

**DRAFT - Engineering Evaluation**  
**Ronald & Ann Williams Charitable Foundation**  
**855 El Camino Real, in the City of Palo Alto, Santa Clara, CA**  
**Plant No. 203304**  
**Application No. 687021**

**Background**

On behalf of Ronald & Ann Williams Charitable Foundation, IRC Environmental Consulting, LLC. has applied for an Authority to Construct/Permit to Operate the following equipment:

**S-1 Soil Vapor Extraction System**  
**Eurus, Model ZZ6M Blower, Maximum 365 CFM**  
**Abated by:**

**A-1 Two, 1,000-pounds granular activated carbon (GAC) vessels in series.**

The Site is the Palo Alto Town & Country Village Shopping Center located at 855 El Camino Real, in the City of Palo Alto, Santa Clara County, California. The Site consists of approximately 13 acres and is an occupied retail shopping center comprising six single-story retail buildings (and several second story offices) with a total of approximately 170,000 square feet. A previous dry cleaner, Meaders Cleaner, operated on the site between circa 1958 and 1965 and the main compound found in the soil was Tetrachloroethylene (PCE), expected emissions were based on laboratory results from samples taken at the site in November 2020. However, knowing that former dry cleaners often have soil contaminated with trichloroethylene (TCE), vinyl chloride, and vinylidene chloride (1,1-Dichloroethene) in addition to tetrachloroethylene, all these compounds were also considered to perform the Health Risk Assessment (HRA), in accordance with the BAAQMD TAC Emission Factor Guidelines. Further details are provided in the Toxic Risk Screening section of this document.

The main area of concern is primarily where the former dry cleaner operated, which is now a parking lot. PCE impacts soil, groundwater, soil-vapor and indoor air at the east end of Building 3 proximate to the source area.

To remediate the area, the facility has proposed to install a Soil Vapor Extraction (SVE) system equipped with a 365 CFM outflow blower abated by two 1000-lbs pound granulated activated carbon vessels.

Procedures are outlined in the conditions found below. 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. 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.

**Emission Calculations**

Initial soil vapor data 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)

- Toxic Air Contaminants (TAC) emissions will be based on soil vapor data submitted with this application.
- The organic flow rate of 365 cfm per two blowers as agreed upon by the applicant.
- The system will be abated by GAC vessels with an abatement efficiency of 90% by weight.

Table 1. SVE System Emissions for S-1						
Pollutant	CAS #	Unabated Emissions				
		Inlet Conc. (ug/m3)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
Tetrachloroethene (PCE)	127-18-4	2100	2.9E-03	6.9E-02	2.5E+01	0.013

**Notes:**

1. Influent data was obtained from the samples analyzed by IRC Environmental and included in the application submittal package.
2. It is assumed that equipment will operate 24 hours a day, 365 days a year.
3. Per Regulation 1-234 and 40 CFR 51.100(s)(1) Tetrachloroethylene (PCE) has been determined to have negligible photochemical reactivity and is considered a Non-Precursor Organic Compounds (NPOC).

Table 2. SVE System Emissions for S-1						
Pollutant	CAS #	Abated Emissions				
		Abatement Efficiency (%)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
Tetrachloroethene (PCE)	127-18-4	90%	2.9E-04	6.9E-03	2.5E+00	0.001

Table 3. Organic Emissions Review for S-1					
Pollutant	Effluent Volumetric Concentration (ppmv)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
POC	0.00	0.00	0.00	0.00	0.000
NPOC	3.16	2.9E-04	6.9E-03	2.51	0.001
Total VOC	3.16	2.9E-04	6.9E-03	2.51	0.001

**Notes:**

1. POC and NPOC emissions are based on Table 1 and 2. The effluent volumetric concentrations are measured as methane.
2. The total VOC effluent volumetric concentration will be used as guide for carbon breakthrough monitoring in the conditions.
3. Annual emissions will be rounded up and used as limit in the permit conditions to 2.51.
4. Total Effluent Volumetric Concentration will be used to monitor carbon breakthrough. Since 50% of the total effluent concentration is 1.58 ppmv, it will be rounded up to 2 ppmv to avoid issues with monitoring equipment.

**Cumulative Increase**

There aren't any other sources permitted within the facility. Cumulative increase accounts only for emissions in this application.

<b>Table 4. 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>
NO <sub>x</sub>	0.000	0.000	0.000
POC	0.000	0.001	0.001
CO	0.000	0.000	0.000
PM <sub>10/2.5</sub>	0.000	0.000	0.000
SO <sub>2</sub>	0.000	0.000	0.000

**Toxic Risk Screening**

The site is a former dry-cleaning facility; therefore, the soil is expected to be contaminated with TCE, vinyl chloride, and vinylidene chloride (1,1-Dichloroethene) in addition to PCE. All the other compounds different than PCE were not detected in the laboratory analysis performed to characterize the soil.

However, to be conservative to perform the Health Risk Assessment (HRA), 50% of the detection limit was assumed to calculate the emissions of the non-detected compounds that are expected to be found in a former dry cleaner. This assumption is based on the BAAQMD TAC Emission Factor Guidelines Document, Chapter 3.3 Source-Specific TAC Emission Factors.

The detection limit was taken from the laboratory analysis report performed by IRC Environmental provided by the applicant.

TCE, vinyl chloride, and vinylidene chloride (1,1-Dichloroethene) emissions are unabated. PCE emissions are 90% abated by weight.

At the given rates in Table 5 and 6, the emissions do not exceed the Acute or Chronic Trigger Levels in Regulation 2-5, Table 2-5-1. Consequently, the project is not subject to a refined Health Risk Assessment (HRA).

<b>Table 5. 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>
1,1-Ddichloroethene	75-35-4	3.3E-06	N/A	N/A
Trichloroethylene (TCE)	79-01-6	4.4E-06	N/A	N/A
Vinyl Chloride	75-01-4	2.1E-06	8.0E+01	No
Tetrachloroethylene (PCE)	127-18-4	2.9E-04	8.8E+00	No

<b>Table 6. 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>
1,1-Dichloroethene	75-35-4	2.9E-02	2.70E+03	No

Trichloroethylene (TCE)	79-01-6	3.9E-02	4.10E+01	No
Vinyl Chloride	75-01-4	1.9E-02	1.10E+00	No
Tetrachloroethylene (PCE)	127-18-4	2.5E+00	1.40E+01	YES

### **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 is not required.

### **California Environmental Quality Act (CEQA)**

The project is subject to California Environmental Quality Act (CEQA) review as set in Regulation 2-1-310. The lead agency is the Office of Planning and Research State Clearinghouse, Department of Toxic Substances Control Site Mitigation and Restoration Program and pursuant to the requirements of the CEQA State Guidelines, after the Initial Study, a Notice of Exemption was prepared in April 2019.

The Notice of Exemption states that the project is a minor action designed to prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of hazardous waste or substances. The project will not exceed \$1 million in cost and does not involve the onsite use of a hazardous waste incinerator or thermal treatment unit. Therefore, is exempt from CEQA under the California Code Categorical Exemption in Title 14, section §15330: Minor Actions to Prevent, Minimize, Stabilize, Mitigate or Eliminate the Release or Threat of Release of Hazardous Waste or Hazardous Substances. All relevant documents are included in this application.

This project complies with Regulation 2-1-426.2.6 and the application has been deemed complete for CEQA purposes.

### **Statement of Compliance**

Regulation 2-1-243 Public Notice. Prior to approving an application for an authority to construct or permit to operate, a public notice, fully describing the potential emissions, shall be prepared for the following cases:

- (i) A new or modified source located within 1000 feet of the outer boundary of a K-12 school site and which results in the increase in emissions of any substance into the ambient air which has been identified by the California Air Resources Board or the APCO as a toxic air contaminant or a hazardous air contaminant or which is on the list required to be prepared pursuant to subdivision (a) of Section 25532 or Section 44321 subsections(a) to (f) inclusive of the Health and Safety Code.

(ii) A new or modified source located within an Overburdened Community as defined in Section 2-1-243 and for which a Health Risk Assessment is required pursuant to Section 2-5-401

This project is not located within an Overburdened Community and triggered a Health Risk Assessment. However, the project is located within 1,000 feet from the K-12 school below, therefore, is subject to the Public Notice requirements.

-Palo Alto High School, 50 Embarcadero Road, Palo Alto, CA 94301-2321

Regulation 8-47-301, any soil vapor extraction operation which emits benzene, vinyl chloride, tetrachloroethene, methylene chloride, and/or trichloroethene shall be vented to a control device which reduces emissions to the atmosphere by at least 90 percent by weight. The facility has installed two GAC vessels to abate emissions with an efficiency that meets this section's requirement.

Regulation 8-47-501 Recordkeeping. The facility is required to keep the pertinent records per condition #100138 pursuant to Regulation 8-47-501.

Prevention of Significant Deterioration (PSD), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) do not apply to this project.

### **Permit Conditions**

#### **Permit Condition #TBD for S-1**

1. The influent vapor flow rate shall not exceed 365 scfm from the blower of S-1. [Basis: Cumulative Increase, Regulation 2-5].
2. The owner/operator shall abate the precursor organic compound (POC)/non-precursor organic compound (NPOC) emissions from the soil vapor extraction systems with the Activated Carbon Vessels (A-1) during all periods of operation as follows:

S-1 shall be abated by A-1, consisting of a minimum of two (2) 1000 lb activated carbon vessels in series.  
[Basis: Regulations 8-47-301 and 8-47-302 and Regulation 2-5].
3. In no event shall the rest of the toxic air contaminant (TAC) emissions to the atmosphere from S-1 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].
4. The owner/operator shall not emit from S-1 more than 2.51 pounds of precursor organic compounds (POC) and 2.51 pounds of non-precursor organic compounds (NPOC) per 12-month consecutive period. [Basis: Cumulative Increase]
5. Upon initial start-up, the owner/operator shall take air samples from S-1 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.  
[Basis: Regulation 2-1-403, Regulation 8-47-301].

6. 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 S-1. The owner/operator shall submit the laboratory report and calculated TAC emissions within 21 days of the initial startup, to demonstrate compliance with Parts 1, 3, and 4 of this condition. [Basis: Regulation 2-1-403, Regulation 2-5].
7. During operation of A-1, 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 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 1 through 6 of this condition and shall be conducted on a daily basis.
  - a. If the owner/operator can demonstrate one (1) month of consecutive daily monitoring readings where the sum of monitoring results of S-1 is lower than 2 ppmv, measured as methane, 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 of S-1 is lower than 2 ppmv, measured as methane, 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 where the monitoring results of S-1 is lower than 2 ppmv, measured as methane, the monitoring frequency may be reduced to monthly.

If any subsequent results from monitoring where the sum of monitoring results of S-1 exceed 2 ppmv, measured as methane, 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 9(a) through (c) of this condition.

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

9. The owner/operator 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. Total throughput of soil vapor from source S-1 in standard cubic feet.

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]

10. The owner/operator 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]
11. 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 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]
12. Upon final completion of the remediation project, the operator shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Regulation 2-1-403]

### *End of Conditions*

#### **Recommendation**

The Air 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 feet of a K-12 school which triggers the public notification requirements of Regulation 2-1-412. After the comments are received from the public and reviewed, the Air District will make a final determination on the permit.

I recommend that the Air 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 Soil Vapor Extraction System**  
**Eurus, Model ZZ6M Blower, Maximum 365 CFM**  
**Abated by:**
- A-1 Two, 1,000-pound granular activated carbon (GAC) vessels in series.**

By Isis Virrueta, AQ Engineer I  
October 2023