

DRAFT-Engineering Evaluation
Phillips 66 Company
5 El Camino Real, Millbrae, CA 94030
Plant No. 203581
Application No. 708208

Background

Atlas on behalf of Phillips 66 Company has applied for an Authority to Construct for the following equipment:

S-1 Soil Vapor Extraction (SVE) System (two blowers in parallel)
Blower 1 - Make: Busch Mink Model: 1322 AV rotary 212 SCFM
Blower 2 - Make: Busch Mink Model: 1502 BP rotary 342 SCFM
Maximum: 300 CFM, Abated by: A-1, Electric Catalytic Oxidizer

A-1 Electric Catalytic Oxidizer
Make: Solleco, Model: SRCO-250ECAT, 300 SCFM

The applicant has proposed the installation of the Soil Vapor Extraction (SVE) system to remediate the soil underneath the 76 Service Station No. 3676 at 5 El Camino Real in Millbrae. This is not within an Overburdened Community (OBC) as defined in Regulation 2-1-413

Phillips 66 Company has been directed by the San Mateo County Groundwater Protection Program (SMCGPP) to repair and restart the SVE to complete remediation of soil and groundwater impacted by a former leaking underground gasoline storage tank at the subject site.

GHD Services Inc. last operated this SVE remediation system under a Permit to Operate (PTO) for Facility No. 24445. In the fourth quarter of 2020, the equipment shut down due to mechanical issues and could not be repaired. GHD terminated the facility. Therefore, Atlas applied for a new PTO through Application No. 708208.

The system includes two Busch Mink vacuum blowers in parallel, with a maximum outflow capacity of 212 and 234 SCFM, respectively. However, the system's maximum outflow capacity will be limited to 300 SCFM as agreed upon by the applicant. The emissions will be abated by an Electric Catalytic Oxidizer (A-1). The catalytic oxidation system can destroy 98.5% of VOCs by weight. A-1 is powered by electricity and does not need fuel to operate; combustion secondary emissions are not expected.

The soil data used to calculate the VOC emissions below is from the BC Laboratories analytical report performed in the last quarter of 2020, provided by the applicant.

Procedures are outlined in the conditions found below. The applicant will be required to provide written notification at the start of the operation. The applicant will be required to stay below the acute and chronic trigger levels of Regulation 2-5.

Emission Calculations

Main Emissions: SSD System - VOCs

Initial soil vapor data will be used to estimate precursor organic compound (POC), non-precursor organic compound (NPOC), and toxic air contaminant (TAC) emissions. It is assumed that the equipment can operate 24 hours a day, 365 days a year. The following are assumptions used to estimate emissions.

- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 Liters (or 386.8 ft³/lb-mol)
- Toxic Air Contaminants (TAC) emissions will be based on soil vapor data submitted with this application summarized in Table 1 of the submittal package.
- The organic influent flow rate of 300 scfm.
- The system will be abated by an Electric Catalytic Oxidizer (A-1) with an efficiency of 98.5% by weight.

Table 1. SVE System Unabated Emissions for S-1						
Pollutant	CAS #	Unabated Emissions				
		Inlet Conc. (ug/m3)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
Benzene	71-43-2	7.2E-06	2.6E-02	6.3E-01	2.3E+02	0.115
Ethylbenzene	100-41-4	2.0E-06	9.9E-03	2.4E-01	8.7E+01	0.044
Toluene	108-88-3	1.9E-04	8.2E-01	2.0E+01	7.2E+03	3.590
TPH-Gasoline	--	6.4E-04	5.0E+00	1.2E+02	4.4E+04	22.103

Table 2. SVE System Abated Emissions for S-1						
Pollutant	CAS #	Abated Emissions				
		Abatement Efficiency (%)	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
Benzene	71-43-2	98.5%	4.0E-04	9.5E-03	3.5E+00	0.002
Ethylbenzene	100-41-4	98.5%	1.5E-04	3.6E-03	1.3E+00	0.001
Toluene	108-88-3	98.5%	1.2E-02	3.0E-01	1.1E+02	0.054
TPH-Gasoline	--	98.5%	7.6E-02	1.8E+00	6.6E+02	0.332

Notes:

1. Influent data for all compounds was obtained from Samples in Table 1 of the application files. This data will be used as the pre abatement concentration.
2. Emissions will be abated by an electrical catalytic oxidizer, A-1.
3. It is assumed that equipment will operate 24 hours a day, 365 days a year.
4. Benzene, Ethylbenzene and Toluene emissions were removed from the total TPH-Gasoline emissions to avoid duplicating them.

Table 3 summarizes organic compound emissions based on the data in Table 2, considering an abatement efficiency of 98.5%.

Table 3. Organic Emissions Review for S-1 – Based on TO-15 Analysis Results					
Pollutant	Effluent Volumetric Concentration (ppmv)¹	Hourly Emission Rate (lb/hr)	Daily Emission Rate (lb/day)	Annual Emission Rate (lb/yr)	Annual Emission Rate (ton/yr)
POC	119	0.09	2.1	776	0.388
NPOC	0	0	0	0	0.000
Total VOC	119	0.09	2.1	776	0.388

Notes:

1. POC and NPOC emissions are based on Table 2. Effluent volumetric concentrations are measured as methane.
5. TPH-Gasoline emissions are considered POC. Benzene, Ethylbenzene and Toluene emissions were removed from the total TPH-Gasoline emissions to avoid duplicating them.
2. Annual emissions will be rounded up and used as a limit in the permit conditions as follows: POC 776 lb/yr.

Secondary Emissions: Electric Catalytic Oxidizer

The catalytic oxidizer is electrically powered, so no combustion-related products are expected. Additionally, although catalytic oxidation of Chlorinated Volatile Organic Compounds (CVOCs) can generate secondary emissions, none are anticipated in this case because no chlorinated compounds were detected.

Cumulative Increase

Table 4. Cumulative Increase			
Pollutant	Current Permitted Emissions, Post 4/5/1991 (ton/yr)	Application New Emissions Increase (ton/yr)	New Cumulative Increase (ton/yr)
POC	0.000	0.388	0.388

Health Risk Assessment (HRA)

At the given rates in Tables 5 and 6, the emissions exceed the chronic trigger levels in Regulation 2-5, Table 2-5-1. Consequently, the project is subject to a Health Risk Assessment (HRA).

The site is a former gasoline dispensing facility (GDF); therefore, the soil is expected to be contaminated with MTBE (Methyl tert-butyl ether) in addition to the compounds listed in Table 1 and 2. MTBE was not detected by the BS Laboratories sampling and analytical report. To be conservative to perform the Health Risk Assessment (HRA), 50% of the detection limit was assumed to calculate the emissions of the non-detected compounds that are expected to be found in the former GDF. This assumption is based on the BAAQMD TAC Emission Factor Guidelines Document, Chapter 3.3 Source-Specific TAC Emission Factors. The detection limit was taken from the laboratory analysis report performed by BC Laboratories provided by the applicant.

Table 5. Project Acute Emissions Review - Regulation 2-5				
Pollutant	CAS #	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Exceeds Acute Trigger Level?
Benzene	71-43-2	4.0E-04	1.2E-02	No

Table 5. Project Acute Emissions Review - Regulation 2-5				
Pollutant	CAS #	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Exceeds Acute Trigger Level?
Ethylbenzene	100-41-4	1.5E-04	N/A	No
Toluene	108-88-3	1.2E-02	2.2E+00	No
MTBE	1634-04-4	2.3E-06	N/A	No

Table 6. Project Chronic Emissions Review - Regulation 2-5				
Pollutant	CAS #	Annual Emission Rate (lb/yr)	Chronic Trigger Level (lb/yr)	Exceeds Chronic Trigger Level?
Benzene	71-43-2	3.5E+00	2.9E+00	Yes
Ethylbenzene	100-41-4	1.3E+00	3.3E+01	No
Toluene	108-88-3	1.1E+02	1.6E+04	No
MTBE	1634-04-4	2.0E-02	1.6E+02	No

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 PM₁₀, PM_{2.5}, or sulfur dioxide (SO₂).

The facility is not expected to have a PTE greater than 10 tons per year of POC. 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 (SO₂), particulate matter less than 10 micrometer (PM₁₀) and particulate matter less than 2.5 micrometer (PM_{2.5}).

NPOC and POC emissions are expected to be below 10 lb/day for S-1. Therefore, BACT is not required.

Reasonably Achievable Control Technology (RACT)

In accordance with Regulation 2-2-102, Reasonably Achievable Control Technology (RACT) is required to control secondary emissions from abatement devices. The electric catalytic oxidizer is not a source of secondary emissions; therefore, it does not require RACT.

California Environmental Quality Act (CEQA)

This project is classified as ministerial under the Air District Regulation 2-1-311, because the engineering review for this project requires only the application of standard emission factors and established formulas as specified in Chapter 9.2 of the Air District's Permit Handbook. This project does not trigger BACT or TBACT and is not subject to the health risk assessment requirements of Regulation 2, Rule 5. This review follows objective procedures and applies standard permit conditions; and therefore, the review of this project is not discretionary as defined by CEQA. Since this project is ministerial, it is not subject to CEQA review requirement of Regulation 2-1-310, and no further CEQA analysis is required.

Compliance

The equipment will be operated within 1000 feet of the Mills High School, located at 400 Murchison Dr Millbrae, CA 94030. Therefore, the project is subject to the public notice requirement of the California Health & Safety Code and Regulation 2-1-412.

Pursuant to Regulation 8-47-301, any soil vapor extraction operation that emits benzene, vinyl chloride, tetrachloroethene, methylene chloride, and/or trichloroethene shall be vented to a control device that reduces emissions to the atmosphere by at least 90 percent by weight. The facility has proposed installing an electric catalytic oxidizer to reduce emissions with an efficiency of 98.5% by weight.

The facility is required to keep the pertinent records per the conditions below pursuant to Regulation 8-47-501.

Prevention of Significant Deterioration (PSD), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) are not triggered.

Permit Conditions**Permit Condition #100809 for S-1**

1. The influent vapor flow rate shall not exceed 300 scfm from the blower of S-1. [Basis: Cumulative Increase, Regulation 2-5].
2. Except for benzene, in no event shall the total toxic air contaminant (TAC) emissions to the atmosphere from S-1 exceed the trigger levels listed in District Regulation 2-5, Table 2-5-1. [Basis: Regulations 8-47-301 and 8-47-302 and Toxics].
3. In no event shall the benzene emissions to the atmosphere from S-1 exceed 3.5 pounds in any consecutive 12-month period. [Basis: Regulations 8-47-301 and 8-47-302 and Toxics].
4. The owner/operator shall not emit from S-1 more than 776 pounds of precursor organic compounds (POC) and non-precursor organic compounds (NPOC) in any consecutive 12-month period. [Basis: Cumulative Increase]
5. The owner/operator shall abate the precursor organic compound (POC)/non-precursor organic compound (NPOC) emissions from S-1 with the Electric Catalytic Oxidizer (A-1) during all periods of operation maintaining a minimum operating temperature of 600 degrees Fahrenheit. The Air District may adjust this minimum temperature, if source test data demonstrates that an alternative temperature is necessary for or capable of maintaining compliance with Part 2 of these conditions. [Basis: Cumulative Increase; Regulations 8-47-301 and 8-47-302 and Regulation 2-5]
6. The total organics (sum of POC and NPOC) abatement efficiency of A-1 shall be maintained at a minimum of 98.5% by weight or a maximum outlet total organics (sum of POC and NPOC) concentration of 10 ppmv (measured as methane) [Basis: Regulations 8-47-301 and 8-47-302 and Regulation 2-5].
7. To determine compliance with the temperature requirement in these permit conditions, the owner/operator shall equip A-1 with a temperature measuring device capable of continuously measuring and recording the temperature in A-1. 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 is recorded. [Basis: Regulation 1-523]

8. Upon initial start-up, the owner/operator shall take air samples from S-1 for laboratory analysis using EPA Method TO-15. The air samples shall be taken at the following locations:
 - a. At the inlet to the catalytic oxidizer
 - b. At the outlet of the catalytic oxidizer, prior to venting to the atmosphere [Basis: Regulation 2-1-403]
9. The owner/operator shall use the results from the laboratory report to calculate the following:
 - a. Organics (POC and NPOC) emissions to demonstrate compliance with Part 3.
 - b. Organics (POC and NPOC) abatement efficiency or outlet Organics (POC and NPOC) concentration of the SVE system (S-1) to demonstrate compliance with Part 5.
 - c. TAC emissions emitted to the atmosphere, using the maximum permitted flow rate of the SVE system (S-1).

The owner/operator shall submit the laboratory report, abatement efficiency, outlet POC concentration, and calculated POC, NPOC, TAC emissions within 21 days of the initial startup, to demonstrate compliance with Parts 1 through 7 of this condition. [Basis: Regulation 2-1-403, Regulation 2-5].

10. The owner/operator shall maintain the following information for each month of operation:
 - 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. 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 (2) years following the date the data is recorded. [Basis: Recordkeeping]

11. The owner/operator shall report any noncompliance 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: Regulation 2-1-403]
12. 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 condition. All measurements, records and data required to be maintained by the operator shall be retained for at least two (2) years following the date the data is recorded. [Basis: Regulation 1-523]
13. Upon final completion of the remediation project, the operator shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Regulation 2-1-403]

End of Conditions

Recommendation

The Air 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 Air 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 ft of a K-12 school, which triggers the public notification requirements of Regulation 2-1-412. After the comments are received from the public and reviewed, the Air District will make a final determination on the permit.

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

S-1 Soil Vapor Extraction (SVE) System (two blowers in parallel)
Blower 1 - Make: Busch Mink Model: 1322 AV rotary 212 CFM
Blower 2 - Make: Busch Mink Model: 1502 BP rotary 342 CFM
Maximum: 300 CFM, Abated by: A-1, Electric Catalytic Oxidizer

A-1 Electric Catalytic Oxidizer
Make: Solleco, Model: SRCO-250ECAT, 300 CFM
Permit Condition No. 100809

By Isis Virrueta,
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