

**Engineering Evaluation
Aspire Public Schools
Plant # 19464
Application Number 19564**

DRAFT

Background

On behalf of Aspire Public Schools, LFR Inc. has applied for an A/C for equipment necessary for soil remediation at the site located at 1009 66th Avenue in Oakland, CA. Treatment will consist of a Soil Vapor Extraction (SVE) system and an ozone generator which will inject ozone into the vadoze zone to assist in breaking down the TPHs (organics) in the soil to carbon dioxide and water. Emissions from the exhaust point are made up of the following compounds residual ozone, oxygen, carbon dioxide and organics. The SVE system includes a 225 CFM liquid ring blower to extract soil vapor from the subsurface. Vapor abatement will be achieved by means of two 300 pounds of carbon vessels connected in series.

This source is located within 1,000 feet of the outer boundary of Acts Christian Academy, 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 school and to each address within a radius of 1,000 feet of the source. This Evaluation Report is posted on the District Webpage along with the Public Notice. A phone line is set-up at the District to receive public comments.

Emission Calculations

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

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21^oC; (V/n =RT/P) 387 ft³.
- Molecular weight of TPHg = 102.2 g/mole (value for "weathered gasoline"). Molecular weight of Benzene = 78.11 g/mole.
- Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate 225 scfm throughout; maximum influent concentration = 184 ppmv VOC, 13 ppmv benzene; destruction efficiency = 98.5% throughout.
- Ozone generation 2 lbs/day of ozone produced- injected into vadoze zone (taken from manufacturer specifications)

S-1 Ozone Generator

	lbs/day	lbs/yr	Trigger Level lbm/yr
ozone	2.00	730.00	7000.00

S-2 Emissions Soil Vapor Extraction System-

Emissions of Precursor Organics:

$$184E-6 * \frac{225 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{\text{lb mole}}{387 \text{ ft}^3} * \frac{102.2 \text{ lb}}{\text{lb mole}} * (1 - 0.985) = \mathbf{0.24 \text{ \#/day}} \text{ (abated)}$$

Emissions of Toxic Air Contaminants (benzene):

$$13E-6 * \frac{225\text{ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{1\text{ lb mole}}{387\text{ft}^3} * \frac{78.11 \text{ lb}}{\text{lb mole}} * (1 - 0.985) = \mathbf{0.0128 \text{ lbm/day}} \text{ (abated)}$$

MW TPH	102
efficiency	98.50%
air flow rate	225
days/yr	365

Compound	ppm (V)	unabated lbm/day	abated lbm/day	abated lbm/yr	abated tons/yr	Trigger Level lbm/yr
TPH	183.476	15.699	0.235	85.950	0.043	
Benzene	12.619	0.825	0.012	4.518	0.002	6.4
Toluene	10.958	0.845	0.013	4.628	0.002	12000.0
Ethylzene	2.717	0.242	0.004	1.322	0.001	77000.0
Xylene	8.831	0.785	0.012	4.298	0.002	27000.0
0-xylene	4.909	0.362	0.005	1.983	0.001	27000.0

Toxics

Emissions of these toxic compounds do not warrant a Toxic Risk Screen Analysis, as the emissions are below the trigger level from Regulation 2 Rule 5 Table 2-5-1. Therefore, the Toxics Section has recommended the issuing of this A/C with a benzene emission limit of 0.0175 lbm/day.

New Source Review

This proposed project will not emit over 10 lbs per highest day for the SVE system. The facility will be in compliance with TBACT. 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 the following required destruction efficiencies: $\geq 98.5\%$ if inlet POC ≥ 2000 ; $\geq 97\%$ if inlet POC ≤ 2000 to >200 ppmv; $\geq 90\%$ if inlet POC <200 ppmv. Offsets need not be imposed as annual emissions will not exceed 10 tons. Regulation 2 Rule 2 Sections 301 and 302 are not applicable for ozone.

Based on the information submitted, this operation is 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 two carbon vessels at all times of operation.

OFFSETS

Offsets are not applicable for this application, as emissions do not exceed 10 tons/yr. Facility not subject to Reg 2-2-302.

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 Chapter 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 emissions will be vented through two carbon vessels at all times of operation.

This project is within 1,000 ft from the nearest public school and is therefore subject to the public notification requirements of Regulation 2-1-412. Public notification was performed.

Regulation 1 – General Provisions and Definitions for S-1

§1-301: Public Nuisance: Prohibits discharging emissions in quantities that cause injury, detriment, nuisance, or annoyance. No violations of this standard are expected

PSD, NSPS, and NESHAPS are not triggered.

Recommendation

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

- S-1 Ozone Generator- generating maximum 2 lbs/day of ozone.
- S-2: Soil Vapor Extraction System consisting of a 225 max scfm vacuum blower, and ancillary equipment, abated by A-1, SVE Abatement System, consisting of two 300 pound carbon vessels in series

Conditions for S-1 and S-2:

1. S-1 Ozone generation shall not exceed 2 lbs/day. The owner/operator shall vent Source S-2 at all times to Abatement device A-1, two (200 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 225 scfm. (basis: Regulation 1-301, Regulation 8-47-301 and 302.2, Cumulative Increase, BACT/TBACT)
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, BACT/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 conditions number 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 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 owner/operator prior to a change to the monitoring schedule. In no event shall the owner/operator emit benzene emissions to the atmosphere exceeding 0.0175 pounds per day. (basis: Cumulative Increase, Regulation 2-5, BACT/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 C1).
(basis: Cumulative Increase, BACT/TBACT)
5. The owner/operator shall change out the last carbon vessel with unspent carbon upon detection at its outlet of 10 ppmv or greater (measured as C1). (basis: Cumulative Increase, BACT/TBACT)
6. The owner/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 owner/operator shall be retained and made available for inspection by the District for at least two years [Note: This is five years for Title V facilities] following the date the data is recorded.
(basis: Cumulative Increase, BACT/TBACT)

7. The owner/operator shall report any non-compliance with parts 4 and/or 5 to the Director of the Compliance & Enforcement Division at the time that it is discovered. The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well at the time of occurrence. (basis: Cumulative Increase, BACT/TBACT).
8. Upon final completion of the remediation project, the owner/operator of sources S-1 and S-2 shall notify the Engineering Division within two weeks of decommissioning the operation. [basis: Cumulative Increase, Regulation 2-5, TBACT]

by _____
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