Draft Engineering Evaluation
J&S Lee Associates, LLC
322 14th Street, Oakland, CA
Application No. 30532; Plant No. 24714

Background

On behalf of J&S Lee Associates, LLC, Roux Associates, Inc. has applied for an Authority to Construct for soil remediation at the site located at 322 14th Street in Oakland, CA. The project location is at a new facility.

S-1 Soil Vapor Extraction System (SVE) consisting of a 200 max scfm Air Tech 3BA1610 Blower

abated by;

A-1 Two parallel lines of Three 200 lb Activated Carbon Vessels arranged in series

The proposed site is located at a dry-cleaning facility. Soil vapor samples were extracted for laboratory analysis. Presence of Tetrachloroethylene (PCE), Trichloroethylene (TCE), Carbon Disulfide, and Chloroform. The SVE unit will consist of a 200 scfm blower which will be abated by two parallel lines of Activated Carbon Vessels with each line containing three 200 lb carbon vessels in series. Emission monitoring for operation of the equipment will be conducted according to established Source Test methodology. Procedures are outlined in the conditions

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 unit influent and effluent volatile organic carbon concentrations will be monitored with a photoionization detector (PID) on a schedule reflecting current 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.

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^{O}C; 1 mole occupies 24.15L
- Influent rate based off maximum blower capacity of 200 scfm and laboratory results submitted with this application. PCE and TCE concentrations were assumed near toxic trigger level for worst case scenario. Maximum reported concentrations were used for Carbon Disulfide and Chloroform.
- Overall abatement efficiency of 99 % was assumed for A-1. This will be enforced by the carbon change out threshold for the last vessel in each series outlined in the conditions below.
- Example Calculations can be seen below:

$$213{,}000\ (PCE) \times 200\frac{ft^3}{min} \times 1440\frac{min}{day} \times \frac{1}{35.31}\frac{m^3}{ft^3} \times \frac{1}{4.54 \times 10^8}\frac{lb}{\mu g} = 3.82\frac{lb}{day}\ (unabated)$$

$$3.82\frac{lb}{day}(PCE) \times (1 - 99\%) \times 365\frac{day}{year} = 13.9\frac{lb}{year}(abated)$$

$$143.6\ ppmv\ (total\ influent) \times (1 - 99\%) = 1.44\ ppmv(total\ effluent)$$

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Table 1 – S-1 SVE System

Pollutant	Influent vapor concentration [µg/m3]	Influent vapor concentration [ppmv]	Effluent vapor concentration [ppmv]	Unabated Emission [lb/day]	Abated Emission [lb/day]	Abated Emission [lb/yr]
TCE	620,000	110.08	1.10	11.12	0.11	40.6
PCE	213,000	30.88	0.31	3.82	0.04	13.9
Carbon Disulfide	8,400	2.65	0.03	0.15	0.00	0.5
Chloroform	3,500	0.70	0.01	0.06	0.00	0.2
Total	**841,400**	**143.6**	**1.44**	**15.1**	**0.15**	**55.1**

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

Pollutant	lb/day	lb/yr	TPY
NPOCs	0.038	13.9	0.007
POCs	0.113	41.4	0.021

Per Regulation 1-234 and 40 CFR 51.100(s)(1), PCE has been determined to have negligible photochemical reactivity and is considered to be a non-precursor organic compound (NPOC).

Table 3 – S-1 Corrected Effluent Concentration

Total Effluent vapor concentration [ppmv]	*Average Correction Factor to Isobutylene	Corrected Total Effluent vapor concentration [ppmv]
1.44	0.55	2.61

*The average correction factor for PCE and TCE were used to correct the organic mixture to isobutylene since the two respective compounds comprise the majority of the organic mixture. Equation to determine corrected value: *Corrected Total Effluent = Uncorrected Total Effluent / Average Correction Factor*

The last carbon vessel in each series will have a carbon change out threshold based on the total effluent concentration. The calculated total organic effluent concentration is 1.44 ppmv. This total will be corrected to isobutylene (as seen in Table 3), the calibration gas for the PID monitoring equipment. The corrected threshold will be enforced in the conditions below.

Cumulative Increase

Table 4- Plant Cumulative Emissions

Pollutant	Current Permitted Emissions, Post 4/5/91 (TPY)	New Emission Increase with A/N 30532 (TPY)	Cumulative Emissions (TPY)
POCs	0	0.021	0.021

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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
TCE	4.63E-03	40.6	-	41	N
PCE	1.59E-03	13.9	44	14	N
Carbon Disulfide	6.28E-05	0.5	14	31,000	N
Chloroform	2.62E-05	0.2	0.33	15	N

Toxic trigger levels per reg 2-5 Table 2-5-1 are not expected to be exceeded.

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.

This project is within 1,000 ft of Envision Academy For Arts & Technology. Therefore, this project is subject to the public notification requirements of Regulation 2-1-412. PSD, NSPS, and NESHAPS are not triggered.

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Permit Conditions

Permit Condition # XXXXX

1. The owner/operator shall abate the Precursor Organic Compound (POC) emissions from Source S-1 by A-1 SVE Abatement System, consisting of two parallel lines of Activated Carbon Vessels with each line consisting of three 200 lb Activated Carbon Vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 200 scfm. In no event shall the 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 carbon vessel in each series.
    b. At the inlet to the last carbon vessel in each series.
    c. At the outlet of the carbon 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 conditions number 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 or the higher of the following:

    a. 10 % of the inlet stream concentration to the Carbon vessel.
    b. 10 ppmv or greater (measured as isobutylene).

    [Basis: Cumulative Increase, Regulation 2-5, TBACT]

5. The owner/operator shall immediately change out the last vessel in series with unspent carbon upon detection at the outlet of 2.61 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:

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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 if 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 operator of Source S-1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

Recommendation

Recommend that a conditional Authority to Construct be issued for the following equipment:

S-1 Soil Vapor Extraction System (SVE) consisting of a 200 max scfm Air Tech 3BA1610 Blower

abated by;

A-1 Two parallel lines of Three 200 lb Activated Carbon Vessels arranged in series

by_____ September 9, 2020

Ali Roohani

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