Draft Engineering Evaluation
Pacific Gas & Electric
Application No. 26571
Plant No. 3172

BACKGROUND

Pacific Gas & Electric (PG&E) has applied for Permit to Operate for the following equipment:

S-10 Emergency Standby Natural Gas/Propane Generator
Cummins, Model: 85GGHG, 131.6 bhp, 0.964 MMBtu/hr

The equipment will be located at 450 Eastmoor Avenue, Daly City, CA 94015.

The emergency unit (S-10) will be powered by natural gas. However, if there is a disruption in the natural gas line, the generator will be powered by propane. A propane tank will be installed on the site. S-10 will only provide power in the case of an emergency. During an emergency, the generator will operate 24 hours a day until regular electric supply is restored. The engine will operate for a maximum of 50 hours per year for maintenance and testing, as limited by Regulation 9-8-330.3.

The engine is subject to attached condition no. 25917.

EMISSIONS CALCULATIONS

For this evaluation, two scenarios were considered. Scenario A calculates the emissions of criteria pollutants produced by S-10 when powered by natural gas. Scenario B calculates the emissions of criteria pollutants from S-1 when powered by propane. The emissions factors used to estimate criteria pollutant emissions from S-10 are based on engine manufacturer emissions data. Total Hydrocarbon emission rates were assumed to be equal to Precursor Organic Compound (POC) emission rates.

Scenario A:
131.6 bhp output rating
50hr/yr operation for testing and maintenance
945 scf/hr max fuel use
1020 BTU/ft^3 natural gas heat content

Table 1. Annual and daily criteria pollutants from natural gas

Pollutant	Emissions Factor (g/bhp-hr)	Emissions (lb/yr)	Emissions (TPY)	Emissions (lb/day)
NOx	0.02	0.3	0.000	0.14
POC	0.14	2.0	0.001	0.98
CO	0.01	0.1	0.000	0.07

Scenario B:
131.6 bhp output rating
50hr/yr operation for testing and maintenance
407 scf/hr max fuel use
2,500 BTU/ft^3 natural gas heat content

Table 2. Annual and daily criteria pollutants from propane

Pollutant	Emissions Factor (g/bhp-hr)	Emissions (lb/yr)	Emissions (TPY)	Emissions (lb/day)
NOx	0.02	0.3	0.000	0.14
POC	0.03	0.4	0.000	0.21
CO	0.01	0.1	0.003	0.07

TOXIC RISK SCREENING

EPA AP-42 does not have a chapter or emission factors for liquefied petroleum gas fired engines. Chapter 1.5, Liquid Petroleum Gas (LPG) Combustion, contains emission factors for industrial and commercial boilers only. Therefore, to estimate Hazardous Air Pollutants (HAPs) or Toxic Air Contaminants (TACs) emissions from S-10, 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 hp are used. The engine being permitted has a maximum firing rate of 0.964 MMBtu/hr and a maximum rating of 131.6 bhp.

As shown in Tables 3 and 4 below, no TACs exceed the District's Risk Screening trigger levels. Therefore, a Health Risk Screening Analysis (HRSA) is not required.

Table 3. HAP EMISSIONS ESTIMATES BASED ON AP-42 TABLE 3.2-2

Compound	AP-42 EF (lb/MMBTU)	Emissions (lb/hr)	Trigger Level (lb/hr)	HRSA Triggered? (Yes/No)	Emissions (lb/year)	Chronic Trigger Level (lb/yr)	HRSA Triggered? (Yes/No)
1,1,2,2-Tetrachloroethane	2.53E-05	2.44E-05	None	No	1.22E-03	1.90E+00	No
1,1,2-Trichloroethane	1.53E-05	1.47E-05	None	No	7.37E-04	6.60E+00	No
1,1-Dichloroethane	1.13E-05	1.09E-05	None	No	5.45E-04	6.60E+01	No
1,2-Dichloroethane	1.13E-05	1.09E-05	None	No	5.45E-04	5.30E+00	No
1,3-Butadiene	6.63E-04	6.39E-04	None	No	3.20E-02	6.30E-01	No
Acetaldehyde	2.79E-03	2.69E-03	1.00E+00	No	1.34E-01	3.80E+01	No
Acrolein	2.63E-03	2.54E-03	5.50E-03	No	1.27E-01	1.40E+01	No
Benzene	1.58E-03	1.52E-03	None	No	7.61E-02	3.80E+00	No
Butyr/isobutyraldehyde	4.86E-05	4.68E-05	None	No	2.34E-03	None	No
Carbon Tetrachloride	1.77E-05	1.71E-05	4.20E+00	No	8.53E-04	2.50E+00	No
Chlorobenzene	1.29E-05	1.24E-05	None	No	6.22E-04	3.90E+04	No
Chloroform	1.37E-05	1.32E-05	3.30E-01	No	6.60E-04	2.00E+01	No
Ethane	7.04E-02	6.79E-02	None	No	3.39E+00	None	No
Ethylbenzene	2.48E-05	2.39E-05	None	No	1.20E-03	None	No
Ethylene Dibromide	2.13E-05	2.05E-05	None	No	1.03E-03	1.50E+00	No
Formaldehyde	2.05E-02	1.98E-02	1.20E-01	No	9.88E-01	1.80E+01	No
Methanol	3.06E-03	2.95E-03	6.20E+01	No	1.47E-01	1.50E+05	No
Methylene Chloride	4.12E-05	3.97E-05	3.10E+01	No	1.99E-03	1.10E+02	No
Naphthalene	9.71E-05	9.36E-05	None	No	4.68E-03	3.20E+00	No
PAH	1.41E-04	1.36E-04	None	No	6.80E-03	6.90E-03	No
Styrene	1.19E-05	1.15E-05	4.60E+01	No	5.74E-04	3.50E+04	No
Toluene	5.58E-04	5.38E-04	8.20E+01	No	2.69E-02	1.20E+04	No
Vinyl Chloride	7.18E-06	6.92E-06	4.00E+02	No	3.46E-04	1.40E+00	No
Xylene	1.95E-04	1.88E-04	4.90E+01	No	9.40E-03	1.40E+00	No

Table 4. HAP Emission Estimates Based on CATEF Emission Factors

Substance	E.F. (lb/MMcf)	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)	PAH PEF	PAH Equiv-alents
Acenaphthene	7.17E-04	3.66E-07	None	No	1.83E-05	None	No		
Acenaphthylene	7.59E-03	3.87E-06	None	No	1.94E-04	None	No		
Acetaldehyde	3.99E+00	2.03E-03	1.00E+00	No	1.02E-01	3.80E+01	No		
Acrolein	1.63E+00	8.31E-04	5.50E-03	No	4.16E-02	1.40E+01	No		
Anthracene	2.56E-04	1.31E-07	None	No	6.53E-06	None	No		
Benzene	1.21E+00	6.17E-04	2.90E+00	No	3.09E-02	3.80E+00	No		
Benzo(a)anthracene	7.78E-05	3.97E-08	None	No	1.98E-06	None	No	0.1	1.98E-07
Benzo(a)pyrene	3.55E-05	1.81E-08	None	No	9.05E-07	None	No	1	9.05E-07
Benzo(b)fluoranthene	3.27E-04	1.67E-07	None	No	8.34E-06	None	No	0.1	8.34E-07
Benzo(g,h,i)perylene	1.03E-04	5.25E-08	None	No	2.63E-06	None	No		
Benzo(k)fluoranthene	5.30E-04	2.70E-07	None	No	1.35E-05	None	No	0.1	1.35E-06
Dibenz(a,h)anthracene	1.09E-05	5.56E-09	None	No	2.78E-07	None	No	1.05	2.92E-07
Fluoranthene	2.50E-04	1.28E-07	None	No	6.38E-06	None	No		
Fluorene	4.60E-04	2.35E-07	None	No	1.17E-05	None	No		
Formaldehyde	2.87E+01	1.46E-02	1.20E-01	No	7.32E-01	1.80E+01	No		
Indeno(1,2,3-cd) pyrene	1.20E-04	6.12E-08	None	No	3.06E-06	None	No	0.1	3.06E-07
Naphthalene	1.22E-01	6.22E-05	None	No	3.11E-03	3.20E+00	No		
Phenanthrene	8.93E-04	4.55E-07	None	No	2.28E-05	None	No		
Propylene	1.87E+01	9.54E-03	None	No	4.77E-01	1.20E+05	No		
Pyrene	1.23E-04	6.27E-08	None	No	3.14E-06	None	No		
Toluene	4.12E-01	2.10E-04	8.20E+01	No	1.05E-02	1.20E+04	No		
Xylene (m,p)	8.63E-02	4.40E-05	4.90E+01	No	2.20E-03	2.70E+04	No		
Xylene (o)	4.94E-02	2.52E-05	4.90E+01	No	1.26E-03	2.70E+04	No		
PAH Equivalents as Benzo(a)pyrene			None	No		6.9E-03	No		3.89E-06

PLANT CUMULATIVE EMISSIONS

S-10 is located at an existing facility. Therefore, there are existing emissions at the plant. Table 5 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-10. The highest values will be used from Scenario A and Scenario B to be conservative.

Table 5. Cumulative increase in tons/year

Pollutant	Existing	New	Total
NOx	0.000	0.000	0.000
POC	0.100	0.001	0.101
CO	0.000	0.003	0.003

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 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/yr 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-10 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(e) states owners and operators of stationary SI ICEs with a maximum engine power greater than 100 hp (except gasoline an 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 greater than 130 hp, the emission standards are:
NOx: 2.0 g/hp-hr
CO: 4.0 g/hp-hr
VOC: 1.0 g/hp-hr

S-10 complies with the above emissions standards.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

S-10 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-10 meets the emissions requirements of 40 CFR 60, Subpart JJJJ.

STATEMENT OF COMPLIANCE

The owner/operator of S-10 shall comply with Regulation 6-1 (*Particulate Matter – General Requirements*) and Regulation 9-1-301 (*Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations).* Pursuant to Regulation 9-1-301, the ground level concentrations of SO_2 shall 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.

S-10 is an emergency standby generator. Per Regulation 9-8 (*NOx and CO from Stationary Internal Combustion Engines*), Section 110.5 (*Emergency Standby Engines*), S-10 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)

This facility is located within 1,000 feet from the nearest school (listed below) and therefore is subject to public notification requirements of Regulation 2-1-412. A public notice was prepared and will be sent to the parents or guardians of children enrolled in any school within one-quarter mile of the source and to each address within a radius of 1,000 feet of the source.

Hope Lutheran Day School
55 San Fernando Way
Daly City, CA 94015

M. Pauline Brown Elementary School
305 Eastmoor Avenue
Daly City, CA 94015

PSD does not apply.

PERMIT CONDITIONS

COND# 25917 ----------

1. The owner/operator of S-10 shall operate the stationary emergency standby engine on natural gas. If natural gas is unavailable, propane gas at a firing rate not to exceed 0.964 MMBtu/hr may be used. (Basis: Cumulative Increase)

2. Operating for reliability-related activities is limited to 50 hours per year. (Basis: Regulation 9-8-330.3)

3. The owner/operator of S-10 shall operate the emergency standby engine 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: Regulation 9-8-330)

4. The owner/operator shall operate S-10 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: Regulation 9-8-530)

5. Records: The owner/operator shall maintain the following monthly records I a District-approved log for at least 24 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 or operation for reliability-related activities (maintenance and testing).
   b. Hours of operation (emergency).
   c. For each emergency, the nature of the emergency condition.
   d. Fuel usage for each engine(s).
   (Basis: Regulation 9-8-502)

End of Conditions

RECOMMENTATION

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. 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 a Permit to Operate for the following source:

S-10 Emergency Standby Natural Gas/Propane Generator
Cummins, Model: 85GGHG, 131.6 bhp, 0.964 MMBtu/hr

By: _____ Date: _____

Simrun Dhoot
Air Quality Engineer