

DRAFT
Engineering Evaluation
1001 42nd Street LLC
1001 42nd Street
Oakland, CA 94608
Plant No. 22984; Application No. 27059

Aqua Science Engineers, Inc. on behalf of 1001 42nd Street LLC has applied for an Authority to Construct and Permit to Operate for the following equipment:

**S-1 Sub-Slab Depressurization (SSD) System – 250 scfm vacuum blower abated by
A-1 SSD Abatement System -- Carbon Adsorption, two (200 lbs minimum capacity) Activated
Carbon Vessels connected in series.**

Background

On behalf of the 1001 42nd Street LLC, Aqua Science Engineers, Inc. has applied for an Authority to Construct for a Sub-Slab Depressurization (SSD) system located at 1001 42nd Street in Oakland. SSD will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating 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. The carbon adsorption system will consist of at least two (200 lb minimum capacity) activated carbon vessels connected in series.

The owner/operator is required to provide written notification before the start of operation. The carbon unit influent and effluent volatile organic compounds (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 initially. Aqua Science Engineers, 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 North Oakland Community Charter School, 1000 42nd Street, Oakland, CA 94608 and Ana Yates Elementary School, 1070 41st Street, Emeryville, CA 94608; as such, this application requires Public Notification via Regulation 2-1-412. A Public Notice was prepared and will be sent to the parents or guardians of children enrolled in St. Eugene Cathedral School and to each address within a radius of 1,000 feet of the source.

Emission Calculations

For a conservative estimate of yearly emissions, we 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 tetrachloroethylene (PCE) = 165.83 g/mole
- * Molecular weight of benzene = 78 g/mole
- * Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: influent rate 250 scfm throughout; maximum influent concentration = 0.01 ppmv PCE, and 0.011 ppmv benzene; carbon abatement efficiency = 99.0% throughout.

Emissions of Toxic Air Contaminants (Tetrachloroethylene):

$$0.01E-6 * \frac{250 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32L}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15L} * \frac{165.8g}{\text{mole}} * \frac{1 \text{ lb}}{454g} * (1 - 0.985) = \mathbf{0.00002 \text{ lb/day}} \text{ (abated)}$$

Emissions of Toxic Air Contaminants (benzene):

$$0.011E-6 * \frac{300 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{28.32L}{1 \text{ ft}^3} * \frac{1 \text{ mole}}{24.15L} * \frac{78g}{\text{mole}} * \frac{1 \text{ lb}}{454g} * (1 - 0.985) = \mathbf{0.00008 \text{ lb/day}} \text{ (abated)}$$

[Enclosed are the detailed emission calculation spreadsheet for the TACs]

Toxics

Based on the pilot test soil vapor concentration data, the toxic air contaminants (TACs) emissions from this source are not expected to exceed any of the trigger levels identified in Regulation 2-5, Table 2-5-1. Therefore, the emissions of TACs are not considered sufficient to warrant a health risk screening analysis and health risks are expected to be insignificant.

	Influent vapor concentration [ppmv]	Abated Emission [lb/day]	Abated Emission [lb/yr]	Abated Emission [g/s]	Emission exceeds Chronic Trigger Levels (Yes/No)
Benzene	0.011	7.85E-06	0.003	4.12E-08	No
Ethyl Benzene	0.011	1.12E-05	0.004	5.89E-08	No
Tetrachloroethylene	0.010	1.57E-05	0.006	8.24E-08	No
Toluene	0.031	2.69E-05	0.010	1.41E-07	No
1,4 Dioxane	0.001	1.12E-06	0.000	5.89E-09	No
Naphthalene	0.002	1.84E-06	0.001	9.65E-09	No
1,1,1 Tichloroethane	0.020	2.47E-05	0.009	1.29E-07	No
Carbon Disulfide	0.002	1.77E-06	0.001	9.30E-09	No
Chloroform	0.001	1.19E-06	0.000	6.24E-09	No
Methylene Chloride	0.001	4.26E-07	0.000	2.24E-09	No
1,1,2 Tichloroethane	0.003	3.14E-06	0.001	1.65E-08	No

New Source Review

This proposed project will not emit over 10 pounds of VOC per highest day and is therefore not required to implement Best Available Control Technology (BACT) for either precursor organic compounds or non-precursor organic compounds. Offsets are not required, since the facility emissions of VOC will not exceed 10 tons per year.

California Environmental Quality Act (CEQA)

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 consistent with Chapter 9.2 of the permit handbook. Therefore, the project is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to CEQA review.

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 VOC emissions will be vented through a carbon adsorption system at all times of operation.

Recommendation

The District has reviewed the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. After any comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following source:

**S-1 Sub-Slab Depressurization (SSD) System – 250 scfm vacuum blower abated by
A-1 SSD Abatement System -- Carbon Adsorption, two (200 lbs minimum capacity) Activated
Carbon Vessels connected in series.**

Conditions:

1. The owner/operator shall vent Source S-1 at all times to Abatement device A-1, at least two (200 lb minimum capacity) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 250 scfm.
[Basis: Cumulative Increase, Regulation 2-5]
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 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.

[Basis: Cumulative Increase, Regulation 2-5, TBACT]

3. The owner/operator shall record these monitor readings in a monitoring log at the time they are taken. The owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with part 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 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 owner/operator prior to a change to the monitoring schedule. [Basis: Cumulative Increase, Regulation 2-5, TBACT]
4. The owner/operator shall immediately 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 limits:
 - a. 10 % of the inlet stream concentration to the carbon bed.
 - b. 10 ppmv (measured as hexane).[Basis: Cumulative Increase, Regulation 2-5, TBACT]
5. The owner/operator shall change out the last carbon vessel with unspent carbon upon detection at its outlet of 10 ppmv (measured as hexane). [Basis: Cumulative Increase, Regulation 2-5, TBACT]
6. The owner/operator of this source shall maintain the following records for each month of operation of the source:
 - 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 at least two years following the date that data is recorded. [Basis: Regulation 1-523]

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

by _____ date _____

Flora Chan
Air Quality Engineer II