-03	2.41E-06	None	NO	1.21E-04	None	NO
Propylene	1.60E+01	5.46E-03	None	NO	2.73E-01	1.20E+05	NO
Pyrene	1.79E-03	6.10E-07	None	NO	3.05E-05	None	NO
Toluene	1.07E+00	3.65E-04	8.2E+01	NO	1.82E-02	1.20E+04	NO
Xylene (m,p)	4.41E-01	1.50E-04	4.9E+01	NO	7.52E-03	2.70E+04	NO
Xylene (o)	2.17E-01	7.40E-05	4.9E+01	NO	3.70E-03	2.70E+04	NO
Xylene (Total)	6.02E-02	2.05E-05	4.9E+01	NO	1.03E-03	2.70E+04	NO
PAH Equivalents as benzo(a)pyrene	1.70E-06	5.80E-10	None	NO	2.90E-08	6.90E-03	NO

PLANT CUMULATIVE EMISSIONS

Since this is a new facility, there are no existing emissions. Table 4 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

Table 4. Cumulative increase post 4/5/91 in tons/year

Pollutant	Existing	New	Total
NO _x	0.000	0.001	0.001
POC	0.000	0.002	0.002
CO	0.000	0.003	0.003
SO ₂	0.000	0.000	0.000
PM ₁₀	0.000	0.000	0.000

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

In accordance with Regulation 2-2-301, 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 in Table 1, BACT is not triggered for any pollutants since the maximum daily emissions of each pollutant do not exceed 10 lb/day. Since the emissions levels are dependent upon the use of the 3-way catalyst, a condition has been added requiring its use.

OFFSETS

Per Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NO_x. Based on the emissions displayed in Table 4, offsets are not required for this application, because the permitted emissions are less than 10 tons/yr.

STATEMENT OF COMPLIANCE**New Source Performance Standards (NSPS)**

S-1 is subject to 40 Code of Federal Regulations (CFR) 60, Subpart JJJJ, Standards of Performance for Stationary Spark Ignition (SI) Internal Combustion Engines (ICEs) because it was manufactured after June 12, 2006 and is with a maximum engine power greater than 25 hp, as required by Section 60.4230(a)(4)(iv).

Section 60.4233(d) states owners and operators of stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) and less than 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards for field testing in 40 CFR 1048.101(c) for their non-emergency stationary SI ICE and with the following emission standards for emergency engines 25<HP<130:

NO_x: 10 g/hp-hr
CO: 387 g/hp-hr

According to engine manufacturer's statement of exhaust emissions, S-1 will comply with above emission standards.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

S-1 is subject to the emission or operating limitations in 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. Per 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE located at an area source must meet the requirements of 40 CFR part 60 subpart JJJJ, for spark ignition engines. S-1 is in compliance with the requirements of 40 CFR part 60 subpart JJJJ, as shown in the "NSPS" section of this evaluation.

The owner/operator of S-1 shall comply with Regulation 6 (*Particulate Matter and Visible Emissions Standards*) and Regulation 9-1-301 (*Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations*). From Regulation 9-1-301, the ground level concentrations of SO₂ will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

District Regulations

S-1 is an emergency standby generator; from Regulation 9, Rule 8 (*NO_x and CO from Stationary Internal Combustion Engines*), Section 110.5 (*Emergency Standby Engines*), S-1 is exempt from the requirements of Regulations 9-8-301 (*Emission Limits on Fossil Derived Fuel Gas*), 9-8-302 (*Emission Limits on Waste Derived Fuel Gas*), 9-8-303 (*Emissions Limits – Delayed Compliance, Existing Spark-Ignited Engines, 51 to 250 bhp or Model Year 1996 or Later*), 9-8-304 (*Emission Limits – Compression-Ignited Engines*), 9-8-305 (*Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later*), 9-8-501 (*Initial Demonstration of Compliance*) and 9-8-503 (*Quarterly Demonstration of Compliance*).

Allowable operating hours and the corresponding record keeping in Regulations 9-8-330 (*Emergency Standby Engines, Hours of Operation*) and 530 (*Emergency Standby Engines, Monitoring and Recordkeeping*) will be included in the Permit Conditions below.

The project is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to California Environmental Quality Act (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 facility is less than 1,000 feet from the nearest school and therefore is subject to the public notification requirements of Regulation 2-1-412. A public notice will be sent to all addresses within 1,000 feet of S-1 and parents and guardians of students of the following school:

Street Academy Alternative School
417 29th Street,
Oakland, CA 94609

PERMIT CONDITIONS

Because the three-way catalytic converter in S-1 is an integral part of the source, the District will not impose any permit condition on the abatement device.

COND# 23107 -----

1. The owner or operator shall operate the stationary emergency standby engine, only to mitigate emergency conditions or for reliability-related activities (maintenance and testing). Operating while mitigating emergency conditions and while emission testing to show compliance with this part is unlimited. Operating for reliability-related activities are limited to 50 hours per year.
(Basis: Emergency Standby Engines, Hours of Operation Regulation 9-8-330)
2. The Owner/Operator shall equip the emergency standby engine(s) with: a non-resettable totalizing meter that measures hours of operation or fuel usage.
(Basis: Emergency Standby Engines, Monitoring and Recordkeeping 9-8-530)
3. The Owner/Operator shall not operate unless the natural gas fired engine is abated with a Catalytic Converter/Silencer Unit
4. Records: The Owner/Operator shall maintain the following monthly records in a District- approved log for at least 24 months from the date of entry. 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 (maintenance and testing).
 - b. Hours of operation for emission testing.
 - c. Hours of operation (emergency).
 - d. For each emergency, the nature of the emergency condition.
 - e. Fuel usage for engine.
 (Basis: Emergency Standby Engines, Monitoring and Recordkeeping 9-8-530)

RECOMMENDATION

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following source:

- S-1 **Emergency Standby Natural Gas Generator Set, with built-in 3-way catalyst**
Generac, Model: SG035, Model Year: 2013
82 bhp, 0.70 MMBtu/hr