

**DRAFT
Engineering Evaluation
Snow Cleaners
Plant No. 21398; Application No. 25084**

P & D Environmental Inc. on behalf of Snow Cleaners has applied for an Authority to Construct and Permit to Operate for the following equipment:

- S-1 Soil Vapor Extraction System – 100 scfm vacuum blower abated by**
- A-1 SVE Abatement System: Carbon Adsorption – two (200 lbs minimum capacity) Activated Carbon Vessels connected in series followed by**
- A-2 SVE Abatement System: three 400 lbs Potassium Permanganate (KMnO4) vessels**

Background

P & D Environmental Inc. on behalf of Snow Cleaners has applied for an Authority to Construct for a Soil Vapor Extraction Unit located at 2678 Coolidge Avenue in Oakland. Soil vapor extraction (SVE) will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 100 scfm. The vacuum unit is also equipped with a water knockout vessel, inlet filter, dilution air valve, recirculation valve, and flow indicators. Vapor abatement will be achieved by carbon adsorption followed by three 400-pound potassium permanganate vessels. The proposed carbon adsorption system will consist of two 2000-pound capacity activated carbon vessels connected in series.

The applicant will be conditioned to provide written notification at the start of operation. The carbon unit influent and effluent VOC concentrations will be monitored with a portable flame-ionization detector (OVA-FID) on a schedule reflecting current loading rates and predicted carbon capacity. To ensure proper operation of equipment and verify attainment of steady-state conditions, Carbon performance will be monitored daily for the first five days P & D Environmental, Inc. may then elect to change their monitoring schedule based on measured influent concentrations and calculated carbon loading. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

This source is located within 1,000 feet of a school: Patten Academy of Christian Education, 2433 Coolidge Avenue, Oakland, CA 94601; therefore, this application requires Public Notification per District's Regulation 2-1-412. Also, Life Academy/ United for Success Academy, located at 2101 35th Avenue, Oakland, CA 94601 is within one-quarter mile of the source and will be included in Public Notification.

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^oC; 1 mole occupies 24.15L
- * Molecular weight of Tetrachloroethylene (PCE) = 165.83 g/mole
- * Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate 100 scfm throughout; maximum influent concentration = 177 ppmv tetrachloroethylene (PCE); destruction efficiency = 99.0% throughout.

Emissions of Toxic Air Contaminants (Tetrachloroethylene):

$$177E-6 \frac{\text{mole}}{\text{min}} * \frac{100 \text{ ft}^3}{1 \text{ day}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32L}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15L} * \frac{165.83g}{\text{mole}} * \frac{1 \text{ lb}}{454g} * (1 - 0.99) = \mathbf{0.109 \text{ lb/day}} \text{ (abated)}$$

[Enclosed with detailed emission calculation spreadsheet]

Highest Daily Emissions	=	0.109 lb/day
Annual Average	=	0.109 lb/day
RFP	=	0.0006 tons/yr

Toxics

The emissions of toxic substances: Tetrachloroethylene (PCE), Trichloroethylene (TCE) and Vinyl Chloride (VC) are considered sufficient to warrant a Risk Screen Analysis. A Health Risk Screen was performed for this application to determine the risk to the maximally exposed industrial and residential receptors. The ISCST3 air dispersion models were used to estimate the pollutant concentrations in the area surrounding the site for a unit emission rate. It was determined that toxic emissions as calculated above corresponded to a risk of 0.84 in a million to the maximally exposed industrial receptor. This emission rate would result in maximum risk of 10 in a million to the maximally exposed residential receptor. In accordance with the District's Regulation 2-5, the impact is then insignificant since this risk is within the threshold of 10 in a million as required for sources implementing TBACT; therefore, the Toxics Section has recommended the issuing of this A/C with a PCE and TCE emission limit of 0.109 lbs/day and 0.115 lbs/day respectively.

New Source Review

This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT. For Soil Vapor Extraction operations, BACT is defined as attainment of set destruction efficiencies corresponding to set influent concentration values. Operation of carbon vessels will be conditioned to ensure attainment of an outlet concentration not to exceed 10 ppmv NPOC. Offsets need not be imposed as annual emissions will not exceed 10 tons.

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 Chapters 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.

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 will be 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 and reviewed, the District will make a final determination on the permit.

- S-1 Soil Vapor Extraction System – 100 scfm vacuum blower abated by
- A-1 SVE Abatement System: Carbon Adsorption – two (200 lbs minimum capacity) Activated Carbon Vessels connected in series followed by
- A-2 SVE Abatement System: three 400 lbs Potassium Permanganate (KMnO₄) vessels

Conditions:

1. The owner/operator shall vent Source S-1 at all times to Abatement device A-1, at least two (200 lb minimum capacity) activated carbon vessels arranged in series, followed by A-2, one 400 lb potassium permanganate vessel. Influent vapor flow shall not exceed 100 scfm. In no event shall emissions to the atmosphere from S-1 exceed the following limits:

Compounds	Emission Limit Based on HRSA [lb/day]
Tetrachloroethylene [PCE]	0.109
Trichloroethylene [TCE]	0.115
Vinyl Chloride [VC]	0.001
Dichloroethene [DCE]	0.007

[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 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 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 limits:
 - a. 10 % of the inlet stream concentration to the carbon bed.
 - b. 10 ppmv (measured as hexane).[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. Hours and time of operation.
 - b. Each emission test, analysis or monitoring results logged in for the day of operation they are taken.
 - c. The number of carbon vessels 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 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]

by _____ date _____

Flora Chan
Air Quality Engineer II