

**DRAFT  
ENGINEERING EVALUATION REPORT  
EXXONMOBIL OIL CORPORATION  
PLANT NUMBER 23468  
APPLICATION NUMBER 28112**

Portable SVE System  
990 San Pablo Avenue  
Albany, CA 94706

## **Background**

On behalf of ExxonMobil Oil Corporation, Cardno has applied to obtain a Permit to Operate a permitted Portable Air Sparge/Dual Phase extraction system consisting of a vacuum pump and ancillary equipment abated by an electric catalytic oxidizer or two carbon beds (200 pound each) arranged in series to remediate petroleum contaminated soil at the above referenced location. The site is within 1000 feet of a school, and therefore requires public notice per Regulation 2-1-412. The source will comply with the updated permit condition ID #26302 as shown below in strikeout/underlined format.

The application covers the following source:

- S-1 Portable Air Sparge/ Dual Phase Extraction System – Regenerative vacuum pump; Nash–Almo, Model R7100R-50, 10 hp, 300 cfm or equivalent, abated by A-1 or A-2**
- A-1 Electric Catalytic Oxidizer, Falmouth Products, FALCO-300, 350 cfm.**
- A-2 Activated Carbon Adsorption Vessels (200 lb each) – 2 in series, Siemens, VSC-200 or equivalent.**

## **Emission Calculations**

Emissions were calculated and accounted for when the source was issued an authority to construct and a permit to operate (Application #27822). The calculations have been revised using the highest total petroleum hydrocarbons as gasoline (TPHg) and Benzene concentrations reported in well SVE1 for this location. For a conservative estimate of yearly emissions, it is assumed that the system is operated for an entire year.

### **Basis:**

- \* Operating conditions: Pressure = 1 atm.; Inlet Temperature = 21°C
- \* Influent values based on operational parameters of equipment and soil vapor test results:
  - Influent rate = 300 cfm maximum;
  - Influent concentrations:
    - TPHg = 8.6 mg/L
    - Benzene = 0.014 mg/L
- \* Abatement efficiency = 98% by wt.

$$\text{Emissions, lb/day} = \text{mg/L} \cdot \text{cfm} \cdot 1440 \text{ min/day} \cdot 28.32 \text{ L/cf} \cdot \text{E-3g/mg} \cdot 1 \text{ lb/454 g} \cdot (1-0.98)$$

Emissions are calculated using the above equation and the basis.

$$\begin{aligned} \text{TPHg emissions (VOC)} &= 8.6 \text{ mg/L} \cdot 300 \text{ cfm} \cdot 1440 \text{ min/day} \cdot 28.32 \text{ L/cf} \cdot \text{E-3 g/mg} \cdot 1 \text{ lb/454 g} \cdot (1-0.98) \\ &= 4.69 \text{ lb/day} \\ &= 1712 \text{ lb/yr @365 days/yr} \\ &= 0.856 \text{ tpy} \end{aligned}$$

**Toxics Emissions:**

$$\begin{aligned} \text{Benzene} &= 0.0076 \text{ lb/day} \\ &= 0.0003 \text{ lb/hr} \\ &= 2.79 \text{ lb/yr @365 days/yr} \end{aligned}$$

**Plant Cumulative Increase**

$$\begin{aligned} \text{Precursor Organic Compounds, POC} &= 0.011 \text{ tpy (current)} + 0.845 \text{ tpy (new)} \\ &= 0.856 \text{ tpy (new total)} \end{aligned}$$

**Toxics Emissions and Health Risk Screening Analysis**

Benzene, Ethylbenzene, and Xylene are the toxic compounds expected to be emitted from the operation and their emissions, as shown below, are below the chronic toxic trigger levels and acute toxic trigger levels given in the Table 2-5-1 of Regulation 2-5. Therefore, a health risk screening is not required.

Toxic Compound	Emission, lb/hr	Acute Trigger level, lb/hr	Emission, lb/yr	Chronic Trigger level, lb/yr
Benzene	0.0003*	2.9	2.79*	3.8
Ethylbenzene			0.0028	43
Xylene	8E-7	49	0.0071	2.7E+4

\*Revised

**Best Available Control Technology (BACT)**

POC emissions from the proposed project will be < 10 pounds per highest day and therefore are not subject to the BACT requirements of Regulation 2-2-301.

**2-2-301 Best Available Control Technology Requirement:** An applicant for an authority to construct or a permit to operate shall apply BACT to any new or modified source:

301.1 Which results in an emission from a new source or an increase in emissions from a modified source and which has the potential to emit 10.0 pounds or more per highest day of precursor organic compounds (POC), non-precursor organic compounds (NPOC), nitrogen oxides (NOx), sulfur dioxide (SO<sub>2</sub>), PM<sub>10</sub> or carbon monoxide (CO). BACT shall be applied for any of the above pollutants which meets both criteria.

*(Amended 6/15/94; 10/7/98; 5/17/00)*

## Offsets

Offsets requirements of Regulation 2-2-302 are not triggered for facility wide or permitted POC emissions < 10 tpy.

## California Environmental Quality Act (CEQA)

The project is considered to be ministerial under the Districts 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 evaluated as per the guidance in Chapter 9.2 of the permit handbook.

## Statement of Compliance

Based on the information submitted, this operation is expected to be in compliance with Regulations 8-47-301, Emission Control Requirements, Specific compounds, and 8-47-302, Organic compounds. The POC emissions will be vented through an electric catalytic oxidizer or a carbon adsorption system at all times of operation.

**8-47-301 Emission Control Requirement, Specific Compounds:** Any air stripping and soil vapor extraction operations which emit benzene, vinyl chloride, perchloroethylene, methylene chloride and/or trichloroethylene shall be vented to a control device which reduces emissions to the atmosphere by at least 90 percent by weight.

**8-47-302 Organic Compounds:** Any air stripping and soil vapor extraction operations with a total organic compound emission greater than 15 pounds per day shall be vented to a control device which reduces the total organic compound emissions to the atmosphere by at least 90 percent by weight.

Prevention of Significant Deterioration, New Source Performance Standards, and National Emission Standards of Hazardous Air Pollutants are not triggered.

## Public Notification, Schools

The project will be located within 1000 feet of K-12 schools, Ocean View Elementary School and Cornell Elementary School, and therefore is subject to the public notification requirements of Regulation 2-1-412. A public notice will be distributed to the parents and guardians of the students of the schools within  $\frac{1}{4}$  mile of the project and to all the addresses within 1000 feet of the project.

## Permit Conditions

COND# 26302 -----

- S-1 Portable Air Sparge/ Dual Phase Extraction System -  
Regenerative vacuum pump; Nash-Almo, Model R7100R-50,  
10 hp, 300 cfm or equivalent, abated by A-1 or A-2

- A-1 Electric Catalytic Oxidizer, Falmouth Products, FALCO-300, 350 cfm.
- A-2 Activated Carbon Adsorption Vessels (200 lb each) - 2 in series, Siemens, VSC-200 or equivalent.
1. The owner/operator of this source shall notify the District at least 3 days prior to start-up of operation at any new location. The notification shall include:
    - a. Source Number 1 and Plant Number 23468.
    - b. Street address, including zip code, for the location where the source will be operated.
    - c. The name and telephone number of a contact person where the source 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 owner/operator may provide telephone notice of said change to the District Engineer. If the start-up is delayed more than 5 days, written notification must be resubmitted.

2. This source shall not 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 source remains at any fixed location for more than 12 months, the portable permit will automatically revert to a conventional permanent location permit and will lose its portability. [Basis: Regulation 2-1-220.2]
3. This portable source, S-1, shall operate at all times in conformance with the eligibility requirements set forth in Regulation 2-1-220 for portable equipment. [Basis: Regulation 2-1-220]
4. This source is not to be operated within 1000 feet of the outer boundary of any K-12 school. Such operation will require the submittal of an application for a revised permit to operate so that the applicable requirements of the California Health and Safety Code Section 42301.6 shall be met. The applicable requirements have been met for the operation at 990 San Pablo Avenue, Albany, CA 94706 (Application #28112). [Basis: Regulation 2-1-220.4]
5. This source shall be used exclusively for the removal of volatile organic compounds associated with extracted soil vapor. This shall be demonstrated by onsite sampling required in Part 10 below.

6. The owner/operator shall abate Volatile Organic Compound (VOC) emissions from Source, S-1 by Abatement device A-1, Electric Catalytic Oxidizer or A-2, Carbon adsorption vessels, during all periods of operation. Soil vapor flow rate shall not exceed 300 scfm.  
[Basis: Cumulative increase; Regulation 8-47-301.1, 8-47-302]
7. The VOC abatement efficiency of abatement device A-1 shall be maintained at a minimum of 98% by weight for all detected inlet VOC concentrations (measured as hexane). The abatement efficiency shall be waived if outlet VOC concentrations are shown to be non-detect (measured as hexane). In no event shall toxic compounds emissions to the atmosphere exceed the toxic trigger levels listed in the Table 2-5-1 of Regulation 2, Rule 5. Annual VOC emissions from all sites combined shall not exceed ~~22~~ 1712 pounds per year. In case, any toxic compound emissions are expected to exceed the trigger levels as per the pilot test results for a proposed site of operation then an application shall be submitted so that a health risk screening analysis requirements of Regulation 2-5 shall be met before commencement of operation at that site.  
[Basis: Cumulative increase; TBACT; Regulation 2-5]
8. While operating the oxidizer, A-1, the minimum operating temperature shall not be less than 600 degrees Fahrenheit.  
[Basis: Cumulative increase; TBACT; Regulation 2-5]
9. To determine compliance with Part 8, the oxidizer, A-1, shall be equipped with continuous measuring and temperature recording instrumentation. The temperature data collected from the temperature recorder shall be maintained 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 compliance with Part 7, within 24 hours after start-up at any new location, the owner/operator of this source shall:
  - a. Analyze the inlet gas to determine the vapor flow rate and concentration of VOC and toxic compounds present.
  - b. Analyze exhaust gas to determine the flow rate, and the concentration of toxic compounds and VOC present.
  - c. Calculate the toxic compounds emission rates in pounds per day and per year based on the exhaust gas analysis and the operating exhaust flow rate. The

- soil vapor flow rate shall be decreased, if necessary, to demonstrate compliance with Part 7.
- d. Calculate the VOC abatement efficiency based on the inlet and outlet gas sampling analysis. For the purpose of determining compliance with Part 7, the VOC concentration shall be reported as hexane.
  - e. Submit to the District 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 8021 or their equivalent to determine the concentrations of VOC and toxic compounds.  
[Basis: Cumulative increase; TBACT; Regulation 8-47-501]
11. Within 30 days from the completion of each treatment operation at a given location, the owner/operator of this source shall provide the District Engineer with a summary showing the following information:
- a. The dates and total number of days that the source was at that location and the dates, and total number of days that the source was operated at that location.
  - b. A summary of the abatement efficiency and VOC and toxic compounds emission rates as determined and reported in the start-up sampling report required by 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-1 at that location (indicated in cubic feet).
  - e. The total emissions of VOC and toxic compounds at that location based on the sampling results required by Part 10 above (indicated in pounds).  
[Basis: Cumulative increase; Regulation 2-5; Regulation 8-47-301.1; 8-47-301.2]
12. During operation of the Carbon Vessels, 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 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]

13. These monitor readings shall be recorded in a monitoring log at the time they are taken. The monitoring results shall be used 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 must be received by the owner/operator prior to a change to the monitoring schedule.
14. The second to last Carbon vessel shall be immediately changed out 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).
15. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv or greater (measured as hexane).
16. The owner/operator of this source shall maintain the following information for each month of operation of the 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.

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 8-47-501; Regulation 1-523]

17. Within 30 days after the end of every calendar year, the owner/operator of this source shall provide the District Engineer a year end summary showing the following information:

- a. The location(s) at which the source 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 VOC and toxic compounds emissions for the previous four quarters (indicated in pounds).  
[Basis: Cumulative increase; Regulation 2-5; Regulation 1-523]
18. 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. 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: Cumulative increase; Regulation 8-47-501; Regulation 1-523]
19. Any non-compliance with these conditions shall be reported to the Compliance and Enforcement Division at the time that it is first discovered. The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well as the time of occurrence.  
[Basis: Cumulative increase; Regulation 2-5; TBACT]

## Recommendations

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination to issue a permit to operate because the project will be expected to comply with all applicable requirements of the District, State, and federal air-quality related regulations. Since the source will be located within 1000 feet of K-12 schools, the public notification requirements of Regulation 2-1-412 are triggered. Final determination/recommendation to issue a permit to operate will be made after public notification and addressing public comments.

- S-1 **Portable Air Sparge/ Dual Phase Extraction System – Regenerative vacuum pump; Nash–Almo, Model R7100R-50, 10 hp, 300 cfm or equivalent, abated by A-1 or A-2**
- A-1 **Electric Catalytic Oxidizer, Falmouth Products, FALCO-300, 350 cfm.**
- A-2 **Activated Carbon Adsorption Vessels (200 lb each) – 2 in series, Siemens, VSC-200 or equivalent.**

By: \_\_\_\_\_  
Dharam Singh, PE  
Air Quality Engineer II