

Application #25893
Engineering Evaluation for a Portable SVE Unit
Plant #22247, Frey Environmental, Inc.

Background

In August 2013, Frey Environmental was granted a Permit to Operate a Portable Soil Vapor Extraction (SVE) System at various sites within the District (under Application #25063, Previous Plant #21560). Pursuant to District Regulation 2-1-413, the District may issue

"a single portable permit which will allow the source to operate anywhere in the District, provided the APCO approves the permit, and the source meets the definition of portable equipment set forth in Section 2-1-220."

Operating permit conditions are imposed to ensure that the requirements and applicable emission limits are satisfied through proper notification, source testing, monitoring, and recordkeeping practices. The operator of the portable equipment is required to provide written notification at the start and end of each of remediation project, as well as to monitor and maintain records of system operating conditions and the results of all monitoring and testing.

Permit conditions issued to portable sources do not allow operation within 1000 feet of the outer boundary of a K-12 school, unless the applicable public notice requirements in the California Health and Safety Code Section 42301.6 have been met. Frey Environmental has proposed to operate this portable soil vapor extraction system to mitigate gasoline soil contamination from 3 abandoned underground storage tanks located at 247 East Saint John Street, in San Jose, at the site of a former auto service business. This location is within 1000 feet of two K-12 schools. In accordance with their operating permit, Frey Environmental has applied for modification of their permit to allow operation at this location.

A feasibility study was conducted at this site to evaluate the best method for addressing the existing petroleum hydrocarbon contamination of the soil and groundwater, in addition to limiting further migration of the existing contamination. Excavation of the contaminated soil for offsite disposal was considered but deemed impractical as the majority of the contaminated soil is at depths of 15 to 20 feet below ground level and underneath a building. Excavation requires use of diesel-powered equipment for excavation and transport, as well as for transport of soil for backfilling. Combustion of diesel fuel during this process will result in emissions of diesel particulate, which is a toxic air contaminant, and the petroleum hydrocarbons in the excavated soil will volatilize during this process, resulting in uncontrolled emissions of volatile organic compounds and toxic air contaminants to the atmosphere. In addition, removal of contaminated soil would not address the groundwater contamination at this site. The feasibility study determined that, due to the high level of contamination, the best method for addressing the existing soil and groundwater contamination is through vapor and groundwater extraction and onsite treatment.

Frey Environmental has proposed to operate, S-2, Portable Soil Vapor Extraction System to extract and treat contaminated soil vapor and groundwater. S-2 consists of a regenerative vacuum blower with a maximum operating capacity of 350 standard cubic feet per minute (scfm). The vacuum unit is also equipped with a water knockout vessel, inlet filter, dilution air valve, recirculation valve, and flow indicators. The operation will pull contaminated soil vapor from 7 drilled wells at the project location and direct the vapor through an abatement device A-2. The soil vapor contains volatile organic compounds (VOC) and these volatile organic compound emissions include several toxic air contaminants (TACs), which are components of gasoline. Control of the VOC and TAC emissions will be initially accomplished by combustion at a Thermal/Catalytic Oxidizer. After the initial concentrations of organic compounds have been reduced, abatement of the VOC and TAC emissions will be achieved through capture of the compounds with an Activated Carbon Adsorption Unit, consisting of two 200 pound (minimum) activated carbon vessels, in series. Frey Environmental projects the switch from the Thermal/Catalytic Oxidizer to the Activated Carbon Adsorption Unit may occur approximately 6 months after initial start-up. The extracted groundwater will be treated with liquid phase activated carbon, and the treated groundwater will be discharged to the sanitary sewer system.

The VOC and TAC emissions from the proposed operation are the fraction of the VOC and TAC compounds in the soil vapor which are not combusted at the Thermal/Catalytic Oxidizer or captured by the Carbon Adsorption unit. To minimize these emissions, the Thermal/Catalytic Oxidizer and Carbon Adsorption Unit are required to meet control efficiencies specified in District regulations. The other emission limits that apply to this operation are the 10 ton per year limit on criteria pollutants for portable equipment, as well as TAC emission rates to limit project risk levels pursuant to District Regulation 2, Rule 5. Compliance with the control efficiencies and emission limits will be enforced through permit condition limits, monitoring, and testing.

Frey Environmental will be required to provide written notification at the start of each phase of abatement. The Thermal/Catalytic Oxidizer will be required to meet a specified temperature to assure high VOC and TAC destruction efficiency and continuous temperature monitoring of the Thermal/Catalytic Oxidizer will track compliance with the temperature limit. Monitoring of proper control with the Carbon Adsorption Unit will consist of daily measurements of influent and effluent VOC concentrations to and from the carbon vessels with a portable flame-ionization detector (OVA-FID) for the first 5 days to verify attainment of steady state conditions. After the first 5 days, Frey Environmental may request a change in the monitoring schedule based on measured influent concentrations, calculated carbon loading, and predicted carbon life. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent issuance of District approval.

The proposed location of this remediation project is 247 East Saint John Street, in San Jose, which is within 1,000 feet of the outer boundary of Horace Mann Elementary School, located at 55 North Seventh Street, and St Patrick Parochial/Elementary School, located at 51 North Ninth Street. As such, this application triggers the public notification requirements in the CA Health and Safety Code and District Regulation 2-1-412.

**S-2, Portable Soil Vapor Extraction System, 350 scfm maximum capacity, abated by
A-2, Thermal/Catalytic Oxidizer or Activated Carbon Adsorption Unit, consisting of two 200 lb
minimum activated carbon vessels, in series.**

Emission Calculations

Chemical analysis of the soil vapor samples for the proposed site were submitted and used as the basis for the initial VOC and TAC emission estimates. Due to regulatory limits that apply to VOC emissions and also to emissions of TACs (resulting from the health risk screening analysis discussed in more detail below), the emissions from the SVE operation will be limited to less than the maximum emissions that could be emitted based on site characteristics. The VOC, benzene, and ethyl benzene emissions will be limited in the permit conditions as discussed below.

For an initial estimate maximum of VOC emissions from this project, it was assumed that the system will be operated for the entire year at the maximum processing capacity of the equipment. Analysis of soil vapor samples from one vapor extraction well at this site measured VOC concentrations between 14,900 and 84,800 ppmv. If emissions were based on the highest measured VOC concentration of 84,800 ppmv, the resulting VOC emissions would exceed 10 tons per year. Since emissions from portable operations are not allowed to exceed 10 tons per year, the VOC concentration to the inlet of the SVE system will be limited to 27,200 ppmv. Similarly, the analysis of the site soil vapor samples from the test extraction well showed benzene concentrations from 76.5 to 1610 ppmv and ethyl benzene concentrations from 2.8 to 386 ppmv. As discussed under Regulation 2, Rule 5 below, the benzene and ethyl benzene concentrations in the soil vapor stream treated at S-2 will be limited to 17 and 20 ppmv, respectively.

Operation of S-2 will draw soil vapor from 7 different wells, not just the single test well. Frey Environmental has indicated that remediation will begin with wells around the perimeter of the contamination plume. Since there is a fixed amount petroleum hydrocarbons in the subsurface, the soil vapor concentrations are expected to decline rapidly during the first month of operation. The operator will be required to monitor the inlet VOC concentration and exhaust benzene and ethyl benzene concentrations and will add ambient air to dilute the influent vapor stream to maintain compliance with the inlet VOC concentration and exhaust benzene and ethyl benzene concentration limits.

The emission calculations have been based on the following data:

- * Standard conditions: Pressure = 1 atm; Temperature = 70°F; 1 mole occupies 24.15 liters.
- * Molecular weight of TPHg = 102 lb/lb-mole (value for "weathered gasoline").
- * Molecular weight of benzene = 78.11 lb/lb-mole
- * Molecular weight of ethyl benzene = 106.2 lb/lb-mole
- * Influent rate of 350 scfm (maximum)
- * Maximum allowed VOC influent concentration = 27,200 ppmv
- * Maximum allowed TAC concentrations: Benzene 17 ppmv, Toluene 583 ppmv, Ethyl benzene 20 ppmv, MTBE 1.25 ppmv, Xylene 991 ppmv
- * Destruction/Control efficiency = 98.5% by weight.

Criteria Pollutants:

Emissions of Volatile Organic Compounds:

$$27,200\text{E-}6 * \frac{350 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{1 \text{ mole}}{386 \text{ ft}^3} * \frac{102 \text{ lb}}{\text{lb-mole}} * (1 - 0.985) = 54.3 \text{ \#/day, average (abated)}$$

$$\text{Annual Average VOC Emissions} = 19,833 \text{ lbs/yr} = 9.92 \text{ tons/yr}$$

TACs:

Emissions of Benzene:

$$17\text{E-}6 * \frac{350 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{1 \text{ mole}}{386 \text{ ft}^3} * \frac{78.11 \text{ lb}}{\text{lb-mole}} * (1 - 0.985) = 2.6\text{E-}2 \text{ \#/day (abated)}$$

Emissions of Ethyl Benzene:

$$20\text{E-}6 * \frac{350 \text{ ft}^3}{\text{min}} * \frac{1440 \text{ min}}{1 \text{ day}} * \frac{1 \text{ mole}}{386 \text{ ft}^3} * \frac{106.2 \text{ lb}}{\text{lb-mole}} * (1 - 0.985) = 4.2\text{E-}2 \text{ \#/day (abated)}$$

Using the methodology above, the emissions have been calculated in the attached spreadsheet for each TAC compound and total volatile organic compounds. The resulting maximum permitted TAC emissions are summarized below:

Table 1
Maximum Permitted TAC Emissions from S-2

Compound	Influent vapor concentration, ppmv	Unabated Emissions, lb/day	Abated Emissions, lb/day	Abated Emissions, lb/yr
Benzene	17	1.73	0.026	9.49
Toluene	583	70.14	1.052	384.0
Ethyl benzene	20	2.77	0.042	15.18
Xylenes	991	137.37	2.060	752.1
MTBE	1.25	0.14	0.002	0.79

Combustion of fuel when the Thermal/Catalytic Oxidizer is being used to abate S-2 will result in secondary emissions from the Thermal/Catalytic Oxidizer. These emissions were assessed for the oxidizer when S-2 was originally permitted. There is no change to these emissions being proposed under this application, but the maximum secondary emissions have been shown on the attached spreadsheet and summarized in Table 2 below for reference.

These emissions are based on assumed continuous operation for a full year (8,760 hours per year) at the maximum natural gas firing rate of the Thermal/Catalytic Oxidizer, 0.75 million BTU per hour. The emission factors for nitrogen oxides (NOx) and carbon monoxide (CO) are the Reasonably Available Control Technology (RACT) emission limits for thermal oxidation. The emission factors for total particulate matter (the entire amount assumed to be PM10), sulfur dioxide (SO2), and VOC are the standard emission factors from EPA's Compilation of Air Pollutant Emission Factors for Natural Gas Combustion, AP-42, Table 1.4-2. Note that the Thermal/Catalytic Oxidizer is not expected to operate for a full year at this location, so the secondary emissions at this project location

are expected be less than the maximum annual emissions shown in Table 2. Once the abatement device is switched to the Activated Carbon Adsorption Unit, there will be no secondary emissions from the SVE operation.

Table 2
Maximum Permitted Secondary Emissions from A-2, Thermal/Catalytic Oxidizer

Compound	Emission Factor, lbs/MMBtu	Emission Factor Basis	Annual Emissions, lbs/yr	Annual Emissions, tons/year
NOx	0.2	RACT	1,314	0.657
CO	0.8	RACT	5,256	2.628
PM10	0.075	AP-42	493	0.246
SO2	0.0006	AP-42	4	0.002
VOC	0.0054	AP-42	36	0.018

Cumulative Increase

The District tracks increases in criteria pollutant emissions from each permitted facility. Typically, evaluation of a revision to a Permit to Operate considers the emission increase above the prior permit. However, this source S-2 was originally permitted under Plant #21560, and the emissions were based on the site specific data at that location. Operation of S-2 at this new proposed location has been assigned a new plant number, Plant #22247, and the emissions originally assessed for S-2 at the previous plant number are not listed under this new plant number.

Also, since S-2 is portable and since the emissions from the newly proposed location are directly related to the level of contamination being treated at this site, the criteria pollutant emission increase charged for operation of S-2 and A-2 under this Plant #22247 will be the maximum permitted emissions allowed at this location (rather than the increase over the amount previously assessed for S-2 at the original location). Therefore, the emission increase consists of the maximum abated VOC emissions from S-2, as well as the maximum potential secondary emissions from the Thermal/Catalytic Oxidizer A-2, summarized below:

Table 3
Plant #22247, Cumulative Criteria Pollutant Emission Increases

Pollutant	Existing Total, tpy	Project Increase, tpy	New Total, tpy
PM10	0	0.246	0.246
VOC	0	9.938	9.938
NOx	0	0.657	0.657
SO2	0	0.002	0.002
CO	0	2.628	2.628

Compliance Determination

California Environmental Quality Act (CEQA) Requirements, District Regulation 2, Rule 1

District Regulation 2, Rule 1, Section 310 specifies that all proposed new and modified sources subject to District permit requirements must be reviewed in accordance with CEQA requirements, except for ministerial projects or projects exempt from CEQA under Section 2-1-312. The project is considered to be ministerial under Regulation 2-1-311. The engineering review for this project requires only the application of standard permit conditions and standard emission factors as outlined in Chapter 9.2 of the permit handbook and therefore is not discretionary as defined by CEQA. This ministerial project is therefore is not subject to CEQA review.

Public Notice Requirements, Regulation 2, Rule 1

The public notification requirements of Regulation 2-1-412 apply to new or modified sources which result in any increase in toxic air contaminant or hazardous air contaminant emissions within 1,000 feet of the boundary of a K-12 school. The public notice requirements in Regulation 2-1-412 apply, since the proposed location is within 1,000 feet radius of two K-12 schools, Horace Mann Elementary School, located at 55 North Seventh Street, and St Patrick Parochial/Elementary School, located at 51 North Ninth Street.

If public notice requirements are triggered, all schools within a ¼ mile radius and all residences within 1,000 feet must also be notified of the proposed project. There are no additional K-12 schools located within ¼ mile of the proposed operation.

New Source Review, District Regulation 2, Rule 2

Per Regulation 2, Rule 2, Section 301, Best Available Control Technology (BACT) is triggered if the maximum potential criteria pollutant emissions from a new or modified source will be 10 pounds per day or more. The abated emissions from operation of the SVE system at the proposed location will exceed 10 pounds of VOC per highest day and operation of S-2 is therefore subject to BACT review.

The BACT/TBACT Workbook Document 151A.1, dated 6/15/1995, applies to all soil vapor extraction operations. The VOC control requirements for BACT1/TBACT (technologically feasible/cost effective) and BACT2 (achieved in practice) are summarized in Table 4 below.

**Table 4
BACT for Soil Vapor Extraction Operations (Document # 151A.16/15/1995)**

Pollutant	BACT1/TBACT	BACT2
VOC	<p>≤ 10 ppmv at outlet of control device; or</p> <p>≥ 98.5% capture/destruction efficiency</p>	<p>≤ 10 ppmv at outlet of control device; or</p> <p>≥ 98.5% capture/destruction efficiency if inlet VOC ≥ 2000 ppmv; or</p> <p>≥ 97% capture/destruction efficiency if inlet VOC ≥ 200 ppmv to < 2000 ppmv; or</p> <p>≥ 90% capture/destruction efficiency if inlet VOC < 200 ppmv</p>

Since Best Available Control Technology for Toxics (TBACT) requirements apply to this operation (discussed in detail under District Regulation 2, Rule 5), the more stringent BACT1/TBACT control requirements apply and will be included in the permit conditions for operation of S-2 at this site.

The emission offset requirements are specified in District Regulation 2, Rule 2, Section 302 for emissions of VOC and NOx. VOC and NOx emission offsets are required for facilities which are permitted to emit more than 10 tons per year. Regarding secondary emissions from the Thermal/Catalytic Oxidizer, the California Health and Safety Code Section 42301.2, specifies:

“A district shall not require emission offsets for any emission increase at a source that results from the installation, operation, or other implementation of any emission control device or technique used to comply with a district, state, or federal emission control requirement, including, but not limited to, requirements for the use of reasonably available control technology or best available retrofit control technology, unless there is a modification that results in an increase in capacity of the unit being controlled.”

The Thermal/Catalytic Oxidizer is an abatement device as defined in Regulation 1-240, which is being operated to meet the control requirements in Regulation 8, Rule 47. The District does not require the applicant to provide emission offsets for the secondary pollutant emissions from an abatement device, unless the source being abated is being modified. In accordance with District policy for secondary pollutant emissions, if the secondary VOC and NOx emissions from an abatement device exceed 10 tons per year, the District provides applicable offsets for secondary pollutants from the Growth Allowance/Small Facilities banking account (BAAQMD Account #1157) to satisfy no net increase requirements.

Since annual emissions from portable equipment may not exceed 10 tons per year, and the VOC and NOx emissions from S-2 and A-2, which will be enforced through permit conditions for this operation, will not exceed 10 tons per year, VOC and NOx offsets are not required.

The Prevention of Significant Deterioration (PSD) requirements in District Regulation 2, Rule 2, Section 304 apply to major facilities which emit more than 100 tons per year for specified source categories or 250 tons per year for unlisted source categories. Since this operation may not emit more than 10 tons per year, the PSD requirements do not apply.

There are no federal NSPS, NESHAP, or MACT regulations that apply to soil vapor extraction operations.

Health Risk Assessment Requirements, District Regulation 2, Rule 5

The District's regulation concerning toxic air contaminant (TAC) emissions is codified in Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. All TAC emissions from new and modified sources are subject to risk assessment review, if emissions of any individual TAC exceed either the acute or chronic emission thresholds defined in Table 2-5-1. Table 2-5-1 emission thresholds are levels below which emissions are not expected to cause, nor contribute significantly to, adverse health effects.

Gasoline contains the TACs - benzene, toluene, ethyl benzene, xylenes, and methyl tertbutyl ether, so emissions of these compounds will occur during remediation of a gasoline-contaminated site. To quantify the maximum expected level of TAC emissions, Frey Environmental performed sampling and testing of the soil contamination at this site. Based on these sample results, the maximum potential TAC emissions resulting from operation of the SVE system at this location for a year were calculated on the attached spreadsheet, based on full operating capacity and continuous operation. These maximum potential emissions and the acute and chronic trigger levels from Regulation 2, Rule 5 for each TAC are summarized in the table below.

**Table 5
TAC Emissions Based on Maximum Site Concentrations***

TAC	Influent Vapor Concentration (ppmv)	Abated TAC Emissions (lbs/hour)	Abated TAC Emissions (lbs/year)	Acute Trigger Level (lbs/hour)	Chronic Trigger Level (lbs/year)
Benzene	1610	0.10	899.0	2.9	3.8
Toluene	583	0.044	384.0	82	12,000
Ethyl benzene	386	0.033	293.0	---	43
Xylenes	991	0.086	752.1	49	27,000
MTBE	1.25	0.00009	0.8	---	210

*Did not pass the Health Risk Analysis

Full-time operation of S-2 at this location based on the highest TAC concentrations measured result in emissions of benzene and ethyl benzene which exceed the chronic risk screening trigger levels in Table 2-5-1. Therefore, a health risk screening analysis was performed to assess the incremental health risk resulting from the TAC emission levels in Table 5.

Modeling: The ISCST3 air dispersion computer model was used to estimate annual average ambient air TAC concentrations resulting from the SVE operation. Since the ISCST3 model does not estimate air concentrations within a building cavity region, where potential receptors are located, the ISC Prime model was also run to evaluate this scenario. The model was run with San Jose International Airport meteorological data. Elevated terrain was considered using 10m DEM input from the USGS San Jose West, Milpitas, Cupertino, Mountain View sub areas. The model run was made with the urban dispersion coefficient. Stack and building parameters for the analysis were based on information provided by the applicant.

Health risk: The resulting ambient air concentrations from the modeling were combined with cancer risk potency values for each TAC determined by the California Office of Environmental Health Hazard Assessment and standard risk assessment methodology. For residents, the standard risk assessment methodology estimates risk assuming exposure to annual average TAC concentrations occurs 24 hours per day, 350 days per year, for 70-years. For offsite workers, risk estimates assume exposure occurs 8 hours per day, 245 day per year, for 40 years. Risk estimates for students assume a higher breathing rate, and potential exposure is assumed to occur 10 hours per day,

36 weeks per year, for 9 years. Cancer risk adjustment factors (CRAFs) were used to calculate all cancer risk estimates. The CRAFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. This risk assessment methodology is considered to be health-protective.

The potential for non-cancer health effects was evaluated by comparing the long-term exposure level to a Reference Exposure Level (REL). A REL is a concentration level at or below which no adverse health effects are anticipated. RELs are designed to protect sensitive individuals within the population. Comparisons to RELs are made by determining the hazard index, which is the ratio of the estimated exposure level to the REL.

Results from the health risk screening analysis based on worst-case emissions in Table 5 indicated a maximum increase in cancer risk estimated at 854 in a million. This was based on the assumption that the highest concentrations of TACS measured at the site would persist for the entire exposure period assessed: 70 years for residents, 40 years for offsite workers, and 9 years for students. This assessed risk is significantly higher than what would actually occur, since the emissions from this operation will be reduced over time and the actual exposure period will be less than these conservative assumptions. However, in accordance with the District's Regulation 2, Rule 5, Section 302, this project risk level is not abordable.

Benzene and ethyl benzene are the TACs responsible for the cancer risk associated with the project. Frey Environmental agreed to accept conditions limiting benzene and ethyl benzene emissions to reduce the estimated project cancer risk. Based on reduced inlet concentrations of benzene not to exceed 17 ppmv and ethyl benzene not to exceed 20 ppmv, the resulting TAC emissions were reduced to the levels presented in the table below. All other TACs emissions were based on the highest measured concentrations from the site analysis.

Table 6
Permitted* TAC Emissions Based on Inlet Benzene ≤ 17 ppmv and Ethyl Benzene ≤ 20 ppmv

TAC	Influent Vapor Concentration (ppmv)	Abated TAC Emissions (lbs/hour)	Abated TAC Emissions (lbs/day)	Abated TAC Emissions (lbs/year)
Benzene	17	0.0011	0.026	9.5
Toluene	583	0.044	1.05	384.0
Ethyl benzene	20	0.0017	0.042	15.2
Xylenes	991	0.086	2.06	752.1
MTBE	1.25	0.00009	0.002	0.8

*Passes the Health Risk Analysis

The resulting health risks for this project, based on the reduced emissions in Table 6, are summarized in Table 7.

Table 7
Project Health Risk Summary

Receptor	Maximum Increased Cancer Risk	Non-Cancer Hazard Index	
		Chronic	Acute
Residential	10 chances in a million	0.0453	0.0079
Worker	2.18 chances in a million	0.0199	0.0066
Horace Mann Elementary	0.056 chances in a million	0.0006	0.0022
St. Patrick Parochial	0.006 chances in a million	0.0001	0.0005

Pursuant to District Regulation 2, Rule 5, Sections 301 and 302, since the maximum increase in incremental cancer risk does not exceed 10 in a million and since the chronic and acute hazard indices do not exceed 1.0, a Permit to Operate for this project can be issued if the project meets TBACT. As previously discussed in the BACT analysis, the Thermal/Catalytic Oxidizer and the Activated Carbon Adsorption System will be required to meet the more

stringent BACT1/TBACT requirements as required by Regulation 2, Rule 5, Section 301. TBACT requires A-2 to meet an abatement efficiency of at least 98.5% by weight, or a VOC concentration of no greater than 10 ppmv at the outlet of the abatement device. Since TBACT will be met, this project is approvable under Regulation 2, Rule 5, Section 302.

Since the benzene and ethyl benzene emissions were limited to less than the concentrations measured at the site in order to pass the Health Risk Analysis, permit conditions will be included limiting emissions of benzene and ethyl benzene to 0.026 pounds per day and 0.042 pounds per day (the abated emissions resulting from inlet concentrations of 17 and 20 ppmv at continuous operation), respectively. The operator will be required to test the benzene and ethyl benzene content in the exhaust gas, calculate the resulting emissions, and adjust the inlet stream as necessary to ensure these emission limits are not exceeded.

Air Stripping and Soil Vapor Extraction Operations, District Regulation 8, Rule 47

Soil vapor extraction operations are subject to the operating standards in District Regulation 8, Rule 47. Due to benzene emissions, this SVE operation is subject to Regulation 8, Rule 47, Section 301, which requires abatement at a control device that reduces emissions to the atmosphere by at least 90% by weight. Due to total organic compound emissions exceeding 15 pounds per day, this operation is also subject to Regulation 8, Rule 47, Section 302, which also requires abatement at a control device that reduces emissions to the atmosphere by at least 90% by weight. This operation is expected to comply with these sections, since it is also subject to BACT1/TBACT control, which requires abatement of 98.5% by weight. The control devices proposed are capable of meeting this control efficiency, which will be included in the permit conditions with associated monitoring to demonstrate compliance.

Condition #25454

The existing permit conditions for S-2 and A-2 will be modified for operation at the proposed location in San Jose, as shown below in strikeout/underline format:

1. The owner/operator of this source (S-2) shall provide written notification to the Engineering Division at least 3 days prior to start-up of operation at any new location. The notification shall include:
 - a. Application Number ~~25063-25893~~ and Plant Number ~~2156022247~~.
 - b. Street address including zip code, for the location where the equipment will be operated.
 - c. The name and telephone number of a contact person where the equipment will be operated.
 - d. The date of initial start-up and estimated duration of operations at that location.
 - e. The distance from the source to the outer boundary of the nearest K-12 school, or indication that the distance is greater than 1500 feet.

In the event that the start-up is delayed less than 5 days, the operator may provide telephone notice of said change to assigned Plant Engineer in the Engineering Division. If the start-up is delayed more than 5 days, written notification must be resubmitted. [Basis: Regulation 2-1-220]

2. The owner/operator shall not allow this equipment to remain at any single location for a period in excess of 12 consecutive months, following the date of initial operation, except as allowed under Section 2-1-220.10. If this portable equipment remains at any fixed location for more than 12 months, the portable permit will automatically revert to a conventional permanent location permit and the owner/operator will lose the portability of this permit. [Basis: Regulation 2-1-220.2]
3. The owner/operator shall operate this portable equipment, S-2, at all times in conformance with eligibility requirements set forth in Regulation 2-1-220 for portable equipment. [Basis: Regulation 2-1-220]
4. The owner/operator shall not operate ~~er~~ this equipment within 1000 feet of the outer boundary of any K-12 school, unless the applicable requirements of the California Health and Safety Code Section 42301.6 have been met. This will require the submittal of an application for a revised permit to operate. In order to operate within 1,000 feet of the outer boundary of any K-12 school, the owner/operator must submit an application for a revised Permit to Operate, meet the public notification requirements, and be issued a revised Permit to Operate. The public notification requirements have been satisfied for operation at 247 East Saint John Street in San Jose. [Basis: Regulation 2-1-220.4]

5. The owner/operator shall use this equipment exclusively for removal of non-chlorinated volatile organic compounds (VOC) associated with petroleum products from extracted soil vapor. Total VOC concentration in the soil vapor at the inlet to S-2 shall not exceed 27,200 ppmv (measured as C₆). This shall be demonstrated by onsite sampling required in condition 10 below. [Basis: Regulation 2-5 Cumulative Increase]
6. The owner/operator shall abate the Precursor Organic Compound (POC) emissions from Source S-2 with A-2, SVE abatement System, consisting of either a thermal/catalytic oxidizer, or at least two (200 lbs minimum capacity) Activated Carbon Vessels during all periods of operations. 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. Soil vapor flow rate to S-2 shall not exceed 350 scfm. [Basis: Cumulative Increase, Regulation 8-47-301-1, and 302]
7. The owner/operator shall operate A-2, thermal /catalytic oxidizer such that the POC-VOC abatement efficiency shall be maintained at a minimum of 98.5% by weight for in-let 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 by the owner/operator. For inlet concentrations below 200 ppmv, a minimum abatement efficiency of 90% shall be maintained by the owner/operator. The minimum abatement efficiency shall be waived if outlet POC-VOC concentrations are shown to be less than 10 ppmv (measured as hexane).
 - a. In no event shall benzene and ethyl benzene emissions to the atmosphere exceed 0.0270.026 pounds per day and 0.2030.042 pounds per day, respectively, for sources S-2 respectively at 4550 Redwood Highway in Petaluma 247 East Saint John Street in San Jose.In no event shall benzene and ethyl benzene emissions to the atmosphere exceed 3.8 pounds per year and 43 pounds per year, respectively, for sources S-2 respectively at other remediation sites. [Basis: Cumulative Increase, Regulation 2-5, TBACT, Reg. 8-47-301]
8. The owner/operator shall not operate A-2 Thermal Oxidizer below a minimum operating temperature of less than 1400 degrees Fahrenheit. The owner/operator shall not operate A-2 Electric Thermal/Catalytic Oxidizer below a minimum operating temperature of less than 600 degrees Fahrenheit. [Basis: Cumulative Increase, Regulation 2-5, TBACT]
9. To determine demonstrate compliance with pPart 8, the owner/operator shall equip the A-2 Thermal/Catalytic Oxidizer with continuous measuring and temperature recording instrumentation. The owner/operator shall collect and maintain the temperature data from the temperature recorder in a file which shall be available for District inspection for a period of at least 2 years following the date on which such data are recorded. [Basis: Regulation 1-523]
10. To determine demonstrate compliance with pParts 5 and 7, within ten days after start-up of the thermal/catalytic oxidizer S-2 at a new location, the owner/operator of this source shall:
 - a. Analyze inlet gas stream to determine the flow rate and concentration of POC-VOC present.
 - b. Analyze exhaust gas to determine the flow rate, and the concentrations of Benzene, Ethyl Benzene, and POC-VOC present.
 - c. Calculate the benzene and ethyl benzene emission rates in pounds per day based on the exhaust gas analysis and the operating exhaust flow rate. The owner/operator shall decrease the soil vapor flow rate or dilute the inlet gas stream to S-2 with air, if necessary, to demonstrate compliance with Condition Parts 5 and 7.
 - d. Calculate the POC-VOC abatement efficiency based on the inlet and exhaust gas analysis. For the purpose of determining compliance with condition Parts 5 and 7, the POC-VOC concentration shall be reported as hexane.
 - e. Submit to the District's Engineering Division the test results and emission calculations within one month from the testing date. Samples shall be analyzed according to modified EPA test methods 8015 and 8020 or their equivalent to determine the concentrations of POC-VOC, Benzene, and Ethyl benzene.
 - f. While S-2 is operating at 247 East Saint John Street in San Jose, the owner/operator shall use an organic vapor analyser (OVA) to monitor VOC and to adjust dilution of the inlet gas stream to S-2 on a daily basis

for the first ten days of operation, then twice a week for the first 30 days and weekly thereafter. The owner/operator shall collect influent and stack samples for laboratory analysis of VOC, benzene, and ethyl benzene on a weekly basis for the first month, and on a monthly basis thereafter.

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

11. The owner/operator of this source shall maintain the following records for each month of operation of the catalytic oxidizer:
 - a. Days and hours of operation.
 - b. Each emission test, analysis or monitoring results logged-in for the day of operation they were taken.
 - c. Analysis results for any catalyst plugs removed from the bed to determine remaining life of the catalyst.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. 1-523]
12. During the operation of the A-2 Activated carbon vessels, the owner/operator of this source shall monitor daily 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, Reg. 8-47-301]
13. 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 14 and 15, 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 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. [Basis: Cumulative Increase, Regulation 2-5, TBACT, Reg. 8-47-301]
14. 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 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).[Basis: Cumulative Increase, Regulation 2-5, TBACT, Reg. 8-47-301]
15. The owner/operator 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, Reg. 8-47-301]
16. The owner/operator of this source shall maintain the following information for each month of operation onve of the Activate 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.
 - d. Total throughput of soil vapor processed at source S-2 in Standard Cubic FeetSuch 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, Reg. 8-47-301]

17. Within 30 days from the completion of each treatment operation at a given location, the owner/operator of this source shall provide the assigned Permit Engineer in the Engineering Division with a summary showing the following information:
 - a. The dates and total number of days that the equipment was at that location and the dates, and total number of days that the equipment was operated at that location.
 - b. A summary of the **VOC** abatement efficiency and benzene **and ethyl benzene** emission rates as determined and reported in the start-up sampling report required by ~~condition-Part~~ 10e above.
 - c. The results of any additionally performed emission test, analysis, or monitoring result logged in for the day of operation they were taken.
 - d. The total throughput of contaminated soil vapor processed by S-2 at that location (indicated in cubic feet).
 - e. The total emissions of benzene **and ethyl benzene** at that location based on the sampling results required by ~~conditions-Part~~ 10 above.[Basis: **Cumulative Increase**, Regulation 1-523, **Reg. 2-1-220, Reg. 8-47-501**]
18. Within 30 days after the end of every calendar year, the owner/operator of this source shall provide the assigned Permit Engineer in the Engineering Division a year-end summary showing the following information:
 - a. The location(s) at which the equipment was operated including the dates operated at each location.
 - b. The total throughput of contaminated soil vapor for the previous four quarters (indicated in cubic feet).
 - c. The total benzene **and ethyl benzene** emissions for the previous four quarters (indicated in pounds).[Basis: **Cumulative Increase**, Regulation 1-523, **Reg. 8-47-501**]
19. The owner/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 Permit to Operate. The owner/operator shall maintain and retain all measurements, records and data required for at least two years following the date the data is recorded. [Basis: **Cumulative Increase**, Regulation 1-523, **Reg. 8-47-501**]
20. The owner/operator 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 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]
21. Upon completion of the remediation project, the operator of Source S-2 shall notify the Engineering Division within two weeks of decommissioning the operation, [basis: **Cumulative Increase, Reg. 2-1-403**]

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 a revised Permit to Operate for the equipment listed below. However, the proposed source will be located within 1000 feet of two schools, which triggers the public notification requirements of District Regulation 2-1-412.6.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on the requested revision to the Permit to Operate for the following source:

S-2, Portable Soil Vapor Extraction System, 350 scfm maximum capacity, abated by
A-2, Thermal/Catalytic Oxidizer or Activated Carbon Adsorption Unit, consisting of two 200 lb minimum
activated carbon vessels, in series.

by Tamiko Endow
Tamiko Endow, Air Quality Engineer

Date 5-28-14