DRAFT Engineering Evaluation
Circraft, Inc.
519 Marine View Avenue, Belmont, CA 94002
Plant No. 203162
Application No. 680752
Project Description: Soil Vapor Extraction System

Background
RMD Environmental Solutions, Inc., (RMD) on behalf of DeBenedetti Investment Associates, the property owner, has applied for an Authority to Construct for the following equipment:

S-1 Soil Vapor Extraction System
Travaini TR0250H Blower, Maximum 250 CFM
Abated by:

A-1 Two 1000 lbs vapor-phase granulated activated carbon (GAC) vessels in series.

S-1 will operate to remediate the parcels at 517, 519, 521, 550 and 579 Marine View Avenue, Belmont, CA. This is not considered an Overburdened Community (OBC).

The applicant has proposed to use the Soil Vapor Extraction (SVE) System to actively remediate chlorinated solvent contamination of soil and groundwater. A mobile vapor extraction unit will operate to extract vapors utilizing the PVC pipes. The system will include one vacuum blower operating at a maximum capacity of 250 CFM that will connect to two 1000 pounds vapor-phase granulated activated carbon (GAC) vessels connected in series that will exhaust to the atmosphere. The GAC vessels will abate emissions with an efficiency of 90% by weight. The emission point and abatement device are stationary.

VOC expected emissions were based on laboratory results from samples taken at the site.

The applicant will be required to provide written notification at the start of the operation and to stay below the acute and chronic trigger levels of Regulation 2-5. Procedures are outlined in the permit conditions 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.

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^{O}C; 1 mole occupies 24.15 Liters (or 386.8 ft3/lb-mol)
- Toxic Air Contaminants (TAC) emissions will be based on soil vapor data submitted with this application. The data was reported by Pace Analytical in September 2021.
- The organic flow rate of 250 cfm per two blowers as agreed upon by the applicant.
- The system will be abated by GAC vessels with an 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)
trans 1,2-dichloroethene	156-60-5	730	6.8E-04	1.6E-02	5.98	0.003
Trichloroethylene (TCE)	79-01-6	3600	3.4E-03	8.1E-02	29.50	0.015
cis 1,2-dichloroethene	156-59-2	6800	6.4E-03	1.5E-01	55.73	0.028
Tetrachloroethylene (PCE)	127-18-4	11000	1.0E-02	2.5E-01	90.15	0.045
Benzene	71-43-2	8.31	7.8E-06	1.9E-04	0.07	0.000
Ethylbenzene	100-41-4	70.2	6.6E-05	1.6E-03	0.58	0.000
Toluene	108-88-3	30.1	2.8E-05	6.8E-04	0.25	0.000
Xylene (total)	1330-20-7	216.3	2.0E-04	4.9E-03	1.77	0.001
Chloroform	67-66-3	24.2	2.3E-05	5.4E-04	0.20	0.000

Notes:
1. Influent data was obtained from the submittal package for this application, Table 1.
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), PCE and trans1,2-dichloroethene have been determined to have negligible photochemical reactivity and are considered 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)
trans 1,2-dichloroethene	156-60-5	90%	6.8E-05	1.6E-03	0.60	0.000
Trichloroethylene (TCE)	79-01-6	90%	3.4E-04	8.1E-03	2.95	0.001
cis 1,2-dichloroethene	156-59-2	90%	6.4E-04	1.5E-02	5.57	0.003
Tetrachloroethylene (PCE)	127-18-4	90%	1.0E-03	2.5E-02	9.02	0.005
Benzene	71-43-2	90%	7.8E-07	1.9E-05	0.01	0.000
Ethylbenzene	100-41-4	90%	6.6E-06	1.6E-04	0.06	0.000
Toluene	108-88-3	90%	2.8E-06	6.8E-05	0.02	0.000
Xylene (total)	1330-20-7	90%	2.0E-05	4.9E-04	0.18	0.000
Chloroform	67-66-3	90%	2.3E-06	5.4E-05	0.02	0.000

Notes:
1. Abatement efficiency of 90% by weight from A-1.

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	1.6	1.0E-03	2.4E-02	8.85	0.004
NPOC	1.8	1.1E-03	2.6E-02	9.65	0.005
Total VOC	3.4	2.1E-03	5.0E-02	18.50	0.009

Notes:
1. POC and NPOC emissions are based on Table 2. The effluent volumetric concentrations are measured as methane.

2. Annual emissions will be rounded up and used as limit in the permit conditions as follows: POC 8.85 lb/yr, NPOC 9.65 lb/yr.

Cumulative Increase

Emissions from this application include only POCs. Cumulative Increase is calculated considering 8760 hours per year for S-1.

Table 4. Cumulative Increase

Pollutant	Current Permitted Emissions, Post 4/5/1991 (ton/yr)	Application New Emissions Increase (ton/yr)	New Cumulative Increase (ton/yr)
NOx	0.000	0.000	0.000
POC	0.000	0.004	0.004
CO	0.000	0.000	0.000
$PM_{10/2.5}$	0.000	0.000	0.000
SO_2	0.000	0.000	0.000

Toxic Risk Screening

At the given rates in Table 5 and 6 below, emissions for all Toxic Air Contaminants (TAC) are below the Acute and Chronic Trigger Levels in Regulation 2-5, Table 2-5-1. Therefore, a Health Risk Assessment is not required.

The facility will be required to stay below the aforementioned limits throughout the operation of the project.

Table 5. Project Acute Emissions Review - Regulation 2-5

Pollutant	CAS #	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Exceeds Acute Trigger Level?
Trichloroethylene (TCE)	79-01-6	3.4E-04	N/A	N/A
Tetrachloroethylene (PCE)	127-18-4	1.0E-03	8.8E+00	No
Benzene	71-43-2	7.8E-07	1.2E-02	No
Toluene	108-88-3	2.8E-06	2.2E+00	No
Xylene (total)	1330-20-7	2.0E-05	9.7E+00	No
Chloroform	67-66-3	2.3E-06	6.6E-02	No
Ethylbenzene	100-41-4	6.6E-06	N/A	N/A

Table 6. Project Chronic Emissions Review - Regulation 2-5

Pollutant	CAS #	Annual Emission Rate (lb/yr)	Chronic Trigger Level (lb/yr)	Exceeds Chronic Trigger Level?
Trichloroethylene (TCE)	79-01-6	3.0E+00	4.10E+01	No
Tetrachloroethylene (PCE)	127-18-4	9.0E+00	1.40E+01	No
Benzene	71-43-2	6.8E-03	2.90E+00	No
Toluene	108-88-3	2.5E-02	1.60E+04	No
Xylene (total)	1330-20-7	1.8E-01	2.70E+04	No
Chloroform	67-66-3	2.0E-02	1.50E+01	No
Ethylbenzene	100-41-4	5.8E-02	3.30E+01	No

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_X). 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_{10}, $PM_{2.5}$, or sulfur dioxide (SO_2).

The facility is not expected to have a PTE greater than 10 tons per year of POC or NO_X, nor is the facility a major facility of PM_{10}, $PM_{2.5}$, and SO_2. 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_x), carbon monoxide (CO), sulfur dioxides (SO_2), particulate matter less than 10 micrometer (PM_{10}) and particulate matter less than 2.5 micrometer ($PM_{2.5}$). 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)

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.

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 schools below, therefore, is subject to the Public Notice requirements.

Schools:
Central Elementary School, 525 Middle Rd, Belmont, CA 94002
Nesbit School, 500 Biddulph Way, Belmont, CA 94002

Regulation 2-5 New Source Review of Toxics Air Contaminants. The source is not expected to exceed any acute or chronic trigger levels in regulation 2-5, Table 1, therefore a refined HRA is not required and the operator will be required to keep emissions under the aforementioned limits at all times, according to permit condition below.

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 is operating the SVE along with two 1000 lbs vapor-phase granulated activated carbon (GAC) vessels in series with an efficiency of 90% by weight.

Regulation 8-47-501 Recordkeeping. The facility is required to keep the pertinent records per condition below 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 #100132 for S-1

1. The influent vapor flow rate shall not exceed 250 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 total 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 8.85 pounds of precursor organic compounds (POC) and 9.65 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 1.7 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 1.7 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 1.7 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 1.7 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 8(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 the preliminary determination that the project is expected to comply with all applicable requirements of the 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 initiates 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
Travaini TR0250H Blower, Maximum 250 CFM
Abated by:

A-1 Two 1000 lbs vapor-phase granulated activated carbon (GAC) vessels in series.

By Isis Virrueta, AQE I
June 2023