Engineering Evaluation
Fremont Retail Partners, LP, Plant # 23848
Application Number 28566
39226-39236 Argonaut Way, Fremont, CA 94538

BACKGROUND

Fremont Retail Partners, LP has applied for an Authority to Construct for soil remediation at the site located at 39226-39236 Argonaut Way, Fremont, CA 94538. The soil vapor extraction (SVE) system consists of following SVE:

S-1 Portable Soil Vapor Extraction System, Travaini TRO 700S, 700 cfm, abated by A-1,
A-1 SVE Abatement System consisting of Carbon Adsorption, two (2000 lbs minimum capacity) Activated Carbon Vessels connected in series.

Fremont Retail Partners has applied to operate the system to remediate soil impacted by VOCs from dry cleaning activities at the above referenced site. Soil vapor extraction will be accomplished by means of a regenerative vacuum blower (S-1, Travaini TRO 700S) with a maximum capacity of 700 cfm with a typical 350 scfm flow rate. Vapor abatement will be achieved by carbon adsorption. The carbon adsorption system will consist of two 2000 lbs minimum capacity granular activated carbon vessels connected in series. Emission monitoring for operation of the equipment will be conducted according to established Source Test methodology.

This location is within 1,000 feet of the outer boundary of Brier Elementary School at 39201 Sundale Dr., Fremont, CA. Therefore, public notice is required per District Regulation 2-1-412.

EMISSION CALCULATIONS

Volatile Organic Compounds

For a conservative estimate of yearly emissions, we shall assume that the system is operated for an entire year within an inlet concentration corresponding to the initial soil concentration level. The soil vapor pilot test results from SVE S-1 inlet indicated Tetrachloroethene (PCE), Xylene, n-Hexane and Cyclohexane were detected in soil at the area S-1 will be working. There are no secondary emissions for the operation of a carbon adsorption system. The calculation for S-1 along with the basis is presented as follows:

Basis:

1. Operating conditions: Pressure = 1 atm; Inlet Temperature = 21°C; 1 mole occupies 24.15L
2. Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate = 350 scfm for S-1.
3. Compounds detected at this site at S-1 inlet include Tetrachloroethene, Acetone, Trichloroethylene (TCE), Xylenes, N-Hexane and Cyclohexane. Molecular Weight (MW) of PCE = 165.8 g/gmole, MW of Xylene= 106.2 g/gmole, MW of n-Hexane = 86.2 g/gmole, MW of Cyclohexane =84.2 g/gmole.
4. Maximum influent concentration = 58,000 $\mu g/m^3$ PCE, 150 $\mu g/m^3$ xylene, 100 $\mu g/m^3$ n-hexane, and 100 $\mu g/m^3$ cyclohexane;
5. Carbon adsorption abatement efficiency = 98.5%

Unabated emissions of the Toxic Air Contaminants PCE, Xylene and n-Hexane from SVE S-1:

$$\text{PCE} = \left(\frac{58000\ \text{ug}}{\text{m}^3}\right)\left(\frac{1\text{g}}{10^6 ug}\right)\left(\frac{350\ \text{ft}^3}{\text{min}}\right)\left(\frac{1440\ \text{min}}{\text{day}}\right)\left(\frac{\text{m}^3}{35.32\ \text{ft}^3}\right)\left(\frac{1\text{lb}}{453.6\ \text{g}}\right) = 1.821\left(\frac{\text{lb}}{\text{day}}\right)$$

$$xylene = \left(\frac{150\ \text{ug}}{\text{m}^3}\right)\left(\frac{1\text{g}}{10^6 ug}\right)\left(\frac{350\ \text{ft}^3}{\text{min}}\right)\left(\frac{1440\ \text{min}}{\text{day}}\right)\left(\frac{\text{m}^3}{35.32\ \text{ft}^3}\right)\left(\frac{1\text{lb}}{453.6\ \text{g}}\right) = 0.005\left(\frac{\text{lb}}{\text{day}}\right)$$

$$\text{n-Hexane} = \left(\frac{100\ \text{ug}}{\text{m}^3}\right)\left(\frac{1\text{g}}{10^6 ug}\right)\left(\frac{350\ \text{ft}^3}{\text{min}}\right)\left(\frac{1440\ \text{min}}{\text{day}}\right)\left(\frac{\text{m}^3}{35.32\ \text{ft}^3}\right)\left(\frac{1\text{lb}}{453.6\ \text{g}}\right) = 0.003\left(\frac{\text{lb}}{\text{day}}\right)$$

$$\text{cyclohexane} = \left(\frac{100\ \text{ug}}{\text{m}^3}\right)\left(\frac{1\text{g}}{10^6 ug}\right)\left(\frac{350\ \text{ft}^3}{\text{min}}\right)\left(\frac{1440\ \text{min}}{\text{day}}\right)\left(\frac{\text{m}^3}{35.32\ \text{ft}^3}\right)\left(\frac{1\text{lb}}{453.6\ \text{g}}\right) = 0.003\left(\frac{\text{lb}}{\text{day}}\right)$$

Table 1. POC Emissions from SVE (S-1)

	Influent vapor concentration [µg/m³]	Influent vapor concentration [ppmv]	Unabated Emission [lb/day]	Abated Emission [lb/day]	Abated Emission [lb/yr]	Abated Emission [ton/yr]	Chronic Trigger Level [lb/yr]	Acute Trigger Level [lb/hr]	HRA required?
PCE	58000	8.41	1.821	0.027	9.968	0.0050	14	44	NO
n-hexane	100	0.03	0.003	0.000	0.017	0.0000	270000	N/A	NO
xylene	150	0.03	0.005	0.000	0.026	0.0000	27000	49	NO
cyclohexane	100	0.03	0.003	0.000	0.017	0.0000	N/A	N/A	
		Total POC	1.832	0.027	2.898	0.0050			

Plant Cumulative Increase

There is no historic emission data for the working site of 39226-39236 Argonaut Way, Fremont, CA 94538. Table 2 presents the cumulative increase from the SVE with carbon adsorption:

Table 2. Cumulative Emission Increase

Pollutant	Existing (ton/yr)	New Increase with this application (ton/yr)	Total (ton/yr)
POC	0	0.005	0.005

COMPLIANCE DETERMINATION

Toxics

Of the VOCs detected, PCE, Xylene and n-Hexane are listed in the Toxic Air Contaminants (TACs) list of Regulation 2-5, Table 2-5-1. With abatement of 98.5%, none of the compounds' abated emission exceed the trigger levels of Table 2-5-1. Therefore, no risk screen analysis is required.

New Source Review

BACT

This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT; however, it is achieved in practice. For Soil Vapor Extraction operations, BACT is defined as attainment of set adsorption/destruction efficiencies corresponding to set influent concentration values. Operation of the Carbon vessels will be conditioned to ensure attainment of the following required destruction efficiencies: $\geq$98.5% if inlet POC $\geq$2000; $\geq$97% if inlet POC $\geq$2000 to <200 ppmv; $\geq$90% if inlet POC <200 ppmv. Operation of the carbon vessels will be conditioned to ensure attainment of an outlet concentration not to exceed 10 ppmv POC.

Offsets

Offsets are not applicable for this application, as emissions do not exceed 10 tons/yr. Facility not subject to Reg 2-2-302.

CEQA

The project is considered to be ministerial under the Districts proposed 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 emission factors and therefore is not discretionary as defined by CEQA. This project is in compliance with Chapter 9.2 of the permit handbook.

Compliance

District Rules and Regulations Applicable Requirements: Soil vapor extraction operations are subject to Regulation 8-47 (Air Stripping and Soil Vapor Extraction Operations). Based on the information submitted, this operation is expected to be in compliance with Regulation 8-47-301, Emission Control Requirements, Specific compounds, and 8-47-302, Organic. The POC emissions will be vented through a carbon adsorption system at all times of operation, which will achieve above 90% reduction efficiency.

In accordance with Regulation 2-1-413, the District may issue "a single portable permit which will allow the source to operate anywhere in the District, provided the APCO approves the permit, and the source meets the definition of portable equipment set forth in Section 2-1-220." The SVE unit meets the requirements of the Definition of Portable Equipment (Regulation 2-1-220).

Prevention of Significant Deterioration, New Source Performance Standards, and National Emissions Standards for Hazardous Air Pollutants are not triggered.

This initial operation site for this project is located less than 1,000 feet from the nearest K-12 school and is therefore subject to the public notification requirements of Regulation 2-1-412. A public notice was prepared and sent to all addresses within 1,000 feet of the SVE system and parents and guardians of students of the following school(s):

Brier Elementary School
39201 Sundale Drive
Fremont, CA 94538

Permit Conditions

Condition #26622, setting out the operating conditions and recordkeeping requirements for operations at Source S-1 shall be made part of the source's authority to construct/permit to operate.

RECOMMENDATION

The District has reviewed 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. However, the proposed source will be located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the 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 Portable Soil Vapor Extraction System, Travaini TRO 700S, 700 cfm, abated by A-1,
A-1 SVE Abatement System consisting of Carbon Adsorption, two (2000 lbs minimum capacity) Activated Carbon Vessels connected in series.

_____ _____
Davis Zhu Date
Air Quality Engineer

COND# 26622----------

1. The owner/operator shall vent Source S-1 at all times to abatement device A-1, at least two (2000 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 350 scfm. [Basis: Cumulative Increase, Regulation 2-5]

2. The owner/operator of this source shall monitor with a photo-ionization detector (PID), flame-ionization detector (FID), or other method approved in writing by the Air Pollution Control Officer 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 carbon vessel that is last in series prior to venting to the atmosphere.
When using an FID to monitor breakthrough, readings may be taken with and without a carbon filter tip fitted on the FID probe. Concentrations measured with the carbon filter tip in place shall be considered methane for the purposes of these permit conditions. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

3. The owner/operator shall record these monitor readings in a monitoring log at the time they are taken. The monitoring results shall be used to estimate the frequency of carbon change-out necessary to maintain

compliance with part 4 and 5, and shall be conducted on a daily basis. The owner/operator of this source may propose for District review, based on actual measurements taken at the site during operation of the source, that monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District's Permit Services Division must be received by the owner/operator prior to a change to the monitoring schedule. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

4. The owner/operator shall change out the second to last Carbon vessel with unspent carbon upon breakthrough, defined as the detection at its outlet of the higher of the following:
a. 10 % of the inlet stream concentration to the Carbon vessel.
b. 10 ppmv or greater. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

5. The owner/operator shall change out the last Carbon vessel with unspent carbon upon detection at its outlet of 10 ppmv (measured as hexane). [Basis: Cumulative Increase, Regulation 2-5, TBACT]

6. The owner/operator of this source shall maintain the following records for each month of operation of the source:
a. Days and hours of operation.
b. Each monitor reading or analysis result for the day of operation they are taken.
c. The number of carbon beds removed from service.
Such records shall be retained and made available for inspection by the District for at least two years following the date that data is recorded. [Basis: Regulation 1-523]

7. The owner/operator shall report any non-compliance with parts 4 and 5 to the Director of the Compliance & 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 at the time of occurrence in the submittal. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

8. Upon final completion of the remediation project, the owner/operator of Source S-1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5, TBACT]