

ENGINEERING EVALUATION
2200 Pacific Homeowners Association
PLANT NO. 15551
APPLICATION NO. 7934

BACKGROUND

2200 Pacific Homeowners Association is applying for an Authority to Construct and/or Permit to Operate the following equipment:

- S-1 Natural Gas Fired 60 kW Tecogen CM-60 Cogeneration System, 85 HP abated by A-1 Johnson Matthey NSCR**

EMISSIONS SUMMARY

Annual Emissions:

The cogeneration system will be run 24 hr/day, 365 day/yr. The cogeneration system with NSCR will be conditionally permitted to meet Best Available Control Technology (BACT) levels.

Emission Factors	
Pollutant	BACT emission limits
NOx	0.15 g/bhp-hr
CO	0.60 g/bhp-hr
POC	0.15 g/bhp-hr
PM10	9.50E-3 lb/MMBtu*
SO2	5.88E-4 lb/MMBtu*

*The emission factor for PM10 and SO2 are from Chapter 3, Table 3.2-3 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.

The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.

$$\text{SO}_2 = 8.09\text{E-}3 \text{ (\% S in fuel oil) lb/hp-hr} = 8.09\text{E-}3 \text{ (0.05\% S) (454 g/lb)} = 0.184 \text{ g/hp-hr}$$

$$\text{NO}_x = (0.15 \text{ g/bhp-hr})(85 \text{ HP})(8760 \text{ hr/yr})(\text{lb}/454 \text{ g}) = 246.0 \text{ lb/yr} = 0.123 \text{ tpy}$$

$$\text{CO} = (0.60 \text{ g/bhp-hr})(85 \text{ HP})(8760 \text{ hr/yr})(\text{lb}/454 \text{ g}) = 984.1 \text{ lb/yr} = 0.492 \text{ tpy}$$

$$\text{POC} = (0.15 \text{ g/bhp-hr})(85 \text{ HP})(8760 \text{ hr/yr})(\text{lb}/454 \text{ g}) = 246.0 \text{ lb/yr} = 0.123 \text{ tpy}$$

$$\text{PM}_{10} = (9.50\text{E-}3 \text{ lb/MMBtu})(0.7976 \text{ MMBtu/hr})(8760 \text{ hr/yr}) = 66.38 \text{ lb/yr} = 0.033 \text{ tpy}$$

$$\text{SO}_2 = (5.88\text{E-}4 \text{ lb/MMBtu})(0.7976 \text{ MMBtu/hr})(8760 \text{ hr/yr}) = 4.11 \text{ lb/yr} = 0.002 \text{ tpy}$$

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

$$\text{NO}_x = (0.15 \text{ g/bhp-hr})(85 \text{ HP})(24 \text{ hr/day})(\text{lb}/454 \text{ g}) = 0.674 \text{ lb/day}$$

$$\text{CO} = (0.60 \text{ g/bhp-hr})(85 \text{ HP})(24 \text{ hr/day})(\text{lb}/454 \text{ g}) = 2.696 \text{ lb/day}$$

$$\text{POC} = (0.15 \text{ g/bhp-hr})(85 \text{ HP})(24 \text{ hr/day})(\text{lb}/454 \text{ g}) = 0.674 \text{ lb/day}$$

$$\text{PM}_{10} = (9.50\text{E-}3 \text{ lb/MMBtu})(0.7976 \text{ MMBtu/hr})(24 \text{ hr/yr}) = 0.182 \text{ lb/day}$$

$$\text{SO}_2 = (5.88\text{E-}4 \text{ lb/MMBtu})(0.7976 \text{ MMBtu/hr})(24 \text{ hr/yr}) = 0.011 \text{ lb/day}$$

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
NOx	0	0.123	0.123
POC	0	0.123	0.123
CO	0	0.492	0.492
SO2	0	0.002	0.002
PM10	0	0.033	0.033
NPOC	0	0	0

Toxic Risk Screening:

The toxic emission of PAH's from the cogeneration system with NSCR exceeds the District Risk Screening Trigger and a Risk Screening Analysis has been performed.

Toxic Pollutant (8760 hours/yr)	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
PAH's	0.099	0.044
Benzo(a)anthracene	0.000201	0.044
Benzo(a)pyrene	0.000079	0.044
Benzo(b)fluoranthene	0.000162	0.044
Benzo(g,h,i)perylene	0.000134	0.044
Benzo(k)fluoranthene	0.000071	0.044
Chrysene	0.000212	0.044
Dibenz(a,h)anthracene	8.56E-6	0.044
Indeno(1,2,3-cd)pyrene	0.000116	0.044

For 8760 hours of operation per year the maximum cancer risk is 0.16 in a million and the hazard index is less than one.

Receptor	Cancer Risk in a million	Hazard Index
Residential	0.16	0.03
Hamlin School	0.0048	0.02
Newcomer School	0.0033	0.01
Convent of the Sacred Heart Elementary School	0.0033	0.01
Convent of the Sacred Heart High School	0.0031	0.01
Stuart Hall for Boys School	0.0030	0.01

The level of risk has been determined as acceptable under the risk management policy. The project meets the most stringent requirements of the Risk Management Policy. To pass the Risk Screen, a project is acceptable if the cancer risk is less than one in a million. But, if a project has applied TBACT, the maximum acceptable cancer risk allowed is 10 in a million. Since the cogeneration system will be conditionally permitted to meet BACT 2 levels, it meets the District's TBACT requirements and the maximum acceptable cancer risk allowed is 10 in a million. (See memo from Toxics Group, November 5, 2003.)

STATEMENT OF COMPLIANCE

The owner/operator of S-1 Natural Gas Fired 60 kW Tecogen CM-60 Cogeneration System, 85 HP abated by A-1 Johnson Matthey NSCR shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). The owner/operator is expected to comply with Regulation 6 since the units are fueled with natural gas. Thus for any period aggregating more than three minutes in any hour, there should be no visible emission as dark or darker than No. 1 on the Ringlemann Chart (Regulation 6-301) and no visible emission to exceed 20% opacity (Regulation 6-302). Sulfur oxides are also very low since natural gas is being used to fire the compressor. Sulfur compounds are removed from natural gas at processing plants. The cogeneration system with NSCR will be conditionally permitted to meet BACT requirements of 0.15 g NO_x/bhp-hr (9 ppmvd NO_x at 15% O₂) and 0.60 g CO/bhp-hr (56 ppmvd CO at 15% O₂). Thus the emission of NO_x meets the limit of 56 ppmv NO_x at 15% O₂ in Regulation 9-8-301.1 and the emission of CO meets the limit of 2000 ppmv CO at 15% O₂ in Regulation 9-8-301.3.

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)

The project is within 1000 feet from the nearest school and therefore the owner/operator is subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and sent on [November XX, 2003] to:

All addresses within 1000 feet of the natural gas fired cogenerator
Parents and guardians of students at the Hamlin School
Parents and guardians of students at the Newcomer School
Parents and guardians of students at the Convent of the Sacred Heart Elementary School
Parents and guardians of students at the Convent of the Sacred Heart High School
Parents and guardians of students at the Stuart Hall for Boys School

[Insert comments received over the 30-day comment period.]

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, NO_x, CO, SO₂ or PM₁₀. Based on the emission calculations above, the owner/operator of S-1 is not subject to BACT.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NO_x. The District may provide offsets from the Small Facility Banking Account for a facility with emissions between 15 and 50 tons/yr of POC or NO_x, provided that facility has no available offsets, and all existing sources of POC and/or NO_x are equipped with Best Available Retrofit Control Technology (BARCT). Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Application 7934 (November 2003):

Conditions for S-1 Natural Gas Fired 60 kW Tecogen CM-60 Cogeneration System, 85 HP abated by A-1 Johnson Matthey NSCR

1. The owner/operator of S-1 Natural Gas Fired 60 kW Tecogen CM-60 Cogeneration System, 85 HP abated by A-1 Johnson Matthey NSCR, shall fire it exclusively with natural gas at a firing rate not to exceed 0.7976 MMBtu/hr (HHV).
(basis: Cumulative Increase and BACT)
2. The owner/operator shall not operate the cogeneration system unless NO_x, CO and POC emissions are abated by the NSCR unit.
(basis: Cumulative Increase, BACT)
3. The owner/operator of S-1 shall not exceed the following emissions limits:
NO_x 0.15 g/bhp-hr (9 ppmvd at 15% O₂)
CO 0.60 g/bhp-hr (56 ppmvd at 15% O₂)
POC 0.15 g/bhp-hr (25 ppmvd at 15% O₂)
(basis: Cumulative Increase and BACT)
4. To demonstrate compliance with Part 3, the owner/operator shall measure the NO_x and CO concentration from S-1. Measurements may be made using a District-approved source test, or using hand-held portable NO_x and CO monitors. Testing shall be done according to the following schedule:
 - a) Within 30 days of startup or longer with written approval from the District. The owner/operator may submit a request detailing why an extension should be granted.
 - b) If using a hand-held monitor, at least every 6-months, following startup.
 - c) If using a District Approved source test, at least once per consecutive 24-month period, following startup.Hand-held portable monitors shall be operated, maintained and calibrated in accordance with manufacturer guidelines. All source testing shall be done in accordance with the District's Manual of Procedures. The facility shall receive approval from the District's Source Test Manager for installation of test ports and source testing procedures. The results shall be delivered to the District no later than 30 days from the date of the source test.
(basis: Cumulative Increase and BACT, Regulation 9-8-501)
5. The owner/operator shall retain the following records on-site for two years, from the date of entry, and make them available for inspection by District staff upon request.
 - a. NO_x and CO concentration measurements taken as per Condition 5.
 - b. Any source test records.(basis: BACT, Cumulative Increase, Reg. 9-8-530: Record keeping)

RECOMMENDATION

Issue an Authority to Construct 2200 Pacific Homeowners Association for the following source:

S-1 Natural Gas Fired 60 kW Tecogen CM-60 Cogeneration System, 85 HP abated by A-1 Johnson Matthey NSCR

EXEMPTIONS

None.

By: _____
Pamela J. Leong
Air Quality Engineer
November 18, 2003