**TABLE 1**

Estimated Hydrocarbon Removal Rates

Gull Harbor Site

Olympia, WA

| Date | BTEX | TPH-G | Hours of Operations | BTEX Removed | TPH-G Removed | |
|---|---|---|---|---|---|---|
| | lbs/hr | lbs/hr | hrs | lbs | lbs | |
| 8/19/2015 | 0.0000 | 0.00 | 0.00 | 0.00 | 0.00 | SVE Startup |
| 9/22/2015 | 0.0475 | 0.89 | 396.90 | 18.85 | 353.24 | 2057.4 hrs |
| 9/23/2015 | 0.3882 | 22.83 | 12.00 | 0.19 | 273.96 | |
| | | | | 0.00 | 0.00 | |
| | | | | 0.00 | 0.00 | |

**418.9 Total Hours Extraction Blower Operated**

***Soil Vapor Extraction***

| | | |
|---|---|---|
| **Total BTEX Removed** | **19.05** | **pounds** |
| **Total TPH-G Removed** | **627.20** | **pounds** |

*Note: The SVE blower was started on August 19, 2015 and is operated from 8:00 AM to 8:00 PM to limit the noise issues from the neighbors.

**TABLE 1**
Soil Vapor Extraction System Air Testing Results
Gull Harbor Site - Olympia Washington

| Date | Sample ID | Contaminant | Laboratory Sample Results parts per million volume (ppmv) | Molecular Weight (1) grams per - mole (g/mole) | Flowrate Measured (2) cubic feet per minute (cfm) | Potential To Emit Actual Flow Rate pounds per hour (lb/hr) | Potential To Emit Actual Flow Rate (3) pounds per day (lb/day) |
|---|---|---|---|---|---|---|---|
| 8/19/2015 | **Air Out-081915** | Benzene | 1.4595 | 78.11 | 200.00 | 0.0034987 | 0.0420 |
| | 10:00 AM | Toluene | 6.7730 | 92.13 | 200.00 | 0.0191509 | 0.2298 |
| | Flow rate 200 cfm | Ethylbenzene | 0.2712 | 106.2 | 200.00 | 0.0008839 | 0.0106 |
| | 5-inches Hg | Xylenes | 7.3446 | 106.2 | 200.00 | 0.0239386 | 0.2873 |
| | Total System Vacuum | Gasoline | 276.5714 | 105 | 200.00 | 0.8912532 | 10.6950 |
| | | | | | **BTEX Totals** | **0.0475** | **0.57** |
| | | | | | **TPH-G Totals** | **0.8913** | **10.70** |

**Notes:**
**SCFM** = Flow rate of gas (standard cubic feet per minute)
**PPMV** = Concentration of gas in parts per million by volume
1 Liter = 0.03531 cubic feet
1 Mole of gas = 24.46 Liters volume at STP (77"F and 29.92 "w.c.)
**ft/min** = feet per minute
**Inches Hg** = Inches Mercury (Hg)

**Conversion from ug/m^3 to PPMV**

| | mg/m3 | Mol Wt. | PPMV |
|---|---|---|---|
| TPH-Gx | 1,210.00 | 105 | 276.571 |
| Benzene | 4.75 | 78.11 | 1.459 |
| Toluene | 26.00 | 92.13 | 6.773 |
| Ethylbenzene | 1.20 | 106.2 | 0.271 |
| Xylenes | 32.50 | 106.2 | 7.345 |

**TO CALCULATE TOTAL POUNDS REMOVED:**

$$\textbf{TOTAL LBS REMOVED} = \frac{\textbf{MW}\ \text{g}}{1\ \text{mole}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} \times \frac{1\ \text{mole}}{24.46\ \text{std L}} \times \frac{1\ \text{L}}{0.03531\ \text{cu ft}} \times \frac{\textbf{SCFM}\ \text{std cu ft}}{\text{min}} \times \frac{\textbf{CONC}\ \text{ppmv}}{1\text{x}10\text{^}6\ /\text{ppmv}}$$

(1) = Taken from the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards.
(2) = Velocity estimated from ROOTS URAI 59 flow curves based on 5.0 inches Hg vacuum at the system inlet.
(3) = Potential emission rate as indicated by no treatment or no Best Available Control Technology (BACT) Method on 12-hours of operation per day.

**TABLE 1**
Soil Vapor Extraction System Air Testing Results
Gull Harbor Site - Olympia Washington

| Date | Sample ID | Contaminant | Laboratory Sample Results<br>parts per million volume (ppmv) | Molecular Weight (1)<br>grams per - mole (g/mole) | Flowrate Measured (2)<br>cubic feet per minute (cfm) | Potential To Emit Actual Flow Rate<br>pounds per hour (lb/hr) | Potential To Emit Actual Flow Rate (3)<br>pounds per day (lb/day) |
|---|---|---|---|---|---|---|---|
| 9/23/2015 | **Outlet-09232015** | Benzene | 23.3517 | 78.11 | 200.00 | 0.0559795 | 0.6718 |
| | 10:00 AM | Toluene | 62.5204 | 92.13 | 200.00 | 0.1767775 | 2.1213 |
| | Flow rate 200 cfm | Ethylbenzene | 4.7458 | 106.2 | 200.00 | 0.0154680 | 0.1856 |
| | 5-inches Hg | Xylenes | 42.9379 | 106.2 | 200.00 | 0.1399488 | 1.6794 |
| | Total System Vacuum | Gasoline | 7085.7143 | 105 | 200.00 | 22.8337596 | 274.0051 |
| | | | | | **BTEX Totals** | **0.3882** | **4.66** |
| | | | | | **TPH-G Totals** | **22.8338** | **274.01** |

**Notes:**
**SCFM** = Flow rate of gas (standard cubic feet per minute)
**PPMV** = Concentration of gas in parts per million by volume
1 Liter = 0.03531 cubic feet
1 Mole of gas = 24.46 Liters volume at STP (77"F and 29.92 "w.c.)
**ft/min** = feet per minute
**Inches Hg** = Inches Mercury (Hg)

**Conversion from ug/m^3 to PPMV**

| | mg/m3 | Mol Wt. | PPMV |
|---|---|---|---|
| TPH-Gx | 31,000.00 | 105 | 7085.714 |
| Benzene | 76.00 | 78.11 | 23.352 |
| Toluene | 240.00 | 92.13 | 62.520 |
| Ethylbenzene | 21.00 | 106.2 | 4.746 |
| Xylenes | 190.00 | 106.2 | 42.938 |

**TO CALCULATE TOTAL POUNDS REMOVED:**

$$\textbf{TOTAL LBS REMOVED} = \frac{\textbf{MW}\ \text{g}}{1\ \text{mole}} \times \frac{1\ \text{lb}}{453.6\ \text{g}} \times \frac{1\ \text{mole}}{24.46\ \text{std L}} \times \frac{1\ \text{L}}{0.03531\ \text{cu ft}} \times \frac{\textbf{SCFM}\ \text{std cu ft}}{\text{min}} \times \frac{\textbf{CONC}\ \text{ppmv}}{1\text{x}10^6\ /\text{ppmv}}$$

(1) = Taken from the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards.
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