

DRAFT
Engineering Evaluation
C&C Property Management
Plant No. 23645; Application No. 28118

345 12th Street, Oakland, CA 94607

Terraphase Engineering, Inc. has applied for an Authority to Construct and Permit to Operate for the following equipment on behalf of C&C Property Management:

**S-1 Sub Slab Depressurization System (SSDS) – 200 scfm vacuum blower abated by
A-1 SSD Abatement System: Carbon Adsorption – three (1,000 lbs minimum capacity) Activated
Carbon Vessels connected in series**

Background

Terraphase Engineering, Inc. has applied for an Authority to Construct for a Soil Vapor Extraction Unit located at 345 12th Street in Oakland. Sub Slab Depressurization (SSD) will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 200 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. The proposed carbon adsorption system will consist of three 1,000 pound capacity activated carbon vessels connected in series.

The Department of Toxic Substances Control (DTSC) ordered the evacuation of the Downtown Charter Academy, which serves 300 students, until C&C Property Management reduces the indoor air levels of trichloroethene (TCE) to 2 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The 2016-2017 academic year is scheduled to begin on August 24, 2016. The staff members need to return to the school at the beginning of August for school preparation. Due to this emergency situation with time constraint, C&C Property Management signed an enforcement agreement on July 27, 2016 with the District for a sub slab depressurization system at the site to capture the TCE and other vapors and to abate them with carbon adsorption in order to prevent their release into the air. This enforcement agreement has more stringent permit conditions than the standard conditions for SSDS and will expire no later than December 31, 2016. Since C&C Property Management started up the SSDS on July 27, 2016, the TCE vapor levels are reduced sufficiently. If a permit to operate is issued, the enforcement agreement will end, and the facility will operate using standard conditions. The District has evaluated the lab results on August 16, 2016, TCE vapor levels are low, bi-weekly monitoring will be granted.

Emission Calculations

S-1 Sub Slab Depressurization System – 200 scfm vacuum blowers

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. The calculation below will discuss only Trichloroethylene (TCE), which is the compound of greatest concern. Generalized assumptions follow:

- * Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21^oC; 1 mole occupies 24.15L
- * Molecular weight of Trichloroethylene (TCE) = 131.4 g/mole
- * Influent values based on operational parameters of equipment and applicant supplied soil vapor test results [Based on the worst case scenario in February 2016]: influent rate 200 scfm throughout; maximum influent concentration = 296 ppmv Trichloroethylene (TCE); control efficiency = 99.5% throughout for TCE.

Emissions of Toxic Air Contaminants (TCE):

$$296\text{E-6} * \frac{200 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{131.4\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.995) = \mathbf{0.144 \text{ lb/day}} \text{ (abated)}$$

Various other toxic air contaminants and other organic compounds are present and will also be controlled. For these compounds, a detailed emission calculation spreadsheet is enclosed in Appendix A.

The TCE vapor levels have dropped so the influent concentration is now at 7.2 ppmv on 8/1/2016:

$$7.2 \text{ E-6} * \frac{200 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{131.4\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.995) = \mathbf{0.004 \text{ lb/day}} \text{ (abated)}$$

Toxics

Based on the pilot test soil vapor concentration data, the toxic air contaminants (TAC) emissions from this source are not expected to exceed any of the trigger levels identified in Regulation 2-5, Table 2-5-1. Therefore, the emissions of TACs are not considered sufficient to warrant a health risk screening analysis and health risks are expected to be insignificant.

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.

California Environmental Quality Act (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 and NPOC emissions will be vented through a carbon adsorption system at all times of operation.

This source is located at the site of Oakland Charter High School. In addition, this source is located within 1,000 feet of various schools: American Indian Public Charter School I & II located at 171 12th Street, Oakland, CA 94607, Lincoln Elementary School located at 225 11th Street, Oakland, CA 94607, Oakland Charter High School located at 345 12th Street, Oakland, CA 94607, and Envision Academy of Arts & Technology located at 1515 Webster Street, Oakland, CA 94612; therefore, this application requires Public Notification per District's Regulation 2-1-412. A Public Notice was prepared and will be sent out to home address of the students of the school and to each address within a radius of 1,000 feet of the source.

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. After the comments are received 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 for the following source:

**S-1 Sub Slab Depressurization System (SSDS) – 200 scfm vacuum blower abated by
A-1 SSD Abatement System: Carbon Adsorption – three (1,000 lbs minimum capacity) Activated
Carbon Vessels connected in series**

Conditions:

1. The owner/operator shall vent Source S-1 at all times to Abatement device A-1, at least three (1,000 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 200 scfm. In no event shall the Toxic Air Contaminants (TACs) emissions to the atmosphere exceed the respective chronic trigger levels in District's Regulation 2-5, Table 2-5-1. In no event shall the owner/operator emit Trichloroethylene to the atmosphere exceeding 0.148 pounds per day. 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 capacity of the activated carbon vessels 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 capacity of the carbon vessels.

[Basis: Cumulative Increase, Regulation 2-5]

2. The owner/operator of this source shall monitor with a photo-ionization detector (PID), 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.

[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 owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with part 4 and 5, and shall be conducted on a bi-weekly 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 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 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