Meridian Environmental Consulting, LLC

November 7, 2017

Carrie Stoltz
Wisconsin Department of Natural Resources
107 Sutliff Avenue
Rhinelander, Wisconsin 54501

Subject: **Soil Vapor Extraction System: Annual Report and Recommendations**

Autostop (former)
119 W. 9th Street North
Ladymith, Wisconsin 54848
BRRTS No. 03-55-282548
PECFA No. 54848-1295-19
Meridian No. 05F630

Doug's Tire (former)
811 Lake Ave W.
Ladysmith, Wisconsin 54848
BRRTS No. 03-55-000408
PECFA No. 54848-1215-11
Meridian No. 05F786

Dear Carrie:

This letter provides a summary of the remedial work completed at the above two sites in the past year.

This work included:

- Pumping (November 2016) to re-develop SVE wells and remove LNAPL
- SVE System Operation and Maintenance (monthly)
- Recommendations for further operation of SVE system and remediation

The remainder of this letter describes and documents the SVE operation and maintenance information and our recommendations. Form 4400-194 is provided in Appendix A.

Based on the data collected to date, we recommend continued operation of the SVE system for one more year. We also recommend the SVE vents be pumped quarterly to remove LNAPL.

## BACKGROUND INFORMATION

The reader is referred to the project files for more detailed background information. Summary information is provided below.

A Soil Vapor Extraction (SVE) system was installed in 2015 at the two properties known as Doug's and Autostop. The intent of the SVE system is to remove as much petroleum impacts as practicable from a targeted area (known as LNAPL Focus Area)(Figure 1). Petroleum vapors are removed from the LNAPL Focus Area by venting extraction wells RW-1, RW-2, RW-3, RW-4, RW-5, EX-2, EX-4, EX-5, M-1.

The extraction wells are individually connected to the SVE trailer via individual piping. Piping was installed under Highway 8 using directional boring equipment to connect to EX-2, EX-4, and EX-5, and M-1.

The SVE system is housed in a trailer located at the south end of the Autostop building (Figure 1). The mechanical system consists of a blower (5 hp) which pulls soil gas (including LNAPL vapors) from the subsurface and discharges these vapors to the atmosphere.

The SVE discharge was treated with a flame oxidizer for the first 4 months of operation. The VOC load decreased after the initial spike which is typical of soil vapor extraction. Therefore the flame oxidizer was removed February 29, 2016 and the air discharge vented directly to the atmosphere (25 ft stack). Discharge mass is subsequently controlled by regulating the air flow rate from the system using a VFD (variable frequency drive) on the blower motor.

## SVE SYSTEM OPERATION

### Regular (monthly) System Checks

The system is checked regularly (at least monthly). The air flow rate was measured and air samples collected. Water accumulation (i.e., condensation) in the piping sumps is removed as needed.

### Air Sampling

The air discharge is subject to the following limits (25 ft stack):

| | |
|---|---|
| Benzene | 936 lbs/year |
| Total VOC | 5.7 lb/hr |

Appendix B contains the analytical reports for the air samples. The results are summarized in Table 1.

The system removed approximately 431 lbs of benzene and 19,548 lbs of VOCs (reported as gasoline) during the reporting period (September 2016 – September 2017). No discharge limits were exceeded.

A total of 53,187 lbs of VOC and 1006 lbs of benzene has been removed from the subsurface since system startup in October 2015. The first 19,625 lbs of VOC and 324 lbs of benzene were removed and treated by the oxidizer during the first 4 months of operation.

Graphs of the system air discharge are provided in Figure 2. The VOC concentration is reducing over time as the system continues to operate. However the current discharge indicates the system is still effectively removing hydrocarbons from the subsurface. In addition, the benzene concentrations in the discharge appear to remain stable.

### Ground Water and LNAPL Measurements

Fluctuating ground water levels can influence soil vapor recovery. More of the vent screen is exposed when the ground water table is low and more vapors are expected during low water levels. In addition, LNAPL thicknesses vary with water table fluctuations.

Figure 3 is a hydrograph from MW-100. Note the ground water levels are consistent with past levels although the water levels were much lower in 2012/2013.

Table 2 summarizes the ground water and LNAPL measurements from the SVE vents. The depth to ground water and to LNAPL was measured using an Interface Probe. In addition, the product (or LNAPL) thickness was measured by using a clear bailer. Typically, the interface probe indicates more LNAPL because it measures the dissolved phase LNAPL present below the product layer.

LNAPL thicknesses have decreased since the SVE system started in late October 2015. Several key observations include:

- LNAPL is no longer measured in RW-1, RW-5, MW-200, and MW-800.
- LNAPL thickness has decreased significantly in RW-2, EX-2 and EX-5.
- The LNAPL thicknesses at vents EX-4 and M-1 have decreased although a spike was measured in EX-4 in September 2017. The spike in EX-4 may be due to northerly ground water flow and transport due to lower hydraulic pressure in EX-4 from venting.

### Disposal of Remediation Waste

LNAPL was bailed from the SVE vents during each measurement event. The LNAPL is currently stored in the aboveground tank.

Water which accumulates in the knockout tank and pipe sumps is temporarily stored onsite in drums and subsequently disposed at the Bloomer Wastewater Treatment Plant.

## CONCLUSIONS AND RECOMMENDATIONS

The SVE system has effectively removed petroleum impacts from the subsurface at the two sites known as Dougs and Autostop (former). Substantial reduction in LNAPL is observed at the Autostop site with only RW-3 containing significant LNAPL. There is a decrease in LNAPL at the Dougs extraction wells EX-2, EX-5 and M-1. LNAPL remains in EX-4.

We recommend the system continue to operate for one more year based on the continuous removal of VOCs from the subsurface by the SVE system. We also recommend quarterly pumping of wells RW-3, EX-4, EX-5, and M-1 to remove LNAPL mass.

We recommend the following remedial actions during the next 12 months:

- The SVE system should continue operating. Monthly site visits should be conducted.
- Monthly air sampling will continue.
- The SVE vents should be measured at least quarterly for LNAPL thickness measurements.
- We recommend the SVE vents with LNAPL be pumped at least quarterly to remove LNAPL mass and aid in remediation.
- Measurements of system operation will be recorded. This includes tables summarizing date, hour meter, air flow rate, air temperature, PID/LEL measurements, vacuum in vents, which vents are open, LNAPL/water level measurements (quarterly), etc.
- The monitoring well network at Doug's and Autostop should be sampled in the fall of 2018. This information will be useful to prepare Closure documents.
- An annual report will be prepared in fall 2018 summarizing the system operation, ground water sampling, and our remedial recommendations to achieve Closure with GIS Registry for Soil and Ground Water.

## COST

A budget for the above recommendations will be submitted in separate correspondence.

## SIGNATURES

I, Kenneth Shimko (Meridian Environmental Consulting, LLC), hereby certify that I am a hydrogeologist as that term is defined in s. NR712.03(1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHss 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR700 to 726, Wis. Adm. Code.

Meridian Environmental Consulting, LLC

Date 11-7-17

I, Gary Gilbert (Meridian Environmental Consulting, LLC), hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR700 to 726, Wis. Adm. Code.

Meridian Environmental Consulting, LLC

Date 11/9/17

# TABLES

# Table 1
# Benzene and Total VOC Emissions

**SVE System**
Dougs/Autostop
Ladysmith, Wisconsin
Meridian Nos. 05F630/786

| Sample Date | Sample Parameters | Lab Result (ug/m3) | Hour Meter | Hours Operation During Reporting Period | Discharge Flow Rate (SCFM) | Emission Rate (ug/sec) | Emission Rate (lbs/hr) | Cumulative Mass Removed (lbs) (before oxidizer) Benzene | Gasoline* |
|---|---|---|---|---|---|---|---|---|---|
| 10/26/2015 | Benzene | 1,100,000 | 4 | 4 | 160 | 83,072 | 0.66 | 2.63 | |
| | Gasoline* | 43,000,000 | | | | 3,247,360 | 25.72 | | 102.88 |
| 10/27/2015 | Benzene | 650,000 | 12.55 | 8.55 | 160 | 49,088 | 0.39 | 5.96 | |
| | Gasoline* | 34,000,000 | | | | 2,567,680 | 20.34 | | 276.75 |
| 10/28/2015 | Benzene | 43,000 | 24.23 | 11.68 | 160 | 3,247 | 0.03 | 6.26 | |
| | Gasoline* | 29,000,000 | | | | 2,190,080 | 17.35 | | 479.34 |
| 11/6/2015 | Benzene | 360,000 | 238.62 | 214.39 | 125 | 21,240 | 0.17 | 42.32 | |
| | Gasoline* | 21,000,000 | | | | 1,239,000 | 9.81 | | 2583.13 |
| 11/16/2015 | Benzene | 290,000 | 481.5 | 242.88 | 135 | 18,479 | 0.15 | 77.87 | |
| | Gasoline* | 20,000,000 | | | | 1,274,400 | 10.09 | | 5034.58 |
| 11/18/2015 | Benzene | 200,000 | 525.32 | 43.82 | 144 | 13,594 | 0.11 | 82.58 | |
| | Gasoline* | 11,000,000 | | | | 747,648 | 5.92 | | 5294.05 |
| 12/17/2015 | Benzene | 220,000 | 1222.7 | 697.38 | 135 | 14,018 | 0.11 | 160.01 | |
| | Gasoline* | 12,000,000 | | | | 764,640 | 6.06 | | 9517.35 |
| 1/4/2016 | Benzene | 290,000 | 1537.7 | 315 | 170 | 23,270 | 0.18 | 218.06 | |
| | Gasoline* | 15,000,000 | | | | 1,203,600 | 9.53 | | 12520.09 |
| 1/22/2016 | Benzene | 76,000 | 1925.3 | 387.6 | 138 | 4,950 | 0.04 | 233.26 | |
| | Gasoline* | 4,700,000 | | | | 306,139 | 2.42 | | 13459.87 |
| 2/15/2016 | Benzene | 340,000 | 2499 | 573.7 | 125 | 20,060 | 0.16 | 324.41 | |
| | Gasoline* | 23,000,000 | | | | 1,357,000 | 10.75 | | 19625.68 |
| **Oxidizer Offgas Treatment Removed 2/29/16 - Replaced with 25 ft stack** | | | | | | | | **Cumulative Discharge (untreated) (begin at zero - March 1)** Benzene | Gasoline* |
| 3/29/2016 | Benzene | 420,000 | 3529 | 1030 | 90 | 17,842 | 0.14 | 146 | |
| | Gasoline* | 8,800,000 | | | | 373,824 | 2.96 | | 3050 |
| 4/20/2016 | Benzene | 120,000 | 4055 | 526 | 110 | 6,230 | 0.05 | 171 | |
| | Gasoline* | 10,000,000 | | | | 519,200 | 4.11 | | 5212 |
| 5/23/2016 | Benzene | 99,000 | 4765.8 | 710.8 | 65 | 3,037 | 0.02 | 189 | |
| | Gasoline* | 7,300,000 | | | | 223,964 | 1.77 | | 6473 |
| 6/30/2016 | Benzene | 71,000 | 5675.1 | 909.3 | 44 | 1,475 | 0.01 | 199 | |
| | Gasoline* | 7,200,000 | | | | 149,530 | 1.18 | | 7550 |
| 8/1/2016 | Benzene | 150,000 | 6181 | 505.9 | 50 | 3,540 | 0.03 | 213 | |
| | Gasoline* | 14,000,000 | | | | 330,400 | 2.62 | | 8874 |
| 9/26/2016 | Benzene | 140,000 | 7521 | 1340 | 54 | 3,568 | 0.03 | 251 | |
| | Gasoline* | 19,000,000 | | | | 484,272 | 3.84 | | 14013 |
| 10/12/2016 | Benzene | 46,000 | 7907 | 386 | 135 | 2,931 | 0.02 | 260 | |
| | Gasoline* | 7,100,000 | | | | 452,412 | 3.58 | | 15397 |
| 11/3/2016 | Benzene | 140,000 | 8435 | 528 | 120 | 7,930 | 0.06 | 293 | |
| | Gasoline* | 12,000,000 | | | | 679,680 | 5.38 | | 18239 |
| 12/21/2016 | Benzene | 130,000 | 9290 | 855 | 50 | 3,068 | 0.02 | 314 | |
| | Gasoline* | 14,000,000 | | | | 330,400 | 2.62 | | 20476 |
| 1/19/2017 | Benzene | 210,000 | 9580 | 290 | 50 | 4,956 | 0.04 | 326 | |
| | Gasoline* | 18,000,000 | | | | 424,800 | 3.36 | | 21452 |
| 2/9/2017 | Benzene | 100,000 | 9999 | 419 | 90 | 4,248 | 0.03 | 340 | |
| | Gasoline* | 9,200,000 | | | | 390,816 | 3.10 | | 22749 |
| 3/8/2017 | Benzene | 95,000 | 10643 | 644 | 90 | 4,036 | 0.03 | 360 | |
| | Gasoline* | 7,300,000 | | | | 310,104 | 2.46 | | 24330 |
| 4/8/2017 | Benzene | 16,000 | 11387 | 744 | 80 | 604 | 0.00 | 364 | |
| | Gasoline* | 2,300,000 | | | | 86,848 | 0.69 | | 24842 |
| 5/15/2017 | Benzene | 230,000 | 12274 | 887 | 90 | 9,770 | 0.08 | 432 | |
| | Gasoline* | 5,700,000 | | | | 242,136 | 1.92 | | 26543 |
| 6/14/2017 | Benzene | 32,000 | 12994 | 720 | 110 | 1,661 | 0.01 | 442 | |
| | Gasoline* | 4,600,000 | | | | 238,832 | 1.89 | | 27905 |
| 7/11/2017 | Benzene | 300,000 | 13620 | 626 | 110 | 15,576 | 0.12 | 519 | |
| | Gasoline* | 6,500,000 | | | | 337,480 | 2.67 | | 29578 |
| 8/9/2017 | Benzene | 220,000 | 14319 | 699 | 125 | 12,980 | 0.10 | 591 | |
| | Gasoline* | 4,900,000 | | | | 289,100 | 2.29 | | 31179 |
| 9/12/2017 | Benzene | 270,000 | 15135 | 816 | 110 | 14,018 | 0.11 | 682 | |
| | Gasoline* | 7,100,000 | | | | 368,632 | 2.92 | | 33561 |
| 9/22/2017 | Shut system down to measure GW/LNAPL | | 15366 | 231 | | | | | |
| 9/27/2017 | Restart system | | 15366 | 0 | | | | | |

| Totals | Benzene (lbs) | VOC (lbs) |
|---|---|---|
| (9/26/16 - 9/12/17) | 430 | 19548 |
| Since Startup | 1006 | 53187 |

**NOTES:**

* Lab report - "Gasoline" = Total VOC

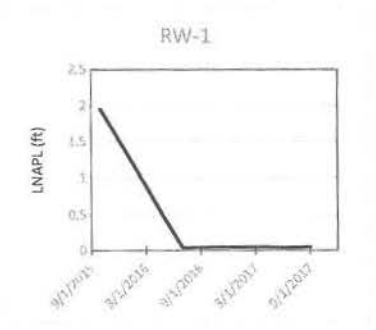
Hour Meter wired incorrectly by vendor. Corrected January 2016. Difference is estimated to be minimal.

| Discharge Limits |
|---|
| Benzene 936 lb/yr |
| Total VOCs = 5.7 lb/hr |

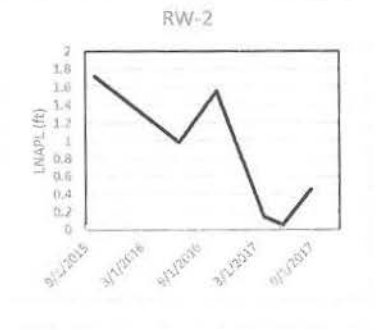
**Table 2: LNAPL Thickness Measurements since SVE Startup - Extraction Wells**
Autostop/Dougs


## AUTOSTOP SVE WELLS

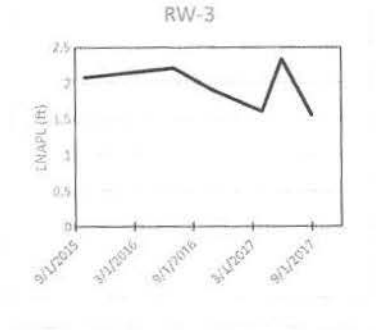
| RW-1 (installed August 23, 2012) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1144 | | |
| Top of Casing Elevation (surveyed) | | | | 1143.49 | | |
| Top of screen elevation | | | | 1125.5 | | |
| Bottom of Screen Elevation | | | | 1115.5 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | 21.45 | 23.4 | 1.95 | NM | 1122.04 | 1120.09 |
| 7/30/2016 | 20.38 | 20.42 | 0.04 | 0 | 1123.11 | 1123.07 |
| 11/3/2016 | 20.95 | 21 | 0.05 | 0 | 1122.54 | 1122.49 |
| 4/8/2017 | 21.6 | 21.65 | 0.05 | 0 | 1121.89 | 1121.84 |
| 6/14/2017 | 19.8 | 19.84 | 0.04 | 0 | 1123.69 | 1123.65 |
| 9/27/2017 | 21.22 | 21.27 | 0.05 | 0 | 1122.27 | 1122.22 |
| | | | | | | |



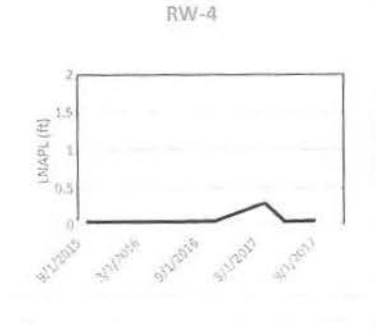

| RW-2 (installed August 23, 2012) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1144 | | |
| Top of Casing Elevation (surveyed) | | | | 1143.85 | | |
| Top of screen elevation | | | | 1126 | | |
| Bottom of Screen Elevation | | | | 1116 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | 21.78 | 23.5 | 1.72 | NM | 1121.71 | 1119.99 |
| 7/30/2016 | 21.02 | 22 | 0.98 | 12 | 1122.47 | 1121.49 |
| 11/3/2016 | 21.45 | 23 | 1.55 | 1 | 1122.04 | 1120.49 |
| 4/8/2017 | 22.01 | 22.15 | 0.14 | 0.5 | 1121.48 | 1121.34 |
| 6/14/2017 | 20.03 | 20.08 | 0.05 | 0 | 1123.46 | 1123.41 |
| 9/27/2017 | 21.8 | 22.25 | 0.45 | 0.5 | 1121.69 | 1121.24 |
| | | | | | | |




| RW-3 (installed August 23, 2012) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1144 | | |
| Top of Casing Elevation (surveyed) | | | | 1143.96 | | |
| Top of screen elevation | | | | 1125.5 | | |
| Bottom of Screen Elevation | | | | 1115.5 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | 21.92 | 24 | 2.08 | NM | 1121.57 | 1119.49 |
| 7/30/2016 | 20.84 | 23.05 | 2.21 | 21 | 1122.65 | 1120.44 |
| 11/3/2016 | 21.3 | 23.2 | 1.9 | 12 | 1122.19 | 1120.29 |
| 4/8/2017 | 21.8 | 23.4 | 1.6 | 16 | 1121.69 | 1120.09 |
| 6/14/2017 | 20.67 | 23 | 2.33 | 3 | 1122.82 | 1120.49 |
| 9/27/2017 | 21.65 | 23.2 | 1.55 | 16 | 1121.84 | 1120.29 |
| | | | | | | |




| RW-4 (installed June 12, 2015) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1146 | | |
| Top of Casing Elevation (surveyed) | | | | 1145.62 | | |
| Top of screen elevation | | | | 1131 | | |
| Bottom of Screen Elevation | | | | 1116 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | 23.63 | 23.67 | 0.04 | NM | 1119.86 | 1119.82 |
| 7/30/2016 | 22.3 | 22.34 | 0.04 | NM | 1121.19 | 1121.15 |
| 11/3/2016 | 22.65 | 22.7 | 0.05 | NM | 1120.84 | 1120.79 |
| 4/8/2017 | 23.51 | 23.8 | 0.29 | 0 | 1119.98 | 1119.69 |
| 6/14/2017 | 21.58 | 21.62 | 0.04 | 0 | 1121.91 | 1121.87 |
| 9/27/2017 | 22.63 | 22.68 | 0.05 | 0 | 1120.86 | 1120.81 |
| | | | | | | |




| RW-5 (installed June 12, 2015) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1144.5 | | |
| Top of Casing Elevation (surveyed) | | | | 1144.11 | | |
| Top of screen elevation | | | | 1129.5 | | |
| Bottom of Screen Elevation | | | | 1114.5 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | 21.82 | 22.4 | 0.58 | NM | 1121.67 | 1121.09 |
| 7/30/2016 | 21.05 | 21.11 | 0.06 | 0 | 1122.44 | 1122.38 |
| 11/3/2016 | 21.65 | 21.7 | 0.05 | 0 | 1121.84 | 1121.79 |
| 4/8/2017 | 22.25 | 22.29 | 0.04 | 0 | 1121.24 | 1121.2 |
| 6/14/2017 | 20.42 | 20.5 | 0.08 | 0 | 1123.07 | 1122.99 |
| 9/27/2017 | 21.9 | 21.94 | 0.04 | 0 | 1121.59 | 1121.55 |
| | | | | | | |

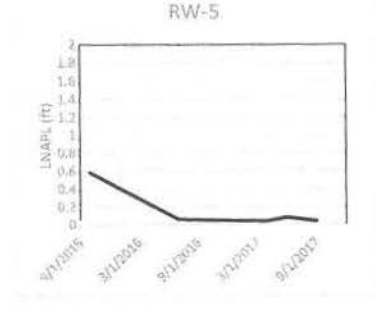
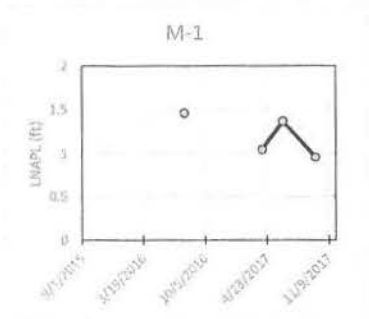


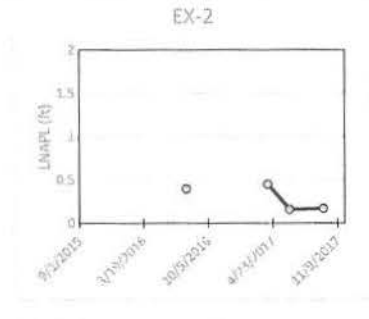
**Table 2: LNAPL Thickness Measurements since SVE Startup - Extraction Wells**
Autostop/Dougs


## DOUGS SVE WELLS

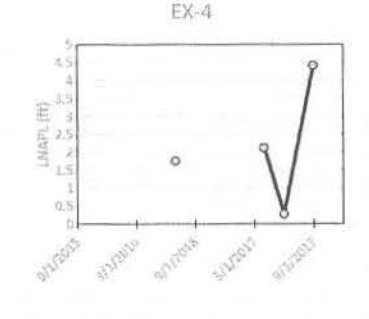
| M-1 (installed June 11, 2015) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1145 | | |
| Top of Casing Elevation (surveyed) | | | | 1144.89 | | |
| Top of screen elevation | | | | 1130 | | |
| Bottom of Screen Elevation | | | | 1115 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | NM | NM | | NM | | |
| 7/30/2016 | 21.84 | 23.3 | 1.46 | 9 | 1121.65 | 1120.19 |
| 11/3/2016 | NM | NM | | 14 | | |
| 4/8/2017 | 22.65 | 23.7 | 1.05 | 6 | 1120.84 | 1119.79 |
| 6/14/2017 | 20.63 | 22 | 1.37 | 8 | 1122.86 | 1121.49 |
| 9/27/2017 | 22.82 | 23.78 | 0.96 | 2 | 1120.67 | 1119.71 |
| | | | | | | |



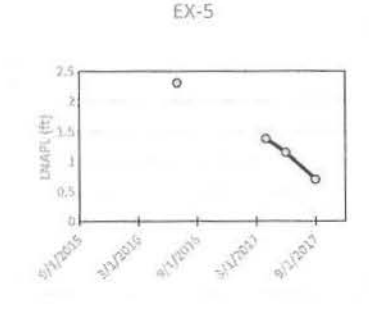

| EX-2 (installed 1/19/1992) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1144.25 | | |
| Top of Casing Elevation (surveyed) | | | | 1144.08 | | |
| Top of screen elevation | | | | 1124 | | |
| Bottom of Screen Elevation | | | | 1109 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | NM | NM | | NM | | |
| 7/30/2016 | 21.1 | 21.5 | 0.4 | 2 | 1122.39 | 1121.99 |
| 11/3/2016 | NM | NM | | 0 | | |
| 4/8/2017 | 21.85 | 22.3 | 0.45 | 1 | 1121.64 | 1121.19 |
| 6/14/2017 | 19.44 | 19.6 | 0.16 | 0.5 | 1124.05 | 1123.89 |
| 9/27/2017 | 21.92 | 22.09 | 0.17 | 0.25 | 1121.57 | 1121.4 |
| | | | | | | |




| EX-4 (installed 11/2/2002) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1145 | | |
| Top of Casing Elevation (surveyed) | | | | 1144.89 | | |
| Top of screen elevation | | | | 1131 | | |
| Bottom of Screen Elevation | | | | 1111 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | NM | NM | | NM | | |
| 7/30/2016 | 21.25 | 23 | 1.75 | 17 | 1122.24 | 1120.49 |
| 11/3/2016 | NM | NM | | 12 | | |
| 4/8/2017 | 22.48 | 24.6 | 2.12 | 24 | 1121.01 | 1118.89 |
| 6/14/2017 | 20.93 | 21.2 | 0.27 | 0.5 | 1122.56 | 1122.29 |
| 9/27/2017 | 22.18 | 26.6 | 4.42 | >36 | 1121.31 | 1116.89 |
| | | | | | | |




| EX-5 (installed 11/2/1992) | | | | | | |
|---|---|---|---|---|---|---|
| Surface Elevation (approx) | | | | 1145 | | |
| Top of Casing Elevation (surveyed) | | | | 1144.77 | | |
| Top of screen elevation | | | | 1130 | | |
| Bottom of Screen Elevation | | | | 1110 | | |
| **Meas. Date** | **DTP(ft)** | **DTW(ft)** | **PT (ft) (IP)*** | **PT(inch)(bailer)** | **TOF Elev (ft)** | **GW Elev (ft)** |
| 10/26/2015 | NM | NM | | NM | | |
| 7/30/2016 | 21.75 | 24.05 | 2.3 | 7 | 1121.74 | 1119.44 |
| 11/3/2016 | NM | NM | | 12 | | |
| 4/8/2017 | 22.52 | 23.9 | 1.38 | 8 | 1120.97 | 1119.59 |
| 6/14/2017 | 20.55 | 21.7 | 1.15 | 6 | 1122.94 | 1121.79 |
| 9/27/2017 | 22.8 | 23.5 | 0.7 | 1.5 | 1120.69 | 1119.99 |
| | | | | | | |




DTP - depth to product (interface probe)
DTW - depth to water (interface probe)
PT (IP) - product thickness using interface probe (IP) (feet)
PT (bailer) - product thickness measured visually with bailer (inches)
TOF - top of fluid elevation (LNAPL and/or GW)
GW - ground water elevation using interface probe

# FIGURES

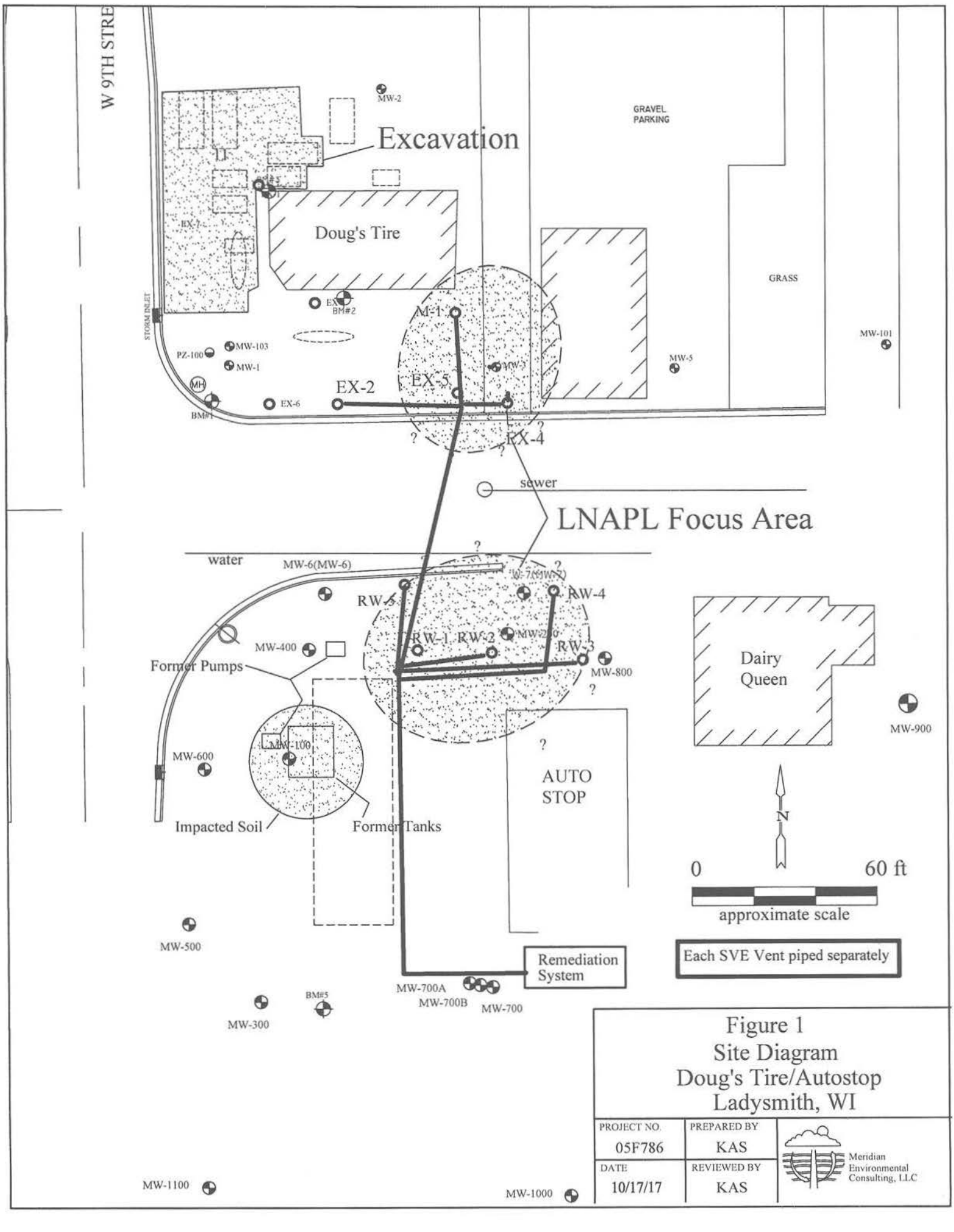
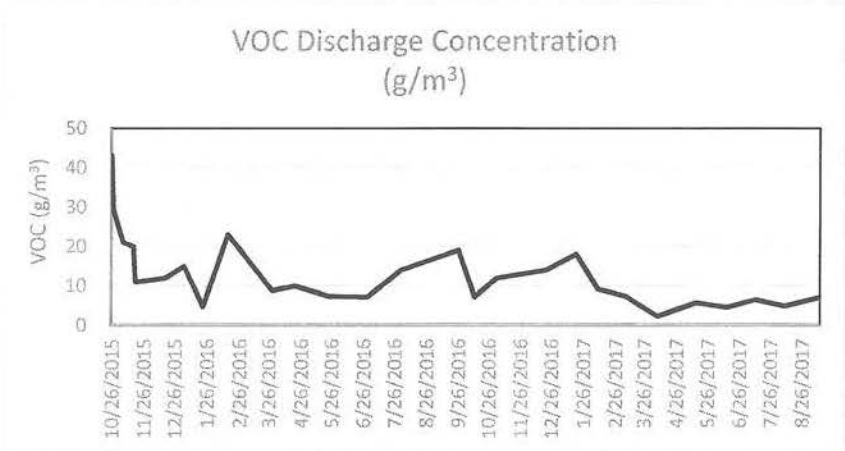
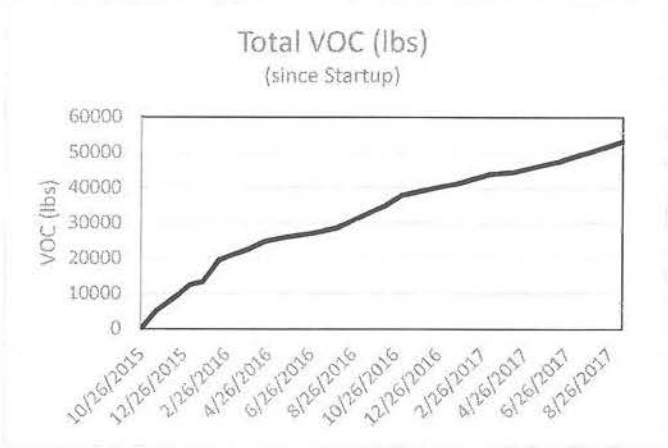


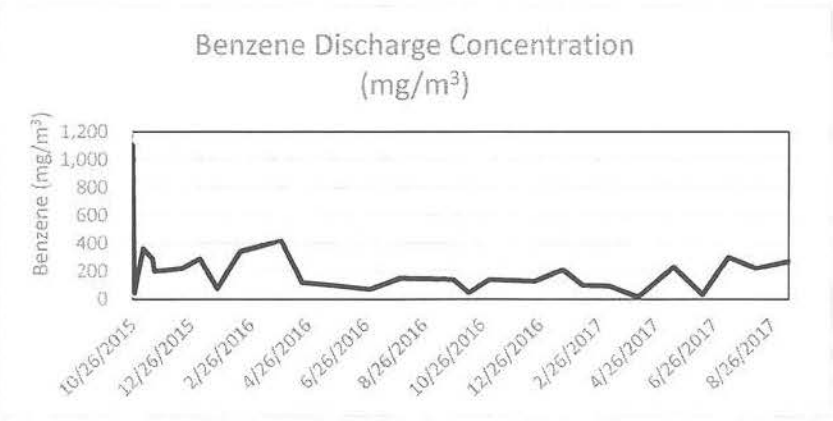

Figure 1
Site Diagram
Doug's Tire/Autostop
Ladysmith, WI

| PROJECT NO. | PREPARED BY |
|---|---|
| 05F786 | KAS |
| DATE | REVIEWED BY |
| 10/17/17 | KAS |

Meridian Environmental Consulting, LLC



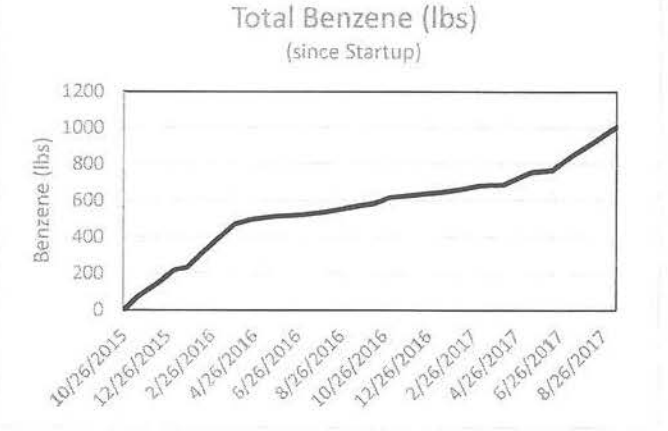




Figure 2: SVE Discharge

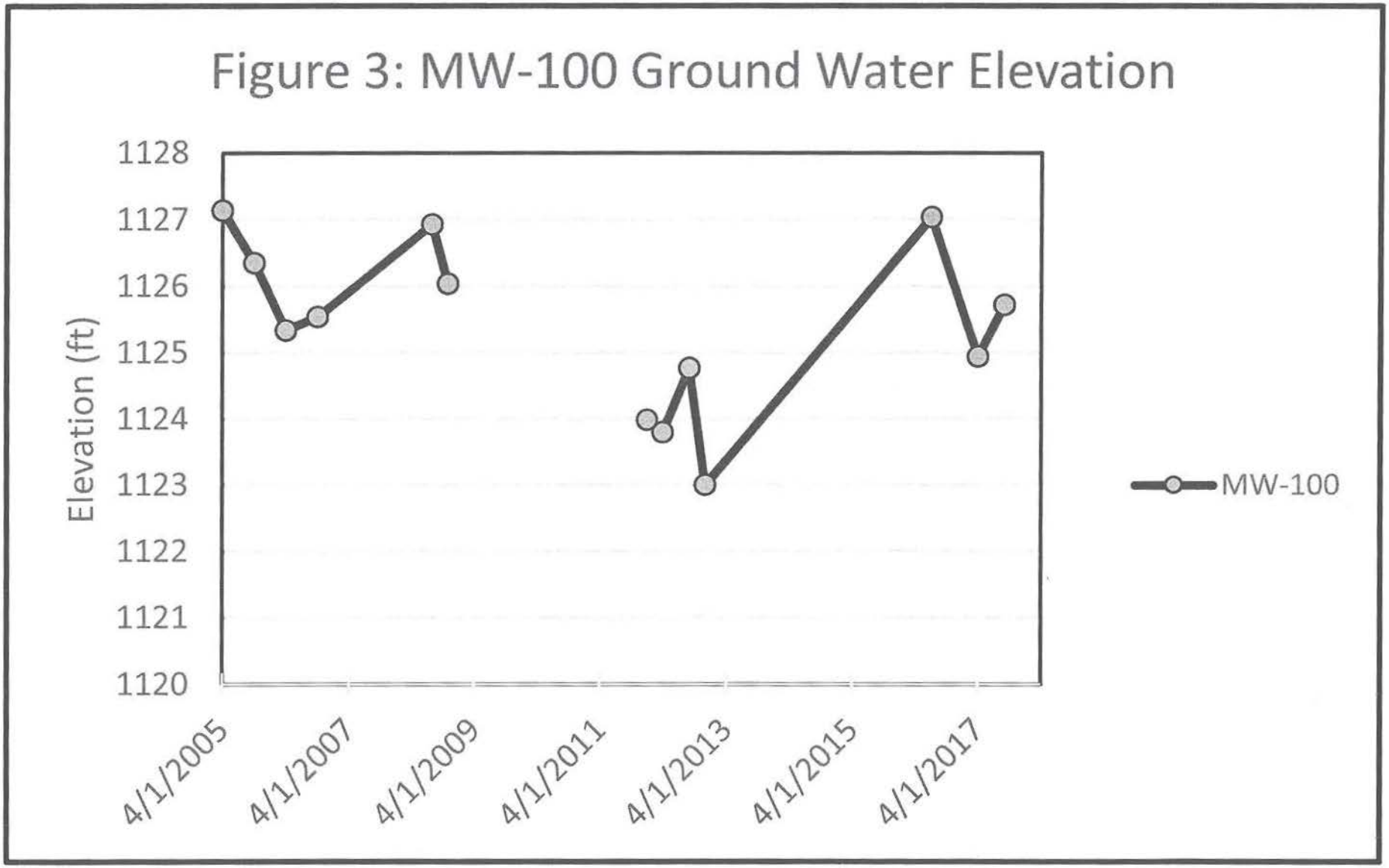


Figure 3: MW-100 Ground Water Elevation
Elevation (ft)
1128
1127
1126
1125
1124
1123
1122
1121
1120
4/1/2005
4/1/2007
4/1/2009
4/1/2011
4/1/2013
4/1/2015
4/1/2017
MW-100

# APPENDIX A

## Form 4400-194

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

# Remediation Site Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 11/14) 

**GENERAL INSTRUCTIONS, PURPOSE AND APPLICABILITY OF THIS FORM:** Completion of this form is required under s. NR 724.13(3), Wis. Adm. Code. A narrative report or letter containing the equivalent information required in this form may be submitted in lieu of the actual form. Failure to submit this form as required is a violation of s. NR 724.13(3), Wis. Adm. Code, and is subject to the penalties in s. 292.99, Wis. Stats. This form must be submitted every six months for soil or groundwater remediation projects that report operation and maintenance progress in accordance with s. NR 724.13(3), Wis. Adm. Code.

Note: Long-term monitoring results submitted in accordance with s. NR 724.17(3), Wis. Adm. Code are required to be submitted within 10 business days of receiving sampling results and are not required to be submitted using this form. However, portions of this form require monitoring data summary information that may be based on information previously submitted in accordance with s. NR 724.17(3), Wis. Adm. Code.

Note: Responsible parties should check with the State Project Manager assigned to the site to determine if this form is required to be submitted at sites responded to under the Federal Comprehensive Environmental Response and Compensation Act (commonly known as Superfund) or an equivalent State lead Superfund response.

Note: Responsible parties should check with the State Project Manager assigned to the site to determine if any of the information required in this form may be omitted or changed and obtain prior written approval for any omissions or changes.

Submittal of this form is not a substitute for reporting required by Department programs such as Waste Water or Air Management. Personally identifiable information on this form is not intended to be used for any other purpose than tracking progress of the remediation by the Bureau for Remediation and Redevelopment.

Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.). Unless otherwise noted, all citations refer to Wisconsin Administrative Code.

Note: There is a separate semi-annual report required under s. NR 700.11(1), Wis. Adm. Code. Reporting under that provision is through an internet-based form:

http://dnr.wi.gov/topic/Brownfields/documents/regs/NR700progreport.pdf

## Section GI - General Site Information

### A. General Information

1. Site name

Autostop & Doug's (two sites combined)

| 2. Reporting period from: | To: | Days in period: |
|---|---|---|
| 10/01/2016 | 10/01/2017 | 365 |

| 3. Regulatory agency (enter DNR, DATCP and/or other) | 4. BRRTS ID No. (2 digit program-2 digit county-6 digit site specific) |
|---|---|
| DNR | 03-55-282548 - Autostop + 03-55-000405 - Doug's |

5. Site location

| Region | County | Address |
|---|---|---|
| Northern Region | Rusk | Hwy 8 & 27 |

| Municipality name ◯ City ◯ Town ◯ Village | Township | Range ◯E ◯W | Section | ¼ | ¼ ¼ |
|---|---|---|---|---|---|
| Ladysmith | N | | | | |

| 6. Responsible party | 7. Consultant |
|---|---|
| Name: V. Richardson & S. Clark | ☒ Select if the following information has changed since the last submittal |
| Mailing address: | Company name: Meridian Environmental Consulting, LLC |
| Phone number: | Mailing address: 2711 North Elco Rd, Fall Creek, 54742 |
| | Phone number: (715) 832-6608 |

8. Contaminants

Petroleum

9. Soil types (USCS or USDA)

silty sand

| 10. Hydraulic conductivity(cm/sec): | 11. Average linear velocity of groundwater (ft/yr) |
|---|---|
| .0001 | |

12. If soil is treated ex situ, is the treatment location off site? ◯ Yes ◯ No

| If yes, give location: Region | County |
|---|---|
| | |

| Municipality name ◯ City ◯ Town ◯ Village | Township | Range ◯E ◯W | Section | ¼ | ¼ ¼ |
|---|---|---|---|---|---|
| | N | | | | |

## B. Remediation Method

Only submit sections that apply to an individual site. Check all that apply:

- ☐ Groundwater extraction (submit a completed Section GW-1).
- ☐ Free product recovery (submit a completed Section GW-1).
- ☐ In situ air sparging (submit a completed Section GW-2).
- ☐ Groundwater natural attenuation (submit a completed Section GW-3).
- ☐ Other groundwater remediation method (submit a completed Section GW-4).
- ☒ Soil venting (including soil vapor extraction building venting and bioventing submit a completed Section IS-1).
- ☐ Soil natural attenuation (submit a completed Section IS-2).
- ☐ Other in situ soil remediation method (submit a completed Section IS-3).
- ☐ Biopiles (submit a completed Section ES-1).
- ☐ Landspreading/thinspreading of petroleum contaminated soil (submit a completed Section ES-2).
- ☐ Other ex situ remediation method (submit a completed Section ES-3).
- ☐ Site is a landfill (submit a completed Section LF-1).

## C. General Effectiveness Evaluation for All Active Systems

If the remediation is active (not natural attentuation), complete this subsection.

1. Is the system operating at design rates and specifications? ◉ Yes ○ No
   If the answer is no, explain whether or not modifications are necessary to achieve the goal that was previously established in design.

2. Are modifications to the system warranted to improve effectiveness ○ Yes ◉ No
   If yes, explain:

3. Is natural attenuation an effective low cost option at this time? ○ Yes ◉ No
4. Is closure sampling warranted at this time? ○ Yes ◉ No
5. Are there any modifications that can be made to the remediation to improve cost effectiveness? ◉ Yes ○ No
   If yes, explain:
   Pumping of extraction wells EX-4, EX-5, M-1, RW-3 will enhance removal of LNAPL

## D. Economic and Cost Data to Date

1. Total investigation cost: _____
2. Implementation costs (design, capital and installation costs, excluding investigation costs: _____
3. Total costs during the previous reporting period: _____
4. Total costs during this reporting period: Autostop - #20,395.78 + Doug's #12,903.29
5. Total anticipated costs for the next reporting period: SAME
6. Are any unusual or one-time costs listed in the reporting periods covered by D.3., D.4. or D.5. above? ○ Yes ◉ No
   If yes, explain:

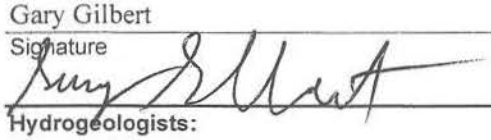
7. If closure is anticipated within 12 months, estimated costs for project closeout: N/A

## E. Name(s), Signature(s) and Date of Person(s) Submitting Form

Legibly print name, date and sign. Only persons qualified to submit reports under ch. NR 712 Wis. Adm. Code are to sign this form for sites with any ongoing active remediation, monitoring or an investigation. Other persons may sign this form for sites with no response activities during the six month reporting period.

**Registered Professional Engineers:**

I hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

| Print name | Title |
|---|---|
| Gary Gilbert | Engineer |
| Signature | Date |
|  | 11/9/17 |

**Hydrogeologists:**

I hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

| Print name | Title |
|---|---|
| Kenneth Shimko | Project Manager |
| Signature | Date |
|  | 11-7-17 |

**Scientists:**

I hereby certify that I am a scientist as that term is defined in s. NR 712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

| Print name | Title |
|---|---|
| | |
| Signature | Date |
| | |

**Other Persons:**

| Print name | Title |
|---|---|
| | |
| Signature | Date |
| | |

**Professional Seal(s), if applicable:**

## Section IS-1, Soil Venting (Including Soil Vapor Extraction, Building Venting and Bioventing)

### A. Soil Venting Operation

**Note:** This form is not required for building vapor mitigation systems that are installed proactively to protect building occupants/users and are not considered part of ongoing active soil remediation.

1. Number of air extraction wells available and number of wells actually in use during the period: 9
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain):
   365
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:
   91
4. Average depth to groundwater: 21 ~~ft~~ gpm

### B. Building Basement/Subslab Venting System Operation

1. Number of venting points available and number of points actually in use during the period:
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain):
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:

### C. Effectiveness Evaluation

1. Average contaminant removal rate for the entire system: 60 pounds per day
2. Average contaminant removal rate per well or venting point: _____ pounds per day
3. If the average contaminant removal rate is less than one pound per day for the entire system, or if the average contaminant removal rate per well is less than one tenth of a pound per day, evaluate the following:
   a. If contaminants are aerobically biodegradable and confirmation borings have not been drilled in the past year:
      i. Oxygen levels in extracted air: _____ percent
      ii. Methane levels in extracted air ($ppm_V$) If over 10 $ppm_V$, explain:
      iii. If methane is not present above 10 $ppm_V$ and if oxygen is greater than 20 percent in extracted air, you should either:
      - Drill confirmation borings during the next reporting period, if the entire site should be considered for closure.
      - Or, perform an in situ respirometry test in a zone of high contamination. Do not perform the test in an air extraction well, use a gas probe or water table well. If a zero order rate of decay based on oxygen depletion is less than 2 mg/kg per day, then you should drill confirmation borings, if the entire site should be considered for closure. If the rate of decay is between 2 and 10 mg/kg, operate for one more reporting period before evaluating further. If the zero order rate of decay is greater than 10 mg/kg total hydrocarbons, continue operating the system in a manner than maximizes aerobic biodegradation.

   b. If contaminants are not aerobically biodegradable and confirmation borings have not been recently drilled during the past year, you should drill confirmation borings during the next reporting period if the entire site should be considered for closure.
   c. If soil borings were drilled during the past year and soil contamination remains above acceptable levels, explain if the system effectiveness can be increased and/or if other options need to be considered to achieve cleanup criteria.

### D. Additional Attachments

Attach the following to this form:

- Well and soil sample location map indicating all air extraction wells. If forced air injection wells are also in use, identify those wells.
- If water table monitoring wells are present at the site, a map of well locations.
- Time versus vapor phase contaminant concentration graph.
- Time versus cumulative contaminant removal graph.
- Groundwater elevations table, if water table wells are present at the site; also list screen lengths and elevations.
- Table of soil contaminant chemistry data.
- Soil gas data, if gas probes are used to monitor subsurface conditions in locations other than where air is extracted.
- System operational data table.

# APPENDIX B

## Analytical Reports (results page only)

Client: REI Engineering, Inc.
Project/Site: Meridian, #6763

TestAmerica Job ID: 310-90615-1

Client Sample ID: Off-Gas
Date Collected: 09/26/16 12:15
Date Received: 09/30/16 09:00
Sample Air Volume: 2 L

Lab Sample ID: 310-90615-1
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 140 | 69 | 22 | | 11 | 10/06/16 13:50 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 19000 | 9700 | | | 590 | 10/10/16 11:09 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: SVE, Ladysmith, #630/78b

TestAmerica Job ID: 310-91818-1

**Client Sample ID: SVE Exhaust**
Date Collected: 10/12/16 00:00
Date Received: 10/17/16 10:00
Sample Air Volume: 1.01 L

**Lab Sample ID: 310-91818-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 46 | 46 | 14 | | 11 | 10/26/16 11:57 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 7100 | 7000 | | | 150 | 10/27/16 08:24 | 1 | JCM |

**Client Sample ID: SVE Exhaust**
Date Collected: 11/03/16 00:00
Date Received: 11/08/16 10:45
Sample Air Volume: 1.01 L

**Lab Sample ID: 310-93415-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 140 | 140 | 42 | | 11 | 11/17/16 10:10 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 12000 | 12000 | | | 150 | 11/17/16 10:11 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Doug's, SVE Exhaust

TestAmerica Job ID: 310-96591-1

Client Sample ID: SVE Exhaust
Date Collected: 12/21/16 00:00
Date Received: 12/27/16 11:10
Sample Air Volume: 1.01 L

Lab Sample ID: 310-96591-1
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 130 | 130 | 42 | | 11 | 01/06/17 09:00 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 14000 | 14000 | | | 290 | 01/06/17 09:00 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Dougs, SVE Exhaust

TestAmerica Job ID: 310-98190-1

**Client Sample ID: SVE Exhaust**
Date Collected: 01/19/17 00:00
Date Received: 01/24/17 11:12
Sample Air Volume: 1.02 L

**Lab Sample ID: 310-98190-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 210 | 210 | 65 | | 11 | 02/01/17 12:06 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 18000 | 17000 | | | 590 | 02/02/17 08:40 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Doug's Autostop

TestAmerica Job ID: 310-99433-1

**Client Sample ID: SVE Exhaust**
Date Collected: 02/09/17 00:00
Date Received: 02/14/17 10:50
Sample Air Volume: 1.01 L

**Lab Sample ID: 310-99433-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 100 | 100 | 32 | | 11 | 02/16/17 11:00 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 9200 | 9100 | | | 290 | 02/17/17 10:26 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop

TestAmerica Job ID: 310-101208-1

**Client Sample ID: SVE Exhaust**
Date Collected: 03/08/17 00:00
Date Received: 03/13/17 11:40
Sample Air Volume: 1.05 L

**Lab Sample ID: 310-101208-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 95 | 90 | 28 | | 11 | 03/16/17 14:14 | 1 | DLK |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 7300 | 7000 | | | 290 | 03/17/17 15:26 | 1 | BKT |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Benzene/Gasoline

TestAmerica Job ID: 310-103287-1

**Client Sample ID: SVE Exhaust**
Date Collected: 04/08/17 00:00
Date Received: 04/12/17 09:10
Sample Air Volume: 1.01 L

**Lab Sample ID: 310-103287-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 16 | 16 | 5.1 | | 11 | 04/20/17 13:03 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 2300 | 2300 | | | 150 | 04/21/17 09:59 | 1 | JCM |

# Client Sample Results

Client: Meridian Environmental Consulting LLC
Project/Site: Meridian Air Sampling Project

TestAmerica Job ID: 310-106070-1

**Client Sample ID: SVE Exhaust**
Date Collected: 05/15/17 00:00
Date Received: 05/18/17 11:55
Sample Air Volume: 1.04 L

**Lab Sample ID: 310-106070-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 230 | 220 | 70 | | 11 | 05/26/17 09:09 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 5700 | 5500 | | | 150 | 05/30/17 13:10 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Auto Stop, Dougs

TestAmerica Job ID: 310-108131-1

**Client Sample ID: SVE Exhaust**
Date Collected: 06/14/17 00:00
Date Received: 06/19/17 11:00
Sample Air Volume: 1.05 L

**Lab Sample ID: 310-108131-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 32 | 31 | 9.6 | | 11 | 06/22/17 12:20 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 4600 | 4400 | | | 150 | 06/23/17 10:38 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Doug's

TestAmerica Job ID: 310-109948-1

**Client Sample ID: SVE Exhaust**
Date Collected: 07/11/17 00:00
Date Received: 07/14/17 11:20
Sample Air Volume: 1.01 L

**Lab Sample ID: 310-109948-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 300 | 290 | 92 | | 11 | 07/20/17 10:25 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 6500 | 6500 | | | 150 | 07/21/17 15:14 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Doug's, SVE Exhaust

TestAmerica Job ID: 310-112055-1

Client Sample ID: SVE Exhaust
Date Collected: 08/09/17 00:00
Date Received: 08/14/17 11:00
Sample Air Volume: 1.03 L

Lab Sample ID: 310-112055-1
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 220 | 210 | 67 | | 11 | 08/21/17 12:55 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 4900 | 4800 | | | 150 | 08/21/17 12:57 | 1 | JCM |

Client: Meridian Environmental Consulting LLC
Project/Site: Autostop, Doug's, SVE Exhaust

TestAmerica Job ID: 310-114432-1

**Client Sample ID: SVE Exhaust**
Date Collected: 09/12/17 00:00
Date Received: 09/15/17 11:10
Sample Air Volume: 1.03 L

**Lab Sample ID: 310-114432-1**
Matrix: Air
Sample Container: IH - Coconut Shell Charcoal Tube, 150 mg

4

**Method: 1501 Sum - NIOSH Method 1501 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result ppm | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzene | 270 | 260 | 82 | | 11 | 09/21/17 14:28 | 1 | JCM |

**Method: 1550 - NIOSH Method 1550 (Modified)**

| Analyte | Result ug/Sample | Result mg/m3 | Result | Qualifier | RL ug/Sample | Analyzed | Dil Fac | Analyst |
|---|---|---|---|---|---|---|---|---|
| Gasoline | 7100 | 6900 | | | 150 | 09/22/17 13:10 | 1 | JCM |