

**DRAFT
ENGINEERING EVALUATION REPORT
GEORESTORATION, INC.
PLANT NUMBER 21197
APPLICATION NUMBER 29356**

Portable SVE System
855 El Camino Real
Town & Village Shopping Center
Palo Alto, CA 94031

Background

On behalf of GeoRestoration Inc., IRC Environmental Consulting, LLC (IRC) has applied to operate a permitted portable soil vapor extraction system, S-1, at the above referenced site under Voluntary Cleanup Agreement (VCA) with the Department of Toxic Substance Control (DTSC). The source will use carbon adsorption vessels (minimum of two 1000 lbs each in series) at this site and will be expected to comply with the updated permit condition ID #25284 as shown below in strikeout/underlined format. Since the site is within 1000 feet of a K-12 school, therefore it requires public notification per Regulation 2-1-412.

The application covers the following source:

- S-1 Portable Soil Vapor Phase Extraction System, abated by A-1**
- A-1 SVE Abatement System – Electric Catalytic Oxidizer/Activated Carbon Adsorption Vessels.**

Emission Calculations

Emissions were calculated and accounted for when the source was issued an authority to construct and a permit to operate (Application #24290 & #25225). Emission calculations, using soil vapor concentrations obtained from the pilot test done at this site, is done to demonstrate compliance with the current and updated emission limits. For a conservative estimate of yearly emissions, it is assumed that the system is operated for an entire year.

Basis:

- * Operating conditions: Pressure = 1 atm.; Inlet Temperature = 21°C
- * Influent values based on operational parameters of equipment and soil vapor test results:
 - Influent rate = 115 cfm maximum;
 - Influent concentrations:
 - Perchloroethylene (PCE) = 160 ug/L
 - Trichloroethylene (TCE) = 0.14 ug/L
- * Abatement efficiency = 99% by wt.

$$\text{Emissions, lb/hr} = \text{ug/L} \cdot \text{cfm} \cdot 60 \text{ min/hr} \cdot 28.32 \text{ L/cf} \cdot E \cdot 6\text{g/ug} \cdot 1 \text{ lb/454 g} \cdot (1-0.99)$$

Emissions are calculated using the above equation and the basis.

Compound	Acute Trigger Level, lb/hr	Chronic Trigger Level, lb/yr	S-1		
			Ug/L	Lb/hr	Lb/yr
PCE	44	14	160	0.001	6.033
TCE		41	0.14		0.005

Plant Cumulative Increase

Precursor Organic Compounds, POC = 1.549 tpy (current) + 0.00 tpy (new)
= 1.549 tpy (new total)

Toxics Emissions and Health Risk Screening Analysis

Perchloroethylene (PCE) and Trichloroethylene are the toxic compounds expected to be emitted from the operation and their emissions, as shown in the table above, are below the applicable chronic toxic trigger and acute toxic trigger levels given in the Table 2-5-1 of Regulation 2-5. Therefore, a health risk screening is not required.

Best Available Control Technology (BACT)

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

2-2-301 Best Available Control Technology Requirement: An applicant for an authority to construct or a permit to operate shall apply BACT to any new or modified source:

301.1 Which results in an emission from a new source or an increase in emissions from a modified source and which has the potential to emit 10.0 pounds or more per highest day of precursor organic compounds (POC), non-precursor organic compounds (NPOC), nitrogen oxides (NOx), sulfur dioxide (SO₂), PM₁₀ or carbon monoxide (CO). BACT shall be applied for any of the above pollutants which meets both criteria.

(Amended 6/15/94; 10/7/98; 5/17/00)

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 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 is expected to be in compliance with Regulations 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.

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.

8-47-302 Organic Compounds: Any air stripping and soil vapor extraction operations with a total organic compound emission greater than 15 pounds per day shall be vented to a control device which reduces the total organic compound emissions to the atmosphere by at least 90 percent by weight.

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

Public Notification, Schools

The project will be located within 1000 feet of K-12 schools, Palo Alto High School, and therefore is subject to the public notification requirements of Regulation 2-1-412. A public notice will be distributed to the parents and guardians of the students of the schools within $\frac{1}{4}$ mile of the project and to all the addresses within 1000 feet of the project.

Permit Conditions

The permit condition ID #25284 is revised/updated. Revisions are shown in strikeout/underlined format.

COND# 25284 -----

S-1 Portable Soil Vapor Phase Extraction System, abated by A-1
A-1 SVE Abatement System – Electric Catalytic Oxidizer/Activated
Carbon Adsorption Vessels.

[Application #24290; Revisions: Application #25225; Application #29356]

1. The owner/operator of this source (S-1) shall provide written notification to the Engineering Division at least 3 days prior to start-up of operation at any new location. The notification shall include:
 - a. Source Number 1 and Plant Number 21197.
 - b. Street address including zip code, for the location where the equipment will be operated.
 - c. The name and telephone number of a contact person where the equipment will be operated.
 - d. The date of initial start-up and estimated duration of operations at that location.
 - e. The distance from the source to the outer boundary

of the nearest K-12 school, or indication that the distance is greater than 1500 feet.

In the event that the start-up is delayed less than 5 days, the operator may provide telephone notice of said change to assigned Plant Engineer in the Engineering Division. If the start-up is delayed more than 5 days, written notification must be resubmitted.

[Basis: Regulation 2-1-413]

2. The owner/operator shall not operate or retain this source at any single location for a period in excess of 12 consecutive months, following the date of initial operation.
If this portable source remains at any fixed location for more than 12 months, the multi-location permit will automatically revert to a conventional permanent location permit and the owner/operator will lose the portability of this permit.
[Basis: Regulation 2-1-413]
3. The owner/operator shall operate this portable source, S-1, at all times in conformance with eligibility requirements set forth in Regulation 2-1-413 for portable equipment.
[Basis: Regulation 2-1-413]
4. The owner/operator shall not operator this source within 1000 feet of the outer boundary of any K-12 school, unless the applicable requirements of the California Health and Safety Code Section 42301.6 have been met. This will require the submittal of an application for a revised permit to operate. These notification requirements have been satisfied for operation at: 2790 Homestead Road in Santa Clara, CA 95051 and 855 El Camino Real, Palo Alto, CA 04031.
[Basis: Regulation 2-1-413.3]
5. The owner/operator shall abate the SVE system with A-1 Electric Catalytic Oxidizer exclusively for removal of non-chlorinated volatile organic compounds (VOC) associated with petroleum products from extracted soil vapor. This shall be demonstrated by onsite sampling required in condition 10 below.
[Basis: Regulation 2-5]
6. The owner/operator shall abate the Precursor Organic Compound (POC) emissions and Non-Precursor Organic Compounds (NPOC) from Source S-1 by A-1, SVE Abatement System, consisting of either an Electric Catalytic Oxidizer, or at least two (200 lbs minimum capacity) Activated Carbon Vessels during all periods of operations. Start-up and subsequent operation of each abatement device shall take place only after written notification of same has been received by the District's Engineering Division.

Soil vapor flow rate shall not exceed 350 scfm.
[Basis: Regulation 8-47-301.1, and 302]

7. The owner/operator shall operate A-1 Electric Catalytic Oxidizer such that the VOC abatement efficiency shall be maintained at a minimum of 98.5% by weight for inlet VOC concentrations greater than or equal to 2000 ppmv (measured as hexane). For inlet concentrations below 2000 ppmv and greater than or equal to 200 ppmv, a minimum abatement efficiency of 97% shall be maintained by the owner/operator. For inlet concentrations below 200 ppmv, a minimum abatement efficiency of 90% shall be maintained by the owner/operator. The minimum abatement efficiency shall be waived if outlet VOC concentrations are shown to be non-detect (measured as hexane). In no event shall toxic air contaminant emissions to the atmosphere exceed the toxic air contaminant trigger levels listed in the Table 2-5-1 of Regulation 2, Rule 5. In case any toxic air contaminant emissions are expected to exceed the trigger levels as per the pilot test results for a proposed site of operation then an application shall be submitted so that health risk analysis requirements of Regulation 2, Rule 5 shall be met before commencement of operation at that site.
[Basis: Cumulative Increase, Regulation 2-5, TBACT]
8. The owner/operator shall not operate A-1 Electric Catalytic Oxidizer below a minimum operating temperature of less than 600 degrees Fahrenheit.
[Basis: Cumulative Increase, Regulation 2-5, TBACT]
9. To determine compliance with part 8, the owner/operator shall equip the A-1 Electric Catalytic Oxidizer with continuous measuring and temperature recording instrumentation. The owner/operator shall collect and maintain the temperature data from the temperature recorder in a file which shall be available for District inspection for a period of at least 2 years following the date on which such data are recorded.
[Basis: Regulation 1-523]
10. To determine compliance with part 7, within ten days after start-up of the electric catalytic oxidizer at any new location, the owner/operator of this source shall:
 - a. Analyze inlet gas stream to determine the flow rate and concentration of VOC and toxic air contaminants present.
 - b. Analyze exhaust gas to determine the flow rate, and the concentration of toxic air contaminants and VOC present.
 - c. Calculate the toxic air contaminant emission rates in pounds per day and per year based on the exhaust gas

analysis and the operating exhaust flow rate. The owner/operator shall decrease the soil vapor flow rate, if necessary, to demonstrate compliance with Condition 7.

- d. Calculate the VOC abatement efficiency based on the inlet and exhaust gas analysis. For the purpose of determining compliance with condition 7, the VOC concentration shall be reported as hexane.
 - e. Submit to the District's Engineering Division the test results and emission calculations within one month from the testing date. Samples shall be analyzed according to modified EPA test methods 8015 and 8020 or their equivalent to determine the concentrations of VOC and toxic air contaminants.
- [Basis: Cumulative Increase, Regulation 2-5, TBACT]

11. The owner/operator of this source shall maintain the following records for each month of operation of the catalytic oxidizer:
 - a. Days and hours of operation.
 - b. Each emission test, analysis or monitoring results logged-in for the day of operation they were taken.
 - c. Analysis results for any catalyst plugs removed from the bed to determine remaining life of the catalyst.

Such records shall be retained and made available for inspection by the District for two years following the date the data is recorded.

[Basis: Regulation 1-523]

12. The owner/operator shall abate chlorinated volatile organic compounds from extracted soil vapor with the A-1 Activated Carbon Vessel.
- [Basis: Regulation 8-47-301.1, and 302]

13. During the operation of the A-1 Activated Carbon Vessels, the owner/operator of this source shall not exceed the acute or chronic trigger levels listed in the Table 2-5-1 of Regulation 2, Rule 5 for any toxic air contaminants.
- [Basis: Regulation 8-47-301.1, and 302; Regulation 2-5]

14. To demonstrate compliance with Part 12 and 13, within ten days after start-up of the A-1 Activated Carbon Vessels, the owner/operator shall conduct the monitoring described in this part and in Parts 15 to 17 and shall follow the carbon replacement procedures in Part 18 and 19.
 - a. Analyze inlet gas stream to determine the flow rate and concentration of toxic compounds and VOC present.
 - b. The owner/operator shall conduct the portable analyzer monitoring described in Part 16 on a

daily basis.

- c. The owner/operate shall conduct a laboratory analysis on the exhaust from the last carbon vessel in series (prior to venting to atmosphere) on a monthly basis.

[Basis: Regulation 8-47-301.1, and 302; Regulation 2-5]

15. During the operation of the A-1 Activated Carbon Vessels, 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]

16. 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 17 and 18, 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 VOC emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District's Engineering Division must be received by the operator prior to a change to the monitoring schedule.

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

17. 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 in excess of the higher of the following limits:
 - a. 10 % of the inlet stream concentration to the carbon bed.
 - b. detection level or higher (measured as hexane).

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

18. The owner/operator shall immediately change out the last carbon vessel with unspent carbon upon detection at its outlet (measured as hexane).

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

19. The owner/operator of this source shall maintain the following information for each month of operation of the Activate Carbon Vessels:
 - a. Hours and time of operation.
 - b. Each emission test, analysis or monitoring results logged in for the day of operation they were taken.
 - c. The number of carbon vessels removed from service.

Such records shall be retained and made available for inspection by the District for two years following the date the data is recorded.

[Basis: Regulation 1-523]

20. Within 30 days from the completion of each treatment operation at a given location, the owner/operator of this source shall provide the assigned Permit Engineer in the Engineering Division with a summary showing the following information:
 - a. The dates and total number of days that the equipment was at that location and the dates, and total number of days that the equipment was operated at that location.
 - b. A summary of the abatement efficiency and VOC emission rates as determined and reported in the start-up sampling report required by condition 10e or 14 above.
 - c. The results of any additionally performed emission test, analysis, or monitoring result logged in for the day of operation they were taken.
 - d. The total throughput of contaminated soil vapor processed by S-1 at that location (indicated in cubic feet).
 - e. The total emissions of VOC at that location based on the sampling results required by conditions 10 or 14 above.

[Basis: Regulation 1-523]

21. Within 30 days after the end of every calendar year, the owner/operator of this source shall provide the assigned Permit Engineer in the Engineering Division a year-end summary showing the following information:
 - a. The location(s) at which the equipment was operated including the dates operated at each location.
 - b. The total throughput of contaminated soil vapor for the previous four quarters (indicated in cubic feet).
 - c. The total emissions of each toxic air contaminant for the previous four quarters (indicated in pounds).

[Basis: Regulation 1-523]

22. The owner/operator 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 Permit to Operate. The owner/operator shall maintain and retain all measurements, records and data required for at least two years following the date the data is recorded.

[Basis Regulation 1-523]

23. The owner/operator 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 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]

24. Upon completion of the remediation project, the operator of Source S-1 shall notify the Engineering Division within two weeks of decommissioning the operation.

[Basis: Notification]

Recommendations

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination to issue a permit to operate because the project will be expected to 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 K-12 schools, the public notification requirements of Regulation 2-1-412 are triggered. Final determination/recommendation to issue a permit to operate for the following source will be made after public notification and addressing public comments.

- S-1 Portable Soil Vapor Phase Extraction System, abated by A-1
A-1 SVE Abatement System – Electric Catalytic Oxidizer/Activated Carbon Adsorption Vessels.**

By: _____
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