

DRAFT
Engineering Evaluation
Integral Engineering Services, Inc.

Plant No. 20512
Application No. 22812

Background

Integral Engineering Services, Inc. has applied for an authority to construct for a portable soil vapor extraction unit. This portable soil vapor extraction will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum capacity of 250 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). These will be applied according to equipment availability. The Carbon adsorption system will consist of two 200 pound 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. Integral Engineering Services, Inc. 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.

In accordance with Regulation 2-1-413, the District may issue “a single portable permit which will allow the source to operate anywhere in the District, provided the APCO approves the permit, and the source meets the definition of portable equipment set forth in Section 2-1-220.”

Operating conditions will be worded to ensure that the requirements, and any expressed emission limits of that section are satisfied, through proper notification, source testing and recordkeeping practices. Regarding emission limits, those of primary concern are the 10 tons per year limit for criteria pollutants, as well as the emission rates corresponding to the acceptable risk level as per Regulation 2-5.

For Portable Equipment per Regulation 2-1-220.4: “The equipment is not operated within 1000 feet of the outer boundary of any K-12 school site, unless the applicable notice requirements of Health and Safety Code Section 42301.6 have been met.”

This first remediation site is located within 1,000 feet of the outer boundary of Pearl Zanker Elementary School, and as such this application requires Public Notification via Reg. 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°C; 1 mole occupies 24.15L
- * Molecular weight of TPHg = 100 g/mole (value for "weathered gasoline"). Molecular weight of Benzene = 78 g/mole.
- * Influent values based on operational parameters of equipment: influent rate = 250 scfm (maximum); maximum influent concentration = 5350 ppmv POC, 80.25 ppmv benzene (assuming benzene is 1.5% of TPHg concentration); destruction efficiency = 99% for throughout.

Emissions of Precursor Organics:

$$5350E-6 * \frac{250 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{100 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{4.975 \#/\text{day}}$$
 (abated)

Emissions of Toxic Air Contaminants {benzene}:

$$80.25E-6 * \frac{250 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{78 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{5.8E-2 \#/\text{day}}$$
 (abated)

<i>Highest Daily Emissions</i>	=	4.975 lb/day
Annual Average	=	4.975 lb/day
RFP	=	0.908 tons/yr

Toxics

A Toxic Risk Screen need not be prepared as the applicant has agreed to monitor emissions of benzene and determined the cumulative annual emissions. Annual emissions are conditioned to the toxic trigger level of 6.4 pounds. Highest daily emissions are limited to 0.25 pounds per day. The equipment will most likely be operated at one location for only a short duration so this annual limit should not be difficult to meet. In accordance the District Regulation 2-5, the impact is then insignificant as emissions do not trigger a risk screen; therefore the Toxics Section has recommended the issuing of this A/C with a daily benzene emission limit of **0.25 #/day**, and annual limit of **3.8 #/year**.

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 POC. 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, The benzene emissions shall be vented to carbon adsorption system at all times of operation.

Recommendation

Recommend that a conditional Authority to Construct be issued for sources:

- S-1: Soil Vapor Extraction System consisting of a 250 max scfm vacuum blower, and ancillary equipment, abated by A-1, at least two (200 lb minimum capacity) Carbon Adsorption Vessels arranged in series.

Conditions:

Application 22812; Plant 20512

Integral Engineering Services, Inc. Source-1, Soil Vapor Extraction System

1. The operator of this source shall notify the District at least 3 days prior to start-up of operation at any new location. The notification shall include:
 - a. Application Number (22812) & Plant Number (20512).
 - 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-12 school, or indication that the distance is greater than 1500 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 Permit Services Division. If the start-up is delayed more than 5 days, written notification must be resubmitted.
2. The owner/operator shall not operate S-1 Portable SVE system for longer than 120 hours within 1000 feet of a school. To operate for longer than 120 hours, the Permit Holder must submit an application to the District so that proper notification of your intended operation can be made known to the affected public in advance of any continued usage of the equipment. [Basis: Regulation 2-1-412]
3. This equipment shall not remain at any single location for a period in excess of 12 consecutive months, following the date of initial operation except as allowed under Section 2-1-220.10. If this portable equipment remains at any fixed location for more than 12 months, the portable permit will automatically revert to a conventional permanent location permit and will lose its portability.
4. This portable equipment, S-1, shall operate at all times in conformance with the eligibility requirements set forth in Regulation 2-1-220 for portable equipment.
5. This equipment is not to be operated within 1000 feet of the outer boundary of any K-12 school. Such operation will require the submittal of an application for a revised permit to operate so that the applicable requirements of the California Health and Safety Code Section 42301.6 may be met. These notification requirements have been satisfied for operation at the 1787 S. Main Street in Milpitas, California 95035.
6. Precursor Organic Compound (POC) emissions from Source S-1 shall be abated by Abatement device A-1, Carbon Adsorption, during all periods of operation. Soil vapor flow rate shall not exceed 250 scfm. In no event shall benzene emissions to the atmosphere exceed 0.25 pounds per day. Annual emission of benzene shall not exceed 3.8 pounds per year.
7. During operation of the Activated Carbon Vessels, the operator of this source shall monitor with a photo-ionization detector (PID), 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 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.

8. These monitor readings shall be recorded 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 conditions number 9 and 10, and shall be conducted on a daily basis. The operator of this source may propose for District review, based on actual measurements taken at the site during operation of the source, that the 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 operator prior to a change to the monitoring schedule.
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 hexane).
10. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv or greater (measured as hexane).
11. The operator of this source shall maintain the following information for each month of operation of the Activated Carbon Vessels:
 - 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 two years following the date the data is recorded. [basis: Reg.523]
12. Within 30 days after the end of every calendar year, the operator of this source shall provide the assigned Plant Engineer in the Permit Services 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 quarters (indicated in cubic feet).
 - c. The total benzene emissions for the previous four quarters (indicated in pounds).
13. The 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 conditional Permit to Operate. All measurements, records and data required to be maintained by the operator shall be retained for at least two years following the date the data is recorded.
14. Any non-compliance with these conditions shall be reported to the Compliance and Enforcement Division at the time that it is first discovered. The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well as the time of occurrence.

by _____ date _____

Flora Chan
Air Quality Engineer