

**ENGINEERING EVALUATION**  
**Habitec Architect**  
**PLANT NO. 20755**  
**APPLICATION NO. 23316**

**BACKGROUND**

Habitec Architect is applying for an Authority to Construct and/or Permit to Operate the following equipment:

- S-1 Emergency Standby Generator; Propane Engine, Cummins model GGHE, 97.5 HP; abated by: Three-Way NSCR System**

The new standby generator is located at 711 E. Gish Road in San Jose.

**EMISSIONS SUMMARY**

**Annual Emissions:**

The 97.5 HP engine will be run on propane fuel. The fuel consumption rate is 345 scfh. Engine emissions are provided by the vendor. For this report, it is assumed that the emission value of non-methane hydrocarbon (NMHC) is equivalent to the emission value of POC. The engine will be abated by a Three-Way NSCR System. Habitec Architect is allowed to operate the engine for maintenance and reliability-related activities for up to 100 hr/yr.

	<u>ENGINE EMISSIONS</u>	
	<u>unabated</u>	<u>abated with Three-way NSCR</u>
NO <sub>x</sub>	14.6 g/hp-hr	0.69 g/hp-hr
CO	2.30 g/hp-hr	0.73 g/hp-hr
POC	1.00 g/hp-hr	0.34 g/hp-hr
PM <sub>10</sub>	negligible	negligible

The emission factor for SO<sub>2</sub> is from Chapter 3, Table 3.2-3 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors. The emissions of SO<sub>2</sub> from a 4-stroke rich burn natural gas engine will be used to approximate the SO<sub>2</sub> emissions from the propane engine.

SO<sub>2</sub>     5.88E-4 lb/MMBtu

NO<sub>x</sub>            = (0.69 g/hp-hr)(97.5 hp)(100 hrs/yr)(lb/454g) = 14.82 lb/yr = 0.007 TPY  
CO                = (0.73 g/hp-hr)(97.5 hp)(100hrs/yr)(lb/454g) = 15.68 lb/yr = 0.008 TPY  
POC              = (0.34 g/hp-hr)(97.5 hp)(100 hrs/yr)(lb/454g) = 7.302 lb/yr = 0.004 TPY  
PM<sub>10</sub>           = (0.0 g/hp-hr)(97.5 hp)(100 hrs/yr)(lb/454g) = 0.000 lb/yr = 0.000 TPY  
SO<sub>2</sub>              = (5.88E-4 lb/MMBtu)(345 scf/hr)(2500 BTU/scf)(MMBtu/1E6 Btu)(100 hr/yr)  
                     = 0.051 lb/yr = 0.000 TPY

**Maximum Daily Emissions:**

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

NO<sub>x</sub>            = (0.69 g/hp-hr)(97.5 hp)(24 hrs/day)(lb/454g) = 3.538 lb/day  
CO                = (0.73 g/hp-hr)(97.5 hp)(24 hrs/day)(lb/454g) = 3.743 lb/day  
POC              = (0.34 g/hp-hr)(97.5 hp)(24 hrs/day)(lb/454g) = 1.752 lb/day  
PM<sub>10</sub>           = (0.0 g/hp-hr)(97.5 hp)(24 hrs/day)(lb/454g) = 0.000 lb/day  
SO<sub>2</sub>              = (5.88E-4 lb/MMBtu)(345 scf/hr)(2500 BTU/scf)(MMBtu/1E6 Btu)(24 hrs/day)

= 0.012 lb/day

**Plant Cumulative Increase: (tons/year)**

<b>Pollutant</b>	<b>Existing</b>	<b>New</b>	<b>Total</b>
<b>NOx</b>	0	0.007	0.007
<b>POC</b>	0	0.008	0.008
<b>CO</b>	0	0.004	0.004
<b>PM<sub>10</sub></b>	0	0.000	0.000
<b>SO<sub>2</sub></b>	0	0.000	0.000

**Toxic Risk Screening:**

EPA AP-42 Compilation of Air Pollutant Emission Factors 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. Chapter 1.5 does state that LPG is considered a “clean” fuel because it does not produce visible emissions. The District database uses generalized factors that appear to be based on natural gas for LPG toxic emissions (see Application Number 6192: Emergency LPG fired engine). Emissions factors for a 4-stroke rich-burn natural gas engine will be used to estimate the emissions from the propane fired engine. Emissions factors are from EPA AP-42 Table 3.2-3. As seen in Appendix A of this report, no toxic air contaminants exceed the District Risk Screening Triggers and a Risk Screening Analysis is not required.

**Public Notification:**

The project is within 1000 feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and posted on the Internet. The public notice was sent to parents and guardians of children enrolled at Challenger School and residential and business neighbors located within 1000 feet of the proposed new source of pollution.

**STATEMENT OF COMPLIANCE**

The owner/operator of S-1 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 unit is fueled with liquefied petroleum gas (propane). 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 propane is being used to fire the compressor. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Gas Turbines) exempts the source from the requirement of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 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)

**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<sub>2</sub> or PM<sub>10</sub>. 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 NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

## PERMIT CONDITIONS

COND# 25045 -----

Application #23316, Plant # 20755  
Conditions for S-1, Emergency Standby Generator; Propane Engine, Cummins model GGHE, 97.5 HP; abated by Three-Way NSCR System

1. The owner/operator of S-1 shall fire the engine exclusively with propane gas at a firing rate not to exceed 4.86 MMBtu/hr (fuel consumption rate of 345 scfh).  
(Basis: Cumulative Increase, BACT)
2. The owner/operator shall not operate S-1 engine unless NOx, CO and POC emissions are abated by the properly operated and maintained Three-Way NSCR System.  
(Basis: Cumulative Increase, BACT)
3. The owner/operator shall operate S-95 only under the following circumstances:
  - a. For emergency use for an unlimited number of hours.
  - b. For reliability-related activities so long as total hours of operation for this purpose do not exceed 100 hours in a calendar year.(Basis: Reg. 9-8-330, Cumulative Increase)

Emergency use is defined by the following circumstances:

- a) In the event of loss of regular natural gas supply;
  - b) In the event of failure of regular electric power supply;
  - c) Flood mitigation;
  - d) Sewage overflow mitigation;
  - e) Fire;
  - f) Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.
- (Basis: Reg. 9-8-231)

Reliability-related activities are defined as either:

- a) Operation of an emergency standby engine to test its ability to perform for an emergency use; or
  - b) Operation of an emergency standby engine during maintenance of a primary motor.
- (Basis: Reg. 9-8-232)

4. The owner/operator shall equip S-95 with either:
  - a. a non-resettable totalizing meter that measures hours of operation for the engine; or
  - b. a non-resettable fuel usage meter, the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

(Basis: Reg. 9-8-530: Record keeping, Cumulative Increase)

5. To determine compliance with the above conditions, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions. A monthly log of usage shall indicate the following:
  - a. Hours of operation (total)
  - b. Hours of operation (emergency)
  - c. For each emergency, the nature of the emergency condition

The owner/operator shall record all records in a District-approved log. The owner/operator shall retain the records on-site for two years, from the date of entry, and make them available for inspection by District staff upon request. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable District Regulations.

(Basis: Toxic Risk Screen, Cumulative Increase, Regulation 1-441, Reg. 9-8-530: Record keeping)

#### **RECOMMENDATION**

Issue an Authority to Construct to Habitec Architect for the following source:

- S-1     Emergency Standby Generator; Propane Engine, Cummins model GGHE, 97.5 HP; abated by: Three-Way NSCR System**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Faye Bruno  
Air Quality Engineer II

Appendix A  
Toxic Air Contaminants from S-1 Emergency Propane Generator

<b>ESTIMATION FOR</b>		emission factor	Calculated	Abatement	Abated	TAC trigger
<b>PROPANE</b>		lb/MMBtu	Emmission	efficiency	Emissions	lb/yr
		(fuel input)				
<b>AP-42 Emmissions for Natural Gas-fired Reciprocating Engines</b>						
<b>3.2 Uncontrolled Emission Factors For 4-Stroke RICH-Burn Engines</b>						
Trace Organic Compounds	1,1,2,2-Tetrachloroethane	2.53E-05	0.0021834	0.6575	0.000748	3.3
	1,1,2-Trichloroethane	1.53E-05	0.0013204	0.6575	0.000452	1.2
	1,1-Dichloroethane	1.13E-05	0.0009752	0.6575	0.000334	120
	1,2-Dichloroethane	1.13E-05	0.0009752	0.6575	0.000334	120
	1,2-Dichloropropane	1.30E-05	0.0011219	0.6575	0.000384	
	<b>1,3-Butadiene</b>	6.63E-04	0.0572169	0.6575	0.019595	1.1
	1,3-Dichloropropene	1.27E-05	0.001096	0.6575	0.000375	
	Acetaldehyde	2.79E-03	0.240777	0.6575	0.082458	72
	<b>Acrolein</b>	2.63E-03	0.226969	0.6575	0.077729	3.9
	Benzene	1.58E-03	0.136354	0.6575	0.046697	6.7
	Butyr/Isobutyraldehyde	4.86E-05	0.0041942	0.6575	0.001436	
	Carbon Tetrachloride	1.77E-05	0.0015275	0.6575	0.000523	4.6
	Chlorobenzene	1.29E-05	0.0011133	0.6575	0.000381	14000
	Chloroform	1.37E-05	0.0011823	0.6575	0.000405	36
	Ethane	7.04E-02	6.07552	0.6575	2.080658	
	Ethylbenzene	2.48E-05	0.0021402	0.6575	0.000733	
	Ethylene Dibromide	2.13E-05	0.0018382	0.6575	0.00063	2.7
	<b>Formaldehyde</b>	2.05E-02	1.76915	0.6575	0.605873	33
	Methanol	3.06E-03	0.264078	0.6575	0.090438	120000
	Methylene Chloride	4.12E-05	0.0035556	0.6575	0.001218	190
	Naphthalene	9.71E-05	0.0083797	0.6575	0.00287	270
*****	<b>PAH</b>	1.41E-04	0.0121683	0.6575	0.004167	0.044
	Styrene	1.19E-05	0.001027	0.6575	0.000352	140000
	Toluene	5.58E-04	0.0481554	0.6575	0.016492	39000
	Vinyl Chloride	7.18E-06	0.0006196	0.6575	0.000212	2.5
	Xylene	1.95E-04	0.0168285	0.6575	0.005763	58000
Input data	Engine	97.5 bhp				
	Max firing rate	BTU/bhp-hr				
	Useage rat	100 hrs/yr				
	fuel usage	0.863 MMBtu/hr	<b>86.3 MMBtu/yr</b>			
		2500 Btu/cf	<b>0.03 MMCF/yr</b>			
*****	<b>Speciated PAH from CATEF</b>	lb/MMCF				
	Benzo(a)anthracene	2.94E-04	1.01E-05	0.6575	3.48E-06	0.044
	Benzo(a)pyrene	1.15E-04	3.97E-06	0.6575	1.36E-06	0.044
	Benzo(b)fluoranthene	2.37E-04	8.18E-06	0.6575	2.8E-06	0.044
	Benzo(g,h,i)perylene	1.95E-04	6.73E-06	0.6575	2.31E-06	0.044
	Benzo(k)fluoranthene	1.03E-04	3.56E-06	0.6575	1.22E-06	0.044
	Chrysene	3.10E-04	1.07E-05	0.6575	3.66E-06	0.044
	Dibenz(a,h)anthracene	1.25E-05	4.32E-07	0.6575	1.48E-07	0.044
	Indeno(1,2,3-cd)pyrene	1.69E-04	5.83E-06	0.6575	2E-06	0.044