

DRAFT

ENGINEERING EVALUATION
Albertson's Store #7016
PLANT NO. 16470
APPLICATION NO. 10861

BACKGROUND

Albertson's Store #7016 of Santa Rosa, California is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

S-1 Stationary Standby Generator Set: Natural Gas Engine; Make: General Motors; Model: Vortec 4.3 L; Rated Horsepower: 75 HP; Abated by: Johnson Matthey CX-2-3-3 three-way catalyst

The generator will be located at 915 Village Court, Santa Rosa, CA 95405. Since it is classified as an emergency generator, it can be allowed up to 100 hours per year for non-emergency operations.

EMISSIONS SUMMARY

Annual Emissions:

The manufacturer-supplied emission factors for S-1 (75 HP- natural gas engine) are listed below, as well as the abatement efficiency of the catalyst.

| Pollutant | Emission Factor (g/hp-hr) | Abatement Efficiency | Abated Emission Factors (g/hp-hr) |
|-----------|---------------------------|----------------------|-----------------------------------|
| NOx | 10.00 | 85.0% | 1.50 |
| CO | 11.00 | 86.0% | 1.54 |
| POC | 2.00 | 50.0% | 1.00 |
| PM10 | N/A | N/A | N/A |

The emission factor for SO₂ is assumed to be 5.88E-4 lb/MMBtu, as provided by Chapter 3, Table 3.2-3 of the EPA Document AP-42, Uncontrolled Natural Gas Emission Factors for 4-Stroke Rich-Burn Engines. The maximum firing rate is 0.556 MMBtu/hr.

NO_x = (1.50 g/hp-hr) (75 hp) (100 hr/yr) (1b/454g) = 24.8 lb/yr = 0.012 TPY
CO = (1.54 g/hp-hr) (75 hp) (100 hr/yr) (1b/454g) = 25.4 lb/yr = 0.013 TPY
POC = (1.00 g/hp-hr) (75 hp) (100 hr/yr) (1b/454g) = 16.5 lb/yr = 0.008 TPY
PM10 = (0 g/hp-hr) (75 hp) (100 hr/yr) (1b/454g) = 0 lb/yr = 0 TPY
SO₂ = (5.88E-4 lb/MMBtu)(0.556 MMBtu/hr)(100 hr/yr)=0.03 lb/yr= 0 TPY

Maximum Daily Emissions:

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

For S-1:

$$\begin{aligned} \text{NOx} &= (1.50 \text{ g/hp-hr}) (75 \text{ hp}) (24 \text{ hrs/day}) (1\text{b}/454\text{g}) = 5.95 \text{ lb/day} \\ \text{CO} &= (1.54 \text{ g/hp-hr}) (75 \text{ hp}) (24 \text{ hrs/day}) (1\text{b}/454\text{g}) = 6.11 \text{ lb/day} \\ \text{POC} &= (1.00 \text{ g/hp-hr}) (75 \text{ hp}) (24 \text{ hrs/day}) (1\text{b}/454\text{g}) = 3.96 \text{ lb/day} \\ \text{PM}_{10} &= (0 \text{ g/hp-hr}) (75 \text{ hp}) (24 \text{ hrs/day}) (1\text{b}/454\text{g}) = 0 \text{ lb/day} \\ \text{SO}_2 &= (5.88\text{E-}4 \text{ lb/MMBtu})(0.556 \text{ MMBtu/hr})(24 \text{ hr/day})=0.01 \text{ lb/day} \end{aligned}$$

Plant Cumulative Increase: (tons/year)

| Pollutant | Existing | New S-1 | Total |
|------------------|----------|---------|-------|
| NOx | 0.000 | 0.012 | 0.012 |
| CO | 0.000 | 0.013 | 0.013 |
| POC | 0.000 | 0.008 | 0.008 |
| PM ₁₀ | 0.000 | 0.000 | 0.000 |
| SO ₂ | 0.000 | 0.000 | 0.000 |
| NPOC | 0.000 | 0.000 | 0.000 |

Toxic Risk Screening Analysis (RSA):

Estimated toxic pollutant emissions at the exhaust stack for one engine are summarized in the table on the next page. The emission factors used in the emissions calculations were provided by AP-42 emission factors.

Basis:

- 100 hr/yr operation
- Firing rate of 0.556 MMBtu/hr
- Emission factors from AP-42 Table 3.2-3 (Uncontrolled Natural Gas Emission Factors for 4-Stroke Rich-Burn Engines)
- Catalyst abatement efficiency of 50%

| Compound | AP-42 Factor (lb/MMBtu) | IC Engine Emissions | | Abated Emissions (lb/yr) | BAAQMD Trigger (lb/yr) | RSA Triggered? |
|----------------------------|----------------------------|---------------------|-----------|-----------------------------|---------------------------|-------------------|
| | | (lb/day) | (lb/year) | | | |
| 1,1,2,2-Tetra chloroethane | 2.53E-05 | 3.38E-04 | 1.41E-03 | 7.03E-04 | 3.30E+00 | No |
| 1,1,2-Trichloroethane | 1.53E-05 | 2.04E-04 | 8.51E-04 | 4.25E-04 | 1.20E+01 | No |
| 1,1-Dichloroethane | 1.13E-05 | 1.51E-04 | 6.28E-04 | 3.14E-04 | 1.20E+02 | No |
| 1,2-Dichloroethane | 1.13E-05 | 1.51E-04 | 6.28E-04 | 3.14E-04 | 1.20E+02 | No |
| 1,2-Dichloropropane | 1.30E-05 | 1.73E-04 | 7.23E-04 | 3.61E-04 | 1.20E+02 | No |
| 1,3-Butadiene | 6.63E-04 | 8.85E-03 | 3.69E-02 | 1.84E-02 | 1.10E+00 | No |
| 1,3-Dichloropropane | 1.27E-05 | 1.69E-04 | 7.06E-04 | 3.53E-04 | 1.20E+02 | No |
| Acetaldehyde | 2.79E-03 | 3.72E-02 | 1.55E-01 | 7.76E-02 | 7.20E+01 | No |
| Acrolein | 2.63E-03 | 3.51E-02 | 1.46E-01 | 7.31E-02 | 3.90E+00 | No |
| Benzene | 1.58E-03 | 2.11E-02 | 8.78E-02 | 4.39E-02 | 6.70E+00 | No |
| Butyr/isobutyraldehyde | 4.86E-05 | 6.49E-04 | 2.70E-03 | 1.35E-03 | n/a | No |
| Carbon Tetrachloride | 1.77E-05 | 2.36E-04 | 9.84E-04 | 4.92E-04 | 4.60E+00 | No |
| Chlorobenzene | 1.29E-05 | 1.72E-04 | 7.17E-04 | 3.59E-04 | 1.40E+04 | No |
| Chloroform | 1.37E-05 | 1.83E-04 | 7.62E-04 | 3.81E-04 | 3.60E+01 | No |
| Ethane | 7.04E-02 | 9.39E-01 | 3.91E+00 | 1.96E+00 | n/a | No |
| Ethylbenzene | 2.48E-05 | 3.31E-04 | 1.38E-03 | 6.89E-04 | n/a | No |
| Ethylene Dibromide | 2.13E-05 | 2.84E-04 | 1.18E-03 | 5.92E-04 | 2.70E+00 | No |
| Formaldehyde | 2.05E-02 | 2.74E-01 | 1.14E+00 | 5.70E-01 | 3.30E+01 | No |
| Methanol | 4.12E-05 | 5.50E-04 | 2.29E-03 | 1.15E-03 | 1.20E+05 | No |
| Methylene Chloride | 4.12E-05 | 5.50E-04 | 2.29E-03 | 1.15E-03 | 1.90E+02 | No |
| Naphthalene | 9.71E-05 | 1.30E-03 | 5.40E-03 | 2.70E-03 | 2.70E+02 | No |
| PAH | 2.74E-06 | 3.66E-05 | 1.52E-04 | 7.62E-05 | n/a | No |
| Styrene | 1.19E-05 | 1.59E-04 | 6.62E-04 | 3.31E-04 | 1.40E+05 | No |
| Toluene | 5.58E-04 | 7.45E-03 | 3.10E-02 | 1.55E-02 | 3.90E+04 | No |
| Vinyl Chloride | 7.18E-06 | 9.58E-05 | 3.99E-04 | 2.00E-04 | 2.50E+00 | No |
| Xylene | 1.95E-04 | 2.60E-03 | 1.08E-02 | 5.42E-03 | 5.80E+04 | No |

As can be seen, no compounds listed in the table above exceed toxic trigger levels. The District has determined that a source with emissions below toxic trigger levels is extremely likely to have no significant risk. Hence, toxic risk screening analysis **is not** required.

PUBLIC COMMENT

The project is within 1000 feet of a public school and therefore subject to the public notification requirements of Reg. 2-1-412. The public notice will be posted on the Internet and mailed to all Parents or Guardians with children enrolled at Montgomery High School. It will also be mailed to all residential neighbors located within 1000 feet of the proposed new source of pollution.

STATEMENT OF COMPLIANCE

S-1 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO2 limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is very likely since natural gas has negligible sulfur content. Like all combustion sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). This engine is not expected to produce visible

emissions or fallout in violation of this regulation and will be assumed to be in compliance with Regulation 6 pending a regular inspection.

Airborne toxics control measure (ATCM) does not apply to natural gas engines.

This application is considered to be ministerial under the District's 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 emission factors in accordance with 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, 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. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for S-1, Emergency Natural Gas Generator

Application #10861, Plant #16470, Albertson's Store #7016:

PC #21983

1. The owner/operator of S-1 shall fire the engines exclusively with PUC quality natural gas at a firing rate not to exceed 0.556 MMBtu/hr.
(basis: Cumulative Increase, BACT)
2. The owner/operator shall not operate engine S-1 unless NO_x, 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-1 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 of S-1 shall not exceed the following emissions limits:

| | |
|-----------------|---------------|
| NO _x | 2.52 g/bhp-hr |
| CO | 2.75 g/bhp-hr |
| POC | 2.52 g/bhp-hr |

(basis: Cumulative Increase and BACT)

5. The owner/operator shall retain all source test records on-site for two years, from the date of entry, and make them available for inspection by District staff upon request.
(basis: BACT, Cumulative Increase, Reg. 9-8-530: Record keeping)

6. The owner/operator shall equip S-1 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)

7. 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:

- c) Hours of operation (total)
- d) Hours of operation (emergency)
- e) 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 Albertson's Store #7016 for:

S-1 Stationary Standby Generator Set: Natural Gas Engine; Make: General Motors; Model: Vortec 4.3 L; Rated Horsepower: 75 HP; Abated by: Johnson Matthey CX-2-3-3 three-way catalyst

EXEMPTIONS

None.

By: _____ Date: _____

Roy Lo
Air Quality Engineering Intern