Draft ENGINEERING EVALUATION

Alameda County GSA
Plant 13908 | Application 30580
1401 Lakeside Dr, Oakland, CA 94612

BACKGROUND

Alameda County has applied for an Authority to Construct and a Permit to Operate for the following equipment:

S-4 Emergency Standby Generator Set: Natural Gas engine
Generac SG130, Model Year: 2020
Engine Family: LGNXB08.9203
229 BHP, 1.57 MMBtu/hr

The Alameda County GSA facility is in Oakland, CA and serves of much of the San Francisco East Bay region. The proposed emergency standby generator will be used for backup emergency energy generation. S-4 will replace the existing emergency standby generator (diesel), S-1.

EMISSIONS

Criteria Pollutants

The criteria pollutants are nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$). NOx, CO, and POC emission factors based on engine manufacturer abated emissions data. Total Hydrocarbon emission rates were assumed to be equal to Precursor Organic Compound (POC) emission rates. The PM_{10} and SO_2 emission factors are referenced from Table 3.2-3 Uncontrolled Emission Factors for 4-stroke Rich-Burn Engines found in AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources.

The engine will operate during emergency use and for a maximum of 50 hours per year for maintenance and testing.

Firing rates – Natural Gas: 1.57MMBtu/hr; Liquefied Propane Gas: 1.50MMBtu/hr

Table 1. Estimated Emissions From S-4 (Natural Gas)

Pollutant	Emission Factor (g/BHP-hr)	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)	Annual Emissions (TPY)
NOx	0.08	4.03E-02	2.02	0.001
POC	0.18	9.07E-02	4.53	0.002
CO	0.56	2.82E-01	14.11	0.007
Natural Gas				
	lb/MMBtu			
PM_{10}	9.50E-03	1.49E-02	7.46E-01	3.73E-04
SO_2	5.88E-04	9.24E-04	4.62E-02	2.31E-05
Liquefied Propane Gas				
	lb/MMBtu			
PM_{10}	9.50E-03	1.42E-02	7.12E-01	3.56E-04
SO_2	5.88E-04	8.82E-04	4.41E-02	2.20E-05

Toxic Air Contaminants

The emission factors used to estimate Hazardous Air Pollutants (HAPs) emissions from the engine described above are from: AP-42 for natural gas fired 4-cycle rich burn engine Table 3.2-3, or the California Air Toxics Emission Factor Database (maintained by the California Air Resources Board) for natural gas fired 4-cycle rich burn engines with less than 650 hp. The CATEF Emission Factors maintained by the ARB were used to estimate emissions for all compounds that have AP-42 emission factors and CATEF emission factors. The HAP emission estimates are based on uncontrolled emission factors for natural gas engines and no assumed abatement.

Tables 2 through 5 below show that no toxic air contaminants exceed the District Risk Screening Triggers and a Risk Screening Analysis is not required.

Table 2. HAP Emissions from AP-42 Table 3.2-3

Substance	Emission Factor (lb/MMBtu)	Hourly Emissions (lb/hr)	Acute Trigger Level (lb/hr)	HRSA Triggered? (Yes/No)	Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Yes/No)
1,1,2,2-Tetrachloroethane	2.53E-05	3.97E-05	None	No	1.99E-03	1.90E+00	No
1,1,2-Trichloroethane	1.53E-05	2.40E-05	None	No	1.20E-03	6.60E+00	No
1,1-Dichloroethane	1.13E-05	1.78E-05	None	No	8.88E-04	6.60E+01	No
1,2-Dichloroethane	1.13E-05	1.78E-05	None	No	8.88E-04	None	No
1,2-Dichloropropane	1.30E-05	2.04E-05	None	No	1.02E-03	None	No
1,3-Butadiene	6.63E-04	1.04E-03	None	No	5.21E-02	1.10E+00	No
1,3-Dichloropropene	1.27E-05	1.99E-05	None	No	9.97E-04	None	No
Acetaldehyde	2.79E-03	4.38E-03	1.00E+00	No	2.19E-01	3.80E+01	No
Acrolein	2.63E-03	4.13E-03	5.50E-03	No	2.07E-01	1.40E+01	No
Benzene	1.58E-03	2.48E-03	2.90E+00	No	1.24E-01	3.80E+00	No
Butyr/isobutyraldehyde	4.86E-05	7.63E-05	None	No	3.82E-03	None	No
Carbon Tetrachloride	1.77E-05	2.78E-05	4.20E+00	No	1.39E-03	2.50E+00	No
Chlorobenzene	1.29E-05	2.03E-05	None	No	1.01E-03	3.90E+04	No
Chloroform	1.37E-05	2.15E-05	3.30E-01	No	1.08E-03	2.00E+01	No
Ethylbenzene	2.48E-05	3.90E-05	None	No	1.95E-03	4.30E+01	No
Ethylene Dibromide	2.13E-05	3.35E-05	None	No	1.67E-03	1.50E+00	No
Formaldehyde	2.05E-02	3.22E-02	1.20E-01	No	1.61E+00	1.80E+01	No
Methanol	3.06E-03	4.81E-03	6.20E+01	No	2.40E-01	1.50E+05	No
Methylene Chloride	4.12E-05	6.47E-05	3.10E+01	No	3.24E-03	1.10E+02	No
Naphthalene	9.71E-05	1.53E-04	None	No	7.63E-03	3.20E+00	No
PAH	1.41E-04	2.21E-04	None	No	1.11E-02	None	No
Styrene	1.19E-05	1.87E-05	4.60E+01	No	9.35E-04	3.50E+04	No
Toluene	5.58E-04	8.77E-04	8.20E+01	No	4.38E-02	1.20E+04	No
Vinyl Chloride	7.18E-06	1.13E-05	4.00E+02	No	5.64E-04	1.40E+00	No
Xylene	1.95E-04	3.06E-04	4.90E+01	No	1.53E-02	2.70E+04	No

Table 3. HAP Emissions based on CATEF

Substance	CATEF Mean Emission Factors (lb/MMcf)	CATEF Mean Emission Factors (lb/MMBtu)	Hourly Emissions (lb/hr)	Acute Trigger Level (lb/hr)	HRSA Triggered? (Yes/No)	Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Yes/No)
1,3-Butadiene	1.04E-01	1.02E-04	1.60E-04	None	No	8.01E-03	6.30E-01	No
Acenaphthene	1.94E-03	1.90E-06	2.99E-06	None	No	1.49E-04	None	No
Acenaphthylene	1.45E-02	1.42E-05	2.23E-05	None	No	1.12E-03	None	No
Acetaldehyde	8.83E-01	8.66E-04	1.36E-03	None	No	6.80E-02	3.80E+01	No
Acrolein	5.47E-01	5.36E-04	8.42E-04	5.50E-03	No	4.21E-02	1.40E+01	No
Anthracene	1.84E-03	1.80E-06	2.83E-06	None	No	1.42E-04	None	No
Benzene	1.91E+00	1.87E-03	2.94E-03	2.90E+00	No	1.47E-01	3.80E+00	No
Benzo(a)anthracene	2.94E-04	2.88E-07	4.53E-07	None	No	2.26E-05	None	No
Benzo(a)pyrene	1.15E-04	1.13E-07	1.77E-07	None	No	8.86E-06	None	No
Benzo(b)fluoranthene	2.37E-04	2.32E-07	3.65E-07	None	No	1.82E-05	None	No
Benzo(g,h,i)perylene	1.95E-04	1.91E-07	3.00E-07	None	No	1.50E-05	None	No
Benzo(k)fluoranthene	1.03E-04	1.01E-07	1.59E-07	None	No	7.93E-06	None	No
Chrysene	3.10E-04	3.04E-07	4.77E-07	None	No	2.39E-05	None	No
Dibenz(a,b)anthracene	1.25E-05	1.23E-08	1.93E-08	None	No	9.63E-07	None	No
Ethylbenzene	1.16E-02	1.14E-05	1.79E-05	None	No	8.93E-04	4.30E+01	No
Fluoranthene	9.95E-04	9.75E-07	1.53E-06	None	No	7.66E-05	None	No
Fluorene	6.91E-03	6.77E-06	1.06E-05	None	No	5.32E-04	None	No
Formaldehyde	2.35E+00	2.30E-03	3.62E-03	2.10E-01	No	1.81E-01	1.80E+01	No
Indeno(1,2,3-cd)pyrene	1.69E-04	1.66E-07	2.60E-07	None	No	1.30E-05	None	No
Naphthalene	7.65E-02	7.50E-05	1.18E-04	None	No	5.89E-03	3.20E+00	No
Phenanthrene	7.07E-03	6.93E-06	1.09E-05	None	No	5.44E-04	None	No
Propylene	1.60E+01	1.57E-02	2.46E-02	None	No	1.23E+00	1.20E+05	No
Pyrene	1.79E-03	1.75E-06	2.76E-06	None	No	1.38E-04	None	No
Toluene	1.07E+00	1.05E-03	1.65E-03	8.20E+01	No	8.24E-02	1.20E+04	No
Xylene (m,p)	4.41E-01	4.32E-04	6.79E-04	4.90E+01	No	3.40E-02	2.70E+04	No
Xylene (o)	2.17E-01	2.13E-04	3.34E-04	4.90E+01	No	1.67E-02	2.70E+04	No
Xylene (Total)	6.02E-02	5.90E-05	9.27E-05	4.90E+01	No	4.64E-03	2.70E+04	No
PAH Equivalents	1.70E-06	1.67E-09	2.62E-09	None	No	1.31E-07	2.70E+04	No

Plant Cumulative Increase

Table 7 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-4.

Table 7. Plant Cumulative Increase

Pollutant	Current Emissions (since April 5, 1991) (tons/year)	Increase with this application (tons/year)	Cumulative Emissions (Current + Increase) (tons/year)
NO_x	0.000	0.001	0.001
POC	0.000	0.002	0.002
CO	0.000	0.007	0.007
PM_{10}	0.000	0.000	0.000
SO_2	0.000	0.000	0.000

STATEMENT OF COMPLIANCE

California Environmental Quality Review (CEQA)

This application is considered to be ministerial under the District's 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 emission factors in accordance with Permit Handbook Chapter 2.3.2 Stationary Natural Gas Engines.

Public Notification, Schools

Public Notice is required pursuant to Regulation 2-1-412 since the nearest public school is within 1,000 of this facility.

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, SO_2 or PM_{10}.

Based on the emission calculations above, BACT is not triggered for any pollutant since the maximum daily emission of each pollutant does not exceed 10 lb/day. Since the low emissions level is dependent on usage of the abatement device, a condition has been added requiring its use.

Prevention of Significant Deterioration (PSD)

This application is not part of a PSD project as defined in Regulation 2-2-304

Offsets

Offsets are not required since the facility permitted levels are below the offset trigger levels in Regulations 2-2-302 and 2-2-303.

Health Risk Assessment (HRA)

HRA review is required when toxic contaminant emissions exceed levels described in Regulation 2-5. The toxic air contaminants from this project do not exceed trigger levels in Table 2-5-1, therefore a refined HRA review is not required.

Particulate Matter – General Requirements, Regulation 6, Rule 1

Because S-4 combusts natural gas or LPG, particulate emissions are negligible and S-4 is expected to comply with Regulation 6-1.

Sulfur Dioxide Limitations – Regulation 9, Rule 1

Because SO_2 emissions from S-4 are negligible the ground level concentrations of SO_2 are not expected to 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.

NO_x and CO from Stationary Internal Combustion Engines – Regulation 9, Rule 8

S-4 is an emergency standby generator; from Regulation 9, Rule 8 (NOx and CO from Stationary Internal Combustion Engines), Section 110.5 (Emergency Standby Engines), S-4 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).

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

Airborne Toxic Control Measure for Stationary Compression Ignition Engines
The owner/operator is expected to comply with all applicable requirements in ATCM, 5/19/2011, section 93115, title 17, CA Code of Regulations

New Source Performance Standards (NSPS)
The owner/operator is expected to comply with all applicable requirements in 40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

National Emissions Standards for Hazardous Air Pollutants (NESHAP)
The owner/operator is expected to comply with all applicable requirements in 40 CFR 63, Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines (RICE)*)

PERMIT CONDITIONS

COND# 23107 ----------

1. Operating for reliability-related activities are limited to 50 hours per year.
   (Basis: Emergency Standby Engines, Hours of Operation Regulation 8-9-330.2)
2. 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.
   (Basis: Emergency Standby Engines, Hours of Operation Regulation 9-8-330)
3. 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)
4. The Owner/Operator shall not operate unless the natural gas fired engine is abated with a Catalytic Converter/Silencer Unit
5. 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

I recommend that the District issue an Authority to Construct for the following source:

S-4 Emergency Standby Generator Set: Natural Gas engine
Generac SG130, Model Year: 2020
Engine Family: LGNXB08.9203
229 BHP, 1.34MMBtu/hr

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Christopher Ablaza Date
Air Quality Engineer, Engineering Division