

**DRAFT
ENGINEERING EVALUATION
142 Britton Avenue Resident
Plant No: 23926
Application No: 28781**

BACKGROUND

142 Britton Avenue Resident of Atherton has applied for an Authority to Construct or Permit to Operate a standby generator powered by a Natural Gas engine (S-1). The engine will be located at 142 Britton Avenue, Atherton, CA 94027.

**S-1 Emergency Standby Generator Set: Natural Gas Engine Make:
General Motors; Model: Vortec 5.7L: 0.83 MMBtu/hr; Model Year;
2017; Rated Horsepower: 105 HP
Abated by A-1 NETT TECHNOLOGIES, INC., TG Series Catalytic Muffler**

EMISSIONS

The 105 hp Natural Gas engine was tested and the emission factors are listed below in Table (1). For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (HC) is equivalent to the emission value of POC.

Abatement Device: The engine is abated by a Muffler/Catalyst abatement device.

Table (1)

Component	Uncontrolled Emission (g/bhp-hr)	Abatement Efficiency	Controlled Emission (g/bhp-hr)
NOx	5.7	98%	0.114
CO	19.93	95%	0.997
POC	0.06	95%	0.003
PM10	Negligible	0%	Negligible
SO2	0.000588 lb/MMBtu	0%	0.000588 lb/MMBtu

**The emission factor for SO2 is from Chapter-3, Table 3.2-3 of the EPA Document AP-42, Emission Factors for 4-Stroke Rich-Burn Engines. SO₂:5.88E-4 lb/MMBtu.*

**A breakdown of 1% and 99% for POC and NOx, respectively, assumed to be consistent with Table 3.2-3 of the EPA document AP-42.*

Maximum Emissions in Tons per year:

Table (2)

NOx	=	(0.114 g/bhp-hr)	(105hp)	(50 hr)	(454 g/lb)	=	1.32 lb/yr	0.000 TPY
CO	=	(0.997 g/bhp-hr)	(105hp)	(50 hr)	(454 g/lb)	=	11.5 lb/yr	0.006 TPY
POC	=	(0.003 g/bhp-hr)	(105hp)	(50 hr)	(454 g/lb)	=	0.035 lb/yr	0.000 TPY
PM10	=	(Negligible)	(105hp)	(50 hr)	(454 g/lb)	=	0.000 lb/yr	0.000 TPY
SO2	=	(0.000588 lb/MMBtu)	(.83 MMBtu/hr)	(50 hr)		=	0.024 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. Check Table (3) for emissions per day.

Table (3)

NOx	=	(0.114 g/bhp-hr)	(105hp)	(24 hr)	=	0.632 lb/day
CO	=	(0.997 g/bhp-hr)	(105hp)	(24 hr)	=	5.53 lb/day
POC	=	(0.003 g/bhp-hr)	(105hp)	(24 hr)	=	0.017 lb/day
PM10	=	(Negligible)	(105hp)	(24 hr)	=	0.000 lb/day
SO2	=	(0.000588 lb/MMBtu)	(.83 MMBtu/hr)	(24 hr)	=	0.012 lb/day

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, NOx, CO, SO₂, or PM₁₀. As shown in Table (3), BACT is not triggered for this source.

Plant Cumulative Increase

Cumulative increase (tons/year) from the plant is as shown in Table (4).

Table (4)

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New S-1	Total TPY
NOx	0.000	0.000	0.000
CO	0.000	0.006	0.006
POC	0.000	0.000	0.000
PM10	0.000	0.000	0.000

Health Risk Assessment (HRA)

Emission factors for a 4-stroke rich-burn Natural Gas engine will be used to estimate the emissions from the engine. Emissions factors are from the California Air Toxic Emission Factors. The HAP emission estimates are based on uncontrolled emission factors for natural gas engines and an assumed abatement efficiency of 50% removal of organic HAP compounds. S-1 is not in excess of any of the risk screening triggers for the CATEF table. A Health Risk Assessment is not required.

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 142
 Company Britton
 Avenue
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Input Data

Engine, BHP	105
Fuel Consumption cf/hr	790
Non-Emergency operation hours (hr/yr)	50
Higher Heating Value, Btu/cf	1050

Calculated Value

Fuel Usage MMBtu/hr	0.830
Fuel Usage MMBtu/yr	4.15E+01
Fuel Usage MMcf/hr	7.90E-04
Fuel Usage MMcf/yr	3.95E-02

CATEF Emission Factors for Rich Burn, 4 Stroke, Natural Gas Engines, < 650 HP

Compound	PEF for PAHs	E.F. [lb/MMcf]	Hourly Abated Emissions [lb/hr] ¹	Acute Trigger Level [lb/hr]	HRSA Triggered? [Y/N]	Annual Abated Emissions [lb/yr]	Chronic Trigger Level [lb/yr]	HRSA Triggered [Y/N]
1,3-Butadiene		1.04E-01	4.11E-05	1.50E+00	No	2.05E-03	4.80E-01	No
Acetaldehyde		8.83E-01	3.49E-04	1.00E+00	No	1.74E-02	2.90E+01	No
Acrolein		5.47E-01	2.16E-04	5.50E-03	No	1.08E-02	1.40E+01	No
Benzene		7.39E-02	5.84E-05	6.00E-02	No	2.92E-03	2.90E+00	No
Ethylbenzene		1.16E-02	4.58E-06	None	No	2.29E-04	3.30E+01	No
Formaldehyde		4.99E-02	3.94E-05	1.20E-01	No	1.97E-03	1.40E+01	No
Naphthalene		7.65E-02	3.02E-05	None	No	1.51E-03	2.40E+00	No
PAH or derivatives		2.12E-04	8.36E-08	None	No	4.18E-06	3.30E-03	No
Benzo(a)anthracene	0.1	2.94E-04	1.16E-07	None	No	5.81E-06	None	No
Benzo(a)pyrene	1	1.15E-04	4.54E-08	None	No	2.27E-06	None	No
Benzo(b)fluoranthene	0.1	2.37E-04	9.36E-08	None	No	4.68E-06	None	No
Benzo(k)fluoranthene	0.1	1.03E-04	4.07E-08	None	No	2.03E-06	None	No
Chrysene	0.01	3.10E-04	1.22E-07	None	No	6.12E-06	None	No
Dibenz(a,h)anthracene	1.05	1.25E-05	4.94E-09	None	No	2.47E-07	None	No
Indeno(1,2,3-cd)pyrene	0.1	1.69E-04	6.68E-08	None	No	3.34E-06	None	No
PAH or derivative TOTAL		2.12E-04	8.36E-08	None	No	4.18E-06	3.30E-03	No
Propylene		1.60E+01	6.32E-03	None	No	3.16E-01	1.20E+05	No
Toluene		1.07E+00	4.23E-04	8.20E+01	No	2.11E-02	1.20E+04	No
Xylene		6.02E-02	2.38E-05	4.90E+01	No	1.19E-03	2.70E+04	No

STATEMENT OF COMPLIANCE

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. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). The engine is not expected to produce visible emissions or fallout in violation of this regulation and it will be assumed to comply with Regulation 6 pending a regular inspection. Emergency use of emergency standby engines is not subject to Toxics Risk Screening per 2-5-111.

California Environmental Quality Act (CEQA): This application is considered ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) and therefore is not subject to CEQA review.

Offsets: 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 emission calculations above, offsets are not required for this application.

National Emission Standards for Hazardous Air Pollutant (NESHAP): This engine will be subject to the Reciprocating Internal Combustion Engine (RICE) NESHAP (40 CFR Part 63, Subpart ZZZZ), because it is a RICE located at an area source of HAP emissions. A new RICE at an area source that is subject to and in compliance with the Part 60 Subpart JJJJ NSPS requirements has no further requirements under Subpart ZZZZ pursuant to 40 CFR Part 63.6590(c).

Prevention of Significant Deterioration (PSD): PSD does not apply.

The New Source Performance Standard (NSPS): NSPS in 40 CFR 60, Subpart JJJJ does apply. The engine will comply with the following limits in Table (1) for emergency spark-ignited engines under 130 hp:

NO _x :	10.0 g/hp-hr
CO:	387.0 g/hp-hr

School Notification (Regulation 2-1-412): Because this equipment will be located within 1,000 feet of Saint Joseph Elementary school, the project is subject to the public notification requirements of Regulation 2-1-412 due to the increase in emissions from the project.

A public notice will be prepared and sent to all addresses within 1,000 ft of the engine, and to parents and guardians of students attending Saint Joseph Elementary School. The public comment period will be 30 days.

PERMIT CONDITIONS

Conditions for S-1 Emergency Standby Natural Gas Generator Set at Plant 23926:

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 is 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 Record keeping 9-8-530)

3. The Owner/Operator shall not operate unless the natural gas fired engine is abated with a Catalytic Converter/Silencer Unit

(Basis: Cumulative Increase)

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 or operating hours 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 Generator Set: Natural Gas Engine Make: General Motors; Model: Vortec 5.7L: 0.83 MMBtu/hr; Model Year: 2017; Rated Horsepower: 105 HP
Abated by A-1 NETT TECHNOLOGIES, INC., TG Series Catalytic Muffler**

EXEMPTIONS

None.

By: _____ Date: 01-31-2018

Sheryl Wallace
Air Quality Permit Technician

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		