DRAFT
Engineering Evaluation
Thomas J. Murphy Trust
Plant No. 21567; Application No. 24850

Background

On behalf of Thomas J. Murphy Trust, TPS Tech America has applied for an Authority to Construct for a Soil Vapor Extraction Unit located at 707 Arguello Street in Redwood City. Soil vapor extraction (SVE) will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 65 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 (Carbon). The Carbon adsorption system will consist of at least two (200 lb minimum capacity) activated carbon vessels connected in series.

The applicant will be conditioned to provide written notification at the start of operation. The carbon unit influent and effluent VOC concentrations will be monitored with a portable flame-ionization detector (OVA-FID) on a schedule reflecting current loading rates and predicted Carbon capacity. To ensure proper operation of equipment and verify attainment of steady-state conditions, Carbon performance will be monitored daily for the first five days TPS Tech America may then elect to change their monitoring schedule based on measured influent concentrations and calculated carbon loading. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

This source is located within 1,000 feet of the outer boundary of Orion Alternative School and Sequoia High School; as such this application requires Public Notification via Regulation 2-1-412. A Public Notice was prepared and sent out to the home address of the students of the schools and to each address within a radius of 1,000 feet of the source.

Emission Calculations

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. Generalized assumptions follow:

* Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21^{O}C; 1 mole occupies 24.15L
* Molecular weight of Tetrachloroethylene (PCE) = 165.83 g/mole and Trichloroethylene (TCE) = 131.4 g/mol
* Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate 65 scfm throughout; maximum influent concentration = 122 ppmv tetrachloroethylene (PCE), and 49.4 ppmv Trichloroethylene (TCE); destruction efficiency = 99.0% throughout.

Emissions of Toxic Air Contaminants (Tetrachloroethylene):

$$122E\text{-}6 * \frac{65\ ft^3}{min} * \frac{1440\ min}{1\ day} * \frac{28.32L}{1\ ft^3} * \frac{1\ mole}{24.15L} * \frac{165.83g}{mole} * \frac{1\ lb}{454g} * (1 - 0.99) = \mathbf{0.049\ lb/day}\ \text{(abated)}$$

Emissions of Toxic Air Contaminants (Trichloroethylene):

$$49.4E\text{-}6 * \frac{65\ ft^3}{min} * \frac{1440\ min}{1\ day} * \frac{28.32L}{1\ ft^3} * \frac{1\ mole}{24.15L} * \frac{131.4g}{mole} * \frac{1\ lb}{454g} * (1 - 0.99) = \mathbf{0.016\ lb/day}\ \text{(abated)}$$

[Enclosed with detailed emission calculation spreadsheet]

Highest Daily Emissions	**=**	***0.049 lb/day***
Annual Average	**=**	***0.049 lb/day***
RFP	**=**	***0.009 tons/yr***

Toxics

This facility would keep Tetrachloroethylene (PCE) and Trichloroethylene (TCE) emissions below the trigger levels listed in Regulation 2-5, Table 2-5-1. Therefore the emissions of toxic substances PCE and TCE are not considered sufficient to warrant a Risk Screen Analysis. PCE trigger = 0.049 lb/ day and TCE trigger = 0.148 lb/day. In accordance with the District's Regulation 2-5, the impact is then insignificant since this risk is within the threshold of 10 in a million as required for sources implementing TBACT; therefore, the District has recommended the issuing of this A/C with a Tetrachloroethylene (PCE) and Trichloroethylene (TCE) emission limit of 0.049 lb/day and 0.148 lb/day respectively.

New Source Review

This proposed project will emit over 10 lbs per highest day and is therefore 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.

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 NPOC emissions will be vented through a Carbon adsorption system at all times of operation.

Conditions:

1. The owner/operator shall vent Source S-1 at all times to Abatement device A-1, at least two (200 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 65 scfm. In no event shall Tetrachloroethylene (PCE) and Trichloroethylene (TCE) emissions to the atmosphere exceed 0.049 pounds per day and 0.148 pounds per day for S-1 respectively. [Basis: Cumulative Increase, Regulation 2-5]

2. 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 Air Pollution Control Officer 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]

3. The owner/operator shall record these monitor readings in a monitoring log at the time they are taken. The monitoring results shall be used to estimate the frequency of carbon change-out necessary to maintain compliance with part 4 and 5, 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 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 Permit Services 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 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:

   a. 10 % of the inlet stream concentration to the Carbon vessel.
   b. 10 ppmv or greater (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. Days and hours of operation.
   b. Each monitor reading or analysis result for the day of operation they are taken.
   c. The number of carbon beds 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 Director of 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]

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 2-1-412.6. 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: Soil Vapor Extraction System consisting of a 65 max scfm vacuum blower, and ancillary equipment, abated by A-1, at least two (200 lb minimum capacity) Carbon Adsorption Vessels arranged in series.

by_____date_____

Flora Chan
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