

**Draft Engineering Evaluation: Modification of Soil Vapor Extraction System**  
**Tara Hill Drive Limited**  
**1577 Tara Hills Drive, Pinole, CA**  
**Application No. 30357; Plant No. 21926**

**Background**

West Environmental has applied for a modification of their existing Permit to Operate, on behalf of Tara Hill Drive Limited, to modify an existing soil vapor extraction (SVE) system. The system is located at 1577 Tara Hills Drive in Pinole, CA

**S-2 Soil Vapor Extraction System consisting of a 300 max scfm AirTech 3BA1610 Blower abated by;**

**A-2 Two parallel lines of Two 200 lb Granulated Activated Carbon Adsorption (GAC) Vessels and Two 400 lb Potassium Permanganate (KMN) Vessels arranged in series.**

West Environmental has proposed to use a new blower with 300 scfm. This is an increase in capacity compared to the existing 200 scfm blower. The facility currently has two 200 lb GAC vessels in series. The applicant has proposed to add an additional line of two 200 lb GAC vessels. In addition, two 400lb KMN vessels, arranged in series, will be added in each line to follow the GAC vessels. This brings the total of GAC vessels to four and KMN vessels to four. The process flow diagram submitted by the applicant can be seen for reference. Laboratory results submitted in previous applications show presence of isopropyl alcohol (IPA) and tetrachloroethylene (PCE). However, the applicant has stated the IPA was result of piping installed at the site and no longer is detected in the influent. In addition, the applicant plans to inject microbes to breakdown PCE compounds. This breakdown may produce trichloroethylene (TCE) and vinyl chloride. The KMN vessels will be installed to mitigate any incoming vinyl chloride in the influent. Since it is currently unknown how much TCE and vinyl chloride will be produced, the concentrations of all hydrocarbons listed in Table 1 will be assumed to be near toxic trigger levels, per Regulation 2-5, as a worst-case scenario.

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 and potassium permanganate vessels influent and effluent organic concentrations 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 300 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:

$$14,200 \frac{\mu g}{m^3} (PCE) \times 300 \frac{ft^3}{min} \times 1440 \frac{min}{day} \times \frac{1}{35.31} \frac{m^3}{ft^3} \times \frac{1}{4.54 \times 10^8} \frac{lb}{\mu g} = 0.38 \frac{lb}{day} \text{ of PCE ( unabated)}$$

$$0.38 \frac{lb}{day} (PCE) \times (1 - 90\%) \times 365 \frac{day}{year} = 13.9 \frac{lb}{year} \text{ of PCE ( abated)}$$

$$9.6 \text{ ppmv (total influent)} \times (1 - 90\%) = 0.96 \text{ ppmv (total effluent)}$$

Table 1 – Emissions from S-2 SVE System

Pollutant	Max Influent vapor concentration [µg/m <sup>3</sup> ]	Max Influent vapor concentration [ppmv]	Effluent vapor concentration [ppmv]	Unabated Emission [lb/day]	Abated Emission [lb/day]	Abated Emission [lb/yr]
TCE	40000	7.10	0.71	1.08	0.11	39.3
PCE	14,200	2.1	0.21	0.38	0.04	13.9
Vinyl Chloride	1,050.00	0.4	0.04	0.03	0.00	1.0
<b>Total</b>	<b>55,250</b>	<b>9.6</b>	<b>0.96</b>	<b>1.5</b>	<b>0.15</b>	<b>54.3</b>

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

Compound	lb/day	lb/yr	TPY
NPOCs	0.038	13.9	0.007
POCs	0.110	40.3	0.020

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

Table 3 – S-2 Corrected Total Effluent Concentration

Total Effluent vapor concentration [ppmv]	*Average Correction Factor to Isobutylene	Corrected Total Effluent vapor concentration [ppmv]
0.96	0.55	1.75

\*Average Correction factors 0.57 and 0.54 for PCE and TCE respectively were used from the RAE PID Handbook. Equation to determine corrected value: *Corrected Total Effluent = Uncorrected Total Effluent (Table 1) / Average 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 2 will be used as the carbon change out threshold, measured as Isobutylene, on the last abatement vessel in each series.

### Cumulative Increase

Table 4- Plant Cumulative Emissions

Compound	Current Permitted Emissions, Post 4/5/91 (TPY)	New Emission Increase with A/N 30357 (TPY)	Cumulative Emissions (TPY)
NPOCs	.000	.007	.007
POCs	.002	.018	.020

Overall emissions will increase with this application. Thus, this project will be considered a modification.

**Toxic Risk Screening**

Table 4 – S-2 Toxic Review

Toxic Pollutant	Abated Emission (lb/hr)	Abated Emission (lb/yr)	Acute Trigger lb/hr	Chronic Trigger lb/yr	HRA required
TCE	4.48E-03	39.3	-	41	N
PCE	1.59E-03	13.9	44	14	N
Vinyl Chloride	1.18E-04	1.0	400	1.1	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 POC emissions will be vented through a Carbon adsorption system at all times of operation. KMN vessels will be in operation at all times to adsorb any vinyl chloride present in the influent.

This project is within 1,000 ft of Pinole Middle School. Because an emission increase will occur with the proposed changes, the facility is subject to the public notification requirements of Regulation 2-1-412. PSD, NSPS, and NESHAPS are not triggered.

**Permit Conditions**

Permit Condition #27209

1. The owner/operator shall abate the Precursor Organic Compound (POC) and Non-precursor Organic Compound (NPOC) emissions from Source S-2 by A-2 SVE Abatement System, consisting of two parallel lines of two 200 pound GAC Vessels and two 400 lb KMN Vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 300 scfm. In no event shall the cumulative Toxic Air Contaminants (TACs) emissions to the atmosphere from

S-2 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 shall take air samples from A-2 for laboratory analysis upon start-up. The owner/operator shall use EPA Method TO-15 to analyze all toxic organics present. The air samples shall be taken at the following A-2 locations:
  - a. At the inlet to the first abatement vessel in each series.
  - b. At the outlet of the abatement vessel that is last in each series prior to venting to the atmosphere.

The owner/operator shall submit the results of the laboratory analysis to the District's Engineering Division within 30 days of start up.

3. 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]

4. 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 conditions 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].
5. The owner/operator shall immediately change out the second and third abatement vessel positioned in series with unspent media upon breakthrough, defined as the detection of the third position vessel's outlet of the higher of the following:
  - a. 10 % of the inlet stream concentration to the abatement vessels.
  - b. 5 ppmv or greater (measured as isobutylene).[Basis: Cumulative Increase, Regulation 2-5, TBACT]

6. 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 1.75 ppmv (measured as isobutylene). [Basis: Cumulative Increase, Regulation 2-5, TBACT]

7. 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-2 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]

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

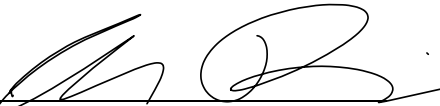
### **Recommendation**

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-2 Soil Vapor Extraction System consisting of a 300 max scfm AirTech 3BA1610 Blower abated by;**

**A-2 Two parallel lines of Two 200 lb Granulated Activated Carbon Adsorption (GAC) Vessels and Two 400 lb Potassium Permanganate (KMn) Vessels arranged in series.**

by   
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May 28, 2020

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