Engineering Evaluation
Safeway, Inc.
Application No. 26376
Plant No. 22507
15 Marina Blvd., San Francisco, CA 94123

BACKGROUND

Safeway, Inc. has applied for an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

S-1 Emergency Standby Generator Set: Natural Gas (NG) engine
Generac, Model: SG0035-3844880100, Model Year: 2004
56 BHP, 0.57MMBtu/hr
Abated by
A-1 Generac 3-way Non-Selective Catalytic Reduction Device

The NG powered emergency standby generator set (S-1) will provide emergency standby power in the event of a disruption to power service. These criteria pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

The applicant installed the engine in September 2004 without a Permit to Operate; consequently late fees and back fees were charged to this application.

EMISSIONS CALCULATIONS

The emission factors used to estimate criteria pollutant emissions from the NG engine generator set described above are provided by the engine manufacturer. Total Hydrocarbon emission rates were assumed to be equal to Precursor Organic Compound (POC) emission rates. The fuel consumption is 555 SCF/hr provided by manufacturer information from the applicant.

The engine will operate during emergency use and for a maximum of 50 hours per year for maintenance and testing. See Table 1.

Table 1-Estimated Emissions From S-1

Pollutant	Emission Factor (g/BHP-hr)	Emission (lb/hr)	Emission (lb/yr)	Emission (TPY)	Maximum Daily Emissions (lb/day)
NOx	0.99	0.123	6.126	0.003	2.941
POC	0.58	0.072	3.604	0.002	1.730
CO	2.26	0.279	13.934	0.007	6.688
PM_{10}	0.05	0.006	0.283	0.000	0.136
SO_2	0.00	0.000	0.017	0.000	0.008

TOXIC RISK SCREENING ANALYSIS

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 an assumed abatement efficiency of 50% removal of organic HAP compounds, except for the pollutants which have abated emission factors in CATEF. The abatement efficiency is based on the fact that the engine is being permitted with a Catalytic Converter and an air fuel ratio controller.

As shown in Table 2 and Table 3 below, no toxic air contaminants exceed the District Risk Screening Triggers and a Risk Screening Analysis is not required.

Table 2
HAP EMISSIONS ESTIMATES BASED ON AP-42 TABLE 3.2-3 (FOR COMPOUNDS WITH NO CATEF E.F.)

Compound		E.F.	Unit	Assumed Abatement Efficiency %	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	lb/MMBtu	50	7.17E-06	None	NO	3.58E-04	1.90E+00	NO
1,1,2-Trichloroethane	<	1.53E-05	lb/MMBtu	50	4.33E-06	None	NO	2.17E-04	6.60E+00	NO
1,1-Dichloroethane	<	1.13E-05	lb/MMBtu	50	3.20E-06	None	NO	1.60E-04	6.60E+01	NO
1,2-Dichloroethane	<	1.13E-05	lb/MMBtu	50	3.20E-06	None	NO	1.60E-04	None	NO
1,2-Dichloropropane	<	1.30E-05	lb/MMBtu	50	3.68E-06	None	NO	1.84E-04	None	NO
1,3-Butadiene		6.63E-04	lb/MMBtu	50	CATEF	None	NO	CATEF	1.10E+00	NO
1,3-Dichloropropene	<	1.27E-05	lb/MMBtu	50	3.60E-06	None	NO	1.80E-04	None	NO
Acetaldehyde		2.79E-03	lb/MMBtu	50	CATEF	1.00E+00	NO	CATEF	3.80E+01	NO
Acrolein		2.63E-03	lb/MMBtu	50	CATEF	5.5E-03	NO	CATEF	1.40E+01	NO
Benzene		1.58E-03	lb/MMBtu	50	CATEF	2.9E+00	NO	CATEF	3.80E+00	NO
Butyr/isobutyraldehyde		4.86E-05	lb/MMBtu	50	1.38E-05	None	NO	6.88E-04	None	NO
Carbon Tetrachloride	<	1.77E-05	lb/MMBtu	50	5.01E-06	4.2E+00	NO	2.51E-04	2.50E+00	NO
Chlorobenzene	<	1.29E-05	lb/MMBtu	50	3.65E-06	None	NO	1.83E-04	3.90E+04	NO
Chloroform	<	1.37E-05	lb/MMBtu	50	3.88E-06	3.3E-01	NO	1.94E-04	2.00E+01	NO
Ethylbenzene	<	2.48E-05	lb/MMBtu	50	CATEF	None	NO	CATEF	4.30E+01	NO
Ethylene Dibromide	<	2.13E-05	lb/MMBtu	50	6.03E-06	None	NO	3.02E-04	1.50E+00	NO
Formaldehyde		2.05E-02	lb/MMBtu	50	CATEF	1.2E-01	NO	CATEF	1.80E+01	NO
Methanol		3.06E-03	lb/MMBtu	50	8.67E-04	6.2E+01	NO	4.33E-02	1.50E+05	NO
Methylene Chloride		4.12E-05	lb/MMBtu	50	1.17E-05	3.1E+01	NO	5.84E-04	1.10E+02	NO
Naphthalene	<	9.71E-05	lb/MMBtu	50	CATEF	None	NO	CATEF	3.20E+00	NO
PAH		1.41E-04	lb/MMBtu	50	CATEF	None	NO	CATEF	None	NO
Styrene	<	1.19E-05	lb/MMBtu	50	3.37E-06	4.6E+01	NO	1.69E-04	3.50E+04	NO
Toluene		5.58E-04	lb/MMBtu	50	1.58E-04	8.2E+01	NO	7.90E-03	1.20E+04	NO
Vinyl Chloride	<	7.18E-06	lb/MMBtu	50	2.03E-06	4.0E+02	NO	1.02E-04	1.40E+00	NO
Xylene		1.95E-04	lb/MMBtu	50	5.52E-05	4.9E+01	NO	2.76E-03	2.70E+04	NO

Table 3
HAP EMISSION ESTIMATES BASED ON CATEF EMISSION FACTORS

SUBSTANCE	E.F. MEAN	UNIT	Assumed Abatement Efficiency %	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	lbs/MMcf	50	2.89E-05	None	NO	0.00144424	6.30E-01	NO
Acenaphthene	1.94E-03	lbs/MMcf	50	5.39E-07	None	NO	2.6941E-05	None	NO
Acenaphthylene	1.45E-02	lbs/MMcf	50	4.03E-06	None	NO	0.00020136	None	NO
Acetaldehyde	8.83E-01	lbs/MMcf	50	2.45E-04	None	NO	0.01226215	3.80E+01	NO
Acrolein	5.47E-01	lbs/MMcf	50	1.52E-04	5.50E-03	NO	0.00759614	1.40E+01	NO
Anthracene	1.84E-03	lbs/MMcf	50	5.11E-07	None	NO	2.5552E-05	None	NO
Benzene	1.38E-01	lbs/MMcf	0	1.06E-03	2.90E+00	NO	0.05304802	3.80E+00	NO
Benzo(a)anthracene	3.39E-04	lbs/MMcf	50	9.42E-08	None	NO	4.7077E-06	None	NO
Benzo(a)pyrene	1.15E-04	lbs/MMcf	50	3.19E-08	None	NO	1.597E-06	None	NO
Benzo(b)fluoranthene	2.37E-04	lbs/MMcf	50	6.58E-08	None	NO	3.2912E-06	None	NO
Benzo(g,h,i)perylene	1.95E-04	lbs/MMcf	50	5.42E-08	None	NO	2.7079E-06	None	NO
Benzo(k)fluoranthene	1.03E-04	lbs/MMcf	50	2.86E-08	None	NO	1.4304E-06	None	NO
Chrysene	3.10E-04	lbs/MMcf	50	8.61E-08	None	NO	4.3049E-06	None	NO
Dibenz(a,h)anthracene	1.25E-05	lbs/MMcf	50	3.47E-09	None	NO	1.7359E-07	None	NO
Ethylbenzene	1.16E-02	lbs/MMcf	50	3.22E-06	None	NO	0.00016109	4.30E+01	NO
Fluoranthene	9.95E-04	lbs/MMcf	50	2.76E-07	None	NO	1.3817E-05	None	NO
Fluorene	6.91E-03	lbs/MMcf	50	1.92E-06	None	NO	9.5959E-05	None	NO
Formaldehyde	4.99E-02	lbs/MMcf	0	1.31E-03	2.1E-01	NO	0.06526851	1.80E+01	NO
Indeno(1,2,3-cd)pyrene	1.69E-04	lbs/MMcf	50	4.69E-08	None	NO	2.3469E-06	None	NO
Naphthalene	7.65E-02	lbs/MMcf	50	2.12E-05	None	NO	0.00106235	3.20E+00	NO
Phenanthrene	7.07E-03	lbs/MMcf	50	1.96E-06	None	NO	9.8181E-05	None	NO
Propylene	1.60E+01	lbs/MMcf	50	4.44E-03	None	NO	0.22219068	1.20E+05	NO
Pyrene	1.79E-03	lbs/MMcf	50	4.97E-07	None	NO	2.4858E-05	None	NO
Toluene	1.07E+00	lbs/MMcf	50	2.97E-04	8.2E+01	NO	0.014859	1.20E+04	NO
Xylene (m,p)	4.41E-01	lbs/MMcf	50	1.22E-04	4.9E+01	NO	0.00612413	2.70E+04	NO
Xylene (o)	2.17E-01	lbs/MMcf	50	6.03E-05	4.9E+01	NO	0.00301346	2.70E+04	NO
Xylene (Total)	6.02E-02	lbs/MMcf	50	1.67E-05	4.9E+01	NO	0.00083599	2.70E+04	NO
PAH Equivalents as Benzo(a)pyrene	1.70E-06	lbs/MMcf	50	8.33E-10	50	NO	4.166E-08	2.70E+04	NO

PLANT CUMULATIVE EMISSIONS

Table 4 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

Table 4

Plant Cumulative Increase: (tons/year)			
Pollutant	**Existing**	**New**	**Total**
POC	0.000	0.002	0.002
NOx	0.000	0.003	0.003
CO	0.000	0.007	0.007
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, NOx, CO, SO_2 or PM_{10}.

Based on the emission calculations above, BACT is triggered for CO since the maximum daily emissions of each exceed 10 lb/day.

Source Category

Source:	***IC Engine – Spark Ignition, Natural Gas Fired Emergency Engine***	**Revision:**	***1***
		Document #:	***96.3.4***
Class:	***>= 50 HP***	**Date:**	***5/7/03***

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. *n/d* 2. *1.0 g/bhp-hr*[a]	1. *n/d* 2. *lean burn technology*[a]
NOx	1. *n/d* 2. *1.0 g/bhp-hr*[a]	1. n/d 2. *lean burn technology*[a]
SO_2	1.*n/a* 2.*n/s*	1. *n/a* 2. *natural gas*[a]
CO	1. *n/d* *2. 2.75 g/bhp-hr*[a]	1. *n/d* 2. *lean burn technology*[a]
PM_{10}	1. *n/d* 2. *n/s*	1. *n/d* 2. *natural gas*[a]
NPOC	1. *n/a* 2. *n/a*	1. *n/a* 2. *n/a*

References

a. 1993 BACT 2 levels for IC Engine-Spark Ignition, Nat. Gas >_ 250 HP (3/19/93) without the need for post-combustion controls (not considered to be cost effective for emergency only applications).

BACT(2) requires the CO emission to be less than 2.75g/hp-hr, and S-1 complies with BACT standard since the CO emissions from S-1 is 2.26 g/hp-hr. BACT(2) requires the POC emission to be less than 1.0 g/hp-hr, and S-1 complies with BACT standard since the POC emissions from S-1 is 0.58 g/hp-hr. BACT(2) requires the NOx emission to be less than 1.0g/hp-hr, and S-1 complies with BACT standard since the NOx emissions from S-1 is 0.99 g/hp-hr. This engine is already abated with a 3 way Non-selective Catalytic Reduction and meets BACT requirements.

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

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Regulation 6, Rule 1 (*Particulate Matter – General Requirements*) 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 SO_2 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.

S-1 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-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 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)

Public Notice is required because the equipment is located within 1000 ft of a K-12 school. Marina Middle School parcel boundary is approximately 500 ft from the Source. The source does not trigger any emission thresholds to require a risk screen, but still must complete the Public Notification process to be in compliance with this Water's Bill requirements.

PERMIT CONDITIONS

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 Record keeping 9-8-530]

3. The Owner/Operator shall not operate unless 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 for engine.
   f. CARB Certification Executive Order for the 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. 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 waiving the Authority to Construct issuance of a Permit To Operate (PO) for the following source:

S-1 Emergency Standby Generator Set: Natural Gas (NG) engine
Generac, Model: SG0035-3844880100, Model Year: 2004
56 BHP, 0.57MMBtu/hr
Abated by
A-1 Generac 3-way Non-Selective Catalytic Reduction Device

By:_____

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