DRAFT
Engineering Evaluation
San Ramon Valley Fire Protection District Fire Station 36
Beatson Electric Co.
Application No. 21098
Plant No. 19903

BACKGROUND

On behalf of San Ramon Valley Fire Protection District, Beatson Electric Co. has applied for an Authority to Construct/Permit to Operate a natural gas fired emergency standby generator set. The generator set will provide emergency standby power in the event of a disruption to power service. The natural gas fired engine is equipped with an air fuel ratio controller and a non-selective catalytic reduction abatement device to reduce exhaust emissions. The source is described as follows:

S-1 Emergency Standby Generator Set, Engine: 8.1 L, General Motors, Model GM34464-GA8, Fuel: Natural Gas, 195 hp, Abated by a CleanAIR Systems Inc. Catalytic Converter (CQD1050BCCN40) with an air/fuel ratio controller.

The equipment will be located on the ground level of the building at Fire Station 36, 2001 Lusitano Street, Danville, CA 94506.

EMISSIONS CALCULATIONS

The emission factors used to estimate criteria pollutant emissions from the natural gas fired engine generator set described above are based on engine manufacturer abated and unabated emissions data. Total Hydrocarbon emission rates were assumed to be equal to Precursor Organic Carbon emission rates. The engine will operate during emergency use and for a maximum of 100 hours per year for maintenance and testing.

Pollutant	Unabated Emission Factor (g/BHP-hr)	Abatement Efficiency (%)	Abated Emission Factor (g/BHP-hr)	Abated Emissions (lb/day)	Abated Emissions (lb/yr)	Abated Emissions (ton/year)
POC	0.6	90	0.06	0.6	2.6	0.001
NOx	5.4	90	0.54	5.6	23.2	0.012
CO	32	95	1.6	16.5	68.8	0.034

The emission factors used to estimate 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 engine being permitted has a maximum firing rate of 1.676 MMBtu/hr and a maximum rating of 195 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. 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.
(Note: According to the "Proposed BAAQMD Air Toxics NSR Program HRSA Guidelines", an HRSA for the emissions of Acrolein will not be conducted.)HAP Emissions Estimates BASED On AP-42 Table 3.2-3 (For Compounds with No CATEF E.F.)

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	2.12E-05	None	NO	2.12E-03	3.20E+00	NO
1,1,2-Trichloroethane	<	1.53E-05	lb/MMBtu	50	1.28E-05	None	NO	1.28E-03	1.10E+01	NO
1,1-Dichloroethane	<	1.13E-05	lb/MMBtu	50	9.47E-06	None	NO	9.47E-04	1.10E+02	NO
1,2-Dichloroethane	<	1.13E-05	lb/MMBtu	50	9.47E-06	None	NO	9.47E-04	None	NO
1,2-Dichloropropane	<	1.30E-05	lb/MMBtu	50	1.09E-05	None	NO	1.09E-03	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	1.06E-05	None	NO	1.06E-03	None	NO
Acetaldehyde		2.79E-03	lb/MMBtu	50	CATEF	None	NO	CATEF	6.40E+01	NO
Acrolein		2.63E-03	lb/MMBtu	50	CATEF	4.2E-04	NO	CATEF	2.30E+00	NO
Benzene		1.58E-03	lb/MMBtu	50	CATEF	2.9E+00	NO	CATEF	6.40E+00	NO
Butyr/isobutyraldehyde		4.86E-05	lb/MMBtu	50	4.07E-05	None	NO	4.07E-03	None	NO
Carbon Tetrachloride	<	1.77E-05	lb/MMBtu	50	1.48E-05	4.2E+00	NO	1.48E-03	4.30E+00	NO
Chlorobenzene	<	1.29E-05	lb/MMBtu	50	1.08E-05	None	NO	1.08E-03	3.90E+04	NO
Chloroform	<	1.37E-05	lb/MMBtu	50	1.15E-05	3.3E-01	NO	1.15E-03	3.40E+01	NO
Ethane		7.04E-02	lb/MMBtu	50	5.90E-02	None	NO	5.90E+00	None	NO
Ethylbenzene	<	2.48E-05	lb/MMBtu	50	CATEF	None	NO	CATEF	7.70E+04	NO
Ethylene Dibromide	<	2.13E-05	lb/MMBtu	50	1.78E-05	None	NO	1.78E-03	2.60E+00	NO
Formaldehyde		2.05E-02	lb/MMBtu	50	CATEF	2.1E-01	NO	CATEF	3.00E+01	NO
Methanol		3.06E-03	lb/MMBtu	50	2.56E-03	6.2E+01	NO	2.56E-01	1.50E+05	NO
Methylene Chloride		4.12E-05	lb/MMBtu	50	3.45E-05	3.1E+01	NO	3.45E-03	1.80E+02	NO
Naphthalene	<	9.71E-05	lb/MMBtu	50	CATEF	None	NO	CATEF	None	NO
PAH		1.41E-04	lb/MMBtu	50	CATEF	None	NO	CATEF	None	NO
Styrene	<	1.19E-05	lb/MMBtu	50	9.97E-06	4.6E+01	NO	9.97E-04	3.50E+04	NO
Toluene		5.58E-04	lb/MMBtu	50	4.68E-04	8.2E+01	NO	4.68E-02	1.20E+04	NO
Vinyl Chloride	<	7.18E-06	lb/MMBtu	50	6.02E-06	4.0E+02	NO	6.02E-04	2.40E+00	NO
Xylene		1.95E-04	lb/MMBtu	50	1.63E-04	4.9E+01	NO	1.63E-02	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	8.59E-05	None	NO	8.59E-03	1.10E+00	NO
Acenaphthene	1.94E-03	lbs/MMcf	50	1.60E-06	None	NO	1.60E-04	None	NO
Acenaphthylene	1.45E-02	lbs/MMcf	50	1.20E-05	None	NO	1.20E-03	None	NO
Acetaldehyde	8.83E-01	lbs/MMcf	50	7.29E-04	None	NO	7.29E-02	6.40E+01	NO
Acrolein	5.47E-01	lbs/MMcf	50	**4.52E-04**	4.20E-04	YES	4.52E-02	2.30E+00	NO
Anthracene	1.84E-03	lbs/MMcf	50	1.52E-06	None	NO	1.52E-04	None	NO
Benzene	1.91E+00	lbs/MMcf	50	1.58E-03	2.90E+00	NO	1.58E-01	6.40E+00	NO
Benzo(a)anthracene	2.94E-04	lbs/MMcf	50	2.43E-07	None	NO	2.43E-05	None	NO
Benzo(a)pyrene	1.15E-04	lbs/MMcf	50	9.49E-08	None	NO	9.49E-06	1.10E-02	NO
Benzo(b)fluoranthene	2.37E-04	lbs/MMcf	50	1.96E-07	None	NO	1.96E-05	None	NO
Benzo(g,h,i)perylene	1.95E-04	lbs/MMcf	50	1.61E-07	None	NO	1.61E-05	None	NO
Benzo(k)fluoranthene	1.03E-04	lbs/MMcf	50	8.50E-08	None	NO	8.50E-06	None	NO
Chrysene	3.10E-04	lbs/MMcf	50	2.56E-07	None	NO	2.56E-05	None	NO
Dibenz(a,h)anthracene	1.25E-05	lbs/MMcf	50	1.03E-08	None	NO	1.03E-06	None	NO
Ethylbenzene	1.16E-02	lbs/MMcf	50	9.58E-06	None	NO	9.58E-04	7.70E+04	NO
Fluoranthene	9.95E-04	lbs/MMcf	50	8.21E-07	None	NO	8.21E-05	None	NO
Fluorene	6.91E-03	lbs/MMcf	50	5.70E-06	5.30E-01	NO	5.70E-04	5.00E+02	NO
Formaldehyde	2.35E+00	lbs/MMcf	50	1.94E-03	2.1E-01	NO	1.94E-01	3.00E+01	NO
Indeno(1,2,3-cd)pyrene	1.69E-04	lbs/MMcf	50	1.40E-07	None	NO	1.40E-05	None	NO
Naphthalene	7.65E-02	lbs/MMcf	50	6.32E-05	None	NO	6.32E-03	None	NO
Phenanthrene	7.07E-03	lbs/MMcf	50	5.84E-06	None	NO	5.84E-04	None	NO
Propylene	1.60E+01	lbs/MMcf	50	1.32E-02	None	NO	1.32E+00	1.20E+05	NO
Pyrene	1.79E-03	lbs/MMcf	50	1.48E-06	None	NO	1.48E-04	None	NO
Toluene	1.07E+00	lbs/MMcf	50	8.83E-04	8.2E+01	NO	8.83E-02	1.20E+04	NO
Xylene (m,p)	4.41E-01	lbs/MMcf	50	3.64E-04	4.9E+01	NO	3.64E-02	2.70E+04	NO
Xylene (o)	2.17E-01	lbs/MMcf	50	1.79E-04	4.9E+01	NO	1.79E-02	2.70E+04	NO
Xylene (Total)	6.02E-02	lbs/MMcf	50	4.97E-05	4.9E+01	NO	4.97E-03	2.70E+04	NO
PAH Equivalents as Benzo(a)pyrene								1.10E-02	NO

PLANT CUMULATIVE EMISSIONS

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
POC	0.000	0.003	0.001
NOx	0.000	0.008	0.012
CO	0.000	0.016	0.034
PM_{10}	0.000	NA	0.000

TOXICS RISK SCREENING ANALYSIS

The annual emissions for all toxic air contaminants were below the toxic air contaminant trigger levels. No toxics risk screening analysis is required.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Regulation 6 (*Particulate Matter and Visible Emissions Standards*) 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)

This facility is located less than 1,000 feet from the nearest school and therefore is subject to the public notification requirements of Regulation 2-1-412. A public notice was prepared and sent to all addresses within 1000 feet of the diesel generator set and parents and guardians of students of the following schools:

Tassajara Hills Elementary School
4675 Camino Tassajara
Danville, CA 94506

Best Available Control Technology: In accordance with Regulation 2, Rule 2, Section 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, the owner/operator of S-1 is not subject to BACT for the any pollutants.

Offsets: 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.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

COND# 23108 ----------

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 100 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 Recordkeeping 9-8-530)
3. The Owner/Operator shall not operate unless the natural gas fired engine is abated with a Catalytic Converter/Silencer Unit

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

Issue an Authority to Construct and/or Permit to Operate to **Beatson Electric Co**. for:

S-1 Emergency Standby Generator Set, Engine: 8.1 L, General Motors, Model GM34464-GA8, Fuel: Natural Gas, 195 hp, Abated by a CleanAIR Systems Inc. Catalytic Converter (CQD1050BCCN40) with an air/fuel ratio controller.

By:_____

Lucy Croy
Air Quality Engineering Intern
DATE: 12/29/09