

DRAFT Engineering Evaluation
United Association of Plumbers and Steamfitters Local Union 342
935 Detroit Ave., Concord
Plant No. 24167
Application No. 29307

BACKGROUND

The United Association of Plumbers and Steamfitters Local Union 342 has applied to obtain an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Emergency Standby Generator; Natural Gas Engine with Integral Catalyst
Generac, Model: SG040, Model Year: 2017
62 bhp, 0.767 MMBtu/hr

The equipment will be located at 935 Detroit Avenue, Concord, CA 94518.

The primary pollutants from natural gas engines are the products of combustion, including oxides of nitrogen (NO_x), hydrocarbon and other organic compounds (POC), carbon monoxide (CO), sulfur dioxide (SO₂), and particulate (PM_{2.5} and PM₁₀).

EMISSIONS CALCULATIONS

Basis for S-1:

- 62 bhp output rating
- 50 hr/yr operation for testing and maintenance
- 250.9 scf/hr max fuel use
- 1,020 Btu/ft³ natural gas heat content

The 62 bhp engine will be run on natural gas. The fuel consumption rate is 250.9 scfh. Engine emissions are provided by the vendor. For this report, it is assumed that the emission value of total hydrocarbon (THC) is equivalent to the emission value of POC. The facility will be allowed to operate the engine for maintenance and reliability-related activities for up to 50 hr/yr per Regulation 9-8-330.3.

Table 1. Annual and daily criteria pollutants from S-1

Pollutant	Emissions Factor (g/bhp-hr)	Emissions (lb/day)	Emissions (lb/yr)	Emissions (TPY)
NO _x	0.22	0.72	1.50	0.000
POC	0.38	1.25	2.60	0.001
CO	0.64	2.10	4.37	0.001

TOXIC RISK SCREENING

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 CARB California Air Toxics Emission Factors (CATEFs) for natural gas fired 4-stroke rich burn engines with less than 650 bhp are used.

The HAP emission estimates are based on uncontrolled emission factors for natural gas engines 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 an exhaust catalyst and an air/fuel ratio controller.

Table 2. AP-42 Emissions for Rich Burn, 4 Stroke, Natural Gas Engines

Toxic Air Contaminant	AP-42	Assumed Abatement Efficiency	Emissions	Acute Trigger Level	HRSA Triggered?	Emissions	Chronic Trigger Level	HRSA Triggered?
	EF (lb/MMBTU)	(%)	(lb/hr)	(lb/hr)	(Yes/No)	(lb/year)	(lb/year)	(Yes/No)
1,1,2,2-Tetrachloroethane	2.53E-05	50	9.70E-06	None	No	4.85E-04	1.40E+00	No
1,1,2-Trichloroethane	1.53E-05	50	5.87E-06	None	No	2.93E-04	5.00E+00	No
1,1-Dichloroethane	1.13E-05	50	4.33E-06	None	No	2.17E-04	5.00E+01	No
1,2-Dichloroethane	1.13E-05	50	4.33E-06	None	No	2.17E-04	4.00E+00	No
1,3-Butadiene	6.63E-04	50	2.54E-04	1.50E+00	No	1.27E-02	4.80E-01	No
Acetaldehyde	2.79E-03	50	1.00E+00	None	No	5.35E-02	2.90E+01	No
Acrolein	2.63E-03	50	1.01E-03	5.50E-03	No	5.04E-02	1.40E+01	No
Benzene	1.58E-03	50	6.06E-04	6.00E-02	No	3.03E-02	2.90E+00	No
Carbon Tetrachloride	1.77E-05	50	6.79E-06	4.20E+00	No	3.39E-04	1.90E+00	No
Chlorobenzene	1.29E-05	50	4.95E-06	None	No	2.47E-04	3.90E+04	No
Chloroform	1.37E-05	50	5.25E-06	3.30E-01	No	2.63E-04	1.50E+01	No
Ethylene Dibromide	2.13E-05	50	8.17E-06	None	No	4.08E-04	1.10E+00	No
Formaldehyde	2.05E-02	50	7.86E-03	1.20E-01	No	3.93E-01	1.40E+01	No
Methanol	3.06E-03	50	1.17E-03	6.20E+01	No	5.87E-02	1.50E+05	No
Methylene Chloride	4.12E-05	50	1.58E-05	3.10E+01	No	7.90E-04	8.20E+01	No
Naphthalene	9.71E-05	50	3.72E-05	None	No	1.86E-03	2.40E+00	No
PAH	1.41E-04	50	5.41E-05	None	No	2.70E-03	3.30E-03	No
Styrene	1.19E-05	50	4.56E-06	4.60E+01	No	2.28E-04	3.50E+04	No
Toluene	5.58E-04	50	2.14E-04	8.20E+01	No	1.07E-02	1.20E+04	No
Vinyl Chloride	7.18E-06	50	2.75E-06	4.20E+00	No	1.38E-04	1.10E+00	No
Xylene	1.95E-04	50	7.48E-05	4.90E+01	No	3.74E-03	2.70E+04	No

Table 3. CATEF Emissions for Rich Burn, 4 Stroke, Natural Gas Engines

Substance	E.F. lb/MMcf	Abatement Efficiency (%)	Abated Emissions (lb/hr)	Acute Trigger Level (lb/hr)	HRSA Triggered? (Yes/No)	Abated Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Yes/No)
1,3-Butadiene	1.05E-01	50	5.36E-05	1.50E+00	No	2.68E-03	4.80E-01	No
Acetaldehyde	1.82E+00	50	9.28E-04	1.00E+00	No	4.64E-02	2.90E+01	No
Acrolein	1.37E+00	50	6.99E-04	5.50E-03	No	3.49E-02	1.40E+01	No
Benzene	1.02E+01	50	5.20E-03	6.00E-02	No	2.60E-01	2.90E+00	No
Formaldehyde	1.40E-01	50	7.14E-05	1.20E-01	No	3.57E-03	1.40E+01	No
Naphthalene	8.66E-02	50	4.42E-05	None	No	2.21E-03	2.40E+00	No
Propylene	4.20E+01	50	2.14E-02	None	No	1.07E+00	1.20E+05	No
Toluene	2.62E+00	50	1.34E-03	8.20E+01	No	6.68E-02	1.20E+04	No
Xylene (m,p)	4.54E-01	50	2.32E-04	4.90E+01	No	1.16E-02	2.70E+04	No
Xylene (o)	2.22E-01	50	1.13E-04	4.90E+01	No	5.66E-03	2.70E+04	No
Xylene (Total)	7.38E-02	50	3.76E-05	4.90E+01	No	1.88E-03	2.70E+04	No

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.

PLANT CUMULATIVE EMISSIONS

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

Table 4. Cumulative increase in tons/year

Pollutant	Existing	New	Total
NOx	0.000	0.000	0.000
POC	0.000	0.001	0.001
CO	0.000	0.001	0.001

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 day of POC, NOx, CO, SO2, PM10, or PM2.5.

Based on the emissions displayed above, BACT is not triggered for any pollutant since the maximum daily emission of each pollutant does not exceed 10 lbs/day.

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/year of POC or NOx. Based on the emissions displayed in Table 4, offsets are not required for this application.

NEW SOURCE PERFORMANCE STANDARDS (NSPS)

S-1 is subject to 40 CFR 60, Subpart JJJJ, Standards of Performance for Stationary Spark Ignition (SI) Internal Combustion Engines (ICEs), Section 60.4230(a)(4)(iv) because the engine is an emergency engine which was manufactured after January 1, 2009 and has a maximum power greater than 25 hp.

Determining Emissions Standards

Section 60.4233(d) states owners and operators of stationary SI ICEs with a maximum engine power greater than 25 hp and less than 100 hp (except gasoline and rich burn engines that use LPG) must comply with emission standards in Table 1 to this subpart for their emergency stationary SI ICE.

From Table 1 for emergency engines between 25 hp and 130 hp, the emission standards are:

NOx: 10 g/hp-hr

CO: 387 g/hp-hr

VOC: N/A

S-1 complies with the above emissions standards.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

S-1 is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE). 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 60, Subpart JJJJ. As stated above in the NSPS section, S-1 meets the emissions requirements of 40 CFR 60, Subpart JJJJ.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Regulation 6-1 (*Particulate Matter – General Requirements*). Properly operated and maintained engines are expected to meet the Ringelmann No. limitation in Regulation 6-1-303.

S-1 is an emergency standby generator. Per Regulation 9-8 (*NOx 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 – Spark-Ignited Engines Powered by Fossil Derived Fuels*), 9-8-302 (*Emission Limits – Spark-Ignited Engines Powered by Waste Derived Fuels*), 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 (50 hours/yr) and the corresponding recordkeeping requirements in Regulations 9-8-330.3 (*Emergency Standby Engines, Hours of Operation*) and 530 (*Emergency Standby and Low Usage Engines, Monitoring and Recordkeeping*) will be included in the permit conditions below.

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 2.3.2)

The facility is located within 1,000 feet from a K-12 school and therefore is subject to the public notification requirements of Regulation 2-1-412. The following school is located within 1,000 feet of S-1:

Ygnacio Valley Elementary School

2217 Chalomar Road

Concord, CA 94518

PSD does not apply.

PERMIT CONDITIONS

COND# 22850 -----

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]
2. The owner/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 while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]
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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]
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: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

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/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, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

End of Conditions

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 1,000 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 Generator; Natural Gas Engine
Generac, Model: SG040, Model Year: 2017
62 bhp, 0.767 MMBtu/hr**

By: _____
Simrun Dhoot
Air Quality Engineer II

Date: _____