

**Draft Engineering Evaluation: Soil Vapor Extraction
McCarthy Santa Cruz Ave LLC
216 N Santa Cruz Ave, Los Gatos, CA
Application No. 30606; Plant No. 24738**

Background

AEI consultants has applied for an Authority to Construct permit on behalf of McCarthy Santa Cruz Ave LLC to modify an existing soil vapor extraction (SVE) system. The system is located at 216 N Santa Cruz Ave in Los Gatos, CA

S-1 Soil Vapor Extraction System consisting of a 170 max scfm Radon Away GX5 Series Blower abated by;

A-1 Two 200 lb Activated Carbon Vessels arranged in series.

AEI has proposed a SVE system consisting of a 170 max scfm blower and two 200 lb carbon vessels arranged in series. The facility is located at a former dry-cleaning site. Laboratory results submitted with this application shows presence of Tetrachloroethylene (PCE) with a max sample concentration of 5,600 ug/m³. However, PCE concentration will be assumed to be near Regulation 2-5 toxic trigger level to be conservative.

The applicant will be conditioned to provide written notification at the start of the operation. Procedures are outlined in the conditions found below. The carbon vessels influent and effluent organic emissions will be monitored with a portable photoionization (PID) on a schedule reflecting current loading rate. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

Emission Calculations

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. Generalized assumptions follow:

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15L
- The organic influent flow rate of 170 scfm and abatement efficiency of 90% was used in the emission estimates.
- Submitted laboratory results were used to determine the presence of pollutants in Table 1. Concentrations are assumed to be near toxic trigger level as worst-case scenario.
- Example Calculations can be seen below:

$$25,000 \frac{\mu g}{m^3} (PCE) \times 170 \frac{ft^3}{min} \times 1440 \frac{min}{day} \times \frac{1}{35.31} \frac{m^3}{ft^3} \times \frac{1}{4.54 \times 10^8} \frac{lb}{\mu g} = 0.381 \frac{lb}{day} \text{ of PCE (unabated)}$$

$$0.381 \frac{lb}{day} (PCE) \times (1 - 90\%) \times 365 \frac{day}{year} = 13.91 \frac{lb}{year} \text{ of PCE (abated)}$$

$$3.62 \text{ ppmv (total influent)} \times (1 - 90\%) = 0.362 \text{ ppmv (total effluent)}$$

Table 1 – Emissions from S-1 SVE System

Pollutant	Max Influent vapor concentration [µg/m ³]	Max Influent vapor concentration [ppmv]	Effluent vapor concentration [ppmv]	Unabated Emission [lb/day]	Abated Emission [lb/day]	Abated Emission [lb/yr]
PCE	25,000	3.62	0.362	0.381	0.038	13.91

Table 2 – S-1 Criteria Organic Emissions (TPY)

Compound	lb/day	lb/yr	TPY
NPOCs	0.038	13.9	0.007

PCE is considered to be non-precursor organic compound (NPOCs) per Regulation 1-234 and 40 CFR 51.100(s)(1).

Table 3 – S-1 Corrected Total Effluent Concentration

Total Uncorrected Effluent vapor concentration [ppmv]	* Correction Factor to Isobutylene	Corrected Total Effluent vapor concentration [ppmv]
0.36	0.57	0.64

* Correction factor taken from RAE PID Handbook of 0.57 for PCE was used. Equation to determine corrected value: *Total Corrected Effluent = Total Uncorrected Effluent (Table 1) / Correction Factor*

The total organic effluent concentration from Table 1 is corrected to Isobutylene, the gas used to calibrate the PID monitor. The corrected effluent concentration in Table 3 will be used as the carbon change out threshold, measured as Isobutylene, on the last carbon vessel in series.

Cumulative Increase

Table 4- Plant Cumulative Emissions

Compound	Current Permitted Emissions, Post 4/5/91 (TPY)	New Emission Increase with A/N 30378 (TPY)	Cumulative Emissions (TPY)
POCs	.000	.000	.000

Toxic Risk Screening

Table 5 – S-1 Toxic Review

Toxic Pollutant	Abated Emission (lb/hr)	Abated Emission (lb/yr)	Acute Trigger lb/hr	Chronic Trigger lb/yr	HRA required
PCE	1.59E-03	13.9	44	14	N

Estimates in Table 5 are considered the worst-case scenario for this project. This source is not expected to exceed applicable toxic trigger levels per Table 2-5-1. This will be enforced by the permit conditions below.

New Source Review

The proposed project will not emit more than 10 lb/day of any criteria pollutant. Facility not subject to Reg 2-2-301. 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

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 compounds. The NPOC/POC emissions will be vented through a Carbon adsorption system at all times of operation.

This project is within 1,000 ft of St. Mary Elementary School. This is a private K-8 school according to greatschools.org. The facility will be subject to the public notification requirements of Regulation 2-1-412. PSD, NSPS, and NESHAPS are not triggered.

Permit Conditions

Permit Condition #XXXX

1. The owner/operator shall abate the Precursor Organic Compound (POC) and Non-precursor Organic Compound (NPOC) emissions from Source S-1 by A-1 SVE Abatement System, consisting of two 200-pound Activated Carbon vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 170 scfm. In no event shall the cumulative Toxic Air Contaminants (TACs) emissions to the atmosphere from S-1 exceed the respective chronic trigger levels in District’s Regulation 2-5, Table 2-5-1. [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 District's Source Test Manager at the following locations:
 - a. At the inlet to the second to the last abatement vessel in each series.
 - b. At the inlet to the last abatement vessel in each series.
 - c. At the outlet of the abatement vessel that is last in each 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 owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with parts number 5 and 6 and shall be conducted on a weekly basis. After demonstrating continuous compliance in weekly monitoring for an additional three (total four) weeks, the owner/operator may switch to monitoring on a monthly schedule. 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 the 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 Engineering 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 immediately change out the second to last abatement vessel with unspent media upon breakthrough, defined as the detection at its outlet of the higher of the following:
 - a. 10 % of the inlet stream concentration to the abatement vessels.
 - b. 2 ppmv or greater (measured as isobutylene).[Basis: Cumulative Increase, Regulation 2-5, TBACT]
5. The owner/operator shall immediately move the last in series abatement vessel into the second to last position and replace the second to last vessel's contents with unspent media upon detection at its outlet of 0.64 ppmv (measured as isobutylene). [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. The hours and times 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.
 - d. Total throughput of soil vapor from source S-1 in Standard Cubic Feet.

All measurements, records and data required to be maintained by the owner/operator shall be retained and made available for inspection by the District for at least two years following the date the data is recorded. [Basis: Regulation 1-523]

7. The owner/operator of S-1 shall report any non-compliance with these conditions to the Compliance and Enforcement Division at the time that it is first discovered. The owner/operator of S-1 shall detail the corrective action taken and include the data showing the exceedance as well as the time of occurrence in the submittal. [Basis: Cumulative Increase, Regulation 2-5]
8. The owner/operator of S-1 shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Authority to Construct/Permit to Operate. All measurements, records and data required to be maintained by the owner/operator shall be retained for at least two years following the date the data is recorded. [Basis: Regulation 1-523]
9. Upon final completion of the remediation project, the owner/operator of S-1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

Recommendation

The 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 is located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. After the comments are received from the public 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 an Authority to Construct for the following source

S-1 Soil Vapor Extraction System consisting of a 170 max scfm Radon Away GX5 Series Blower abated by;

A-1 Two 200 lb Activated Carbon Vessels arranged in series.

by 

Ali Roohani

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