

**Engineering Evaluation
Atlantic Richfield Company; Plant Number 15094
Application Number 6742**

Background

On behalf of Atlantic Richfield Company, SLR International Corporation (SLR) is applying for an AC/PO for equipment necessary for soil and groundwater remediation at a site located at 3010 Union Avenue in San Jose. Remediation activities include both a Groundwater Treatment System (GTS) and Soil Vapor Extraction System (SVES). SVE will be accomplished by means of a liquid ring pump (S-1) with a maximum operating capacity of 375 scfm. The vacuum unit is also equipped with a water knockout vessel, inlet filter, dilution air valve, recirculation valve, and flow indicators. The GTS will consist of an airstripper (S-2) operating at a liquid flow rate of 40 gallons per minute. The vapor stream from the GTS will be ducted to that for the SVES.

Vapor abatement for the two sources will be achieved by carbon adsorption (carbon). The carbon system will consist of two 3000 pound capacity activated carbon vessels connected in series. Permit conditions will specify that the capacity of the carbon vessels be no less than 200 pounds. 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. SLR 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 the New Covenant Christian Center 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. Copies of the Risk Screening Analysis report, and the Public Notice were sent to the Principal of the schools and posted on the District Website. A phone line was set-up at the district to receive public comments and ?? 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 \$???.00. This amount exceeded the \$914.00 Public Notice fee. All fees including the standard AC/PO fees of \$4,828.00 have been paid.

Emission Calculations

S-1: Soil Vapor Extraction System

Assumptions:

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 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 = 78 g/mole.
- * Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate = 375 scfm throughout; maximum influent concentration = 2500 ppmv POC, 74 ppmv Benzene; abatement efficiency = 90% per vessel or 99% aggregate.

Emissions of Precursor Organics (S-1):

$$2500E-6 * \frac{375 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{100 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = \mathbf{3.49 \#/\text{day}} \text{ (abated)}$$

Emissions of Toxic Air Contaminants {benzene} (S-1):

$$74E-6 * \frac{375 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32 \text{ l}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15 \text{ l}} * \frac{78 \text{ g}}{\text{mole}} * \frac{1 \#}{454 \text{ g}} * (1 - 0.99) = 8.0E-2 \text{ \#/day (abated)}$$

S-2: Ground Water Treatment System

Assumptions:

- * Contaminant concentrations in ground water: 12 ppmw POC, 0.46 ppmw benzene (based on groundwater sampling conducted by SLR in May of 2003).
- * Emission factors based on manufacturer guarantees. Limiting factor is the pump capacity of 40 gal/min. Liquid phase hydrocarbon removal efficiency of stripper = 100%. Liquid flow rate = 40 gal/min. Carbon abatement efficiency = 90% per vessel or 99% aggregate.

Emissions of Precursor Organics (S-2):

$$12E-6 * \frac{40 \text{ gal}}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{8.337 \#}{1 \text{ gal}} * (1.0) * (1 - 0.99) = 5.8E-2 \text{ \#/day (abated)}$$

Emissions of Toxic Air Contaminants {benzene} (S-2):

$$0.46E-6 * \frac{40 \text{ gal}}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{8.337 \#}{1 \text{ gal}} * (1.0) * (1 - 0.99) = 2.2E-3 \text{ \#/day (abated)}$$

Combined Emissions of Precursor Organics:

Highest Daily Emissions	=	3.55 \#/day
Annual Average	=	3.55 \#/day
RFP	=	0.65 t/yr

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 an emission rate of 0.082 pounds per day corresponded to a risk of 7.4 in a million to the maximally exposed receptor. This emission rate would result in maximum risks of 5.0E-8, to the students of New Covenant Christian Center. 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 P/O with standard conditions for carbon adsorption vessels.

New Source Review

This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT; however, 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 that the POC concentration at the outlet of the last vessel is never more than 10 ppmv. Offsets need not be imposed as annual emissions will not exceed 15 tons.

CEQA

The project is considered to be ministerial under the District's 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 Thermal Oxidizer, Catalytic Oxidizer, or 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 SLR was invoiced for the services required. Fees in the amount of \$???.00 (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 sources:

- S-1: Soil Vapor Extraction System consisting of a 375 max scfm liquid ring pump, and ancillary equipment, abated by A-1, Carbon Adsorption System, consisting of two (200 lb minimum capacity) Carbon Adsorption Vessels arranged in series.
- S-2: Groundwater Treatment System consisting of a 40 gpm max capacity Air Stripper, and ancillary equipment, abated by A-2, Carbon Adsorption System, consisting of two (200 lb minimum capacity) Carbon Adsorption Vessels arranged in series.

Conditions

S-1:

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. Emissions shall enter the atmosphere from a point no less than 15 feet above grade. Soil vapor flow shall not exceed 375 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 C₆).
5. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv (measured as C₆).
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 exceedance of conditions number 4 and/or 5 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.

S-2:

1. Source S-2 shall be vented at all times to A-2, at least two (200 lb minimum capacity) activated carbon vessels arranged in series. Emissions shall enter the atmosphere from a point no less than 15 feet above grade. Groundwater flow rate from S-2 shall not exceed 40 gpm.
2. For each of the first three days of operation of the S-2, at least one influent groundwater sample shall be collected and analyzed. At least one sample shall be collected and analyzed thereafter for each calendar month of operation. Samples shall be collected in accordance with the Regional Water Quality Control Board's analytical methods.
3. 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.

4. 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.

5. 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 C₆).
6. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv (measured as C₆).
7. 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.

8. Any noncompliance 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.**
9. Upon final completion of the remediation project, the operator of Source S-2 shall notify the Permit Services Division within two weeks of decommissioning the operation.

by _____ date _____

Robert E. Cave
Air Quality Engineer II