ENGINEERING EVALUATION
POSADA DE COLORES – THE UNITY COUNCIL
2221 FRUITVALE AVENUE
OAKLAND, CA 94601
PLANT NO. 24365; APPLICATION NO. 29807

BACKGROUND

West Environmental Services & Technology, Inc on behalf of Posada De Colores – The Unity Council has applied for an Authority to Construct/Permit to Operate the following soil remediation project:

S-1: Soil Vapor Extraction (SVE) System; Make: Airtech; Model: 3BA94207AT56; Maximum flow rate: 225 scfm; abated by
A-1: (2) – 350 lb Granular Activated Carbon (GAC) Adsorbers arranged in series; Make: Mako; Model: 110

The above equipment will be located at 2221 Fruitvale Avenue, Oakland, CA 94601. SVE will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum flow rate of 250 scfm. The extracted vapors will be abated by A-1 (2) 350-pound capacity GAC Adsorbers connected in series. The SVE system will be operated to remove volatile organic compounds (VOCs) in subsurface vapors at the site.

S-1 will be located within 1,000 feet of the outer boundary of Oakland Charter High School at 2433 Coolidge Avenue, Oakland, CA 94601. Therefore, this application requires Public Notification per District Regulation 2-1-412. Also, the following five schools are within one-quarter mile of the source and will be included in public notification.

- Patten Academy of Christian Education, located at 2430 Coolidge Ave., Oakland, CA 94601
- United for Success Academy, located at 2101 35th Ave., Oakland, CA 94601
- Life Academy of Health and Bioscience, located at 2101 35th Ave., Oakland, CA 94601
- Achieve Academy, located at 1700 28th Ave., Oakland CA 94601
- Urban Promise Academy, located at 3031 East 18th Street, Oakland, CA 94601

A public notice was prepared and will be sent to the parents or guardians of children enrolled in the above referenced schools and to each address within a radius of 1,000 feet of the source.

EMISSIONS CALCULATION

POC and NPOC Emissions from S-1 Soil Vapor Extraction System:

For a conservative estimate of annual emissions, the District staff assumed that the system 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 °C; 1 mole occupies 24.15 L
- Influent values based on operational parameters of equipment and applicant supplied soil vapor test results: Influent volumetric flowrate limit of 225 scfm; maximum influent concentration = tetrachloroethylene (PCE) 3060, benzene 90 µg/m^3, toluene 978 µg/m^3, ethyl benzene 90.3 µg/m^3, xylenes 606 µg/m^3, 1,1,2,2-tetrachloroethane 12.2 µg/m^3, 1,3,5-trimethylbenzene 20.4 µg/m^3, 1,2,4-Trimethylbenzene 43.6 µg/m^3
- Abatement efficiency of 90% was assumed for A-1 (2) - GAC 350-pound capacity Adsorbers.

Emissions of Toxic Air Contaminants [PCE]:

$$\frac{3060\ \mu g}{m^3} * \frac{225\ ft^3}{min} * \frac{1440\ min}{1\ day} * \frac{1\ m^3}{35.31\ ft^3} * \frac{1\ lb}{4.54E{+}08\ \mu g} * (1 - 0.9) = \textbf{0.00618 lb/day}\ \text{(abated)}$$

0.00618 lb/day * 365 days/yr = **2.25 lb/year** (abated) = **0.001 tons/year** (abated)

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Table 1 – Estimated Emissions from S-1

Pollutant	Influent Vapor Concentration (µg/m^3)	Unabated Daily Emissions (lb/day)	Abated Hourly Emissions (lb/hr)	Abated Daily Emissions (lb/day)	Abated Annual Emissions (lb/yr)
PCE	3,060.00	0.06189	2.58E-04	6.19E-03	2.259
Benzene	90.0	0.00182	7.58E-06	1.82E-04	0.066
Toluene	978.0	0.01978	8.24E-05	1.98E-03	0.722
Ethyl benzene	90.3	0.00183	7.61E-06	1.83E-04	0.067
Xylenes	606.0	0.01226	5.11E-05	1.23E-03	0.447
1,1,2,2-Tetrachloroethane	12.2	0.00025	1.03E-06	2.47E-05	0.009
1,3,5-Trimethylbenzene	20.4	0.00041	1.72E-06	4.13E-05	0.015
1,2,4-Trimethylbenzene	43.6	0.00088	3.67E-06	8.82E-05	0.032

Total Emissions from S-1:

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

Table 2 – Total Criteria Pollutant Emissions from S-1

Pollutant	Emissions		
	(lb/day)	(lb/yr)	(TPY)
POC	3.72E-03	1.36	0.001
NPOC	6.19E-03	2.26	0.001

PLANT CUMULATIVE INCREASE

Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant No. 24365 from operation of S-1.

Table 3 - Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Existing Emissions, Post 4/5/91 (TPY)	New Increase with This Application (TPY)	Cumulative Emissions (TPY)
POC	0.000	0.001	0.001
NPOC	0.000	0.001	0.001

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HEALTH RISK ANALYSIS

Table 4 - Toxic Air Contaminant Emissions

Pollutant	Abated Hourly Emissions (lb/h)	Acute Trigger Level (lb/h)	Abated Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)	HRA Required? (Y/N)
PCE	2.58E-04	4.40E+01	2.26	1.40E+01	N
Benzene	7.58E-06	6.00E-02	0.07	2.90E+00	N
Toluene	8.24E-05	8.20E+01	0.72	1.20E+04	N
Ethyl benzene	7.61E-06	N/A	0.07	3.30E+01	N
Xylenes	5.11E-05	4.90E+01	0.45	2.70E+04	N
1,1,2,2-Tetrachloroethane	1.03E-06	N/A	0.01	1.40E+00	N
1,3,5-Trimethylbenzene	1.72E-06	N/A	0.02	N/A	N
1,2,4-Trimethylbenzene	3.67E-06	N/A	0.03	N/A	N

Based on calculations presented in Table 4, emissions of TACs for S-1 do not exceed acute or chronic trigger levels set forth in Table 1 of Regulation 2-5; therefore, a toxic risk screen is not required.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 is expected to comply with Regulation 8-47-301, "Emission Control Requirements, Specific compounds", and Regulation 8-47-302, "Organic compounds", since S-1 will be abated by A-1. The emissions from S-1 will be required to be vented to A-1 at all times of operation.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

In accordance with Regulation 2-2-301, 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 ($PM_{2.5}$). Based on the emission calculations presented in POC emissions calculation section, S-1 is not subject to BACT, since the potential to emit for all criteria pollutants is less than 10 pounds per day for S-1.

Offsets

Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NO_X per Regulation 2-2-302. Table 3 above summarizes increases in criteria pollutant emissions at the plant. Offsets are not applicable to this application, since the emissions do not exceed 10 tons/yr. Thus, this facility is not subject to Regulation 2-2-302.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

This project is considered to be ministerial under the District's 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 as described in the District's Permit Handbook Chapter 9.2 (Soil Vapor Extraction) and therefore is not discretionary as defined by CEQA.

PERMIT CONDITION

Permit Condition #26991

1. The owner/operator shall vent Source S-1 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. In no event shall the Toxic Air Contaminants (TACs) emissions to the atmosphere 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 of S-1 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 of S-1 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 2, 4 and 5. Monitoring 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 also 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 of S-1 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 hexane).
   [Basis: Cumulative Increase, Regulation 2-5, TBACT]

5. The owner/operator of S-1 shall immediately 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 S-1 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

   Such records shall be retained and made available for inspection by the District for two years following the date the data is recorded. [Basis: Regulation 1-523]

7. The owner/operate of S-1 shall report any non-compliance with these conditions to the Compliance & 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, TBACT]

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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 owner/operator of 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 of a Permit to Operate for the following source:

S-1 Soil Vapor Extraction (SVE) System; Make: Airtech; Model: 3BA94207AT56; Maximum flow rate: 225 scfm; abated by
A-1 (2) – 350 lb Granular Activated Carbon (GAC) Adsorbers arranged in series; Make: Mako; Model: 110

Prepared by: **Date:** 7/3/19

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