

**Engineering Evaluation**  
**Former Unocal Bulk Plant # 0519; Plant Number 14660**  
**Application Number 5796**

***Background***

On behalf of the property owner, Environmental Resolutions, Inc. (ERI) is applying for an AC/PO for equipment necessary for soil remediation at the site of a former bulk plant, located at 2921 Jefferson Street in Napa. Soil vapor extraction will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 100 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 system will consist of at least two 200 pound 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. ERI 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 McPherson Elementary School, and as such this application requires Public Notification via Reg. 2-1-412. Napa High School is within ¼ mile of the source. As part of the Public Notification process, a Toxic Risk Screen was performed to determine the cancer risk to the students of the school as well as the residents in the surrounding area. A Public Notice was prepared and will be sent out to the home address of the students of the school and to each address within a radius of 1,000 feet of the source. Copies of the Risk Screening Analysis report, and the Public Notice will be sent to the Principals of McPherson Elementary and Napa High Schools as well as the reference librarian of the nearest Public Library. They will be retained on file for 50 days. A phone line will be set-up at the district to receive public comments and five were received.

Attached to this report are copies of the Public Notice, Risk Screen Analysis report, and a summary of the Public comments received. The total cost of the Public Notification amounted to \$. This amount (did not) exceed(ed) the \$900.00 Public Notice fee. All fees including the standard AC/PO fees of \$1,825.00 have been paid.

***Emission Calculations***

For a conservative estimate of yearly emissions, we shall assume that the system is operated for an entire year with an inlet concentration corresponding to the initial soil vapor concentration level. Generalized assumptions follow:

- \* Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 l.
- \* Molecular weight of TPHg = 100 g/mole (value for "weathered gasoline"). Molecular weight of Benzene = 87 g/mole.
- \* Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate = 100 scfm throughout; maximum influent concentration = 1,000 ppmv VOC; 20 ppmv benzene; destruction efficiency = 99% throughout (90% per carbon vessel or 99% aggregate).

**Emissions of Precursor Organics:**

$$1,000E-6 * \frac{100 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{100 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{0.37 \#/\text{day}}$$
 (abated)

**Emissions of Toxic Compounds (benzene):**

$$20E-6 * \frac{100 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{87 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{6.4E-3 \#/\text{day}}$$
 (abated)

<b>Highest Daily Emissions</b>	=	<b>0.37 #/day</b>
<b>Annual Average</b>	=	<b>0.37 #/day</b>
<b>RFP</b>	=	<b>6.8E-2 t/yr</b>

**Toxics**

A Toxic Risk Screen was performed for this application to determine the risk to the maximally exposed receptor as well as that to the students of the school. The ISCST3 air dispersion model was used to estimate the pollutant concentrations in the area surrounding the site for a unit emission rate. By applying unit risk factors (taken from CAPCOA guidelines), a linear relationship between emissions and risk was established. It was determined that a benzene emission rate of 0.0064 pounds per day corresponded to a risk of 0.28 in a million to the maximally exposed receptor. This emission rate would result in a maximum risk of 1.7E-10 to the students of McPherson Elementary School, and 1.1E-9 to the students of Napa High School. In accordance with the Toxic Section Risk Management Policy, the impact is then insignificant since this risk is no more than 10 in a million; therefore, the Toxics Section has recommended the issuing of this Authority to Construct.

**New Source Review**

This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT. Nevertheless it will be achieved in practice. For Soil Vapor Extraction operations, BACT is defined as attainment of set destruction efficiencies corresponding to set influent concentration values. Operation of the carbon vessels will be conditioned to ensure attainment of an outlet concentration not to exceed 10 ppmv POC.

**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.

**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 emissions will be vented through a carbon adsorption system at all times of operation. The application triggered Public Notification as required by Regulation 2-1-412. Public Notification was performed by the District and CETI was invoiced for the services required. Fees in the amount of \$ (including the standard A/C and P/O fees) have been paid in full.

**Recommendation**

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

- S-1: Soil Vapor Extraction System consisting of a 100 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***

1. Source S-1 shall be vented at all times to A-1, at least two (200 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 100 scfm.
2. 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 purpose of these permit conditions.

3. 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 4 and 5, 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 Permit Services Division must be received by the operator prior to a change to the monitoring schedule.
4. The second to last Carbon vessel shall be immediately changed out 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 (measured as C<sub>6</sub>).
5. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv (measured as C<sub>6</sub>). In no event shall Benzene emissions to the atmosphere exceed 0.020 pounds per day.
6. The operator of this source shall maintain the following records for each month of operation of the source:
  - a. The hours and times 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.

All measurements, records and data required to be maintained by the operator shall be retained and made available for inspection by the District for at least two years following the date the data is recorded.

7. Any non-compliance of 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.**

8. Upon final completion of the remediation project, the operator of Source S-1 shall notify the Permit Services Division within two weeks of decommissioning the operation.

by \_\_\_\_\_ date \_\_\_\_\_

Robert E. Cave  
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