Draft Engineering Evaluation: Soil Vapor Extraction
DS Westgate West L.P.
5309 Prospect Road, San Jose, CA
Application No. 30391; Plant No. 24650

Background

On behalf of DS Westgate West L.P, Converse Consultants has applied for an authority to construct to install a soil vapor extraction (SVE) system at the site located at 5309 Prospect Road in San Jose, CA.

S-1 Soil Vapor Extraction System consisting of a 1000 max scfm Sutorbilt Legend Blower abated by;

A-1 Two 5,000 lb capacity Activated Carbon vessels arranged in series

The proposed SVE unit consists of a vacuum blower (S-1) with a maximum capacity 1000 scfm. Soil vapor will be extracted with vapor abatement achieved by two 5,000 lb carbon vessels in series (A-1). The project is located at existing dry cleaning facility. Records indicate that the drycleaner utilized a tetrachloroethylene (PCE)-based cleaning machine from 1985 to around 2009-2010. Petroleum hydrocarbons also were detected in soil samples taken for laboratory analysis. A maximum 469,000 ug/m3 of PCE was reported from one of air samples in the lab analysis. However, the applicant has stated that the worst case scenario for influent PCE concentrations is 85,000 ug/m3. Soil vapors extracted from various wells will dilute the incoming influent. 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 1000 cfm is used in the calculations. Expected concentrations of organic compounds at the proposed site can be seen in Table 1. Ethyl Benzene and Benzene were assumed to be near trigger levels as a worst-case scenario. Toluene and Total Xylenes were each assumed to be 35% of the Total Petroleum Hydrocarbon (TPH) as a worst case scenario.
- Applicant has committed to an overall abatement efficiency of 99.5 % for A-1 (2) – 5,000 lb GAC Adsorbers in series. This efficiency will be enforced with an effluent threshold placed in the permit conditions.

$$85{,}000\,\frac{\mu g}{m^3}(PCE) \times 1000\,\frac{ft^3}{min} \times 1440\,\frac{min}{day} \times \frac{1}{35.31}\frac{m^3}{ft^3} \times \frac{1}{4.54 \times 10^8}\frac{lb}{\mu g} = 7.62\,\frac{lb}{day} of\ PCE\ (unabated)$$

$$7.62\,\frac{lb}{day}(PCE) \times (1 - 99.5\%) \times 365\,\frac{day}{year} = 13.9\,\frac{lb}{year} of\ PCE\ (abated)$$

$$213\ ppmv\ (total\ influent) \times (1 - 99.5\%) = 1.1\ ppmv(total\ effluent)$$

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]
Ethyl Benzene	200,000	45.29	0.226	17.94	0.09	32.73
Benzene	17,500	5.39	0.027	1.57	0.01	2.86
Toluene	128,100	33.42	0.167	11.49	0.06	20.97
Total Xylenes	128,100	29.01	0.145	11.49	0.06	20.97
TPH	366,000	99.98	0.500	32.82	0.16	60
PCE	85,000	12.38	0.062	7.623	0.04	13.9
n-Hexane	5,740	1.60	0.008	0.515	0.00	0.94
Total	**839,700**	**213**	**1.1**	**75.3**	**0.38**	**137.4**

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

Pollutant	lb/day	lb/yr	TPY
POCs	0.34	123.5	0.062
NPOCs	0.04	13.9	0.007

Per Regulation 1-234 and 40 CFR 51.100(s)(1), PCE 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 A/N 30391 (TPY)	Cumulative Emissions (TPY)
POCs	0	0.062	0.062
NPOCs	0	0.007	0.007

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Toxic Risk Screening

Table 4 – S-1 Toxic Review

Toxic Pollutant	Abated Emission (lb/hr)	Abated Emission (lb/yr)	Acute Trigger lb/hr	Chronic Trigger lb/yr	HRA required
Eythl Benzene	3.74E-03	32.73	-	3.30E+01	N
Benzene	3.27E-04	2.86	0.006	2.90E+00	N
Toluene	2.39E-03	20.97	82	1.20E+04	N
Xylenes	2.39E-03	20.97	49	2.70E+04	N
PCE	1.59E-03	13.9	44	1.40E+01	N
n-Hexane	1.07E-04	0.9	-	2.70E+05	N

With abatement of 99.5% and maximum influent flow rate of 1000 cfm, emissions are not expected to exceed toxic trigger levels in Table 2.5.1.

New Source Review

The proposed project will not emit more than 10 lb/day of any criteria pollutant. Facility not subject to Reg 2-2-301. 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 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 Prospect High School and is therefore subject to the public notification requirements of Regulation 2-1-412. PSD, NSPS, and NESHAPS are not triggered.

Permit Conditions

Permit Condition # XXXXX

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 two 5,000 pound Activated Carbon Vessels arranged in series, during all periods of operation. Influent vapor flow shall not exceed 1,000 scfm. In no event shall the Toxic Air Contaminants (TACs) emissions to the atmosphere from S-1 exceed the respective chronic trigger levels in District's Regulation 2-5, Table 2-5-1. [Basis: Cumulative Increase, Regulation 2-5].

2. The owner/operator shall take air samples from A-1 for laboratory analysis upon start-up. The owner/operator shall use EPA Method TO-15 to analyze all toxic organics present. The air samples shall be taken at the following A-1 locations:
    a. At the inlet to the first abatement vessel in series.
    b. At the outlet of the abatement vessel that is last in series prior to venting to the atmosphere.

    The owner/operator shall submit the results of the laboratory analysis to the District's Engineering Division within 30 days of start up.

3. 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 each series.
    b. At the inlet to the last carbon vessel in each series.
    c. At the outlet of the carbon vessel that is last in each 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]

4. 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 conditions number 5 and 6, 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]

5. 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]

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6. The owner/operator shall immediately change out the last carbon vessel in each series with unspent Carbon upon detection at each outlet of 1.1 ppmv (measured as isobutylene). [Basis: Cumulative Increase, Regulation 2-5, TBACT]

7. 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]

8. 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]

9. The owner/operator if 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]

10. 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 1000 max scfm Sutorbilt Legend Blower abated by;

A-1 Two 5,000 lb capacity Activated Carbon vessels arranged in series

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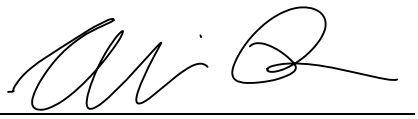
by 
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June 23, 2020

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