

Draft Engineering Evaluation
FREY Environmental, Inc.
1098 West San Carlos Street, San Jose, CA 95126
Plant No. 25007 (Site No. E5007)
Application No. 31226
Project Description: Soil Vapor Extraction & Treatment System

Background

FREY Environmental, Inc. has applied for an Authority to Construct for the following equipment:

- S-1 Soil Vapor Extraction & Treatment System**
Frontier 420 DPE High Vacuum/Dual Phase Extraction (DPE) System: Air/Water Separator, Liquid Ring Pump (Make: DVT, Model: VMX0453K, Maximum 420 ACFM, 150 SCFM Abated by A-1, Activated Carbon Vessels; OR A-2, Thermal/Catalytic Oxidizer

- A-1 Activated Carbon Vessels**
Two (2) Carbon Resources V-2000, 2,000-LBS Activated Carbon Vessels, Arranged in Series

- A-2 Thermal/Catalytic Oxidizer**
Make: Frontier, Model: 420TCMLRS, Max Operating Rate: 400,000 BTU/hr

Operating at 1098 West San Carlos Street in San Jose, CA, the vapor extraction and treatment system will include an air sparge well and compressor, electrical submersible groundwater pumps, a high vacuum/dual phase soil vapor extraction unit, a knock-out pot with a liquid transfer pump, and two (2) 500-gallon groundwater holding tanks. The high vacuum/dual phase soil vapor extraction (SVE) unit will have a liquid ring pump with a maximum rated flow rate of 150 scfm and will be abated primarily by two (2) 2,000-LBS capacity granular activated carbon (GAC) vessels arranged in series. FREY has also applied for a Thermal/Catalytic Oxidizer as a backup if elevated influent organic concentrations require carbon changeout too frequently. Emissions are based on influent vapor data to a previously operated dual phase extraction (DPE) system and are provided in the submitted Report of Groundwater Monitoring conducted by ETIC Engineering in 2008.

The Site is currently an automobile smog certification business but was previously a gas station from 1963 until 1992. In 1963, two 5,000-gallon gasoline underground storage tanks (USTs), a 7,500-gallon gasoline UST, and a 5,000-gallon diesel UST were installed on the south-central portion of the Site. Additionally, a 550-gallon UST was installed on the south-central portion of the Site. The presence of petroleum hydrocarbons was initially discovered beneath the Site during removal of all the USTs in 1994. According to the Report of Groundwater Monitoring conducted by ETIC Engineering in 2008, past remediation efforts include a soil vapor extraction system that operated from 1998 to 1999 and a high-vacuum, dual phase extraction system that operated from 2007 to 2008.

The site is a Leaking Underground Storage Tank (LUST) Cleanup Site listed on the State Water Resources Control Board GeoTracker database (GeoTracker ID No. T0608501849) with the Santa Clara County LOP as the lead oversight agency. The soil vapor extraction system is being installed on the site by direction of the County of Santa Clara Department of Environmental Health (CSCDEH).

Procedures are outlined in the conditions found below. During operation of A-1, effluent volatile organic compound (VOC) concentrations will be monitored with a flame-ionization detector (FID) on a schedule reflecting current loading rates and predicted carbon capacity. Monitoring schedule changes will be allowed based on monitoring data collected.

Emission Calculations

There was previously installed SVE system in operation at the site between 2007 and 2008. Influent vapor was monitored on a monthly basis and the data was provided with this application. Influent vapor data to the previous SVE system will be used to estimate precursor organic compound (POC), non-precursor organic compound (NPOC), and toxic air contaminant (TAC) emissions. For a conservative estimate of emissions, it is assumed that the system will operate for 24 hours per day and 365 days per year with an inlet concentration corresponding to the maximum influent concentration found in the previously installed SVE system. The following assumptions are used to estimate emissions.

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 Liters (or 386.8 ft³/lb-mol)
- Hydrocarbons will be abated by two (2) 2,000-lb minimum activated carbon vessels in series or a thermal/catalytic oxidizer (in which case there will be secondary emissions from fuel combustion)
- POC cumulative emissions are based on a 380 ppmv (as methane) effluent concentration since the last carbon threshold changeout level on the last abatement vessel.
- Toxic Air Contaminants (TAC) emissions will be based on influent vapor data from previous system submitted with this application.
- The organic influent flow rate of 150 scfm and abatement efficiency of 98.5% was used in the calculations.
- Total Petroleum Hydrocarbons as gasoline (TPH-g) is assumed to represent total POC.
- The molar weight of TPH-g is assumed to be 108.0 lb/lb-mol (*Source: U.S. Agency for Toxic Substances and Disease Registry*)

Table 1. Emissions From S-1 Soil Vapor Extraction System

Chemical	CAS #	Pollutant Designation			Inlet Concentration (ppmv)	Unabated Emission Rate			
		POC	NPOC	TAC		Hourly (lbs/hr)	Daily (lbs/day)	Annual (lbs/yr)	Annual (tons/yr)
TPH-g	-	X			3400	8.54E+00	2.05E+02	7.48E+04	3.74E+01
Benzene	71-43-2	X		X	92	1.67E-01	4.01E+00	1.46E+03	7.32E-01
Toluene	108-88-3	X		X	110	2.36E-01	5.65E+00	2.06E+03	1.03E+00
Ethylbenzene	100-41-4	X		X	17	4.20E-02	1.01E+00	3.68E+02	1.84E-01
Xylenes (Total)	1330-20-7	X		X	100	2.47E-01	5.92E+00	2.16E+03	1.08E+00
MTBE	1634-04-4	X		X	0.5	1.02E-03	2.46E-02	8.98E+00	4.49E-03
Chemical	CAS #	Pollutant Designation			Abatement Efficiency (%)	Abated Emission Rate			
		POC	NPOC	TAC		Hourly (lbs/hr)	Daily (lbs/day)	Annual (lbs/yr)	Annual (tons/yr)
TPH-g	-	X			98.5%	1.28E-01	3.07E+00	1.12E+03	5.61E-01
Benzene	71-43-2	X		X	98.5%	2.51E-03	6.01E-02	2.20E+01	1.10E-02
Toluene	108-88-3	X		X	98.5%	3.53E-03	8.48E-02	3.10E+01	1.55E-02
Ethylbenzene	100-41-4	X		X	98.5%	6.29E-04	1.51E-02	5.51E+00	2.76E-03
Xylenes (Total)	1330-20-7	X		X	98.5%	3.70E-03	8.88E-02	3.24E+01	1.62E-02
MTBE	1634-04-4	X		X	98.5%	1.54E-05	3.69E-04	1.35E-01	6.73E-05

Notes:

1. TPH-g stands for Total Petroleum Hydrocarbons as gasoline

2. MTBE stands for Methyl Tertiary-Butyl Ether
3. Influent data was obtained from influent sample results of a previously installed SVE system located at the same site from 2007 to 2008.
4. It is assumed that equipment will operate 24 hours a day, 365 days a year.

Pollutant	Effluent Volumetric Concentration (ppmv)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
POC	380	0.14	3.40	1242	0.621
NPOC	0	0.00	0.00	0.00	0.000

Notes:

1. POC emissions will be based on an effluent limit of 380 ppmv, measured as methane.
2. Emissions in this table are from the SVE system only. Secondary emissions from combustion products are not included.

In the event that abatement is achieved with A-2 Thermal/Catalytic Oxidizer, secondary emissions from the combustion of natural gas will be included in the review. The burner for the thermal/catalytic oxidizer has an input heat rating of 400,000 BTU/hr, which is equal to 0.4 MMBTU/hr. Emission factors from the Environmental Protection Agency (EPA) AP-42 Chapter 1.4 *“Natural Gas Combustion”* were used to calculate emission rates of TAC, POC, particulate matter (PM), and sulfur dioxide (SO₂). Emissions of nitrogen oxides (NO_x) and carbon monoxide (CO) were calculated using the respective BAAQMD Reasonably Achievable Control Technology (RACT) limits of 50 ppmv NO_x at 15% O₂ and 350 ppmv CO at 15% O₂.

Emission rates for both NO_x and CO were calculated after adjustment to 0% O₂. For purposes of estimating maximum emissions from A-2, it is assumed that the thermal/catalytic oxidizer will operate 24 hours per day and 365 days per year.

	Pollutant	Emission Factor (lb/MMscf natural gas)	Emission Factor (lb/MMscf exhaust)	Hourly (lbs/hr)	Daily (lbs/day)	Annual (lbs/yr)	Annual (tons/yr)
Criteria Pollutants	NO _x	-	20.94	7.29E-02	1.75E+00	6.39E+02	3.20E-01
	POC	5.50	-	2.16E-03	5.18E-02	1.89E+01	9.45E-03
	CO	-	89.21	3.11E-01	7.46E+00	2.72E+03	1.36E+00
	PM ₁₀	7.60	-	2.98E-03	7.15E-02	2.61E+01	1.31E-02
	PM _{2.5}	7.60	-	2.98E-03	7.15E-02	2.61E+01	1.31E-02
	SO ₂	0.60	-	2.35E-04	5.65E-03	2.06E+00	1.03E-03
TAC	Benzene	2.10E-03	-	8.24E-07	1.98E-05	7.21E-03	3.61E-06
	Formaldehyde	7.50E-02	-	2.94E-05	7.06E-04	2.58E-01	1.29E-04
	Toluene	3.40E-03	-	1.33E-06	3.20E-05	1.17E-02	5.84E-06

Notes:

- 1) Emission rates assume operation 24 hours per day, 365 days per year.

Cumulative Increase

Table 4. Cumulative Increase			
Pollutant	Current Permitted Emissions, Post 4/5/1991 (ton/yr)	Application New Emissions Increase (ton/yr)	New Cumulative Increase (ton/yr)
POC	0.000	0.631	0.631
NO _x	0.000	0.320	0.320
PM ₁₀	0.000	0.013	0.013
PM _{2.5}	0.000	0.013	0.013
SO ₂	0.000	0.001	0.001
CO	0.000	1.361	1.361

Notes:

1. Cumulative increase includes primary emissions from S-1 and secondary emissions from A-2.

Toxic Risk Screening

Table 5. Project Toxic Air Contaminant Emission Review						
Toxic Air Contaminant	CAS #	Hourly Emission Rate (lbs/hr)	Acute Trigger Level (lbs/hr)	Annual Emission Rate (lbs/yr)	Chronic Trigger Level (lbs/yr)	Exceeds Trigger Level?
Benzene	71-43-2	2.51E-03	6.00E-02	2.20E+01	2.90E+00	YES
Toluene	108-88-3	3.54E-03	8.20E+01	3.10E+01	1.20E+04	No
Ethylbenzene	100-41-4	6.29E-04	-	5.51E+00	3.30E+01	No
Xylenes	1330-20-7	3.70E-03	4.90E+01	3.24E+01	2.70E+04	No
MTBE	1634-04-4	1.54E-05	-	1.35E-01	1.60E+02	No
Formaldehyde	50-00-0	2.94E-05	1.20E-01	2.58E-01	1.40E+01	No

Notes:

1. Project emissions include primary emissions from S-1 and secondary emissions from A-2.
2. Emission rates shown in Table 5 are after 98.5% abatement efficiency. The Health Risk Assessment was performed assuming 95.2% abatement efficiency.
3. MTBE stands for Methyl Tertiary-Butyl Ether.

This project is expected to exceed the chronic toxic threshold for benzene and is therefore subject to the requirements of Regulation 2-5. Assuming an abatement efficiency of 95.2%, a Health Risk Assessment (HRA) was conducted, and the results indicate that the project has a maximum cancer risk of 6.5 in a million, a maximum chronic hazard index of 0.10, and an acute hazard index of 0.18. These risk values comply with Regulation 2-5-302 project risk requirements. However, since the cancer risk exceeds 1.0 the source must meet Best Available Control Technology for Toxics (TBACT), pursuant to Regulation 2-5-301. POC is the only criteria pollutant of concern for implementation of TBACT for S-1. It should be noted that the risk values from the HRA were based on an assumption of 95.2% abatement efficiency. Actual abatement efficiency for S-1 will be at least 98.5%, therefore actual risk values will be lower than the values reported.

Section 9 of the Air District's BACT/TBACT Workbook has guidelines for Soil Vapor Extraction operations. If technologically feasible and cost-effective, TBACT 1 for POC requires the effluent volumetric concentration of POC to be less than or equal to 10 ppmv; or POC must be abated with a capture/destruction efficiency of at least 98.5%. The typical technology to achieve this requirement is by at least two (2) activated carbon vessels in series or a thermal oxidizer. The applicant is already proposing to use two (2) activated carbon vessels in series or a thermal/catalytic oxidizer as a backup. Furthermore, the applicant has stated they can meet the abatement/emission requirements of TBACT 1. The TBACT 1 requirements will be reflected in the conditions below.

Offsets

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of precursor organic compounds (POCs) or nitrogen oxides (NO_x). Furthermore, pursuant to Regulation 2-2-303 offsets must be provided for any new or modified source at a major facility with a cumulative increase that exceeds 1.0 ton per year of PM₁₀, PM_{2.5}, or sulfur dioxide (SO₂).

The facility is not expected to have a potential to emit (PTE) greater than 10 tons per year of POC or NO_x, nor is the facility a major facility of PM₁₀, PM_{2.5}, and SO₂. Therefore, the requirements of Regulations 2-2-302 and 2-2-303 do not apply.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxides (SO₂), particulate matter less than 10 micrometer (PM₁₀) and particulate matter less than 2.5 micrometer (PM_{2.5}).

POC emissions are expected to be 3.40 lbs/day. Therefore, a BACT review is not required. However, BACT requirements are identical to TBACT requirements for Soil Vapor Extraction operations. As discussed in an earlier section, S-1 is subject to TBACT and will be conditioned to comply with TBACT 1 requirements.

Reasonably Achievable Control Technology (RACT)

In accordance with Regulation 2-2-102, Reasonably Achievable Control Technology (RACT) is required to control secondary emissions from abatement devices. Per the Air District Policy: *NOx and CO RACT Levels for Thermal Oxidizers*, the following emission limits are required for thermal oxidizers:

Pollutant	ppm _v @ 15% O ₂	lb/MMBTU
NO _x	50	0.20
CO	350	0.8

For thermal oxidizers with a rated heat input less than 7.5 MMBTU/hr and vendor guaranteed emissions of NO_x and CO that comply with the above-mentioned limits, source testing is not required to verify compliance.

A-2 Thermal/Catalytic Oxidizer will have secondary emissions and is therefore subject to RACT. The rated heat input is less than 7.5 MMBTU/hr, and the vendor could not guarantee emissions below the RACT limits for NO_x and CO. Therefore, in the event that A-2 is used, the owner/operator will be conditioned to perform source testing to verify that secondary emissions of NO_x and CO comply with the RACT limits.

California Environmental Quality Act (CEQA)

This project is classified as ministerial under the District Regulation 2-1-311, because the engineering review for this project requires only the application of standard emission factors and established formulas as specified in Chapter 9.2 of the District's Permit Handbook. This review follows objective procedures and applies standard permit conditions; and therefore, the review of this project is not discretionary as defined by CEQA. Since this project is ministerial, it is not subject to CEQA review requirement of Regulation 2-1-310, and no further CEQA analysis is required.

Compliance**Regulation 2, Rule 1**

S-1 will be located within 1,000 feet of the Sunol Community School (grades 9 through 12) located at 258 Sunol Street in San Jose, California. The project is subject to public notification requirements of Regulation 2-1-412 due to an increase in toxic emissions. A public notice will be sent to all parents of students of the above-mentioned school(s) and all residents within 1,000 feet of the facility. There will be a 30-day public comment period.

Regulation 8, Rule 47

Based on the information submitted, this operation is expected to meet the 90% control requirement of Regulations 8-47-301 and 8-47-302. Emissions will be vented through a carbon adsorption system or a thermal/catalytic oxidizer at all times of operation.

Prevention of Significant Deterioration, New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants

Prevention of Significant Deterioration (PSD), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) are not triggered.

Permit Conditions**Permit Condition #27662**

1. The owner/operator shall abate the precursor organic compound (POC) emissions from the soil vapor extraction system (S-1) with the Activated Carbon Vessel (A-1), consisting of a minimum of two (2) 2,000-lb activated carbon vessels in series; or with Thermal/Catalytic Oxidizer (A-2), during all periods of operation. The influent vapor flow rate shall not exceed 150 scfm. [Basis: Regulations 8-47-301 and 8-47-302, Toxics]
2. The POC abatement efficiency of A-1 and A-2 shall be maintained at a minimum of 98.5% by weight. The minimum abatement efficiency shall be waived if outlet POC concentrations are shown to be less than or equal to 10 ppmv (measured as methane). In no event shall the benzene emission rate to the atmosphere exceed 22.0 pounds per year. [Basis: TBACT, Toxics]
3. Except as provided in Part 2 of this condition, in no event shall the toxic air contaminant (TAC) emissions to the atmosphere from S-1 exceed the trigger levels listed in Air District Regulation 2-5, Table 2-5-1. [Basis: Toxics]

4. Upon initial start-up, the owner/operator shall take air samples from S-1 for laboratory analysis using EPA Method TO-15. The air samples shall be taken at the following locations:

If operating with (A-1) Activated Carbon Vessels:

- a. At the inlet to the first carbon vessel in series.
- b. At the outlet of the carbon vessel that is last in series prior to venting to the atmosphere.

If operating with (A-2) Thermal/Catalytic Oxidizer:

- c. At the inlet to the thermal/catalytic oxidizer
- d. At the outlet of the thermal/catalytic oxidizer, prior to venting to the atmosphere

The owner/operator shall use the results from the laboratory report to calculate TAC emissions emitted to the atmosphere, using the maximum design flowrate of S-1. The owner/operator shall submit the laboratory report and calculated TAC emissions within 21 days of the initial startup, to demonstrate compliance with Parts 1, 2, and 3 of this condition. [Basis: Regulation 2-1-403]

5. During operation of A-1, the owner/operator shall monitor with a flame-ionization detector (FID) or other method approved in writing by the District's Source Test Manager at the following locations:

- a. At the inlet to the second to last carbon vessel in series.
- b. At the inlet to the last carbon vessel in series.
- c. At the outlet of the last carbon vessel in series, prior to venting to the atmosphere.

[Basis: Regulations 1-523 and 2-1-403]

6. The owner/operator shall conduct monitoring on a daily basis in accordance with Part 5 of this condition. The owner/operator shall record these monitor readings in a monitoring log at the time they are taken. The owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with Parts 1, 7, and 8 of this condition.

- a. If the owner/operator can demonstrate two (2) weeks of consecutive daily monitoring readings lower than 190 ppmv, measured as methane, the monitoring frequency may be reduced to weekly.
- b. After the monitoring frequency has been reduced to weekly, if the owner/operator can demonstrate one (1) month of consecutive weekly monitoring readings lower than 190 ppmv, measured as methane, the monitoring frequency may be reduced to once every two (2) weeks.
- c. After the monitoring frequency has been reduced to once every two (2) weeks, if the owner/operator can demonstrate one (1) month of consecutive bi-weekly readings lower than 190 ppmv, measured as methane, the monitoring frequency may be reduced to monthly.
- d. If any subsequent results from monitoring exceed 190 ppmv, measured as methane, the owner/operator shall revert to daily monitoring. If monitoring reverts back to daily, the owner/operator may reduce the monitoring frequency in accordance with Parts 4(a) through (c) of this condition.

[Basis: Cumulative Increase, Toxics, and Regulations 1-523 and 2-1-403]

7. The second to last carbon vessel shall be immediately changed out with unspent carbon upon breakthrough, defined as the detection at its outlet in excess of the higher of the following limits:

- a. 10 % of the inlet stream concentration to the carbon bed.

- b. 10 ppmv (measured as methane).
[Basis: Cumulative Increase and Regulations 1-523 and 2-1-403]
8. The last carbon vessel shall be immediately changed out with unspent carbon upon detection at its outlet of 380 ppmv or greater (measured as methane). [Basis: Cumulative Increase and Regulations 1-523 and 2-1-403]
9. During operation of A-2 as a Thermal Oxidizer, the owner/operator shall not operate A-2 below a minimum operating temperature of less than 1400 degrees Fahrenheit. During operation of A-2 as a Catalytic Oxidizer, the owner/operator shall not operate A-2 below a minimum operating temperature of 600 degrees Fahrenheit. The Air District may adjust this minimum temperature, if source test data demonstrates that an alternative temperature is necessary for or capable of maintaining compliance with Part 2 of these conditions. [Basis: Cumulative Increase; TBACT]
10. To determine compliance with the temperature requirement in Part 9 of these conditions, the owner/operator shall equip A-2 with a temperature measuring device capable of continuously measuring and recording the temperature in A-2. The owner/operator shall install, and maintain in accordance with the manufacturer's recommendations, a temperature measuring device that meets the following criteria: the minimum and maximum measurable temperatures with the device are -300 degrees F and 2,400 degrees F, respectively, and the minimum accuracy of the device over this temperature range shall be 1.0 percent of full-scale. [Basis: Cumulative Increase; TBACT]
11. The owner/operator shall not emit more than 50 ppmvd NO_x @ 15% O₂ (0.20 lb/MMBTU) from A-2 Thermal Oxidizer. [Basis: RACT, Source Test Method 13A]
12. The owner/operator shall not emit more than 350 ppmvd CO @ 15% O₂ (0.80 lb/MMBTU) from A-2 Thermal Oxidizer. [Basis: RACT, Source Test Method 6]
13. No later than 60 days from the startup of A-2, the owner/operator shall conduct Air District approved source tests to determine initial compliance with the limits in Parts 11 and 12 of these conditions. The owner/operator shall submit the source test results to Air District staff no later than 60 days after the source test. [Basis: RACT, Cumulative Increase]
14. The owner/operator shall obtain approval for all source test procedures from the Air District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the Air District's Manual of Procedures. The owner/operator shall notify the Air District's Source Test Section, in writing, of the source test protocols and projected test dates at least 7 days prior to testing. [Basis: RACT, Cumulative Increase]
15. The owner/operator shall maintain the following information for each month of operation:
- Hours and time of operation.
 - Each emission test, analysis, or monitoring results logged in for the day of operation they were taken.
 - The number of carbon vessels removed from service.
 - Total throughput of soil vapor from source S-1 in standard cubic feet.

Such records shall be retained and made available for inspection by the Air District for two (2) years following the date the data is recorded. [Basis: Recordkeeping]

16. The owner/operator shall report any noncompliance with these conditions to the Compliance and Enforcement Division at the time that it is first discovered. The owner/operator shall detail the corrective action taken and include the data showing the exceedance as well as the time of occurrence in the submittal. [Basis: Regulation 2-1-403]
17. The owner/operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this condition. All measurements, records and data required to be maintained by the operator shall be retained for at least two (2) years following the date the data is recorded. [Basis: Regulation 1-523]

Upon final completion of the remediation project, the operator shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Regulation 2-1-403]

Recommendation

The Air 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 1,000 feet of at least one school, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the Air District will make a final determination on the permit.

I recommend that the Air District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following equipment:

- S-1 Soil Vapor Extraction & Treatment System**
Frontier 420 DPE High Vacuum/Dual Phase Extraction System: Air/Water Separator, Liquid Ring Pump (Make: DVT, Model: VMX0453K, Maximum 420 ACFM, 150 SCFM Abated by A-1, Activated Carbon Vessels
- A-1 Activated Carbon Vessels**
Two (2) Carbon Resources V-2000, 2,000-LBS Activated Carbon Vessels, Arranged in Series
- A-2 Thermal/Catalytic Oxidizer**
Make: Frontier, Model: 420TCMLRS, Max Operating Rate: 400,000 BTU/hr

By: _____

Date: _____

Cameron Fee
 Air Quality Engineer I