

DRAFT
Engineering Evaluation Report
Partner Engineering & Science, Inc.
Plant Number 23225
Application Number 27431

660 B San Antonio
Mountain View, CA 94040

Background

On behalf of World Plaza Associates, LLC, Partner Engineering & Science, Inc. has applied to obtain an Authority to Construct and a Permit to operate a soil vapor extraction system at the above referenced site. The system will mitigate chlorinated Volatile Organic Compounds (VOC) in shallow soil, contaminated by a dry cleaning operation. Extracted vapors will be abated by a set of two vessels of granulated activated carbon arranged in series before discharge to the atmosphere through an exhaust vent. Emissions of toxic compounds are expected to be below the respective triggers levels in Regulation 2-5 (Table 2-5-1).

The Carbon unit influent and effluent VOC concentrations will be monitored with a portable flame-ionization detector (OVA-FID) on a schedule reflecting initial loading rates and predicted carbon capacity. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

The application covers the following source:

- S-1 Soil Vapor Extraction System (1 regenerative blower & ancillary), Mako Industries, U RAI 56, 250 scfm (or equivalent), abated by A-1.**
- A-1 Activated Carbon Adsorption Vessels (2 nos. arranged in series) – Mako Industries, 1000 pound carbon each (or equivalent).**

Emission Calculations

For a conservative estimate of emissions, it is assumed that the system will be operated for 24 hours a day and 8760 hours a year with maximum inlet concentration level of each compound. Generalized operating conditions are as follows:

- * Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C
- * Influent values based on operational parameters of equipment and applicant's supplied soil vapor test results (2015):
 - influent rate: 250 scfm;
 - Tetrachloroethylene (PCE): 32 ug/L max.
 - Trichloroethene (TCE): 3.1 ug/L max.
 - Acetone: 1.3 ug/L max.
 - Isopropyl alcohol: 81 ug/L max.
 - Cyclohexane: 0.16 ug/L max.
 - Chloroform: 1.16 ug/L max.
 - Toluene: 0.19 ug/L max.
 - Tetrahydrofuran: 24 ug/L max.
 - abatement efficiency: 98.5%

Emission of each compound is calculated using the following equations:

$$\text{Emissions, lb/hr} = \text{ug/L} * \text{scfm} * 60 \text{ min/hr} * 28.32 \text{ L/cf} * \text{E-6 g/ug} * 1 \text{ lb/454 g} * (1 - 0.985)$$

$$\text{Emissions, lb/yr} = (\text{emissions, lb/hr}) * (8760 \text{ hrs/yr})$$

Emissions, as calculated, are given in the table below:

Compound	Acute trigger level, lb/hr	Chronic trigger level, lb/yr	S-1		
			ug/L	lb/hr	lb/yr
Tetrachloroethene, PCE (NPOC)	44	18	32	0.0004	3.96
Acetone (NPOC)			1.3		0.16
Trichloroethene, TCE		54	3.1		0.35
Isopropyl alcohol	7.1	2.7E+5	81	0.0011	10.1
Cyclohexane			0.16		0.02
Chloroform	0.33	20	1.16	1.62E-5	0.14
Toluene	82	1.2E+4	0.19	2.7E-6	0.023
Tetrahydrofuran			24		2.99
Total POC					13.62
Total NPOC			33.3		4.12

Total Precursor Organic Compound (POC) emissions = 0.037 lb/day @24 hrs/day
= 13.62 lb/yr @8760 hrs/yr
= 0.007 tpy

Total Non-Precursor Organic Compound (NPOC) emissions = 0.011 lb/day @24 hrs/day
= 4.12 lb/yr @8760 hrs/yr
= 0.0021 tpy

Plant Cumulative Increase

POC = 0.007 tpy
NPOC = 0.0021 tpy

Toxics Emissions and Health Risk Screening Analysis

As shown in the table above, toxic compound emissions are below the respective toxic trigger levels listed in the Table 2-5-1 of Regulation 2, Rule 5, and therefore a health risk screening analysis is not required per Regulation 2, Rule 5.

Best Available Control Technology (BACT)

POC and NPOC emissions from the proposed project will be < 10 lbs per highest day and therefore are not subject to the BACT requirements of Regulation 2-2-301.

Offsets

Offsets requirements of Regulation 2-2-302 are not triggered for facility wide or permitted POC emissions < 10 tpy.

California Environmental Quality Act (CEQA)

The project is considered to be ministerial under the Districts 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 evaluated as per the guidance in Chapter 9.2 of the permit handbook.

Statement of Compliance

Based on the information submitted, this operation will be expected to comply with the requirements of Regulation 8-47-301, Emission Control Requirements.

8-47-301 Emission Control Requirement, Specific Compounds: Any air stripping and soil vapor extraction operations which emit benzene, vinyl chloride, perchloroethylene, methylene chloride and/or trichloroethylene shall be vented to a control device which reduces emissions to the atmosphere by at least 90 percent by weight.

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

Public Notification, Schools

The project is located within 1000 feet of the nearest K-12 school, School for Independent Learners, and therefore is subject to the public notice requirements of Regulation 2-1-412. A public notice will be distributed to the parents and guardians of the students of the schools within ¼ mile of the project and to all the addresses within 1000 feet of the project.

Permit Conditions

S-1 Soil Vapor Extraction System (1 regenerative blower & ancillary), Mako Industries, U RAI 56, 250 scfm (or equivalent), abated by A-1.

A-1 Activated Carbon Adsorption Vessels (2 nos. arranged in series) – Mako Industries, 1000 pound carbon each (or equivalent).

1. The owner/operator shall abate the Volatile Organic Compound (VOC) emissions from Source S-1 by A-1, two (1000 lb minimum capacity each) Activated Carbon Vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 250 cfm. In no event shall emissions to the atmosphere exceed any toxic emissions above the toxic trigger levels listed in the Table 2-5-1 of Regulation 2-5 for S-1.

[Basis: Cumulative increase, Regulation 2-5, Regulation 8-47-301]

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 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 owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with Parts 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 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 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 (measured as hexane).
 [Basis: Cumulative Increase, Regulation 2-5, TBACT]
5. The owner/operator shall immediately 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. 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.
 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 8-47-501, Regulation 1-523]
7. The owner/operate shall report any non-compliance of these conditions to Compliance & Enforcement Division at the time that it is 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: 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]

Recommendations

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project will comply with all applicable requirements of the District, State, and federal air-quality related regulations. Since the source will be located within 1000 feet of a K-12 school, the public notification requirements of the District Regulation 2-1-412 are triggered. After receiving and reviewing the public comments, the District will make a final determination on the permit.

- S-1 Soil Vapor Extraction System (1 regenerative blower & ancillary), Mako Industries, U RAI 56, 250 scfm (or equivalent), abated by A-1.**
- A-1 Activated Carbon Adsorption Vessels (2 nos. arranged in series) – Mako Industries, 1000 pound carbon each (or equivalent).**

By: _____
Dharam Singh, PE
Air Quality Engineer II