

**Draft Engineering Evaluation**  
**CalClean, Inc. (Portable Sources)**  
**18674-18850 Cox Avenue, Saratoga, CA 95070**  
**Plant No. 24958 (Site No. E4958)**  
**Application No. 31091**  
**Project Description: Portable Soil Vapor Extraction**

**Background**

CalClean, Inc. has applied for an Authority to Construct for the following multiple-location portable soil vapor extraction (SVE) system:

**S-1 Portable Soil Vapor Extraction System****Blower Make: Dekker, Model: VMX, Maximum 500 CFM****Abated by A-1, Activated Carbon Vessels****A-1 Activated Carbon Vessels****Minimum of Three (3) 1,000-LBS Activated Carbon Vessels Arranged in Series****Make: CalClean, Model: DPS-500**

S-1 will initially operate at 18674-18850 Cox Avenue in Saratoga, CA.

The applicant has proposed to use the portable SVE system for sites contaminated with chlorinated and petroleum hydrocarbon vapor trapped in the soil. The system will include a 500 cfm vacuum blower which will be abated by three (3) 1,000-lb carbon vessels in series. The proposed equipment will be used at multiple locations. Emissions will be based on laboratory results and pilot test data submitted in this application for the initial sites.

The applicant will be required to provide written notification at the start of the operation. The applicant will be required to stay below the acute and chronic trigger levels of Regulation 2-5. Furthermore, if the equipment will be moved within 1,000 feet of a kindergarten through grade 12 school, the applicant will be required to submit a permit application to address the school public noticing requirement of the California Health & Safety Code, prior to the commencement of operation at that location. The initial location of operation in Saratoga, CA is within 1,000 feet of two schools that have kindergarten students and will therefore be subject to the school public notification for its initial location.

Procedures are outlined in the conditions found below. Effluent volatile organic compound (VOC) concentrations will be monitored with a flame-ionization detector (FID) on a schedule reflecting current loading rates and predicted carbon capacity. Monitoring schedule changes will be allowed based on monitoring data collected.

**Emission Calculations**

Data collected from a pilot test performed at the initial operation site will be used to estimate precursor organic compound (POC), non-precursor organic compound (NPOC), and toxic air contaminant (TAC) emissions. It is assumed that the equipment can operate 24 hours a day, 365 days a year. The following are assumptions used to estimate emissions.

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 Liters (or 386.8 ft<sup>3</sup>/lb-mol)
- Hydrocarbons will be abated by three (3) 1,000-lb minimum activated carbon vessels in series. POC cumulative emissions are based on a 3-ppmv effluent concentration since the last carbon

threshold changeout level on the last abatement vessel will be limited 6 ppmv, calibrated to methane. This limit is based on a calculated maximum volumetric concentration of NPOC of 3-ppmv at the initial Saratoga site. An equivalent limit will be set for POC, yielding a total organic limit of 6-ppmv.

- Toxic Air Contaminants (TAC) emissions will be based on soil vapor data submitted with this application.
- The organic influent flow rate of 500 scfm and abatement efficiency of 90% was used in the calculations.
- A handful of compounds were found only in the effluent vapor stream analysis and were not detected in the influent. For a conservative estimate of emissions, these compounds were included in the emission review of S-1 and are assumed to be after abatement.

**Table 1. Emissions from Portable Soil Vapor Extraction S-1**

Pollutant	CAS #	Pollutant Designation			Inlet Conc. ( $\mu\text{g}/\text{m}^3$ )	Unabated Emissions			
		POC	NPOC	TAC		Hourly Emission Rate (lbs/hr)	Daily Emission Rate (lbs/day)	Annual Emission Rate (lbs/yr)	Annual Emission Rate (tons/yr)
Freon 12	75-71-8		X		120	2.25E-04	5.39E-03	1.97	9.83E-04
Tetrachloroethene	127-18-4		X	X	4900	9.17E-03	0.22	80.32	0.040
Benzene*	71-43-2	X		X	ND	-	-	-	-
2-Butanone*	78-93-3	X		X	ND	-	-	-	-
Ethanol*	64-17-5	X			ND	-	-	-	-
Ethylbenzene*	100-41-4	X		X	ND	-	-	-	-
Xylenes (Total)*	1330-20-7	X		X	ND	-	-	-	-
Acetone*	67-64-1		X		ND	-	-	-	-
Pollutant	CAS #	Outlet Conc. ( $\mu\text{g}/\text{m}^3$ )	Abatement Efficiency	Abated Emissions					
				Hourly Emission Rate (lbs/hr)	Daily Emission Rate (lbs/day)	Annual Emission Rate (lbs/yr)	Annual Emission Rate (tons/yr)		
Freon 12	75-71-8	-	90%	2.25E-05	5.39E-04	0.197	9.83E-05		
Tetrachloroethene	127-18-4	-	90%	9.17E-04	0.022	8.032	4.02E-03		
Benzene*	71-43-2	2.6	-	4.87E-06	1.17E-04	0.043	2.13E-05		
2-Butanone*	78-93-3	4.4	-	8.23E-06	1.98E-04	0.072	3.61E-05		
Ethanol*	64-17-5	310	-	5.80E-04	0.014	5.081	2.54E-03		
Ethylbenzene*	100-41-4	5.2	-	9.73E-06	2.34E-04	0.085	4.26E-05		
Xylenes (Total)*	1330-20-7	26	-	4.87E-05	1.17E-03	0.426	2.13E-04		
Acetone*	67-64-1	1500	-	2.81E-03	0.067	24.587	1.23E-02		

**Notes:**

1. Influent and effluent data was obtained from a pilot test conducted at the initial Saratoga site in February 2022.
2. Pollutants marked with an asterisk\* were only detected at the effluent during pilot test. Will use these as the outlet concentration to the atmosphere.
3. It is assumed that equipment will operate 24 hours a day, 365 days a year.

<b>Table 2. Organic Emissions Review – Portable Soil Vapor Extraction System S-1</b>					
<b>Pollutant</b>	<b>Effluent Volumetric Concentration (ppmv)</b>	<b>Hourly Emission Rate (lb/hr)</b>	<b>Daily Emission Rate (lb/day)</b>	<b>Annual Emission Rate (lb/yr)</b>	<b>Annual Emission Rate (ton/yr)</b>
POC	3	3.73E-03	0.090	32.69	0.016
NPOC	3	3.73E-03	0.090	32.69	0.016

**Notes:**

1. POC and NPOC emissions will be based on an effluent limit of 3 ppmv each, measured as methane.

**Cumulative Increase**

<b>Table 3. Cumulative Increase</b>			
<b>Pollutant</b>	<b>Current Permitted Emissions, Post 4/5/1991 (ton/yr)</b>	<b>Application New Emissions Increase (ton/yr)</b>	<b>New Cumulative Increase (ton/yr)</b>
POC	0.000	0.016	0.016

**Toxic Risk Screening**

<b>Table 4. Project Acute Emissions Review - Regulation 2-5</b>				
<b>Pollutant</b>	<b>CAS #</b>	<b>Hourly Emission Rate (lb/hr)</b>	<b>Acute Trigger Level (lb/hr)</b>	<b>Exceeds Acute Trigger Level?</b>
Tetrachloroethene	127-18-4	9.17E-04	4.40E+01	No
Benzene	71-43-2	4.87E-06	6.00E-02	No
2-Butanone	78-93-3	8.23E-06	2.90E+01	No
Ethylbenzene	100-41-4	9.73E-06	-	-
Xylenes (Total)	1330-20-7	4.87E-05	4.90E+01	No

<b>Table 5. Project Chronic Emissions Review - Regulation 2-5</b>				
<b>Pollutant</b>	<b>CAS #</b>	<b>Annual Emission Rate (lb/yr)</b>	<b>Chronic Trigger Level (lb/yr)</b>	<b>Exceeds Chronic Trigger Level?</b>
Tetrachloroethene	127-18-4	8.03E+00	1.40E+01	No
Benzene	71-43-2	4.26E-02	2.90E+00	No
2-Butanone	78-93-3	7.21E-02	-	-
Ethylbenzene	100-41-4	8.52E-02	3.30E+01	No
Xylenes (Total)	1330-20-7	4.26E-01	2.70E+04	No

This project is not expected to exceed applicable toxic trigger levels of Regulation 2-5, Table 2-5-1. Therefore, the requirements of Regulation 2-5 do not apply. The facility will be required to perform laboratory analysis to demonstrate that the project is below the toxic trigger levels of Regulation 2-5, Table 2-5-1.

**Offsets**

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of precursor organic compounds (POCs) or nitrogen oxides (NO<sub>x</sub>). Furthermore, pursuant to Regulation 2-2-303 offsets must be provided for any new or modified source at a major facility with a cumulative increase that exceeds 1.0 ton per year of PM<sub>10</sub>, PM<sub>2.5</sub>, or sulfur dioxide (SO<sub>2</sub>).

The facility is not expected to have a PTE greater than 10 tons per year of POC or NO<sub>x</sub>, nor is the facility a major facility of PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub>. Therefore, the requirements of Regulations 2-2-302 and 2-2-303 do not apply.

**Best Available Control Technology (BACT)**

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), sulfur dioxides (SO<sub>2</sub>), particulate matter less than 10 micrometer (PM<sub>10</sub>) and particulate matter less than 2.5 micrometer (PM<sub>2.5</sub>).

NPOC and POC emissions are expected to be below 10 lb/day for S-1. Therefore, BACT review is not required.

**California Environmental Quality Act (CEQA)**

This project is classified as ministerial under the District Regulation 2-1-311, because the engineering review for this project requires only the application of standard emission factors and established formulas as specified in Chapter 9.2 of the District's Permit Handbook. This project does not trigger BACT or TBACT and is not subject to the health risk assessment requirements of Regulation 2, Rule 5. This review follows objective procedures and applies standard permit conditions; and therefore, the review of this project is not discretionary as defined by CEQA. Since this project is ministerial, it is not subject to CEQA review requirement of Regulation 2-1-310, and no further CEQA analysis is required.

**Compliance**

Based on the information submitted, this operation is expected to meet the 90% control requirement of Regulations 8-47-301 and 8-47-302. Emissions will be vented through a carbon adsorption system at all times of operation.

This initial location for S-1 will not be in an overburdened community (OBC), but will be located within 1,000 feet of the Saratoga Challenger School (PK-K). The project is subject to public notification requirements of Regulation 2-1-412 due to an increase in toxic emissions. A public notice will be sent to all parents of students of the above-mentioned school(s) and all residents within 1,000 feet of the facility. There will be a 30-day public comment period.

Prevention of Significant Deterioration (PSD), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) are not triggered.

**Permit Conditions****Permit Condition #27768 for S-1**

1. The operator/operator of the Portable Soil Vapor Extraction System (S1) shall provide written notification to the Engineering Division at least 3 days prior to startup of operation at any new location. The notification shall include:
  - a. Application Number 31091 and Plant Number 24958.
  - 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 through 12 school, or indication that the distance is greater than 1,000 feet.

In the event that the start-up is delayed less than 5 days, the operator may provide telephone notice of said change to the assigned Plant Engineer in the Engineering Division. If the startup is delayed more than 5 days, written notification must be resubmitted. [Basis: Regulation 2-1-413]

2. The owner/operator of S1 shall not operate or retain the sources at any single location for a period in excess of 12 consecutive months, following the date of initial operation. If the portable sources remain at any fixed location for more than 12 months, the multi location permit will automatically revert to a conventional permanent location permit and will lose its portability. [Basis: Regulations 2-1-403 and 2-1-413]
3. The owner/operator shall operate S1, at all times in conformance with the eligibility requirements set forth in Regulation 2-1-413 for portable equipment. [Basis: Regulation 2-1-413]
4. The owner/operator shall not operate S1 within 1,000 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 18674-18850 Cox Avenue in Saratoga, CA (95070). [Basis: Regulation 2-1-413.3]
5. The owner/operator shall abate the precursor organic compound (POC)/non-precursor organic compound (NPOC) emissions from the portable soil vapor extraction system (S1) with the Activated Carbon Vessels (A1), each consisting of a minimum of three (3) 1,000 lbs activated carbon vessels in series, during all periods of operation. The influent vapor flow rate for S1 shall not exceed 500 scfm. In no event shall the toxic air contaminant (TAC) emissions to the atmosphere from S1, exceed the trigger levels listed in District Regulation 2-5, Table 2-5-1. [Basis: Regulations 8-47-301 and 8-47-302 and Toxics].
6. Upon initial start-up and start-up at any new location, the owner/operator shall take air samples from S1 for laboratory analysis using EPA Method TO-15. The air samples shall be taken at the following locations:
  - a. At the inlet to the first carbon vessel in series.
  - b. At the outlet of the carbon vessel that is last in series prior to venting to the atmosphere.

The owner/operator shall use the results from the laboratory report to calculate TAC emissions emitted to the atmosphere, using the maximum design flowrate of S1. The owner/operator shall submit the laboratory report and calculated TAC emissions within 21 days of the initial startup and startup at any new location, to demonstrate compliance with Part 5 of this condition. [Basis: Regulation 2-1-403]

7. During operation of A1, the owner/operator shall monitor with a 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 last carbon vessel in series, prior to venting to the atmosphere.

[Basis: Regulations 1-523 and 2-1-403]

8. The owner/operator shall conduct monitoring on a daily basis in accordance with Part 7 of this condition. 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 9, and 10 of this condition.

- a. If the owner/operator can demonstrate two (2) weeks of consecutive daily monitoring readings less than or equal to 10% of the inlet stream, the monitoring frequency may be reduced to weekly.
- b. After the monitoring frequency has been reduced to weekly, if the owner/operator can demonstrate one (1) month of consecutive weekly monitoring readings less than or equal to 10% of the inlet stream, the monitoring frequency may be reduced to once every two (2) weeks.
- c. After the monitoring frequency has been reduced to once every two (2) weeks, if the owner/operator can demonstrate one (1) month of consecutive bi-weekly readings less than or equal to 10% of the inlet stream, the monitoring frequency may be reduced to monthly.
- d. If any subsequent results from monitoring exceed 10% of the inlet stream, the owner/operator shall revert to daily monitoring. If monitoring reverts back to daily, the owner/operator may reduce the monitoring frequency in accordance with Parts 8(a) through (c) of this condition.

[Basis: Cumulative Increase, Toxics, and Regulations 1-523 and 2-1-403]

9. The second to last carbon vessel shall be immediately changed out 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. 10 ppmv (measured as methane).

[Basis: Cumulative Increase and Regulations 1-523 and 2-1-403]

10. The last carbon vessel shall be immediately changed out with unspent carbon upon detection at its outlet in excess of the higher of the following limits:

- a. 10 % of the inlet stream concentration to the final carbon bed.
- b. 6 ppmv or greater (measured as methane).

[Basis: Cumulative Increase and Regulations 1-523 and 2-1-403]

11. The owner/operator of S1 shall maintain the following information for each month of operation:
  - 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. Any measured toxic air contaminant emissions (in pounds).
  - d. The number of carbon vessels removed from service.

Such records shall be retained and made available for inspection by the District for two (2) years following the date the data is recorded. [Basis: Recordkeeping]

12. Within 30 days after the end of every calendar year, the operator of S6 through S8 shall provide the assigned Plant 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 (4) quarters (indicated in cubic feet).
  - c. Any measured toxic air contaminant emissions for the previous four (4) quarters (indicated in pounds).[Basis: Regulation 1-523]
13. The owner/operator of S1 shall report any noncompliance 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: Regulation 2-1-403]
14. The owner/operator of S1 shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this condition. All measurements, records and data required to be maintained by the operator shall be retained for at least two (2) years following the date the data is recorded. [Basis: Regulation 1-523]
15. Upon final completion of the remediation project, the operator of S1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Regulation 2-1-403]

**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 1,000 ft of a school, which triggers the public notification requirements of Regulation 2-1-412. 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 of an Authority to Construct and/or a Permit to Operate for the following equipment:

**S-1 Portable Soil Vapor Extraction System**  
**Blower Make: Dekker, Model: VMX, Maximum 500 CFM**  
**Abated by A-1, Activated Carbon Vessels**

**A-1 Activated Carbon Vessels**  
**Minimum of Three (3) 1,000-LBS Activated Carbon Vessels Arranged in Series**  
**Make: CalClean, Model: DPS-500**

by 

August 31, 2022

Cameron Fee  
Air Quality Engineer I