

<b>ENGINEERING EVALUATION REPORT</b>
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<b>PLANT NAME</b>	<b>Marlow Partners</b>
<b>PLANT NUMBER</b>	<b>16914</b>
<b>APPLICATION NUMBER</b>	<b>12140</b>
<b>PLANT/SITE ADDRESS</b>	<b>1791 Marlow Road Santa Rosa, CA</b>
<b>DATE</b>	<b>23 May 2005</b>
<b>ENGINEER</b>	<b>R.E. Frazier</b>
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## 1. BACKGROUND

Marlow Partners has applied for an AC/PO for the equipment necessary for soil remediation at the former site of a perchloroethylene dry-cleaning business located at 1791 Marlow Road in Santa Rosa. Soil vapor extraction will be accomplished by means of a regenerative vacuum blower (S-1) with a maximum operating capacity of 250 scfm. The vacuum unit is also equipped with a water knockout vessel with the assorted appurtenances and control systems for proper handling of any liquid extract. Vapor abatement will be achieved by carbon adsorption (carbon). The carbon system will consist of at least two 250 pound activated carbon vessels connected in series (4 vessels total). The source being permitted is described as follows:

**S-1 Soil Vapor Extraction System, 250 scfm, Abated by A-1 Carbon Adsorption System and Ancillary Equipment consisting of 2 pair of vessels in series, 250 lb/vessel**

The carbon unit influent and effluent VOC concentrations will be monitored with either a portable flame-ionization detector (OVA-FID) or a photo ionization detector (PID) on a schedule appropriate to the level of contamination. To ensure proper operation of equipment and verify attainment of steady-state conditions, Carbon performance will be monitored daily for the first five days. PES may then elect to change their monitoring schedule based on measured influent concentrations and calculated carbon loading. Monitoring schedule changes will be allowed only after District review of concentration measurements and subsequent receipt of District approval.

This source is located within 1,000 feet of the outer boundary of the A.F. Biella Elementary School, and as such this application requires Public Notification via Reg. 2-1-412. A Public Notice will be prepared and sent out to the home address of the students of the school and to each address within a radius of 1,000 feet of the source. Copies of the Public Notice will be sent to the Principal of Biella School

Included in the permit application folder are copies of the Public Notice, a summary of the Public comments received, and a record of the total costs associated with the notice.

## 2. EMISSION CALCULATIONS

Calculations Basis:

Hours of Operation, Annual: 8760 hr per year (100% Op Factor)  
 Flow Rate: 5.54E6 Btu/hr (9200 cf/hr –digester gas; 5500 cf/yr—natural gas)  
 (72.5 MM scf/yr digester gas)

Emission estimates are developed by utilizing vapor concentrations based on the results of soil vapor sampling as well as a pilot study conducted in November of 2004, in conjunction with the following assumptions:

- \* Standard conditions: Pressure = 1 Atm; Temperature = 70°F; 1 lb-mole occupies 360.5 cu ft
- \* Influent concentrations based on estimates provided by applicant: perchloroethylene (PCE) = 0.736 ppmv; trichloroethylene (TCE) = 0.0336 ppmv; cis 1,2-Dichloroethylene (DCE) = 0.0257 ppmv.
- \* Influent flow rate based on operational parameters of equipment: 250 scfm (maximum); abatement efficiency = 99% total. (90 % per vessel). Estimated loading ~20% by weight.

Abated emissions of individual toxic compounds take the following form:

$$E = C_i * Q * C_o * (1 - 0.99)$$

where:

- E = Abated Emissions in #/day;
- C<sub>i</sub> = Influent Concentration in ppmv
- Q = Flow Rate in scfm (250);
- C<sub>o</sub> = Conversion Units

PCE:  $E = 250 \text{ cu ft/min}(60 \text{ min/hr})(24 \text{ hr/day})(\text{lb-mole}/360.5 \text{ cu ft})(165.8 \text{ lb PCE/lb-mole PCE})(0.736 \text{ cu ft PCE}/1\text{E}6 \text{ cu ft air})[1-0.99] = 1.22\text{E-}03 \text{ lb/day PCE (0.44 lb/yr)}$

TCE:  $E = (250)(60)(24)(1/360.5)(131.4 \text{ lb/lb-mole})(0.0336/1\text{E}6)(1-0.99) = 4.4\text{E-}05 \text{ lb/day (0.016 lb/yr)}$

DCE:  $E = (250)(60)(24)(1/360.5)(96.9 \text{ lb/lb-mole})(0.0257/1\text{E}6)(1-0.99) = 2.5\text{E-}05 \text{ lb/day (0.009 lb/yr)}$

Summarized Emissions Are As Follows:

Table 1 Abated Emissions Summary

Compound	Daily Emissions (lb)	Annual Emissions (lb)	Toxic Trigger (lb/yr)
Perchloroethylene (PCE)	1.22E-03	0.44	33
Trichloroethylene (TCE)	4.4E-05	0.016	97
Cis 1,2-Dichloroethylene (DCE)	2.5E-05	0.009	n/s
Total	1.3E-03	0.465	n/a
RFP (tpy)		2.3E-4	

### 3. STATEMENT OF COMPLIANCE

#### A. Toxic Evaluation

Since the maximum annual toxic emissions are less than the toxic trigger levels of Table 2-1-316, a risk screening assessment is not required. In accordance with the Toxic Section Risk Management Policy, the impact is insignificant since these emissions are unlikely to cause a risk greater than 1 in a million. A public notice is however, required since the proposed operation is within 1000' of a school boundary.

#### B. Regulation 1 – General Provisions and Definitions

§1-301: Prohibits discharging emissions in quantities that cause injury, detriment, nuisance, or annoyance. Emissions from this operation are not expected to violate this section.

#### C. Permits – General Requirements, Regulation 2 Rule 1

The proposed source is located within 1000' of the A. F. Biella Elementary School. Therefore a public notification due to toxic air contaminants is required. This notification will be made in June of 2005.

#### D. Permits – New Source Review, Regulation 2 Rule 2 (dated 12/21/2004)

1. **BACT:** This proposed project will not emit over 10 lbs per highest day and is therefore not required to implement BACT. Nevertheless it will be achieved in practice. For soil vapor extraction operations, BACT is defined as attainment of set destruction efficiencies corresponding to set influent concentration values. Operation of the carbon vessels will be conditioned to ensure attainment of an outlet concentration not to exceed 10 ppmv POC.

2. **Offset Requirements:** §2-2-303 (12/21/2004): No criteria pollutant emissions are above 10 tpy, therefore offsets are not required for any pollutants.
3. **Prevention of Significant Deterioration:** §2-2-304: Not applicable.

**E. Regulation 3 – Fees**

Marlow Partners have complied with fee requirements for this application.

**F. Regulation 6 – Particulate Matter and Visible Emissions**

1. Section 301 prohibits for more than 3 minutes per hour, visible emissions as dark or darker than Ringelmann 1 or equivalent opacity. Source S-1 is expected to easily comply with this requirement.
2. Section 305 prohibits emissions of visible particles from causing a nuisance on property other than the operators. S-1 is expected to easily comply with this standard.
3. Section 310 limits the particulate concentration in exhaust gases to 0.15 gr/dscf. Emissions are composed of air + trace amounts of unabated hydrocarbon (colorless). No particulate emissions are expected from this source.

**G. Regulation 8-47 – Organic Compounds – Air Stripping and Soil Vapor Extraction**

Section 301 states “Any air stripping and soil vapor extraction operations which emit benzene, vinyl chloride, perchloroethylene, methylene chloride, or trichloroethylene shall be vented to a control device which reduces emissions to the atmosphere by at least 90 percent by weight.” The proposed S-1 consisting of at least 2 carbon drums in series is expected to approach an abatement efficiency of at least 99%, hence compliance with 8-47 will be ensured.

**H. NSPS/NESHAPS**

There is no New Source Performance Standard or National Emission Standards for Hazardous Air Pollutants that applies to this source.

**I. CEQA**

This project is considered to be ministerial under the District’s CEQA Regulation 2-1-311. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA.

**4. CONDITIONS**

**S-1 Soil Vapor Extraction System, 250 scfm, Abated by A-1 Carbon Adsorption System and Ancillary Equipment consisting of 2 pair of vessels in series, 250 lb/vessel**

1. Source S-1 shall be vented at all times to A-1 consisting of at least two (250 lb minimum capacity each) activated carbon vessels arranged in series. Influent vapor flow shall not exceed 250 scfm. [Basis: Regulation 8-47-301]
2. The 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: [Basis: Regulation 2-1-403]
  - 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 purpose of these permit conditions.

- 3. 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 conditions number 4 and 5, and shall be conducted on a daily basis. The 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 Permit Services Division must be received by the operator prior to a change to the monitoring schedule. [Basis: Regulation 2-1-403]
- 4. The second to last Carbon vessel shall be immediately changed out with unspent Carbon upon breakthrough, defined as the detection at its outlet of the higher of the following: [Basis: Cumulative Increase]
  - a. 10 % of the inlet stream concentration to the Carbon vessel.
  - b. 10 ppmv (measured as C<sub>1</sub>).
- 5. The last Carbon vessel shall be immediately changed out with unspent Carbon upon detection at its outlet of 10 ppmv (measured as C<sub>1</sub>). [Basis: Cumulative Increase]
- 6. The 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.

All measurements, records and data required to be maintained by the 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]

- 7. Any non-compliance of 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: 1-523]
- 8. Upon final completion of the remediation project, the operator of Source S-1 shall notify the Permit Services Division within two weeks of decommissioning the operation. [Basis: Regulation 1-441]

**9. RECOMMENDATIONS**

Issue an Authority to Construct for source S-1 subject to Condition # 22316.

by: \_\_\_\_\_  
Randy E. Frazier, P.E.  
23 May 2005