

DRAFT
Engineering Evaluation
Former JoFran Dry Cleaners
Plant No. 7540; Application No. 21309

Background

RRM, Inc. has applied for an authority to construct for soil remediation at the former site known as JoFran Dry Cleaners located at 905 King Drive in Daly City. Soil vapor extraction will be accomplished by means of a regenerative vacuum blower (S-3) with a maximum capacity of 400 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 minimum capacity activated carbon vessels connected in series.

The applicant will be conditioned to provide written notification at the start of each phase of abatement. Procedures are outlined in the conditions found below. 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. RRM, 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.

This source is located within 1,000 feet of the outer boundary of Skyline Elementary School in Daly City, 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 PCE = 165.83 g/mole; Molecular weight of TCE = 131.4 g/mole, Molecular weight of 1,1, DCE = 96.94 g/mole and Molecular Weight of Vinyl Chloride = 62.50 g/mole.
- * Influent values based on operational parameters of equipment and applicant supplied soil sample test results: influent rate 400 scfm throughout; maximum influent concentration = 275.44 ppmv PCE, 64.03 ppmv TCE; 1.04 ppmv for 1,1, DCE and 1.19 ppmv for vinyl chloride; destruction efficiency = 99% throughout. For vinyl chloride assume nothing is adsorbed because adsorption rate is very weak.

Emissions of Toxic Air Contaminants:

Worst Case Scenario

NPOC- PCE

$$275.44 \text{ E-6} * \frac{400 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{165.83\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.99) = \mathbf{0.680 \text{ lb/day}} \text{ (abated)}$$

POC - TCE

$$64.03\text{E-}6 * \frac{400 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{131.4\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.99) = \mathbf{0.1252 \text{ lb/day}} \text{ (abated)}$$

Compounds	lbm/day	lbm/yr	tons/yr
POCs	0.2377	86.74	0.0434
NPOCs	0.6798	2.48E+02	1.24E-01

Average concentrations

NPOC- PCE

$$37.3 \text{ E-}6 * \frac{350 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{165.83\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.99) = \mathbf{0.08 \text{ lb/day}} \text{ (abated)}$$

POC - TCE

$$10.3 \text{ E-}6 * \frac{350 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32\text{L}}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15\text{L}} * \frac{131.4\text{g}}{\text{mole}} * \frac{1 \text{ lb}}{454\text{g}} * (1 - 0.99) = \mathbf{0.02 \text{ lb/day}} \text{ (abated)}$$

Compounds	lbm/day	lbm/yr	tons/yr
POCs	0.0387	14.11525	0.007058
NPOCs	0.0806	2.94E+01	1.47E-02

Toxics

The calculations are based on the maximum flow rate and highest concentrations found in one of the soil vapor extraction wells. Results will be much lower as the facility will not be operating at the maximum flow rate but rather at 250 cfm and emissions will be pulled from several wells so the average concentrations will be much less (for PCE around 37.3 ppm, TCE 10.31 ppm, 1,1, DCE around 0.25 ppm and vinyl chloride 0.291 ppm). At these concentrations, the facility is below the toxic trigger level and risk screen analysis is not required. Therefore the emissions of toxic substances are not considered sufficient to warrant a Risk Screen Analysis. PCE trigger = 0.082 lb/day, TCE trigger level is 0.249 lb/day and vinyl chloride trigger level is 0.007. 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 Toxics Section has recommended the issuing of this A/C with emission limits on the above compounds.

New Source Review

This proposed project will emit over 10 lbs per highest day and is therefore required to implement BACT. The facility is applying BACT technology. For Soil Vapor Extraction operations, BACT is defined as attainment of set destruction efficiencies corresponding to set influent concentration values. Operation of the Thermal/Catalytic Oxidizer, I.C.E., and 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 ≥ 200 to < 2000 ppmv; $\geq 90\%$ if inlet POC < 200 ppmv. 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 POC emissions will be vented through a Carbon adsorption system at all times of operation.

Recommendation

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

S-3: Soil Vapor Extraction System consisting of a 400 max scfm vacuum blower, and ancillary equipment, abated by A-3, SVE Abatement System, consisting of at least two (200 lb minimum capacity) Carbon Adsorption Vessels arranged in series.

Conditions:

1. Precursor Organic Compound (POC) and Non-Precursor Organic Compound (NPOC) emissions from Source S-3 shall be abated by Abatement device A-3 SVE Abatement System, consisting of at least two (200 lbs minimum capacity) Activated Carbon Vessels during all periods of operation. Start-up and subsequent operation of each abatement device shall take place only after written notification of same has been received by the District's Engineering Division. Influent vapor flow shall not exceed 350 scfm. [Basis. Reg 8-47-301,302].
2. The POC abatement efficiency of abatement device A-3 shall be maintained at a minimum of 98.5% by weight for inlet POC concentrations greater than or equal to 2000 ppmv (measured as hexane). For inlet concentrations below 2000 ppmv and greater than or equal to 200 ppmv, a minimum abatement efficiency of 97% shall be maintained. For inlet concentrations below 200 ppmv, a minimum abatement efficiency of 90% shall be maintained. The minimum abatement efficiency shall be waived if outlet POC concentrations are shown to be less than 10 ppmv (measured as hexane). In no event shall the following compounds (tetrachloroethylene, trichloroethylene, and vinyl chloride) be exceeded to the atmosphere for sources S-3.

Compound	pounds/day
Tetrachloroethylene (PCE, PERC)	0.082
Trichloroethylene (TCE)	0.249
Vinyl Chloride	0.007

3. 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 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 5 and 6, 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.
5. 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).
6. 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).
7. 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]

8. 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.**
9. 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 Authority to Construct/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 [basis: Reg 1-523].
10. Upon final completion of the remediation project, the operator of Source S-3 shall notify the Engineering Division within two weeks of decommissioning the operation.

by _____ date 1/10/10

Flora Chan
Air Quality Engineer