DRAFT Engineering Evaluation: Soil Vapor Extraction
Former Norge Cleaners
2114 MacArthur Blvd, Oakland, CA 94602
Application No. 30963; Plant No. 24890

Background

Former Norge Cleaners has applied for an authority to construct to install a soil vapor extraction (SVE) system at the site located at 2114 MacArthur Blvd, Oakland, CA.

S-1 Soil Vapor Extraction System Consisting of a 400 Max SCFM Mako MKVES Blower abated by;

A-1 Three (3) 1,000 Lb Capacity Activated Carbon Vessels Arranged In Series

The proposed SVE unit consists of a vacuum blower (S-1) with a maximum capacity 400 scfm. Soil vapor will be extracted with vapor abatement achieved by three 1,000 lb carbon vessels in series (A-1). The project is located at former dry-cleaning facility. Laboratory results show presence of chlorinated hydrocarbon vapors in the soil. Emission monitoring for operation of the equipment will be conducted according to established source test methodology. Procedures are outlined in the conditions.

The applicant will be conditioned to provide written notification at the start of the operation. Procedures are outlined in the conditions found below. The carbon unit influent and effluent VOC concentrations will be monitored with a portable photoionization detector (PID) on a schedule reflecting current loading rates and predicted carbon capacity. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

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^{O}C; 1 mole occupies 24.15L
- Maximum flow rate capacity of 400 cfm is used in the calculations. Concentrations of compounds listed in Table 1 are maximum reported results shown in laboratory report submitted by the facility.
- Applicant has committed to an overall abatement efficiency of 90 % for A-1, three (3) – 1,000 lb activated carbon vessels in series.

Table 1 – Emissions from S-1 SVE System

Pollutant	Influent vapor concentration [µg/m3]	Influent vapor concentration [ppmv]	Effluent vapor concentration [ppmv]	Unabated Emission [lb/day]	Abated Emission [lb/day]	Abated Emission [lb/yr]
Vinyl Chloride	190	0.07	0.007	0.01	0.00	0.25
Chloroethane	82	0.03	0.003	0.00	0.00	0.11
Ethanol	100	0.05	0.005	0.00	0.00	0.13
Acetone	560	0.23	0.023	0.02	0.00	0.73
trans-1,2-Dichloroethene	40	0.01	0.001	0.00	0.00	0.05
2-Butanone (Methyl Ethyl Ketone)	160	0.06	0.006	0.01	0.00	0.21
cis-1,2-Dichloroethene	2,200	0.55	0.055	0.079	0.01	2.88
Tetrahydrofuran	130	0.04	0.004	0.00	0.00	0.17
Benzene	18	0.01	0.001	0.00	0.00	0.02
Trichloroethene	1,100	0.20	0.020	0.04	0.00	1.44
Toluene	34	0.01	0.001	0.00	0.00	0.04
Tetrachloroethene	8,700	1.27	0.127	0.31	0.03	11.72
Total	**13,314**	**2.53**	**0.253**	**0.47**	**0.04**	**17.75**

Table 2 – S-1 Criteria Organic Emissions (TPY)

Pollutant	lb/day	lb/yr	TPY
POCs	0.01	5.30	0.003
NPOCs	0.03	12.45	0.006

Per Regulation 1-234 and 40 CFR 51.100(s)(1), PCE and Acetone has been determined to have negligible photochemical reactivity and is a non-precursor organic compound (NPOC). All other compounds in Table 1 are precursor organic compounds (POC).

Cumulative Increase

Table 3- Plant Cumulative Emissions

Pollutant	Current Permitted Emissions, Post 4/5/91 (TPY)	New Emission Increase with Application (TPY)	Cumulative Emissions (TPY)
POCs	0	0.003	0.003

Toxic Risk Screening

Table 4 – S-1 Toxic Review

Toxic Pollutant	CAS Number	Abated Emission (lb/hr)	Abated Emission (lb/yr)	Acute Trigger lb/hr	Chronic Trigger lb/yr	HRA required
Vinyl Chloride	75-01-4	2.84E-05	0.25	4.00E+02	1.10E+00	N
Chloroethane	75-00-3	1.23E-05	0.11	-	1.20E+06	N
Ethanol	64-17-5	1.49E-05	0.13	-	-	N
Acetone	67-64-1	8.37E-05	0.73	-	-	N
trans-1,2-Dichloroethene	156-60-5	5.98E-06	0.05	-	-	N
2-Butanone (Methyl Ethyl Ketone)	78-93-3	2.39E-05	0.21	2.90E+01	-	N
cis-1,2-Dichloroethene	156-59-2	3.29E-04	2.88	2.70E+05	0.00E+00	N
Tetrahydrofuran	109-99-9	1.94E-05	0.17	-	-	N
Benzene	71-43-2	2.69E-06	0.02	6.00E-02	2.90E+00	N
Trichloroethene	79-01-6	1.64E-04	1.44	-	4.10E+01	N
Toluene	108-88-3	5.08E-06	0.04	8.20E+01	1.20E+04	N
Tetrachloroethene	127-18-4	1.30E-03	11.39	4.40E+01	1.40E+01	N

Emissions are not expected to exceed toxic trigger levels in Table 2.5.1 for this project.

Offsets

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of precursor organic compounds (POCs) or nitrogen oxides (NO_X). Furthermore, pursuant to Regulation 2-2-303 offsets must be provided for any new or modified source at a major facility with a cumulative increase that exceeds 1.0 ton per year of PM_{10}, $PM_{2.5}$, or sulfur dioxide (SO_2).

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Based on emissions in Table 1, the facility is not expected to have a PTE greater than 10 tons per year of POC or NO_X, nor is the facility a major facility of PM_{10}, $PM_{2.5}$, and SO_2. Therefore, the requirements of Regulations 2-2-302 and 2-2-303 do not apply.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxides (SO_2), particulate matter less than 10 micrometer (PM_{10}) and particulate matter less than 2.5 micrometer ($PM_{2.5}$).

NPOC and POC emissions are expected to be below 10 lb/day. Therefore, BACT review is not required.

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 VOC emissions will be vented through a Carbon adsorption system at all times of operation. Adsorption efficiency and influent flow rates will be enforced by the permit conditions outlined below.

This project is within 1,000 ft of the following schools and is therefore subject to the public notification requirements of Regulation 2-1-412. PSD, NSPS, and NESHAPS are not triggered.

Table 5 – Schools Within 1,000 Feet of Source

School Name	Address	Grades
The Renaissance International School	3650 Dimond Avenue Oakland, CA 94602	K-9

Permit Conditions

Permit Condition # 27445

1. The owner/operator shall abate the Precursor Organic Compounds (POCs) and Non-Precursor Organic Compounds (NPOCs) emissions from Source S-1 by A-1 SVE Abatement System, consisting of three (3) 1,000 pound Activated Carbon Vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 400 scfm. In no event shall the Toxic Air Contaminants (TACs) emissions to the atmosphere from S-1 exceed the respective acute and chronic trigger levels in District's Regulation 2-5, Table 2-5-1. [Basis: Cumulative Increase and Toxics].

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 the 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 parts number 4 and 5, and shall be conducted on a daily basis for the first week of operation. After demonstrating continuous compliance for the first week, the owner/operator may switch to monitoring to a weekly schedule. 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 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:

    a. 10 % of the inlet stream concentration to the Carbon vessel.
    b. 10 ppmv or greater (measured as isobutylene)

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

5. The owner/operator shall immediately change out the last carbon vessel in series with unspent Carbon upon detection at each outlet of 10 ppmv (measured as isobutylene). [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. 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.
    d. Total throughput of soil vapor from source S-1 in Standard Cubic Feet.

    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 following the date the data is recorded. [Basis: Regulation 1-523]

7. The owner/operator of S-1 shall report any non-compliance with these conditions to the Compliance and Enforcement Division at the time that it is first discovered. The owner/operator of S-1 shall detail the corrective action taken and include the data showing the exceedance as well as the time of occurrence in the submittal. [Basis: Cumulative Increase, Regulation 2-5]

8. The owner/operator of S-1 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 owner/operator shall be retained for at least two years following the date the data is recorded. [Basis: Regulation 1-523]

9. Upon final completion of the remediation project, the operator of Source S-1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5, TBACT]

Recommendation

The District has reviewed the material contained in 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 is located within 1000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. After the comments are received from the public 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 an Authority to Construct for the following source:

S-1 Soil Vapor Extraction System Consisting of a 400 Max SCFM Mako MKVES Blower abated by;

A-1 Three 1,000 Lb Capacity Activated Carbon Vessels Arranged In Series

by_____ May 11, 2021
Ali Roohani