AIR EMISSIONS COMPLIANCE TEST REPORT

Property 01-115, Handy Andy #8

Air Sparging and Soil Vapor Extraction System

4403 NE St. James Road, Vancouver, Washington

Prepared for:

Washington Department of Ecology
Southwest Regional Office
Toxics Cleanup Program
P.O. Box 47775
Olympia, Washington 98504-7775

Prepared by:

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Portland, Oregon 97224
(503) 639-3400

On Behalf Of:

TOC Holdings Co.
2737 West Commodore Way
Seattle, Washington 98199

August 2011

Project No. 1-61M-076111.01.2

August 26, 2011
Project No. 1-61M-076111.01.2

Washington Department of Ecology
Southwest Regional Office
Toxics Cleanup Program
P.O. Box 47775
Olympia, Washington 98504-7775

Attention: Mr. Mohsen Kourehdar, P.E.

Subject: Air Emissions Compliance Test Report
Property 01-115, Handy Andy #8
Air Sparging and Soil Vapor Extraction System
4403 NE St. James Road, Vancouver, Washington

Dear Mr. Kourehdar:

On behalf of TOC Holdings Co., AMEC Earth & Environmental, Inc. (AMEC) is pleased to present this Air Emissions Compliance Test Report. This report presents the results of air emissions testing performed on August 12, 2011 at the soil vapor extraction system located at 4403 NE St. James Road in Vancouver, Washington. The testing was performed in accordance with the Comprehensive Test Plan in the Air Emissions Permit, issued under Consent Decree DE 99TC S-206.

Sincerely,

AMEC Earth & Environmental, Inc.

Lance B. Johnson, PE
Senior Mechanical Engineer

Jack T. Spadaro, Ph.D., CHMM
Project Manager

Attachments: Air Emissions Compliance Test Report

HN/lp

c: Mr. Mark Chandler, TOC Holdings Co.

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1.0 INTRODUCTION

A dissolved phase gasoline groundwater plume extends from the Handy Andy #8 gas station (3314 NE 44th Street) to Arnold Park, near the residence at 2818 NE Cherry Road in Vancouver, Washington (Figure 1). An air sparging and soil vapor extraction (AS/SVE) system has been installed to remediate petroleum impacted soil and groundwater within the plume. The AS/SVE equipment compound is located at 4403 NE St. James Road (Site), adjacent to the station. The AS/SVE system includes wells and piping on the station property, the property at 4403 NE St. James Road, nearby public roads downgradient of the station, and three commercial properties located south of NE 44th Street. Air emissions monitoring, sampling, and reporting are conducted at the AS/SVE system to satisfy requirements of the Air Emissions Permit issued by the Washington Department of Ecology (Ecology) under Consent Decree DE 99TC S-206. This Air Emissions Compliance Test Report, prepared by AMEC Earth & Environmental, Inc. (AMEC) on behalf of TOC Holdings Co. (formerly Time Oil Co.), contains the results of SVE system emissions testing performed on August 12, 2011.

1.1 AS/SVE SYSTEM OVERVIEW

The AS/SVE system is designed to remove contaminants from the subsurface through physical processes and enhanced natural biological degradation processes. The AS/SVE equipment compound is located at 4403 NE St. James Road, adjacent to the service station (Figure 1). AS/SVE wells were originally installed in 2001 at the service station property, at 4403 NE St. James Road, along NE 44th Street (Station Area), and along NE St. James Road and NE 42nd Street (Mid-Plume Area). The AS/SVE system was expanded in 2009 to include an additional 21 AS wells and 6 SVE located south of NE 44th Street. The current AS/SVE system includes 40 AS wells and 16 SVE wells. Two 15-horsepower positive displacement rotary lobe blowers in the compound are used to inject air into the 40 AS wells, and up to three 5-horsepower regenerative blowers are used to extract vapors from the 16 SVE wells.

Since the first quarter of 2006, two 500-pound vapor phase granular activated carbon (GAC) air treatment units and one 1,000-pound GAC unit have been used for air treatment as needed, depending on influent photoionization detector (PID) readings and/or air analytical results.

Comparison of historical air analytical results with field PID readings collected since the system startup indicate that a PID reading of approximately 25 parts per million by volume (ppmv) corresponds to the total volatile organic compound (VOC) emission limit of 1.0 ton per year specified in the Site air discharge permit. Therefore, for field monitoring purposes, an effluent PID reading of 20 ppmv was set as a general trigger point for treatment of extracted soil vapors.

When PID readings indicate the influent VOC concentrations are consistently below treatment threshold limits, the carbon units are bypassed and the extracted soil vapors are discharged directly to the atmosphere. Currently blower #2 from the original system and both blowers from the expanded system (#3 and #4) are discharging directly to the effluent stack. Blower #1 from the original system is not currently operational.

The GAC units are changed out as needed in response to constituent breakthrough, indicated by elevated VOC concentrations in the GAC effluent. The most recent GAC change out of all three vessels occurred on June 15, 2010.

1.2 TEST PROGRAM

The air emissions testing program consists of monitoring, sampling, and analytical testing activities at the AS/SVE system as outlined in the Air Emissions Permit under Consent Decree DE 99TC S-206 and the Comprehensive Test Plan. The Permit Reference Table (Table 1) contains a summary of the Air Emissions Permit requirements.

A vapor sample of the SVE system effluent was collected on August 15, 2011. A 1 liter stainless steel Summa canister was filled with air discharged from the SVE system at a sampling port located on the effluent stack. The vapor sample was submitted to Environmental Science Corp. (Mt. Juliet, Tennessee) and analyzed for VOCs, including permitted constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPH-G) by modified Method TO-15 (United States Environmental Protection Agency [EPA] Method TO-15). Chemical analysis of the sample was performed within the proper holding period (14 days).

The results of laboratory testing and the field measured system air flow rate were used to calculate an emission rate for the SVE system. The Comprehensive Test Plan describes the testing procedures and the air flow and emission rate calculations in more detail.

2.0 DISCUSSION OF TESTING RESULTS

The following sections provide a summary of the operation parameters and estimated emission rates for the SVE system.

2.1 AS/SVE SYSTEM OPERATING PARAMETERS

Three SVE blowers are currently operating and were operating during the latest sampling event. The SVE flow rate of the system at the time of air sampling was determined to be 668 standard cubic feet per minute ([scfm] Table 2, attached), using vacuum measurements collected before each blower, and pressure measurements collected after each blower on August 15, 2011. The readings are collected in actual cubic feet per minute (acfm), if actual site conditions are different from the standard or reference conditions, corrections must be made to reflect the actual conditions of pressure, temperature and relative humidity (i.e., convert to acfm using the standard equation for conversion). Blower performance calculations, including head (used for centrifugal compressors) and horsepower, are based on actual (not standard) conditions existing at the inlet and outlet connections of the blower. These vacuum and pressure measurements were used with the blower manufacturer's "vacuum versus flow curve" to determine blower flow rates (Appendix A). The total flow of the system is the sum of the flows from each of the three operational SVE blowers. It should be noted that the blower curves used to calculate system flow rate are representative of factory conditions, and will yield conservatively high system flow rates when applied to blowers that have been in use and have experienced wear that lower blower efficiencies. The average calculated total flow from the blowers during the testing period between February 2011 and August 2011 was 420 scfm.

The manufacturer's blower curve is included in Appendix A. Data for system operating parameters and the derived system flow rates for the expanded system operation between February 2011 and August 2011 are included in Table 2. Historical system flow data are included in Tables B-1 and B-2 in Appendix B. The flow rate conversion calculation is shown in attached Table 3.

2.2 AS/SVE SYSTEM AIR EMISSIONS

Laboratory test results are included in Appendix C. The analytical results for the August 12, 2011 air effluent sample indicated that benzene, ethylbenzene, and xylenes were not detected above their respective method reporting limits. Permit regulated constituents, including ethylbenzene, xylenes, and TPH-G were detected in the air sample at concentrations of 0.019 micrograms per liter ([µg/L] 4.4 parts per billion by volume [ppbV]), 0.54 µg/L (124 ppbV), and 6.6 µg/L (1,600

ppbV), respectively. Calculations used for the conversion of the laboratory reported concentration units are included in Table 4, attached.

The emission rate of total VOCs to the atmosphere was calculated to be less than 0.06 tons per year (Table 5), based on both an estimated maximum TPH-G concentration (Table 4, attached) of 6.6 µg/L (1,600 ppbV) in the effluent sample and the total system flow rate of 534 scfm, on August 15, 2011 (Table 2). Vapor readings collected from the effluent stack with a PID have generally been below 1 ppmv. From the original AS/SVE system startup on January 15, 2001 through the August 15, 2011 monitoring event, the estimated cumulative emission of VOCs was approximately 0.65 tons (Table 5, attached).

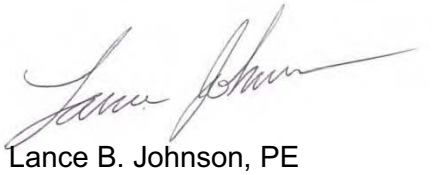
Analytical results of previous Site soil gas samples indicate that TPH-G accounts for the majority of VOCs in the soil gas. As such, the emission calculation assumes that TPH-G analytical results account for all of the VOCs in the effluent sample. The effluent air stream was odorless, and emissions were not visible. Emission calculations are included in Table 5 (attached).

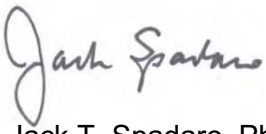
2.3 MONITORING AND RECORD KEEPING

As stipulated in the Air Emissions Permit, air emission testing events are conducted on a biannual basis. The results of the 22nd emission testing event for the AS/SVE system, covering the period from February 2011 through August 2011, are detailed in this report and summarized in Table 5 (attached). System data required to calculate air flow rates will continue to be recorded on a monthly basis, at a minimum, in accordance with the requirements of the existing permit.

AMEC Earth & Environmental, Inc.

REVIEWED BY:





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LIMITATIONS

This report was prepared exclusively for TOC Holdings Co. by AMEC Earth & Environmental, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in AMEC services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This Air Emissions Compliance Test Report is intended to be used by TOC Holdings Co. for Property 01-115 (Handy Andy #8) only, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

The findings contained herein are relevant to the dates of the AMEC Site visit and should not be relied upon to represent conditions at later dates. In the event that changes in the nature, usage, or layout of the property or nearby properties are made, the conclusions and recommendations contained in this report may not be valid. If additional information becomes available, it should be provided to AMEC so the original conclusions and recommendations can be modified as necessary.

TABLES

TABLE 1
Permit Reference Table
Air Sparging and Soil Vapor Extraction System
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Emission Limitations	**Permit Limit/Requirement**
Visible emissions shall be negligible	Zero percent
VOC emissions	1.0 ton per year combined
Benzene	540 ppbV
Toluene	2,980 ppbV
Ethylbenzene	540 ppbV
Xylenes	2,870 ppbV
TPH-G	33,900 ppbV
Operating Limitations	**Permit Limit/Requirement**
Discharge from effluent stack to atmosphere	Vertical 10 feet above ground surface
Air flow rate through system	Maximum of 780 acfm
Monitoring/Record Keeping	**Permit Limit/Requirement**
VOC emissions	Tested biannually and as noted in permit
Gaseous flow rate	Recorded monthly
Record retention	Maintain for three years
Semi-annual report to Ecology	30 days after recording period

Notes:
The emissions limitations for BTEX and TPH-G are 24-hour average effluent concentrations
acfm = actual cubic feet per minute
ppbV = parts per billion by volume

TABLE 2
Temperature, Pressure, and Flow Data for Air Emissions Permit
Air Sparging and Soil Vapor Extraction System
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Pressure After Blower #3 (in. WC)	Pressure After Blower #4 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Vacuum Before Blower #3 (in. WC)	Vacuum Before Blower #4 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Derived Vacuum Blower #3 (in. WC)	Derived Vacuum Blower #4 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Flow (from Curve) Blower #3 (scfm)	Flow (from Curve) Blower #4 (scfm)	Total Flow (scfm)
01/21/11	NA	**0**	**0**	**0**	**0**	**0**	**0**	**64**	**64**	**0**	**0**	**64**	**64**	**0**	**0**	**154**	**154**	**307**
02/03/11	NA	0	0	0	0	0	0	62	62	0	0	62	62	0	0	159	159	319
02/15/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
03/03/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
03/16/11	NA	0	0	0	0	0	0	58	58	0	0	58	58	0	0	170	170	341
03/31/11	NA	0	0	0	0	0	0	58	58	0	0	58	58	0	0	170	170	341
04/07/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
04/12/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
05/12/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
06/13/11	NA	0	0	0	0	0	0	56	56	0	0	56	56	0	0	176	176	352
06/24/11	NA	0	0	0	0	0	35	56	56	0	35	56	56	0	228	176	176	580
07/06/11	NA	0	0	0	0	0	35	56	56	0	35	56	56	0	228	176	176	580
07/21/11	NA	0	0	0	0	0	40	60	60	0	40	60	60	0	217	165	165	546
08/02/11	NA	0	0	0	0	0	45	60	60	0	45	60	60	0	204	165	165	534
08/15/11	**NA**	**0**	**0**	**0**	**0**	**0**	**35**	**60**	**60**	**0**	**45**	**60**	**60**	**0**	**204**	**165**	**165**	**534**

Average Total Flow (February 2011 through August 2011) 420

Notes:
Data in **bold** represent data gathered for an air emissions report
Flows were determined from the Rotron EN707 flow(y) versus vacuum(x) curve (Appendix A) and the polynomial fitted equation:
y = -0.0088x2 - 1.7033x + 298.74
deg F = degrees Fahrenheit
in. WC = pressure measured in inches of water column
scfm = standard cubic feet per minute
NA = Field data not available
"from Curve" = flows calculated using blower curves representative of factory conditions
See Table B-1 and B-2 (Appendix B) for data prior to 07/23/10

TABLE 3
Calculation for Flow Permit Limitation Conversion
Air Sparging and Soil Vapor Extraction System
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Flow Permit Limit Q_{acfm} (ft^3/min)	Temperature @ stack (deg C)	Pressure @ stack (psia)	ρ_{blow} (lbm/ft3)	Equivalent Permit Limit Q_{scfm} (ft^3/min)
780	30	14.7	0.0728	757

Converts 780 actual cubic feet per minute (acfm) to equivalent standard cubic feet per minute (scfm).

Equations Used:

Conservation mass: $Q_{acfm} \times \rho_{blow} = Q_{scfm} \times \rho_{stp}$

therefore,

where Q is flow, ρ_{blow} is density of air at pressure side of blowers, and $\rho_{stp} = 0.075$ lbm/ft^3

and ρ_{blow} is solved from the perfect gas law: $PV = nR_uT$ or $P = \rho \times (R_u/MW) \times T$

where $R_u = 1{,}545$ (lbf X ft)/(pmole X ^oR).

Notes and Assumptions for Conversion of acfm to scfm:

1. The 780 acfm permit limit is assumed to be at the system stack.
2. The gas is air with molecular weight of 29.0 lb/pmole.
3. The air is a perfect gas following the perfect gas law: $PV = n R_uT$.

TABLE 4
Conversion Calculations for Air Emission Concentrations
Air Sparging and Soil Vapor Extraction System
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Sampling Date	Benzene		Toluene		Ethylbenzene		Xylenes		TPH-G	
	(µg/L)	(ppbv)	(µg/L)	(ppbv)	(µg/L)	(ppbv)	(µg/L)	(ppbv)	(µg/L)	(ppbv)
4/12/2001	0.10 U	31	0.10 U	27	0.10 U	23	0.50 U	120	10.0 U	2,440
5/16/2001	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
8/13/2001	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	13.3	3,245
1/14/2002	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
7/10/2002	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
1/13/2003[1]	0.10 U	31	0.23	61	0.31	72	1.2	276	49	11,834
7/15/2003	0.48	150	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
1/20/2004	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
7/12/2004	0.10 U	31	0.10 U	27	0.10 U	23	0.30 U	69	10.0 U	2,440
1/27/2005	0.026	8.1	0.024	6.4	0.052	12	0.53	121	2.5	615
7/27/2005	0.10 U	31	0.10 U	27	0.10 U	23	0.20 U	46	10.0 U	2,440
1/31/2006	0.10 U	31	0.10 U	27	0.10 U	23	0.20 U	46	10.0 U	2,440
7/26/2006	0.10 U	31	0.10 U	27	0.10 U	23	0.20 U	46	10.0 U	2,440
1/25/2007	0.96 U	300	1.5 U	400	1.7 U	400	6.1 U	1,400	22	5,300
7/11/2007	0.10 U	31	0.10 U	27	0.10 U	23	0.20 U	46	10 U	2,440
1/21/2008	0.50 U	160	5.7E-03	1.5	1.7E-03 U	0.40	5.2E-03 U	1.2	0.62	151
6/27/2008	1.3E-03 U	0.40	1.5E-03 U	0.40	1.7E-03 U	0.40	5.2E-03 U	1.2	16	3,904
1/28/2009	1.3E-03 U	0.40	1.5E-03 U	0.40	1.7E-03 U	0.40	5.2E-03 U	1.2	0.50	122
6/29/2009	1.3E-03 U	0.40	2.7E-03	0.72	1.7E-03 U	0.40	5.2E-03 U	1.2	0.41 U	100
1/28/2010	1.3E-03 U	0.40	2.6E-03	0.69	1.7E-03 U	0.40	6.5E-03	1.5	2.0	488
7/23/2010	1.3E-03 U	0.40	5.3E-03	1.41	1.7E-03 U	0.40	5.2E-03 U	1.2	0.5	122
1/21/2011	1.3E-03 U	0.40	2.2E-03	0.58	1.7E-03 U	0.40	5.2E-03 U	1.2	0.99	242
8/15/2011	2.6E-03 U	0.80	3.0E-03 U	0.80	1.9E-02	4.40	5.4E-01	124	6.6	1,600

Permit Limits:
Benzene (B) - 540 ppbv
Toluene (T) - 2,980 ppbv
Ethylbenzene (E) - 540 ppbv
Xylenes (X) - 2,870 ppbv
TPH-G - 33,900 ppbv

Conversion Calculation:
µg/L X (1 g/1,000,000 µg) X (1/MW_x g/mole) X (24.4 L air/ 1 mole) = $moles_x/moles_{air}$ = **ppbv** X 10^{-9}

Notes:
µg/L = micrograms per liter
ppbv = parts per billion by volume
[1] Air treatment was bypassed due to low air influent concentrations, therefore an air effluent sample was not collected. The results shown are for an air influent sample.
Conversions assume dry air at standard temperature and pressure.
Conversion for TPH-G assumes a molecular weight of TPH-G of approximately 100 g/mole.
Molecular Weights: B = 78 grams (g)/mole, T = 92 g/mole, E = 106 g/mole, X = 106 g/mole.
When analytical results indicate an analyte is below laboratory detection limits, the detection limit is used in calculations.
MW_x = molecular weight in gram/mole
g = gram
TPH-G = gasoline range total petroleum hydrocarbon
U = Analyte not detected at the indicated detection limit

TABLE 5
Calculations for Total VOCs Emitted from the System
Air Sparging and Soil Vapor Extraction System
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Sampling Date	Maximum VOCs Emission Rate (Estimate) (tons/year)	Estimated Cumulative VOC Emissions Since Startup (tons)
1/15/2001	-	-
4/12/2001	0.060	0.014
5/16/2001	0.066	0.021
8/13/2001	0.089	0.042
1/14/2002	0.050	0.064
7/10/2002	0.064	0.094
1/13/2003	0.313	0.255
7/15/2003	0.062	0.286
1/20/2004	0.059	0.316
7/12/2004	0.055	0.342
1/27/2005	0.015	0.350
7/27/2005	0.054	0.377
1/31/2006	0.071	0.414
7/26/2006	0.083	0.454
1/25/2007	0.105	0.507
7/11/2007	0.076	0.541
1/21/2008	0.004	0.543
6/27/2008	0.117	0.594
1/28/2009	0.004	0.596
6/29/2009	0.004	0.598
1/28/2010	0.021	0.610
7/23/2010	0.004	0.612
1/21/2011	0.002	0.613
8/15/2011	0.058	0.646

Permit Limit:
1.0 ton/year

Emissions Calculation Used:
µg/L X (1 g/1,000,000 µg) X (1 lbm/453.6 g) X (1 ton/2,000 lbm) X (28.32 L/ft3)
X **scfm** X (525,600 min/yr) = **tons/year**

Notes:
Flow rates (in scfm) used in calculations are from Table 1.
Concentrations (in µg/L) used in calculations are from TPH-G data in Table 3.
When analyte is below the laboratory detection limit, the detection limit is used in the emission calculation.
Total VOCs are assumed to be accounted for in the TPH-G analytical results.
VOC = volatile organic compound

FIGURE

LEGEND

- Outfall
- VE-1 — Vapor Extraction Well
- VE-10 — Vapor Extraction Well (Installed 2008)
- S-1 — Sparge Well (Installed 2001)
- S-21 — Sparge Well (Installed 2008)
- S-20 — Sparge Well Angled Below NE 44th Street (Installed 2008)
- PW-1 — Pumping Well
- MW-1 — Monitoring Well
- bbcn / Seep-7 — Stream Gauging Station / Seeps
- Groundwater Pumping and Treatment System Piping
- AS/SVE System Trenching/Piping (Installed 2000)
- AS/SVE System Trenching/Piping (Installed 2008)
- Plume Boundary (approximate)
- Top of Bluff (approximate)
- 160 — Ground Surface Elevation (ft contours)
- Building Outlines (approximate)

AIR TREATMENT COMPOUND
4403 NE ST. JAMES ROAD

HANDY ANDY NO. 8
3314 NE 44TH STREET

2815 NE 42ND STREET

2818 NE CHERRY ROAD

WATER TREATMENT COMPOUND

GROUNDWATER PUMPING SYSTEM PIPING

DISCHARGE PIPE

NE 44TH STREET
NE 43RD STREET
NE 42ND STREET
NE ST. JOHNS ROAD
NE ST. JAMES ROAD
NE 37TH AVENUE
NE CHERRY

BURNT BRIDGE CREEK

Private Well

MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23
B-8
VE-1, VE-2, VE-3, VE-4, VE-5, VE-6, VE-7, VE-8, VE-9, VE-10, VE-11, VE-12, VE-13
S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-18, S-19, S-20, S-21, S-22, S-23, S-24, S-25, S-26, S-27, S-28, S-29, S-30, S-31, S-32, S-33, S-34, S-35, S-36, S-37, S-38, S-39, S-40
PW-1, PW-2, PW-3, PW-4, PW-5, PW-6, PW-7, PW-8
Seep-1, Seep-2, Seep-3, Seep-4, Seep-5, Seep-6, Seep-7, Seep-8, Seep-9, Seep-10
bbcn, bbcbn, bbcbs, bbcs
Outfall

0 150 300 450 Feet

NOTE:
Well coordinates and elevations data derived from survey completed in December 2008 by Ztec.

Base map used is site.dwg, July 1996, AEE.

All other existing site features from measurements completed by AMEC employees. Location of these features are not from data gathered by a registered land surveyor and should be considered approximate.

CLIENT: TOC HOLDINGS CO.

AMEC Earth & Environmental
7376 SW Durham Road
Portland, OR, U.S.A. 97224

DWN BY: PM / BRJ
CHK'D BY: JTS
DATUM: NAD83
PROJECTION: WA S.P. South
SCALE: 1 inch = 150 feet

PROJECT: TOC HOLDINGS CO. No. 01-115
3314 NE 44TH STREET
VANCOUVER, WASHINGTON

TITLE: SITE PLAN

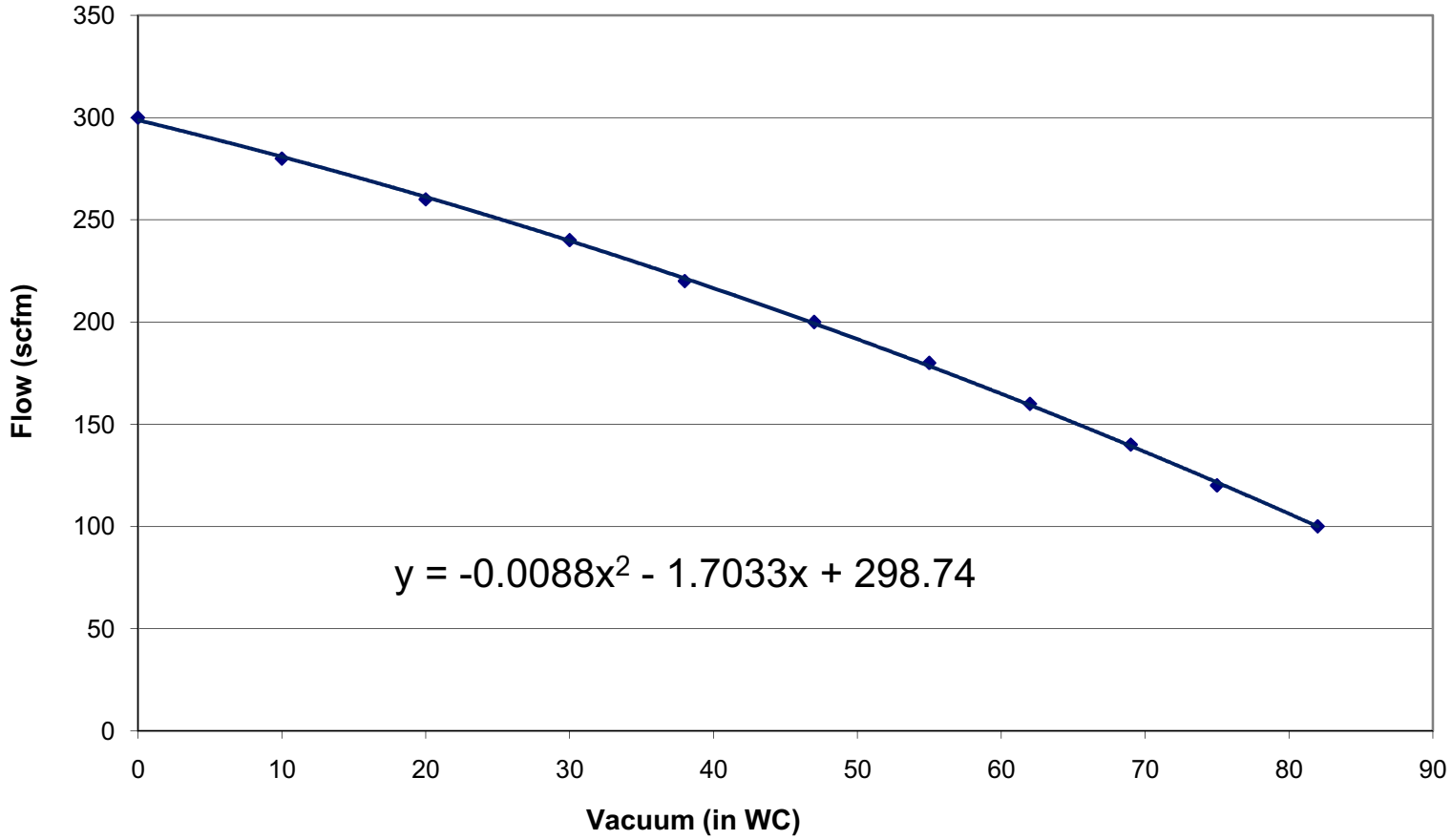
DATE: JULY 2011
PROJECT NO.: 1-61M-076111-2-2
REV. NO.: 1
FIGURE NO.: FIGURE 1

K:\7000\7600\7611\Reports&WorkPlans\Quarters and Semis\2011\1&2-2011\Figures\DWG\Figure 1 - Site Plan 2011.mxd

APPENDIX A

Reference Information

Rotron EN707 Vacuum v. Flow Curve



APPENDIX B

Historical Temperature, Pressure, and Flow Data

TABLE B-1
Historical Temperature, Pressure, and Flow Data
Air Sparging and Soil Vapor Extraction System
March 6, 2009 - January 13, 2010
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Pressure After Blower #3 (in. WC)	Pressure After Blower #4 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Vacuum Before Blower #3 (in. WC)	Vacuum Before Blower #4 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Derived Vacuum Blower #3 (in. WC)	Derived Vacuum Blower #4 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Flow (from Curve) Blower #3 (scfm)	Flow (from Curve) Blower #4 (scfm)	Total Flow (scfm)
01/21/11	**NA**	**0**	**0**	**0**	**0**	**0**	**0**	**64**	**64**	**0**	**0**	**64**	**64**	**0**	**0**	**154**	**154**	**307**
01/04/11	NA	0	0	0	0	0	43	31	56	0	43	31	56	0	209	237	176	622
12/28/10	NA	0	0	0	0	0	42	30	58	0	42	30	58	0	212	240	170	622
12/10/10	NA	0	0	0	0	0	42	56	56	0	42	56	56	0	212	176	176	564
11/11/10	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/13/10	NA	0	0	20	20	0	10	52	52	0	10	72	72	0	281	130	130	542
08/12/10	NA	0	0	20	20	0	10	54	54	0	10	74	74	0	281	125	125	530
07/23/10	**NA**	**0**	**0**	**20**	**20**	**0**	**42**	**50**	**50**	**0**	**42**	**70**	**70**	**0**	**212**	**136**	**136**	**484**
07/06/10	NA	0	0	20	20	0	42	48	48	0	42	68	68	0	212	142	142	496
06/18/10	NA	0	0	20	20	0	42	48	48	0	42	68	68	0	212	142	142	496
04/28/10	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/01/10	NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/16/10	NA	0	0	0	0	40	40	42	42	40	40	42	42	217	217	212	212	856
01/13/10	**NA**	**20**	**20**	**20**	**20**	**40**	**40**	**46**	**46**	**60**	**60**	**66**	**66**	**165**	**165**	**148**	**148**	**626**
12/03/09	NA	0	42	44	44	40	40	44	44	40	82	88	88	217	100	81	81	478
11/07/09	NA	0	0	0	0	40	40	44	44	40	40	44	44	217	217	207	207	847
10/14/09	NA	0	0	0	0	40	40	45	45	40	40	45	45	217	217	204	204	842
06/23/09	**NA**	**20**	**20**	**20**	**20**	**50**	**50**	**38**	**38**	**70**	**70**	**58**	**58**	**136**	**136**	**170**	**170**	**613**
05/28/09	NA	20	20	20	20	56	56	36	36	76	76	56	56	118	118	176	176	588
05/08/09	NA	22	22	22	22	55	55	38	38	77	77	60	60	115	115	165	165	561
04/28/09	NA	0	0	0	0	45	45	40	40	45	45	40	40	204	204	217	217	842
04/16/09	NA	0	0	0	0	45	45	40	40	45	45	40	40	204	204	217	217	842
03/31/09	NA	0	0	0	0	40	40	40	40	40	40	40	40	217	217	217	217	866
03/17/09	NA	0	0	0	0	42	65	42	42	42	65	42	42	212	151	212	212	786
03/06/09	NA	0	0	0	0	42	63	40	40	42	63	40	40	212	157	217	217	801

Notes:
Data in **bold** represent data gathered for an air emissions report
Flows were determined from the Rotron EN707 flow(y) versus vacuum(x) curve (Appendix A) and the polynomial fitted equation:
y = -0.0088x2 - 1.7033x + 298.74
deg F = degrees Fahrenheit
in. WC = pressure measured in inches of water column
scfm = standard cubic feet per minute
NA = Field data not available
"from Curve" = flows calculated using blower curves representative of factory conditions
See Table B-2 for data prior to 03/06/09

TABLE B-2
Historical Temperature, Pressure, and Flow Data
Air Sparging and Soil Vapor Extraction System
December 15, 2000 - January 28, 2009
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Total Flow (scfm)
1/28/09	NA	0	0	22	20	22	20	257	261	518
9/28/08	NA	0	0	26	19	26	19	249	263	512
7/23/08	NA	0	0	20	25	20	25	261	251	512
7/8/08	NA	0	0	19	19	19	19	263	263	526
6/27/08	**NA**	**12**	**13**	**25**	**25**	**37**	**38**	**224**	**221**	**445**
6/10/08	NA	20	0	33	30	53	30	184	240	423
5/20/08	NA	15	0	40	42	55	42	178	212	390
5/5/08	NA	0	0	40	40	40	40	217	217	433
4/17/08	NA	0	0	50	50	50	50	192	192	383
3/31/08	NA	20	20	48	48	68	68	142	142	284
2/21/08	NA	20	20	40	40	60	60	165	165	330
2/7/08	NA	20	20	40	40	60	60	165	165	330
1/24/08	**NA**	**20**	**20**	**30**	**30**	**50**	**50**	**192**	**192**	**383**
1/9/08	NA	20	20	40	40	60	60	165	165	330
12/26/07	NA	20	20	40	40	60	60	165	165	330
12/12/07	NA	43	45	38	40	81	85	103	90	193
11/14/07	NA	20	20	30	30	50	50	192	192	383
10/25/07	NA	29	29	41	--	70	--	136	--	--
10/9/07	NA	35	30	30	30	65	60	151	165	316
9/27/07	NA	37	30	31	30	68	60	142	165	307
9/13/07	NA	45	30	30	30	75	60	121	165	286
8/29/07	NA	48	30	26	26	74	56	125	176	300
8/17/07	NA	52	30	26	25	78	55	112	178	291
7/26/07	NA	50	30	30	30	80	60	106	165	271
7/19/07	NA	29	28	34	34	63	62	157	159	316
7/11/07	**NA**	**18**	**5**	**24**	**20**	**42**	**25**	**212**	**251**	**462**
7/5/07	NA	8	8	19	21	27	29	246	242	488
6/27/07	NA	24	10	22	20	46	30	202	240	441
6/13/07	NA	25	9	24	20	49	29	194	242	436
5/30/07	NA	15	10	25	25	40	35	217	228	445
5/8/07	NA	8	15	43	43	51	58	189	170	359
4/24/07	NA	15	12	43	45	58	57	170	173	343
4/5/07	NA	20	20	40	40	60	60	165	165	330
3/22/07	NA	15	9	42	38	57	47	173	199	372
2/13/07	NA	23	23	47	47	70	70	136	136	273
1/25/07	**NA**	**26**	**26**	**40**	**40**	**66**	**66**	**148**	**148**	**296**
1/21/07	NA	20	20	30	30	50	50	192	192	383
1/9/07	NA	20	20	40	40	60	60	165	165	330
12/26/06	NA	4	4	45	45	49	49	194	194	388
12/15/06	NA	4	4	40	40	44	44	207	207	414
12/6/06	NA	3.5	3	38	38	41.5	41	213	214	427
11/15/06	NA	3	3	30	30	33	33	233	233	466
11/3/06	NA	50	50	28	28	78	78	112	112	225
10/3/06	NA	50	50	23	23	73	73	128	128	255
9/21/06	NA	50	50	22	22	72	72	130	130	261
9/6/06	NA	50	50	25	25	75	75	121	121	243
8/23/06	NA	48	48	28	28	76	76	118	118	237
8/7/06	NA	42	42	24	24	66	66	148	148	296
7/26/06	**NA**	**0**	**0**	**24**	**24**	**24**	**24**	**253**	**253**	**506**

TABLE B-2
Historical Temperature, Pressure, and Flow Data
Air Sparging and Soil Vapor Extraction System
December 15, 2000 - January 28, 2009
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Total Flow (scfm)
7/11/06	NA	0.5	0.5	22	22	22.5	22.5	256	256	512
6/27/06	NA	1	1	26	26	27	27	246	246	493
6/21/06	NA	2.5	3	26	26	28.5	29	243	242	485
6/6/06	NA	0	0	22	22	22	22	257	257	514
5/31/06	NA	0	0	24	24	24	24	253	253	506
5/24/06	NA	2	2	22	22	24	24	253	253	506
5/11/06	NA	0	0.5	36	34	36	34.5	226	230	456
5/1/06	NA	0	0	46	46	46	46	202	202	404
4/12/06	NA	3	3	40	40	43	43	209	209	418
4/1/06	NA	1.5	0	50	50	51.5	50	188	192	379
3/16/06	NA	0	0	40	40	40	40	217	217	433
3/2/06	NA	0	0	40	40	40	40	217	217	433
2/17/06	NA	0	0	50	50	50	50	192	192	383
1/31/06	**NA**	**0**	**0**	**40**	**40**	**40**	**40**	**217**	**217**	**433**
1/18/06	NA	0	0	80	80	80	80	106	106	212
12/29/05	NA	0	0	70	70	70	70	136	136	273
11/22/05	NA	0	0	60	60	60	60	165	165	330
11/10/05	NA	0	0	60	60	60	60	165	165	330
10/18/05	NA	0	0	60	60	60	60	165	165	330
10/6/05	NA	0	0	60	60	60	60	165	165	330
9/21/05	NA	0	0	60	60	60	60	165	165	330
9/7/05	NA	0	0	60	60	60	60	165	165	330
8/24/05	NA	0	0	60	60	60	60	165	165	330
8/12/05	NA	0	0	60	60	60	60	165	165	330
7/27/05	**NA**	**0**	**0**	**60**	**60**	**60**	**60**	**165**	**165**	**330**
7/14/05	NA	0	0	55	55	55	55	178	178	357
7/1/05	NA	0	0	60	60	60	60	165	165	330
6/13/05	NA	0	0	58	58	58	58	170	170	341
6/3/05	NA	0	0	50	50	50	50	192	192	383
5/18/05	NA	10	10	50	50	60	60	165	165	330
5/2/05	NA	0	0	82	84	82	84	100	94	193
4/22/05	NA	0	0	47	50	47	50	199	192	391
4/6/05	NA	0	0	0	41	0	41	299	214	513
3/24/05	NA	0	0	58	58	58	58	170	170	341
3/9/05	NA	5	0	58	58	63	58	157	170	327
2/24/05	NA	7	4	42	40	49	44	194	207	401
1/27/05	**NA**	**7**	**3**	**50**	**50**	**57**	**53**	**173**	**184**	**357**
1/11/05	NA	6	3	45	45	51	48	189	197	386
7/12/04[1]	**NA**	**16**	**13**	**45**	**45**	**61**	**58**	**162**	**170**	**332**
12/28/04	NA	6	3	50	50	56	53	176	184	360
12/13/04	NA	5	3	45	41	50	44	192	207	398
11/30/04	NA	14	3	40	40	54	43	181	209	390
11/5/04	NA	14	12	34	33	48	45	197	204	401
10/12/04	NA	14	10	38	38	52	48	186	197	383
9/24/04	NA	14	8	34	34	48	42	197	212	408
9/7/04	NA	14	10	30	32	44	42	207	212	418
7/30/04	NA	14	9	36	35	50	44	192	207	398
6/14/04	NA	16	13	30	30	46	43	202	209	411
5/27/04	NA	13	15	28	28	41	43	214	209	423

TABLE B-2
Historical Temperature, Pressure, and Flow Data
Air Sparging and Soil Vapor Extraction System
December 15, 2000 - January 28, 2009
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Total Flow (scfm)
4/15/04	NA	11	9	42	40	53	49	184	194	378
3/15/04	NA	6	4	60	60	66	64	148	154	302
3/4/04	NA	7	6	50	60	57	66	173	148	321
1/20/04	**NA**	**10**	**9**	**45**	**45**	**55**	**54**	**178**	**181**	**360**
12/17/03	NA	6	3	50	50	56	53	176	184	360
12/1/03	NA	15	14	45	43	60	57	165	173	338
11/6/03	NA	7	4	42	40	49	44	194	207	401
10/2/03	NA	7	4	40	40	47	44	199	207	406
9/16/03	NA	8	3	40	40	48	43	197	209	406
8/21/03	NA	7	3	40	40	47	43	199	209	408
7/28/03	NA	12	4	40	40	52	44	186	207	393
7/15/03	**NA**	**12**	**10**	**40**	**40**	**52**	**50**	**186**	**192**	**378**
7/1/03	NA	12	9	40	40	52	49	186	194	381
6/13/03	NA	13	10	40	40	53	50	184	192	375
5/23/03	NA	10	15	45	45	55	60	178	165	343
5/16/03	NA	12	9	40	45	52	54	186	181	367
4/29/03	NA	10	8	42	44	52	52	186	186	373
4/15/03	NA	10	7	42	50	52	57	186	173	359
3/12/03	NA	7	4	50	50	57	54	173	181	354
3/3/03	NA	7	4	48	52	55	56	178	176	354
2/24/03	NA	7	5	50	50	57	55	173	178	351
2/20/03	NA	7	4	50	50	57	54	173	181	354
2/18/03	NA	8	6	48	52	56	58	176	170	346
1/27/03	NA	8	4	40	40	48	44	197	207	403
1/13/03	**NA**	**9**	**7**	**40**	**40**	**49**	**47**	**194**	**199**	**393**
1/6/03	NA	9	7	40	40	49	47	194	199	393
1/14/02[2]	**560**	**6**	**18**	**40**	**62**	**46**	**80**	**202**	**106**	**308**
12/24/02	NA	9	7	44	48	53	55	184	178	362
12/12/02	NA[6]	9	7	44	48	53	55	184	178	362
11/15/02	558	5	14	40	40	45	54	204	181	385
10/28/02	560	4	15	40	40	44	55	207	178	385
10/17/02	560	4	15	40	40	44	55	207	178	385
10/7/02	562	4	14	40	40	44	54	207	181	388
9/29/02	560	4	15	40	40	44	55	207	178	385
9/17/02	564	4	15	39	39	43	54	209	181	390
9/13/02	563	4	14	40	40	44	54	207	181	388
8/8/02	560	4	14	40	40	44	54	207	181	388
7/10/02	**561**	**4**	**14**	**40**	**40**	**44**	**54**	**207**	**181**	**388**
6/13/02	561	4	13	40	40	44	53	207	184	391
5/31/02	561	4	14	40	40	44	54	207	181	388
5/29/02	563	4	14	50	50	54	64	181	154	335
4/11/02	560	4	14	42	44	46	58	202	170	372
3/15/02	560	4	12	60	60	64	72	154	130	284
2/27/02	561	4	12.5	52	52	56	64.5	176	152	328
2/19/02	567	4.5	14	50	50	54.5	64	180	154	333
1/10/02	**552**	**5**	**17**	**40**	**60**	**45**	**77**	**204**	**115**	**320**
5/15/01[3]	558	0	15	40	42	40	57	217	173	390
1/29/01[4]	1,456	0	16	52	34	52	50	186	192	378
1/12/01[5]	1,435	2	14	50	48	52	62	186	159	346
12/20/01	559	16	5	28	38	44	43	207	209	416

TABLE B-2
Historical Temperature, Pressure, and Flow Data
Air Sparging and Soil Vapor Extraction System
December 15, 2000 - January 28, 2009
TOC Holdings Co., Property 01-115, Handy Andy #8
4403 NE St. James Road
Vancouver, Washington

Date	Oxidizer Temp (deg F)	Pressure After Blower #1 (in. WC)	Pressure After Blower #2 (in. WC)	Vacuum Before Blower #1 (in. WC)	Vacuum Before Blower #2 (in. WC)	Derived Vacuum Blower #1 (in. WC)	Derived Vacuum Blower #2 (in. WC)	Flow (from Curve) Blower #1 (scfm)	Flow (from Curve) Blower #2 (scfm)	Total Flow (scfm)
12/7/01	553	18	10	25	40	43	50	209	192	401
10/3/01	556	2	12	40	38	42	50	212	192	403
9/28/01	555	2	12	38	38	40	50	217	192	408
8/28/01	555	30	15	38	36	68	51	142	189	331
8/13/01	**555**	**0**	**15**	**40**	**35**	**40**	**50**	**217**	**192**	**408**
7/18/01	556	0	15	38	34	38	49	221	194	415
6/29/01	558	0	16	34	32	34	48	231	197	427
6/19/01	555	0	16	36	34	36	50	226	192	418
6/14/01	556	1	15	38	32	39	47	219	199	418
5/30/01	555	0	16	38	34	38	50	221	192	413
5/22/01	555	0	16	38	36	38	52	221	186	408
5/16/01	**558**	**1**	**15**	**38**	**38**	**39**	**53**	**219**	**184**	**403**
5/1/01	1,433	0	13	44	38	44	51	207	189	396
4/25/01	1,430	0	12	45	40	45	52	204	186	391
4/20/01	1,450	0	13	50	47	50	60	192	165	356
4/12/01	**1,456**	**3**	**11**	**48**	**44**	**51**	**55**	**189**	**178**	**367**
4/9/01	1,457	0	10	50	44	50	54	192	181	373
4/4/01	1,465	0	12	50	44	50	56	192	176	367
3/22/01	1,462	0	10	45	43	45	53	204	184	388
3/20/01	1,455	0	12	50	42	50	54	192	181	373
3/13/01	1,463	0	12	45	45	45	57	204	173	377
3/8/01	1,454	0	13	45	38	45	51	204	189	393
2/26/01	1,462	0	11	54	40	54	51	181	189	370
2/21/01	1,453	0	12	50	46	50	58	192	170	362
2/14/01	1,452	1	12	50	40	51	52	189	186	375
2/9/01	1,457	0	15	5	34	5	49	290	194	484
2/5/01	1,456	0	12	52	52	52	64	186	154	340
1/23/01	1,446	2	14	50	44	52	58	186	170	357
1/16/01	1,457	1	12	60	60	61	72	162	130	293
1/11/01	1,446	2	14	45	45	47	59	199	168	367
12/15/00[7]	1,450	2	12	41	41	43	53	209	184	393

Notes:
Data in bold represent data gathered for an air emissions report.
Flows were determined from the Rotron EN707 flow(y) versus vacuum(x) curve (Appendix C) and the polynomial fitted equation:
$y = -0.0088x^2 - 1.7033x + 298.74$
deg F = degrees Fahrenheit
in. WC = pressure measured in inches of water column
scfm = standard cubic feet per minute
'-- = Field data not available
[1]Pressure readings were not taken on 7/12/2004, therefore pressure readings collected during the previous monitoring event (6/14/04) were used in the flow calculations for 7/12/04.
[2]Blower #2 pressure readings on 1/10 and 1/14/02 are suspected high due to a gauge malfunction.
[3]Temperature reading is first measurement after installation of catalyst. Treatment unit has operated as a catalytic oxidizer from this date until November 28, 2002.
[4]Pressure gauge on outlet from blower #1 may be dysfunctional, but pressures suspected low (<3 inches WC).
[5]The oxidizer temperature is an average of the ongoing temperature fluctuations on that day.
[6]The oxidizer was disconnected from the SVE system on November 28, 2002, therefore the oxidizer temperature will no longer be collected.
[7]The SVE system was started on 12/15/00. The thermox temperature was approximately 1,450 degrees F based on discussions with Rick Shepherd (H2Oil). Vacuum and pressure readings were approximated based on future system performance as all gauges were not installed. Bleed valve was open due to thermox oxygen demand.

APPENDIX C

Reported Laboratory Data

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Heidi Rice
AMEC Earth & Environmental - OR
7376 SW Durham Road
Portland, OR 97224

Report Summary

Wednesday August 17, 2011

Report Number: L531218
Samples Received: 08/16/11
Client Project:

Description: Handy Andy - Time Oil

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Jarred Willis , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002,NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory atandard operating procedures: 060302, 060303, and 060304.

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REPORT OF ANALYSIS

Heidi Rice
AMEC Earth & Environmental - OR
7376 SW Durham Road
Portland, OR 97224

August 17, 2011

ESC Sample # : L531218-01

Site ID :

Project # :

Date Received : August 16, 2011
Description : Handy Andy - Time Oil

Sample ID : SVE-EFF

Collected By : Lance Johnson
Collection Date : 08/15/11 12:55

Parameter	Cas#	Mol Wght	RDL1	RDL2	ppbv	ug/m3	Method	Date	Dil.
Volatile Organics									
TPH (GC/MS) Low Fraction	8006-61-9	101	200.	830.	1600	6600	TO-15	08/16/11	4
Benzene	71-43-2	78.1	0.800	2.60	< 0.80	< 2.6	TO-15	08/16/11	4
Ethylbenzene	100-41-4	106	0.800	3.50	4.4	19.	TO-15	08/16/11	4
MTBE	1634-04-4	88.1	0.800	2.90	< 0.80	< 2.9	TO-15	08/16/11	4
Naphthalene	91-20-3	128	2.52	13.0	37.	190	TO-15	08/16/11	4
2-Propanol	67-63-0	60.1	5.00	12.0	11.	27.	TO-15	08/16/11	4
Toluene	108-88-3	92.1	0.800	3.00	< 0.80	< 3.0	TO-15	08/16/11	4
m&p-Xylene	1330-20-7	106	1.60	6.90	74.	320	TO-15	08/16/11	4
o-Xylene	95-47-6	106	0.800	3.50	50.	220	TO-15	08/16/11	4
1,4-Bromofluorobenzene	460-00-4				100.57	% Rec.	TO-15	08/16/11	4

RDL1 = ppbv , RDL2 = ug/m3
Note:
Units are based on (STP) - Standard Temperature and Pressure
The reported analytical results relate only to the sample submitted.

.
Reported: 08/17/11 09:37 Printed: 08/17/11 09:37

Summary of Remarks For Samples Printed
08/17/11 at 09:37:40

TSR Signing Reports: 358
R2 - Rush: Next Day

Sample: L531218-01 Account: AMECPORTOC Received: 08/16/11 09:00 Due Date: 08/17/11 00:00 RPT Date: 08/17/11 09:37

ESC LABORATORIES
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AMEC Earth & Environmental - OR
Heidi Rice
7376 SW Durham Road

Portland, OR 97224

Quality Assurance Report
Level II

L531218

August 17, 2011

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
2-Propanol	< 1.25	ppb			WG550801	08/16/11 17:56
Benzene	< .2	ppb			WG550801	08/16/11 17:56
Ethylbenzene	< .2	ppb			WG550801	08/16/11 17:56
m&p-Xylene	< .4	ppb			WG550801	08/16/11 17:56
MTBE	< .2	ppb			WG550801	08/16/11 17:56
Naphthalene	< .63	ppb			WG550801	08/16/11 17:56
o-Xylene	< .2	ppb			WG550801	08/16/11 17:56
Toluene	< .2	ppb			WG550801	08/16/11 17:56
TPH (GC/MS) Low Fraction	< 50	ppb			WG550801	08/16/11 17:56
1,4-Bromofluorobenzene		% Rec.	96.51	60-140	WG550801	08/16/11 17:56

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
2-Propanol	ppb	3.75	3.47	92.6	70-130	WG550801
Benzene	ppb	3.75	3.56	94.9	70-130	WG550801
Ethylbenzene	ppb	3.75	3.57	95.2	70-130	WG550801
m&p-Xylene	ppb	7.5	7.00	93.3	70-130	WG550801
MTBE	ppb	3.75	3.51	93.6	70-130	WG550801
Naphthalene	ppb	3.75	3.11	83.1	70-130	WG550801
o-Xylene	ppb	3.75	3.58	95.5	70-130	WG550801
Toluene	ppb	3.75	3.63	96.7	70-130	WG550801
TPH (GC/MS) Low Fraction	ppb	150	148.	99.0	70-130	WG550801
1,4-Bromofluorobenzene				101.2	60-140	WG550801

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
2-Propanol	ppb	3.49	3.47	93.0	70-130	0.490	25	WG550801
Benzene	ppb	3.56	3.56	95.0	70-130	0.0800	25	WG550801
Ethylbenzene	ppb	3.62	3.57	96.0	70-130	1.41	25	WG550801
m&p-Xylene	ppb	7.10	7.00	95.0	70-130	1.43	25	WG550801
MTBE	ppb	3.61	3.51	96.0	70-130	2.95	25	WG550801
Naphthalene	ppb	3.16	3.11	84.0	70-130	1.35	25	WG550801
o-Xylene	ppb	3.64	3.58	97.0	70-130	1.50	25	WG550801
Tolnene	ppb	3.64	3.63	97.0	70-130	0.460	25	WG550801
TPH (GC/MS) Low Fraction	ppb	150.	148.	100.	70-130	0.880	25	WG550801
1,4-Bromofluorobenzene				100.5	60-140			WG550801

Batch number /Run number / Sample number cross reference

WG550801: R1816791: L531218-01

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Quality Assurance Report
Level II

L531218

August 17, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, snd the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target anslytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the snalytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of sn environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limita. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.