US EPA RECORDS CENTER REGION 5
496909

CONESTOGA-ROVERS
& ASSOCIATES

200 W. Allegan Street, Suite 300
Plainwell, Michigan 49080-1397
Telephone: (269) 685-5181 Fax: (269) 685-5223
www.CRAworld.com

January 10, 2013

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 121
Groundwater and Landfill RD/RA
Reporting Period: October 1through December 31, 2012
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 INTRODUCTION

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree ("CD"), Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 ACTIVITIES PERFORMED DURING THIS REPORTING PERIOD

### 2.1 OPERATION AND MAINTENANCE

The quarterly round of groundwater elevations were measured on December 27, 2012. The corresponding groundwater contour map is provided on Figure 1.

Quarterly groundwater samples were collected on December 4 through 10, 2012 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

## 2.2 REPORTS

Quarterly Progress Report No. 120 was submitted to United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ) on September 15, 2012.

## 3.0 SUMMARY OF FINDINGS

The results of the fourth quarter 2012 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in the Groundwater Remediation Monitoring Program.

During the fourth quarter 2012 sampling, seven of the 27 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the seven monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 8.9 µg/L vinyl chloride |
| CRA-RA-24 | 5.3/5.6 µg/L vinyl chloride (duplicate sample) |
| CRA-RA-26S | 90 µg/L trichloroethene |
| CRA-RA-27 | 13/13 µg/L vinyl chloride (duplicate sample) |
| CRA-RA-30 | 4.2 µg/L vinyl chloride |
| EB-PZ-4 | 4.0 µg/L vinyl chloride |
| 81-4 | 3.3 µg/L vinyl chloride |

These are the same seven monitoring wells that had COCs above Part 201 DWC during the third quarter 2012.

CRA typically collects the annual Rasmussen residential well sample in the third quarter, however, there is a leak in the plumbing system and the well is currently turned off. As of December 12, 2012 the leak has not been repaired. If the leak is repaired by the home owner CRA will collect the annual Rasmussen residential well sample in the first quarter 2013.

## 4.0 PROBLEMS ENCOUNTERED

No major problems were encountered with the treatment system during the fourth quarter of 2012.

## 5.0 CORRECTIVE MEASURES TO RECTIFY PROBLEMS

No major problems were encountered with the treatment system during the fourth quarter of 2012.

## 6.0 CONTACTS AND SIGNIFICANT CORRESPONDENCE WITH PUBLIC REPRESENTATIVES

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | September 15, 2012 | Report No. 120 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDNRE) |

## 7.0 PLANNED UPCOMING ACTIVITIES/SCHEDULE

Landfill and groundwater component activities planned for the first quarter of 2013:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The first quarter groundwater sampling event is scheduled for the week of February 25, 2013
- The wells to be sampled in the first quarter of 2013 are listed in Table 5
- Obtain access to the property north of Spicer Road, if possible, to install vertical aquifer sampling (VAS) boreholes and monitoring wells
- Pending access and seasonal weather, install VAS boreholes and monitoring wells

CONESTOGA-ROVERS
& ASSOCIATES

January 10, 2013 Reference No. 032504-15



Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven Rapai

FOR Bart Bartholomy

AJD/cb/29
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Steven Nadeau, Honigman Miller
Mike Mateyk, CRA

# FIGURES AND TABLES

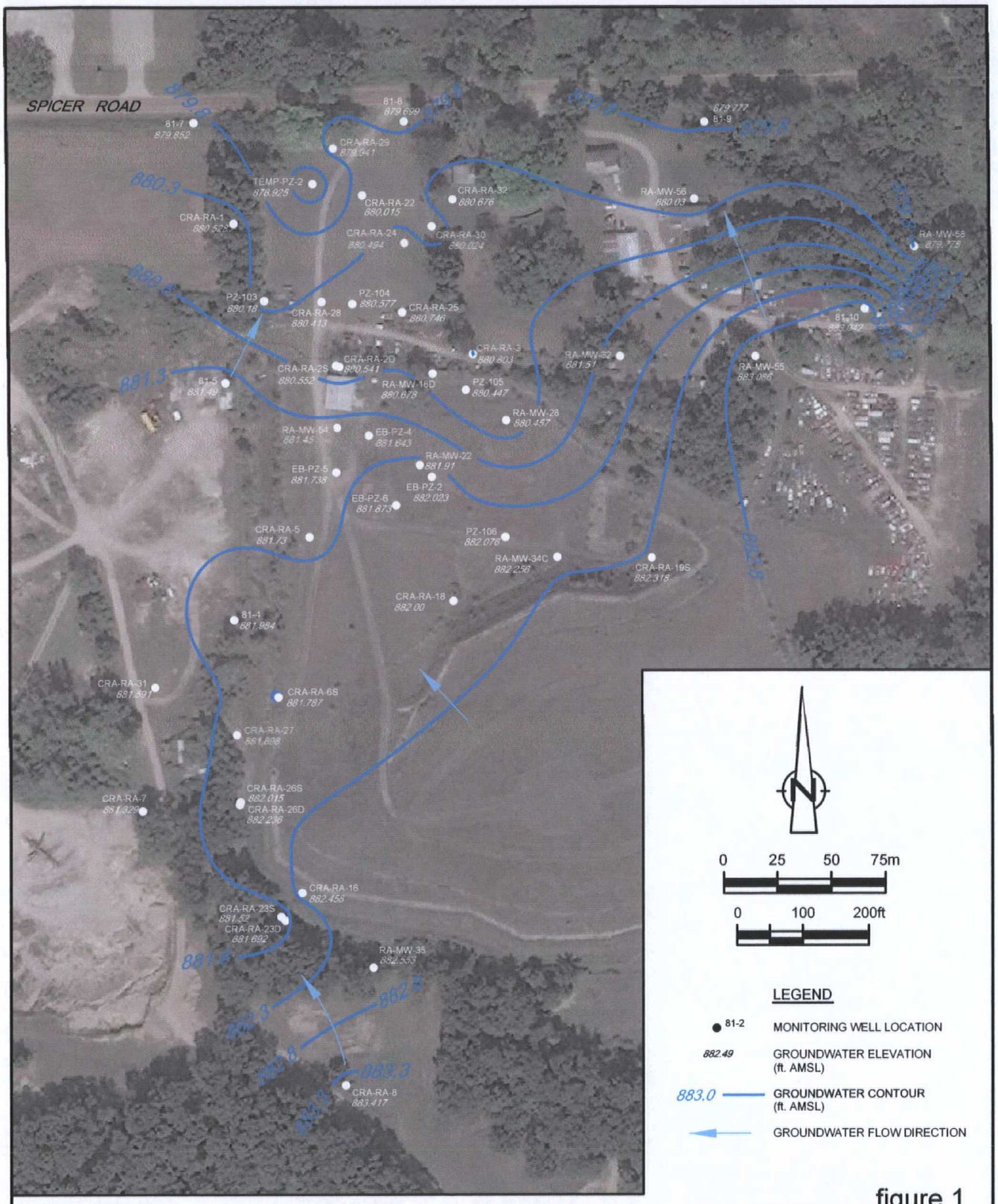



figure 1

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
DECEMBER 2012
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN029)GN-WA001 JAN 10/2013

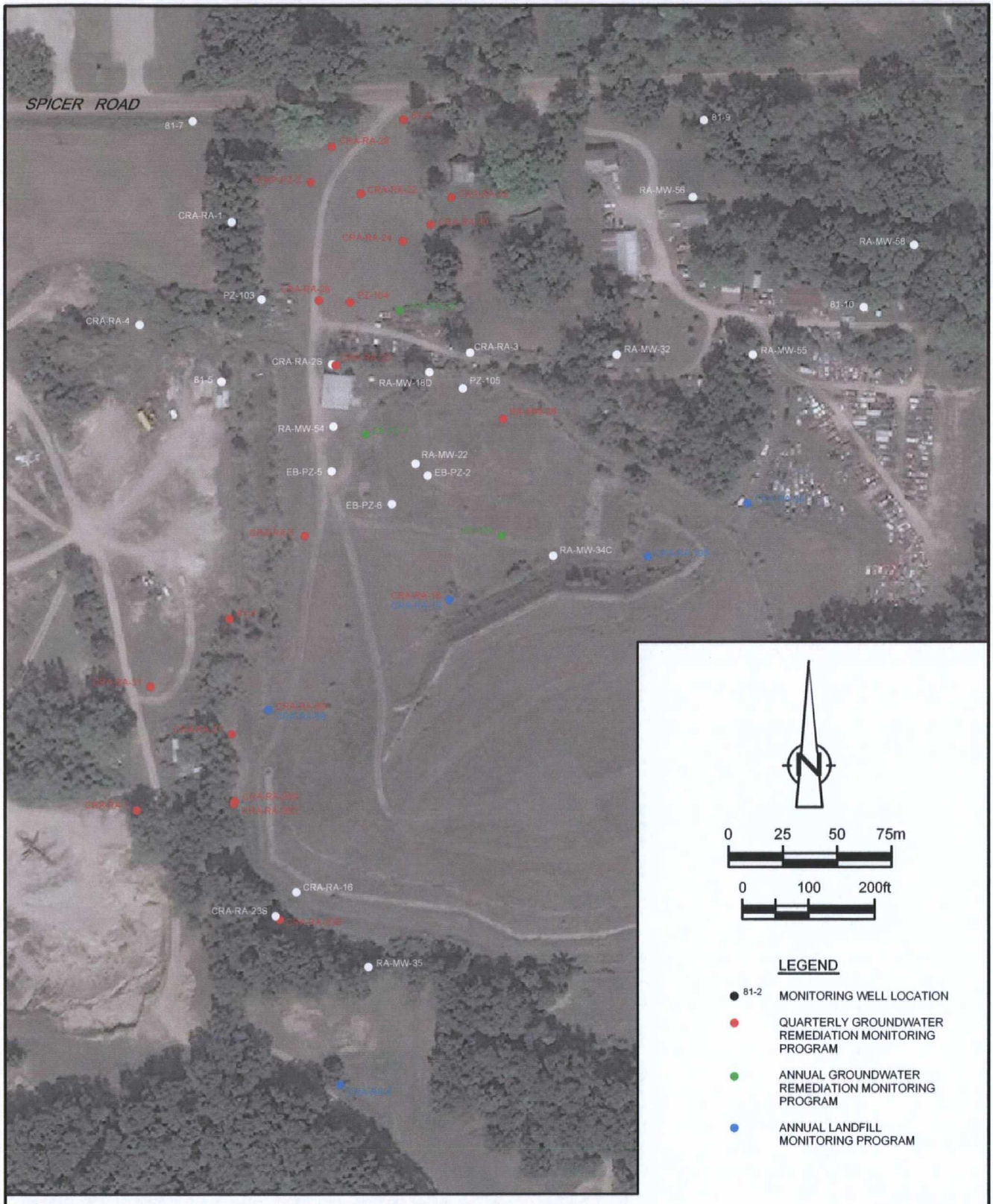



figure 2

2013 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN029)GN-WA003 JAN 10/2013

# TABLE 1

## ANALYTICAL RESULTS - NORTHERN PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-22 GW-SR-1595 3/14/2012* | *CRA-RA-22 GW-SR-1610 5/24/2012* | *CRA-RA-22 GW-SR-1648 9/14/2012* | *CRA-RA-22 GW-SR-1667 12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 6.7 | 8.2 | 7.3 | 8.9 | Up 1.6 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-24 GW-SR-1598 3/14/2012* | *CRA-RA-24 GW-SR-1607 5/23/2012* | *CRA-RA-24 GW-SR-1646 9/13/2012* | *CRA-RA-24 GW-SR-1663 12/5/2012* | *CRA-RA-24 GW-SR-1664 12/5/2012 Duplicate* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 4.5 | 4.4 | 3.5 | 5.3 | 5.6 | Up 2.0 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-25 GW-SR-1407 08/26/2010* | *CRA-RA-25 GW-SR-1408 08/26/2010 Duplicate* | *CRA-RA-25 GW-SR-1546 8/24/2011* | *CRA-RA-25 GW-SR-1547 8/24/2011 Duplicate* | *CRA-RA-25 GW-SR-1645 9/13/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 1.4 | 1.4 | 1.0 | ND(1) | 1.2 | Up 0.2 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-28 GW-SR-1591 3/13/2012* | *CRA-RA-28 GW-SR-1605 5/23/2012* | *CRA-RA-28 GW-SR-1643 9/13/2012* | *CRA-RA-28 GW-SR-1661 12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 1.1 | 2.2 | 1.5 | 1.4 | Down 0.1 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| VINYL CHLORIDE | µg/L | 2 | 1.0 | 1.8 | 1.0 | 1.4 | Up 0.4 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-29*<br>*GW-SR-1593*<br>*3/14/2012* | *CRA-RA-29*<br>*GW-SR-1612*<br>*5/24/2012* | *CRA-RA-29*<br>*GW-SR-1650*<br>*9/14/2012* | *CRA-RA-29*<br>*GW-SR-1669*<br>*12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-30*<br>*GW-SR-1596*<br>*3/14/2012* | *CRA-RA-30*<br>*GW-SR-1608*<br>*5/24/2012* | *CRA-RA-30*<br>*GW-SR-1647*<br>*9/13/2012* | *CRA-RA-30*<br>*GW-SR-1665*<br>*12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 5.0 | 5.9 | 3.5 | 4.2 | Up 0.7 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-32 GW-SR-1597 3/14/2012* | *CRA-RA-32 GW-SR-1609 5/24/2012* | *CRA-RA-32 GW-SR-1654 9/14/2012* | *CRA-RA-32 GW-SR-1655 9/14/2012 Duplicate* | *CRA-RA-32 GW-SR-1666 12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *PZ-104*<br>*GW-SR-1601*<br>*3/15/2012* | *PZ-104*<br>*GW-SR-1602*<br>*3/15/2012*<br>*Duplicate* | *PZ-104*<br>*GW-SR-1606*<br>*5/23/2012* | *PZ-104*<br>*GW-SR-1644*<br>*9/13/2012* | *PZ-104*<br>*GW-SR-1662*<br>*12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 3.7 | 3.6 | 3.9 | 3.2 | 3.1 | Down 0.1 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *TEMP-PZ-2*<br>*GW-SR-1592*<br>*3/14/2012* | *TEMP-PZ-2*<br>*GW-SR-1611*<br>*5/24/2012* | *TEMP-PZ-2*<br>*GW-SR-1649*<br>*9/14/2012* | *TEMP-PZ-2*<br>*GW-SR-1668*<br>*12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *81-8*<br>*GW-SR-1594*<br>*3/14/2012* | *81-8*<br>*GW-SR-1613*<br>*5/24/2012* | *81-8*<br>*GW-SR-1614*<br>*5/24/2012*<br>*Duplicate* | *81-8*<br>*GW-SR-1651*<br>*9/14/2012* | *81-8*<br>*GW-SR-1672*<br>*12/6/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | 1.1 | 1.1 | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-2D GW-SR-1581 3/7/2012* | *CRA-RA-2D GW-SR-1604 5/23/2012* | *CRA-RA-2D GW-SR-1629 9/10/2012* | *CRA-RA-2D GW-SR-1656 12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(13) | ND(20) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(13) | ND(20) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(13) | ND(20) | |
| BENZENE | µg/L | 5 | 1.1 | 1.1 | ND(1.3) | ND(2.0) | |
| CHLOROBENZENE | µg/L | 100 | 40.6 | 31.3 | 42 | 40 | Down 2 µg/L |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.3) | ND(2.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | 1.5 | ND(1.3) | ND(2.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) J | ND(1.3) | ND(2.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-18 GW-SR-1588 3/13/2012* | *CRA-RA-18 GW-SR-1617 6/20/2012* | *CRA-RA-18 GW-SR-1638 9/12/2012* | *CRA-RA-18 GW-SR-1639 9/12/2012 (Duplicate)* | *CRA-RA-18 GW-SR-1659 12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 91.9 | 86.3 | 90 | 78 | 100 | Up 22 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(29) | ND(40) | ND(50) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(29) | ND(40) | ND(50) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(29) | ND(40) | ND(50) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| TRICHLOROETHENE | µg/L | 5 | 1.9 | 2.0 | ND(2.9) | ND(4.0) | ND(5) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *EB-PZ-4*<br>*GW-SR-1309*<br>*08/27/2009* | *EB-PZ-4*<br>*GW-SR-1310*<br>*08/27/2009*<br>*Duplicate* | *EB-PZ-4*<br>*GW-SR-1445*<br>*9/3/2010* | *EB-PZ-4*<br>*GW-SR-1548*<br>*8/24/2011* | *EB-PZ-4*<br>*GW-SR-1630*<br>*9/10/2012* | *EB-PZ-4*<br>*GW-SR-1657*<br>*12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | 1.42 | ND(1) | ND(1.0) | ND(2.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.0) | |
| CHLOROBENZENE | µg/L | 100 | 28 | 27 | 29 | 38.7 | 39 | 39 | Stable |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| VINYL CHLORIDE | µg/L | 2 | 3.6 | 3.6 | ND(1) | ND(1) | 3.3 | 4.0 | Up 0.7 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *PZ-106*<br>*GW-SR-1208*<br>*8/26/2008*<br>*Duplicate* | *PZ-106*<br>*GW-SR-1314*<br>*1/9/2009* | *PZ-106*<br>*GW-SR-1399*<br>*08/25/2010* | *PZ-106*<br>*GW-SR-1549*<br>*8/25/2011* | *PZ-106*<br>*GW-SR-1640*<br>*9/12/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Stable; all |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Non- |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Detect |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *RA-MW-28 GW-SR-1589 3/13/2012* | *RA-MW-28 GW-SR-1590 3/13/2012 Duplicate* | *RA-MW-28 GW-SR-1618 6/20/2012* | *RA-MW-28 GW-SR-1642 9/13/2012* | *RA-MW-28 GW-SR-1660 12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 12.0 | 11.8 | 12.4 | 10 | 9.8 | Down 0.2 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(1) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

# TABLE 3

## ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-5 GW-SR-1587 3/13/2012* | *CRA-RA-5 GW-SR-1615 6/19/2012* | *CRA-RA-5 GW-SR-1631 9/10/2012* | *CRA-RA-5 GW-SR-1658 12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 29.8 | 24.2 | 30 | 23 | Down 7 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | 1.2 | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-6S GW-SR-1586 3/8/2012* | *CRA-RA-6S GW-SR-1625 6/21/2012* | *CRA-RA-6S GW-SR-1626 6/21/2012 Duplicate* | *CRA-RA-6S GW-SR-1632 9/10/2012* | *CRA-RA-6S GW-SR-1673 12/5/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | 1.1 | Up 0.1 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) UJ | ND(10) | ND(10) | ND(10) | ND(1.0) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) UJ | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) UJ | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 1.4 J | 1.8 | 1.9 | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) UJ | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

# TABLE 3

## ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-7 GW-SR-1600 3/15/2012* | *CRA-RA-7 GW-SR-1627 6/21/2012* | *CRA-RA-7 GW-SR-1653 9/14/2012* | *CRA-RA-7 GW-SR-1671 12/6/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-27 GW-SR-1585 3/8/2012* | *CRA-RA-27 GW-SR-1620 6/20/2012* | *CRA-RA-27 GW-SR-1633 9/11/2012* | *CRA-RA-27 GW-SR-1674 12/6/2012* | *CRA-RA-27 GW-SR-1675 12/6/2012 Duplicate* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 8.2 | 12.2 | 13 | 13 | 13 | Stable |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-31*<br>*GW-SR-1599*<br>*3/15/2012* | *CRA-RA-31*<br>*GW-SR-1616*<br>*6/19/2012* | *CRA-RA-31*<br>*GW-SR-1652*<br>*9/14/2012* | *CRA-RA-31*<br>*GW-SR-1670*<br>*12/6/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

# TABLE 3

## ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *81-4*<br>*GW-SR-1603*<br>*3/15/2012* | *81-4*<br>*GW-SR-1621*<br>*6/20/2012* | *81-4*<br>*GW-SR-1634*<br>*9/11/2012* | *81-4*<br>*GW-SR-1576*<br>*12/10/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 3.1 | 3.2 | 3.1 | 3.3 | Up 0.2 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 4**

**ANALYTICAL RESULTS - SOUTHERN TCE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-23D*<br>*GW-SR-1582*<br>*3/7/2012* | *CRA-RA-23D*<br>*GW-SR-1624*<br>*6/21/2012* | *CRA-RA-23D*<br>*GW-SR-1637*<br>*9/11/2012* | *CRA-RA-23D*<br>*GW-SR-1678*<br>*12/10/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | 4.9 | 5.9 | 4.9 | 4.4 | Down 0.5 µg/L |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-26D GW-SR-1584 3/8/2012* | *CRA-RA-26D GW-SR-1623 6/21/2012* | *CRA-RA-26D GW-SR-1636 9/11/2012* | *CRA-RA-26D GW-SR-1677 12/6/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | Stable; all Non Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 4**

**ANALYTICAL RESULTS - SOUTHERN TCE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-26S GW-SR-1583 3/8/2012* | *CRA-RA-26S GW-SR-1622 6/21/2012* | *CRA-RA-26S GW-SR-1635 9/11/2012* | *CRA-RA-26S GW-SR-1676 12/6/2012* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 2.2 | 2.2 | ND(5.7) | ND(3.3) | Stable |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(57) | ND(33) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(57) | ND(33) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(57) | ND(33) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| TRICHLOROETHENE | µg/L | 5 | 117 | 133 | 100 | 90 | Down 10 µg/L |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(5.7) | ND(3.3) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

# TABLE 5

## 2013 GROUNDWATER SAMPLING PROGRAM
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Quarterly Sampling - VOCs* | *Additional Routine Samples* | | | |
|---|---|---|---|---|
| | *Q1* | *Q2* | *Q3* | *Q4* |
| 81-4 | | | | |
| 81-8 | | | | |
| CRA-RA-2D | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-5 | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-18 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only)[1] | |
| CRA-RA-22 | | CRA-RA-19S | | |
| CRA-RA-23D | | CRA-RA-20 | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

Note:

1 - As of Q3 2012 there is a leak in the plumbing for the New Rasmussen Water Supply Well and the well is unavailable for sampling. CRA will collect a sample when the plumbing is repaired and then resume routine annual sampling.

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 10/3/12 | 10/11/12 | 10/18/12 | 10/26/12 | 11/2/12 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L Rapai | L Rapai | L Rapai | L Rapai | L Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 60 | 55 | 58 | 60 | 60 |
| Feed Air Pressure psi | 105 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 75 | 65 |
| Holding Tank Pressure psi | 40 | 42 | 42 | 44 | 42 |
| Run Time hours | | | | 78310.8 | 78477.0 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 7 | 8 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 34 | 35 | 32 | 40 | 36 |
| Regulator #2 psi | 22 | 22 | 22 | 25 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 1 | 3 | 3 | 1 |
| Zone Time hours | 1/2 | 1/2 | 2 | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 11/9/12 | 11/16/12 | 11/21/12 | 11/29/12 | 12/7/12 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L Rapi | L Rapi | L Rapi | L Rapi | L Rapi |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 50 | 60 | 62 | 60 | 58 |
| Feed Air Pressure psi | 110 | 70 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 60 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 44 | 44 | 44 | 42 |
| Run Time hours | ~~GREEN~~ 78648.0 | 78816.1 | 78933.2 | | 79319.3 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 8 | 8 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | 40 | 38 | 38 | 42 |
| Regulator #2 psi | 22 | 25 | 24 | 22 | 23 |
| Alarm Reading ppm, O3 | — | — | — | — | — |
| Zone On | 2 | 3 | 3 | 1 | 3 |
| Zone Time hours | 1/2 | 2 | 2 | 1/2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | 12/14/12 | 12/19/12 | 12/27/12 | | |
| **OPERATOR SIGNATURE** | S Rapp | S Rapp | S Rapp | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Compressor** | | | | | |
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | | |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Sep** | | | | | |
| | | | | | |
| Receiver Pressure psi | 60 | 56 | 58 | | |
| Feed Air Pressure psi | 115 | 120 | 110 | | |
| Cycle Pressure psi | 65 | 70 | 70 | | |
| Holding Tank Pressure psi | 44 | 44 | 42 | | |
| Run Time hours | 79486.4 | 79607.5 | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Dryer** | | | | | |
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | | |

| | | | | | |
|---|---|---|---|---|---|
| **Ozone Generator** | | | | | |
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 8 | | |
| % O3 capacity | 45 | 45 | 45 | | |
| Regulator #1 psi | 36 | 38 | 36 | | |
| Regulator #2 psi | 27 | 23 | 22 | | |
| Alarm Reading ppm, O3 | – | – | – | | |
| Zone On | 3 | 3 | 1 | | |
| Zone Time hours | 2 | 2 | 1/2 | | |

| | | | | | |
|---|---|---|---|---|---|
| **Distribution Panel** | | | | | |
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** OCT. 11, 2012
**Time:** 10:00 AM

**Weather Conditions:** CLEAR 45°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** OK

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** OCTOBER 26, 2012
**Time:** 1:30 PM

**Weather Conditions:** DRIZZLE, COLD WIND, 52°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY BUT WET

**Drainage Spillways & Outfalls:** MINOR FLOW

**Roadways:** OK

**Vegetation:** GOING DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** NOVEMBER 9, 2012
**Time:** 2:00PM

**Weather Conditions:** CLOUDY 52°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** NOV. 27, 2012
**Time:** 1200 PM

**Weather Conditions:** CLEAR 31°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** DECEMBER 5, 2012
**Time:** 11:00 AM

**Weather Conditions:** CLEAR 33°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** DECEMBER 27, 2012
**Time:** 1:30 PM

**Weather Conditions:** CLEAR 30° - +6" OF SNOW THIS MORNING

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:** OK - PLOWED BY STAN RASMUSSEN

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: 10/3 & 10/11, 2012 | | | DATE: Nov. 16, 2012 | | | DATE: DEC. 5 & DEC. 6, 2012 | | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 6 | SW-1 | 0.8 | 6 | SW-1 | 0.8 | 5 |
| SW-2 | 0.8 | 5 | SW-2 | 0.8 | 5 | SW-2 | 1.0 | 5 |
| SW-3 | 0.8 | 12 | SW-3 | 0.8 | 14 | SW-3 | 0.8 | 16 |
| SW-4 | 0.8 | 13 | SW-4 | 0.8 | 15 | SW-4 | 0.8 | 14 |
| SW-5 | 0.7 | 15 | SW-5 | 0.8 | 15 | SW-5 | 0.8 | 15 |
| SW-6 | 0.8 | 15 | SW-6 | 0.8 | 15 | SW-6 | 0.8 | 14 |
| SW-7 | 1.0 | 14 | SW-7 | 0.6 | 16 | SW-7 | 0.8 | 12 |
| SW-8 | X | X | SW-8 | X | X | SW-8 | X | X |
| SW-9 | X | X | SW-9 | X | X | SW-9 | X | X |
| SW-10 | X | X | SW-10 | X | X | SW-10 | X | X |
| SW-11 | X | X | SW-11 | X | X | SW-11 | X | X |
| SW-12 | 0.8 | 19 | SW-12 | 0.6 | 20 | SW-12 | 0.8 | 19 |
| SW-13 | 0.8 | 3 | SW-13 | 0.8 | 5 | SW-13 | 0.8 | 3 |
| SW-14 | X | X | SW-14 | X | X | SW-14 | X | X |
| SW-15 | X | X | SW-15 | X | X | SW-15 | X | X |
| SW-16 | X | X | SW-16 | X | X | SW-16 | X | X |
| SW-17 | 0.6 | 17 | SW-17 | 0.6 | 18 | SW-17 | 0.8 | 16 |
| SW-18 | 0.6 | 20 | SW-18 | 0.8 | 18 | SW-18 | 0.8 | 16 |
| SW-19 | 0.8 | 16 | SW-19 | 0.8 | 17 | SW-19 | 0.8 | 16 |
| SW-20 | 0.6 | 19 | SW-20 | 0.8 | 20 | SW-20 | 0.8 | 19 |
| SW-21 | X | X | SW-21 | X | X | SW-21 | X | X |
| SW-22 | 0.8 | 16 | SW-22 | 0.8 | 15 | SW-22 | 0.6 | 16 |
| SW-23 | 0.8 | 15 | SW-23 | 0.6 | 15 | SW-23 | 1.0 | 15 |
| SW-24 | 0.8 | 17 | SW-24 | 0.6 | 15 | SW-24 | 0.6 | 18 |
| SW-25 | 0.8 | 12 | SW-25 | 0.8 | 15 | SW-25 | 0.6 | 13 |
| SW-26 | 0.8 | 5 | SW-26 | 0.6 | 5 | SW-26 | 0.6 | 5 |
| SW-27 | 0.8 | 5 | SW-27 | 0.8 | 5 | SW-27 | 0.8 | 5 |
| SW-28 | 0.8 | 6 | SW-28 | 0.8 | 5 | SW-28 | 0.8 | 5 |
| SW-29 | 0.8 | 5 | SW-29 | 0.8 | 5 | SW-29 | 0.8 | 5 |
| SW-30 | X | X | SW-30 | | X | SW-30 | X | X |

12/4/12 32504-25

TASK: BEGIN 1/4LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: RAIN, 56°F

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA: pH=4.00, COND.=4.49, TURB=0, D.O.= TEMP=

SAMPLE OF CRA-RA2D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 11:00 | 7.26 | 2.04 | 18.4 | 2.06 | 11.43 |
| 11:10 | 6.95 | 1.98 | 6.2 | 0.23 | 11.40 |
| 11:20 | 7.01 | 2.06 | 5.1 | 0.18 | 11.39 |
| 11:25 | 7.00 | 2.07 | 4.4 | 0.18 | 11.38 |
| 11:30 | 7.00 | 2.06 | 4.1 | 0.18 | 11.38 |
| 11:35 | 7.00 | 2.06 | 4.0 | 0.19 | 11.38 |

SAMPLED @ 1136 ID: GW-32504-120412-SR-1656

SAMPLE OF EB-PZ-4

| | | | | | |
|---|---|---|---|---|---|
| 1200 | 7.14 | 1.04 | 162.0 | 3.99 | 11.32 |
| 1215 | 7.07 | 1.03 | 30.3 | 0.30 | 11.21 |
| 1230 | 7.07 | 1.03 | 17.4 | 0.18 | 11.21 |
| 1235 | 7.08 | 1.03 | 11.5 | 0.15 | 11.28 |
| 1240 | 7.09 | 1.02 | 10.2 | 0.15 | 11.21 |
| 1245 | 7.10 | 1.02 | 10.4 | 0.15 | 11.17 |

CONTINUED ON NEXT PAGE

32504-25 12/4/12

SAMPLE OF EB-PZ-4 (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1250 | 7.10 | 1.02 | 9.8 | 0.14 | 11.20 |
| 1255 | 7.11 | 1.02 | 10.1 | 0.14 | 11.20 |

PURGED WELL FOR OVER ONE HOUR

SAMPLED @ 1300 ID: GW-32504-120412-SR-1657

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1315 | 6.93 | 1.44 | 7.7 | 2.93 | 11.18 |
| 1325 | 6.93 | 1.41 | 6.7 | 0.27 | 11.16 |
| 1335 | 6.95 | 1.40 | 2.1 | 0.63 | 11.16 |
| 1340 | 6.97 | 1.40 | 2.8 | 0.75 | 11.14 |
| 1350 | 6.98 | 1.41 | 2.7 | 0.77 | 11.14 |
| 1355 | 6.98 | 1.41 | 2.7 | 0.76 | 11.14 |

SAMPLED @ 1356 ID: GW-32504-120412-SR-1658

SAMPLE OF CRA-RA-18

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 6.90 | 2.15 | 20.5 | 5.05 | 10.62 |
| 1425 | 6.89 | 2.11 | 3.4 | 4.68 | 10.67 |
| 1435 | 6.90 | 2.11 | 3.2 | 4.64 | 10.61 |
| 1440 | 6.90 | 2.11 | 2.9 | 4.62 | 10.62 |
| 1445 | 6.91 | 2.11 | 2.7 | 4.61 | 10.62 |
| 1450 | 6.91 | 2.11 | 2.7 | 4.61 | 10.62 |

SAMPLED @ 1451 ID: GW-32504-120412-SR-1659

12/4/12 32504-25

SAMPLE OF RA-MW-47

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1500 | 7.26 | 0.814 | 3.6 | 1.83 | 10.84 |
| 1510 | 7.19 | 0.813 | 4.2 | 1.57 | 10.82 |
| 1520 | 7.18 | 0.813 | 4.0 | 1.63 | 10.88 |
| 1525 | 7.18 | 0.813 | 4.3 | 1.65 | 10.88 |
| 1530 | 7.17 | 0.813 | 3.1 | 1.66 | 10.89 |
| 1535 | 7.18 | 0.813 | 2.9 | 1.66 | 10.88 |

SAMPLED @ 1536 ID:GW-32504-120412-SR-1660

SAMPLE OF CRA-RA-28

| | | | | | |
|---|---|---|---|---|---|
| 1550 | 7.15 | 1.05 | 4.9 | 2.31 | 11.29 |
| 1600 | 7.13 | 1.03 | 10.4 | 0.20 | 11.28 |
| 1610 | 7.13 | 1.05 | 8.5 | 0.15 | 11.26 |
| 1615 | 7.13 | 1.05 | 5.2 | 0.15 | 11.26 |
| 1620 | 7.13 | 1.06 | 4.4 | 0.16 | 11.26 |
| 1625 | 7.13 | 1.06 | 3.9 | 0.16 | 11.26 |

SAMPLED @ 1626 ID:GW-32504-120412-SR-1661

SAMPLES PACKED IN COOLER WITH ICE

32504-25 14°C

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER:

H&S:

CALIBRATION OF RENTAL HORIBA: pH=4.00, COND.=4.49, TURB.=0, D.O.=8.67, TEMP=24.1°C

SAMPLE OF PZ-104

| TIME | pH | COND. | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0955 | 6.89 | 1.21 | 12.9 | 2.41 | 11.62 |
| 1005 | 6.96 | 1.26 | 3.7 | 1.00 | 11.32 |
| 1015 | 7.05 | 1.27 | 3.1 | 0.25 | 11.30 |
| 1020 | 7.06 | 1.28 | 2.9 | 0.23 | 11.24 |
| 1025 | 7.09 | 1.28 | 1.8 | 0.21 | 11.24 |
| 1030 | 7.10 | 1.28 | 3.1 | 0.20 | 11.25 |
| 1035 | 7.10 | 1.28 | 2.0 | 0.21 | 11.24 |

SAMPLED @ 1036 ID:GW-32504-120512-SR-1662

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1045 | 7.00 | 1.04 | 5.0 | 0.98 | 11.23 |
| 1055 | 6.95 | 1.05 | 4.2 | 0.24 | 11.23 |
| 1105 | 6.93 | 1.05 | 4.2 | 0.18 | 11.21 |
| 1110 | 6.93 | 1.05 | 4.2 | 0.18 | 11.21 |
| 1115 | 6.93 | 1.05 | 4.0 | 0.18 | 11.21 |

SAMPLED @ 1116 ID:GW-32504-120512-SR-1663

SAMPLED @ 1120 ID:GW-32504-120512-SR-1664

~~TASK~~ SAMPLE OF CRA-RA-30

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1155 | 7.28 | 1.09 | 14.2 | 2.46 | 11.15 |
| 1205 | 7.06 | 1.09 | 2.5 | 0.19 | 11.18 |
| 1215 | 7.07 | 1.09 | 1.7 | 0.14 | 11.16 |
| 1220 | 7.08 | 1.09 | 1.9 | 0.14 | 11.16 |
| 1225 | 7.08 | 1.09 | 1.4 | 0.14 | 11.17 |

SAMPLED @ 1226 ID: GW-32504-120512-SR-1665

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1235 | 7.31 | 1.03 | 1.2 | 1.15 | 10.94 |
| 1245 | 7.10 | 1.04 | 4.5 | 0.17 | 10.91 |
| 1255 | 7.11 | 1.04 | 4.2 | 0.17 | 10.92 |
| 1300 | 7.12 | 1.04 | 4.3 | 0.18 | 10.95 |
| 1305 | 7.13 | 1.04 | 1.8 | 0.18 | 10.94 |
| 1310 | 7.13 | 1.04 | 2.2 | 0.18 | 10.95 |

SAMPLED @ 1311 ID: GW-32504-120512-SR-1666

SAMPLE OF CRA-RA-22

| | | | | | |
|---|---|---|---|---|---|
| 1325 | 7.02 | 1.29 | 7.4 | 0.25 | 11.20 |
| 1335 | 7.04 | 1.30 | 6.1 | 0.16 | 11.26 |
| 1345 | 7.04 | 1.29 | 5.7 | 0.19 | 11.22 |
| 1350 | 7.05 | 1.29 | 4.6 | 0.19 | 11.23 |
| 1355 | 7.05 | 1.29 | 4.1 | 0.19 | 11.22 |

SAMPLED @ 1356 ID: GW-32504-120512-SR-1667

SAMPLE OF TEMP-PZ-2

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1405 | 7.15 | 2.09 | 10.2 | 1.67 | 11.14 |
| 1415 | 7.14 | 2.09 | 3.2 | 0.30 | 11.10 |
| 1425 | 7.13 | 2.16 | 4.1 | 0.19 | 11.08 |
| 1430 | 7.13 | 2.16 | 4.2 | 0.19 | 11.08 |
| 1435 | 7.14 | 2.16 | 4.0 | 0.18 | 11.08 |

SAMPLED @ 1436 ID: GW-32504-120512-SR-1668

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1445 | 7.18 | 1.28 | 7.3 | 5.16 | 11.14 |
| 1455 | 7.11 | 1.23 | 5.2 | 5.61 | 11.08 |
| 1505 | 7.11 | 1.23 | 3.9 | 5.71 | 11.09 |
| 1510 | 7.10 | 1.23 | 1.5 | 5.70 | 11.08 |
| 1515 | 7.10 | 1.23 | 1.7 | 5.71 | 11.08 |
| 1520 | 7.10 | 1.23 | 1.3 | 5.70 | 11.08 |

SAMPLED @ 1521 ID: GW-32504-120512-SR-1669

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OHIO.

12/6/12 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY 27°, HIGH 43°

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA: pH=4.00

COND = 4.49, TURB = 0, D.O. = 8.36, TEMP = 22.6

SAMPLE OF CRA-RA-31

TUBING FROZEN - HAD TO THAW

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0945 | 7.15 | 0.565 | 2.1 | 7.97 | 10.73 |
| 0955 | 7.20 | 0.563 | 9.4 | 7.77 | 10.65 |
| 1005 | 7.23 | 0.562 | 4.6 | 7.69 | 10.61 |
| 1010 | 7.24 | 0.561 | 4.0 | 7.67 | 10.63 |
| 1015 | 7.26 | 0.560 | 3.6 | 7.66 | 10.65 |
| 1020 | 7.26 | 0.560 | 3.6 | 7.67 | 10.64 |

SAMPLED @ 1021 ID: GW-32504-120612-SR-1670

SAMPLE OF CRA-RA-7

| | | | | | |
|---|---|---|---|---|---|
| 1030 | 7.60 | 0.363 | 6.4 | 6.96 | 10.92 |
| 1040 | 7.57 | 0.362 | 3.0 | 6.68 | 10.91 |
| 1050 | 7.57 | 0.363 | 4.7 | 6.54 | 10.94 |
| 1055 | 7.56 | 0.363 | 3.2 | 6.50 | 10.90 |
| 1100 | 7.56 | 0.363 | 2.9 | 6.41 | 10.91 |

CONTINUED ON NEXT PAGE

32504-25 12/6/12

SAMPLE OF CRA-RA-7 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1105 | 7.56 | 0.363 | 2.4 | 6.42 | 10.90 |
| 1110 | 7.56 | 0.363 | 2.6 | 6.41 | 10.91 |

SAMPLED @ 1111 ID: GW-32504-120612-SR-1671

SAMPLE OF 81-B

| | | | | | |
|---|---|---|---|---|---|
| 1125 | 7.21 | 0.916 | 37.9 | 4.75 | 10.64 |
| 1135 | 7.34 | 0.859 | 33.9 | 5.45 | 10.02 |
| 1145 | 7.34 | 0.898 | 17.8 | 9.06 | 10.34 |
| 1150 | 7.34 | 0.891 | 9.4 | 9.14 | 10.36 |
| 1155 | 7.35 | 0.888 | 5.1 | 9.18 | 10.35 |
| 1200 | 7.34 | 0.887 | 4.0 | 9.20 | 10.36 |
| 1205 | 7.34 | 0.887 | 3.8 | 9.20 | 10.36 |

SAMPLED @ 1206 ID: GW-32504-120612-SR-1672

SAMPLE OF CRA-RA-6

| | | | | | |
|---|---|---|---|---|---|
| 1230 | 6.96 | 1.26 | 2.9 | 1.66 | 11.29 |
| 1240 | 6.89 | 1.27 | 1.9 | 0.56 | 11.49 |
| 1250 | 6.91 | 1.28 | 1.9 | 0.56 | 11.44 |
| 1255 | 6.91 | 1.28 | 1.8 | 0.65 | 11.52 |
| 1300 | 6.92 | 1.28 | 1.7 | 0.59 | 11.55 |
| 1305 | 6.93 | 1.28 | 1.7 | 0.55 | 11.57 |
| 1310 | 6.92 | 1.28 | 1.6 | 0.54 | 11.55 |
| 1315 | 6.92 | 1.28 | 1.7 | 0.55 | 11.55 |

SAMPLED @ 1316 ID: GW-32504-120612-SR-1673

12/6/12 32504-25

SAMPLE OF CRA-RA-27

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1325 | 6.96 | 1.97 | 4.2 | 1.18 | 11.13 |
| 1335 | 6.96 | 2.01 | 2.3 | 0.35 | 11.20 |
| 1345 | 6.96 | 2.02 | 2.5 | 0.32 | 11.18 |
| 1350 | 6.97 | 2.03 | 2.3 | 0.28 | 11.23 |
| 1355 | 6.97 | 2.04 | 2.7 | 0.26 | 11.23 |
| 1400 | 6.97 | 2.03 | 2.6 | 0.27 | 11.23 |

SAMPLED @ 1401 ID: GW-32504-120612-SR-1674

SAMPLED @ 1410 ID: GW-32504-120612-SR-1675

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 6.99 | 1.67 | 2.5 | 5.79 | 10.69 |
| 1425 | 6.98 | 1.69 | 2.3 | 5.65 | 10.75 |
| 1435 | 6.98 | 1.71 | 2.3 | 5.67 | 10.76 |
| 1440 | 6.99 | 1.71 | 2.3 | 5.66 | 10.75 |
| 1445 | 6.99 | 1.71 | 2.4 | 5.67 | 10.75 |

SAMPLED @ 1446 ID: GW-32504-120612-SR-1676

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 7.38 | 1.61 | 8.6 | 8.54 | 10.30 |
| 1500 | 7.07 | 1.87 | 4.5 | 0.33 | 10.76 |
| 1510 | 7.07 | 1.87 | 4.7 | 0.30 | 10.77 |
| 1515 | 7.07 | 1.87 | 4.6 | 0.29 | 10.77 |

CONTINUED ON NEXT PAGE

32504-25

SAMPLE OF CRA-RA-26D (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1520 | 7.07 | 1.87 | 4.5 | 0.30 | 10.77 |

SAMPLED @ 1521 ID: GW-32504-120612-SR-1677

SAMPLES PACKED IN COOLER WITH ICE.

12/10/12 32504-25

TASK: FINISH 4LK SAMPLE EVENT

CRA: STEVE RAPP

WEATHER: CLOUDY, DRIZZLE, 41°

H2S: LEVEL D

CALIBRATION OF RENTAL HORIBA: pH=4.00, COND.=4.49, TURB.=0.0, D.O.=8.73, TEMP=22.84

SAMPLE OF CRA-RA-23D

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1000 | 7.04 | 0.932 | 10.2 | 6.41 | 13.01 |
| 1010 | 6.85 | 1.08 | 3.6 | 5.79 | 10.24 |
| 1020 | 6.84 | 1.09 | 2.9 | 5.77 | 10.24 |
| 1025 | 6.84 | 1.10 | 2.6 | 5.77 | 10.25 |
| 1030 | 6.84 | 1.10 | 2.5 | 5.78 | 10.24 |
| 1035 | 6.84 | 1.10 | 2.6 | 5.77 | 10.25 |

SAMPLED @ 1036 ID: GW-32504-121012-SR-1678

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1100 | 7.12 | 1.51 | 23.9 | 4.25 | 11.10 |
| 1120 | 6.84 | 1.53 | 3.9 | 0.18 | 11.31 |
| 1125 | 6.85 | 1.53 | 3.4 | 0.23 | 11.35 |
| 1130 | 6.85 | 1.53 | 3.5 | 0.25 | 11.35 |
| 1135 | 6.85 | 1.53 | 3.5 | 0.25 | 11.35 |

SAMPLED @ 1136 ID: GW-32504-121012-SR-1679 MS/MSD

12/10/12 32504-25

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.

12/27/12 32504-25

TASK: QUARTERLY WATER LEVELS

CRA: STEVE RAPAI

WEATHER: PARTLY CLOUDY 30°

H&S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| B1-4 | 29.84 |
| B1-5 | 34.28 |
| B1-7 | 46.46 |
| B1-8 | 43.49 |
| B1-9 | 16.22 |
| B1-10 | 32.27 |
| RA-1 | 68.98 |
| RA-2D | 55.85 |
| RA-2S | 55.60 |
| RA-3 | 52.55 |
| RA-4 | 26.63 |
| RA-5 | 54.76 |
| RA-6 | 59.24 |
| RA-7 | 33.14 |
| RA-8 | 19.47 |
| RA-16 | 58.68 |
| RA-18 | 41.57 |
| RA-18D | 56.14 |
| RA-19D | 52.22 |



32504-25 12/27/12

| WELL ID | LEVEL |
|---|---|
| RA-19S | 47.48 |
| RA-20 | 50.09 |
| RA-22 | 53.26 |
| RA-23D | 33.37 |
| RA-23S | 33.67 |
| RA-24 | 56.55 |
| RA-25 | 53.86 |
| RA-26D | 49.45 |
| RA-26S | 49.78 |
| RA-27 | 61.57 |
| RA-28 | 54.40 |
| RA-29 | 45.86 |
| RA-30 | 58.07 |
| RA-31 | 32.09 |
| RA-32 | 56.67 |
| MW-22 | 42.03 |
| MW-28 | 42.46 |
| MW-32 | 34.64 |
| MW-34C | 41.54 |
| MW-35 | 24.37 |
| MW-41 | 47.73 |
| MW-42 | 63.75 |
| MW-47 | 53.92 |
| MW-54 | 55.85 |

| | | |
|---|---|---|
| 12/27/12 | | 32504.25 |
| WELL ID | | LEVEL |
| MW-55 | | 36.56 |
| MW-56 | | 34.36 |
| MW-58 | | 21.40 |
| EB-PZ-2 | | 40.09 |
| EB-PZ-4 | | 53.36 |
| EB-PZ-5 | | 55.05 |
| EB-PZ-6 | | 54.82 |
| PZ-103 | | 57.09 |
| PZ-104 | | 54.82 |
| PZ-105 | | 51.59 |
| PZ-106 | | 39.20 |
| TEMP-PZ-2 | | 58.50 |

CONESTOGA-ROVERS
& ASSOCIATES

200 W. Allegan Street, Suite 300
Plainwell, Michigan 49080-1397
Telephone: (269) 685-5181 Fax: (269) 685-5223
www.CRAworld.com

April 17, 2013

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 122
Groundwater and Landfill RD/RA
Reporting Period: January 1through March 31, 2013
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 INTRODUCTION

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree ("CD"), Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 ACTIVITIES PERFORMED DURING THIS REPORTING PERIOD

### 2.1 OPERATION AND MAINTENANCE

Figure 1 is a Site location map showing the wells included in the Groundwater Remediation Monitoring Program. Quarterly groundwater samples were collected from March 21 through 25, 2013 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed in Section 3.0 below.

Quarterly groundwater elevations were measured on March 29, 2013. The corresponding groundwater contour map is provided on Figure 2.

Equal
Employment Opportunity
Employer

REGISTERED COMPANY FOR
ISO 9001
ENGINEERING DESIGN

Worldwide Engineering, Environmental, Construction, and IT Services

## 2.2 REPORTS

Quarterly Progress Report No. 121 was submitted to United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ) on January 10, 2013.

## 3.0 SUMMARY OF FINDINGS

The results of the first quarter 2013 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in the Groundwater Remediation Monitoring Program.

During the first quarter 2013 sampling, seven of the 21 monitoring wells sampled detected Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the seven monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 12 μg/L vinyl chloride |
| CRA-RA-24 | 7.4 μg/L vinyl chloride |
| CRA-RA-26S | 97/99 μg/L trichloroethene (original/duplicate result) |
| CRA-RA-27 | 17 μg/L vinyl chloride |
| CRA-RA-30 | 5.6 μg/L vinyl chloride |
| PZ-104 | 1.3 μg/L vinyl chloride |
| 81-4 | 3.6 μg/L vinyl chloride |

Groundwater samples from six of these monitoring wells had COCs above Part 201 DWC during the fourth quarter 2012. The March 2013 sample from PZ-104 represents the first detection of vinyl chloride in samples from this well since March 2010.

CRA typically collects the annual Rasmussen residential well sample during the third quarter sampling event. However, a leak was detected in the plumbing system prior to the sampling event in September 2012 and the well is currently turned off. As of March 24, 2013 the leak has not been repaired. If the leak is repaired by the home owner CRA will collect the annual Rasmussen residential well sample in the second quarter 2013.

## 4.0 PROBLEMS ENCOUNTERED

On January 11, 2013, during the weekly site visit, CRA discovered that the solenoid valve controlling oxygen flow to zone 2 on the distribution panel was not functioning properly. The valve was not opening when the zone 2 timer was turned on.

In late February 2013, CRA discovered that the AirSEP unit (oxygen concentrator) was venting gas through one of its two waste valves when the valve was supposed to be closed. Pressures were still building enough to allow for normal operation but new valve rebuild kits were ordered for installation. On March 20, 2013, all solenoid valves within the unit were rebuilt.

After the installation of the new waste valve rebuild kits, the AirSEP unit began venting gas at an extremely high rate through the waste valves and was not allowing pressure to build for normal system operation. The manufacturer of the oxygen concentrator was contacted and after many hours of trouble-shooting, it was diagnosed that the newly installed waste valve was bad and needed to be replaced. The technician at AirSEP also stated that serious damage could occur to the unit if it were allowed to run in this condition. Given the age of the existing unit (more than 10 years old), the potential for additional damage if left running, and the fact that new waste valves take up to five weeks for delivery, the decision was made to shut down the system. Multiple vendors were contacted in an attempt to expedite delivery of new valves, but all had similar delivery time frames. This type of valve is not typically held in stock and would need to be ordered for manufacture in Mexico.

## 5.0 CORRECTIVE MEASURES TO RECTIFY PROBLEMS

On January 11, 2013, CRA installed a rebuild kit in the solenoid valve controlling flow to zone 2 on the distribution panel.

In an attempt to reduce the five week time frame for delivery of the new waste valves for the oxygen concentrator, CRA and AirSEP are working together to solve the issue at hand. During the course of the conversation, CRA has learned that AirSEP had just encountered an identical problem with a waste valve rebuild kit at their facility. AirSEP stated that they may have received defective rebuild kits from the valve manufacturer and they were investigating these two specific issues. Because the old parts from the equalization valves were still on-Site, CRA decided to remove the new rebuild parts and re-install the old parts from the equalization valve

into the waste valves (the waste valves and the equalization valves are identical, thereby allowing an interchange of their parts).

On Tuesday, April 2, 2013, the unit was turned back on, CRA did not observe any leaks, and the unit appeared to be functioning as designed. All system components were then turned back on and the treatment system was returned to "run" mode. AirSEP has told CRA that they will ship out new kits once the problem with the manufacturer has been solved.

## 6.0 CONTACTS AND SIGNIFICANT CORRESPONDENCE WITH PUBLIC REPRESENTATIVES

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | January 10, 2013 | Report No. 121 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDNRE) |
| email | March 25, 2013 | Q1 3013 Report deadline extension |

## 7.0 PLANNED UPCOMING ACTIVITIES/SCHEDULE

Landfill and groundwater component activities planned for the second quarter of 2013:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The second quarter groundwater sampling event is scheduled for the week of May 27, 2013 The wells to be sampled in the second quarter of 2013 are listed in Table 5
- Pending USEPA approval, install VAS boreholes and monitoring wells at the alternate locations described in the April 4, 2013 letter sent to USEPA

CONESTOGA-ROVERS
& ASSOCIATES

April 17, 2013 Reference No. 032504-15



Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

For Steven Rapai

Bart Bartholomy

AJD/cb/31
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Steven Nadeau, Honigman Miller
Mike Mateyk, CRA

# FIGURES AND TABLES

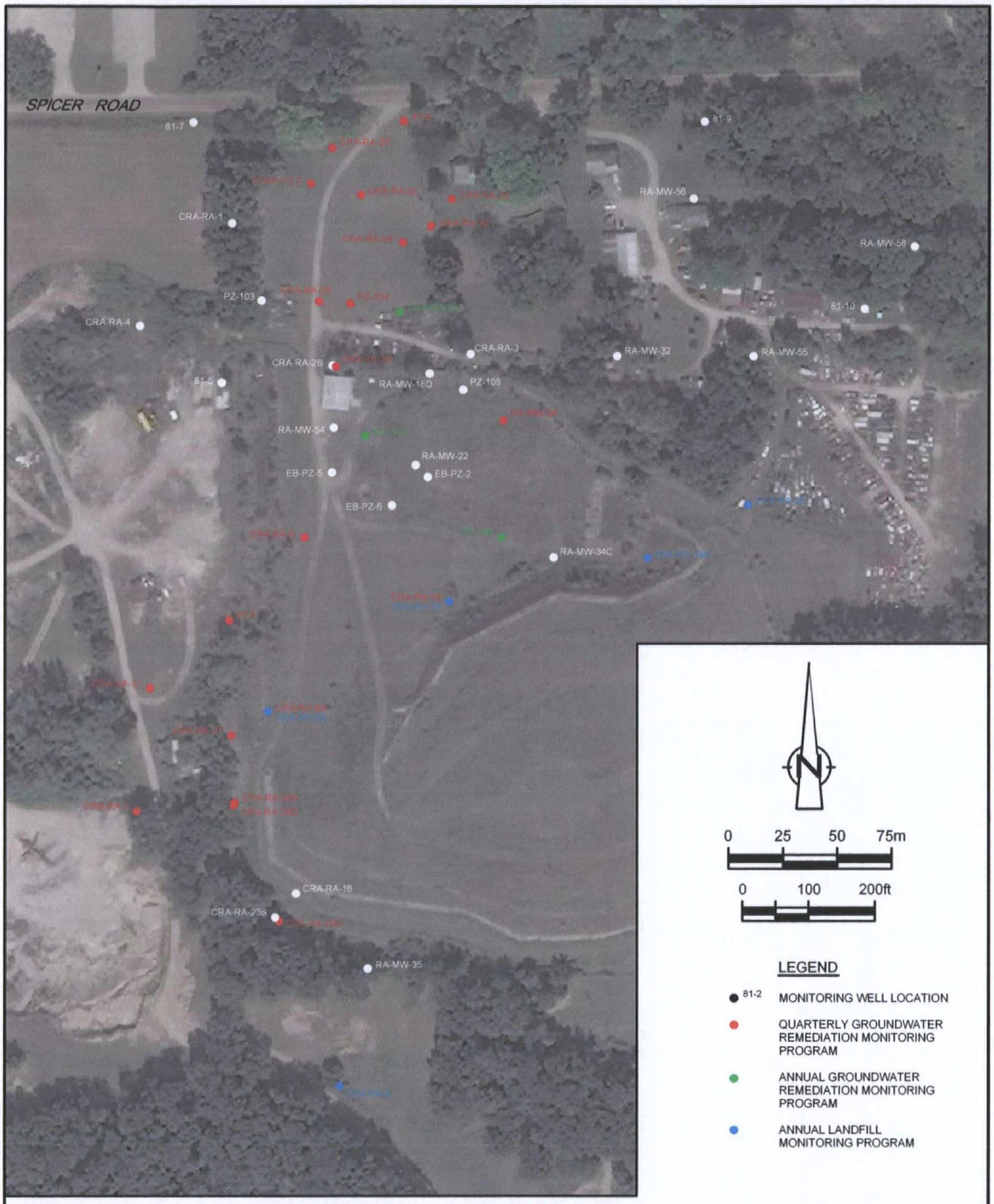



figure 1

2013 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN031)GN-WA002 APR 16/2013

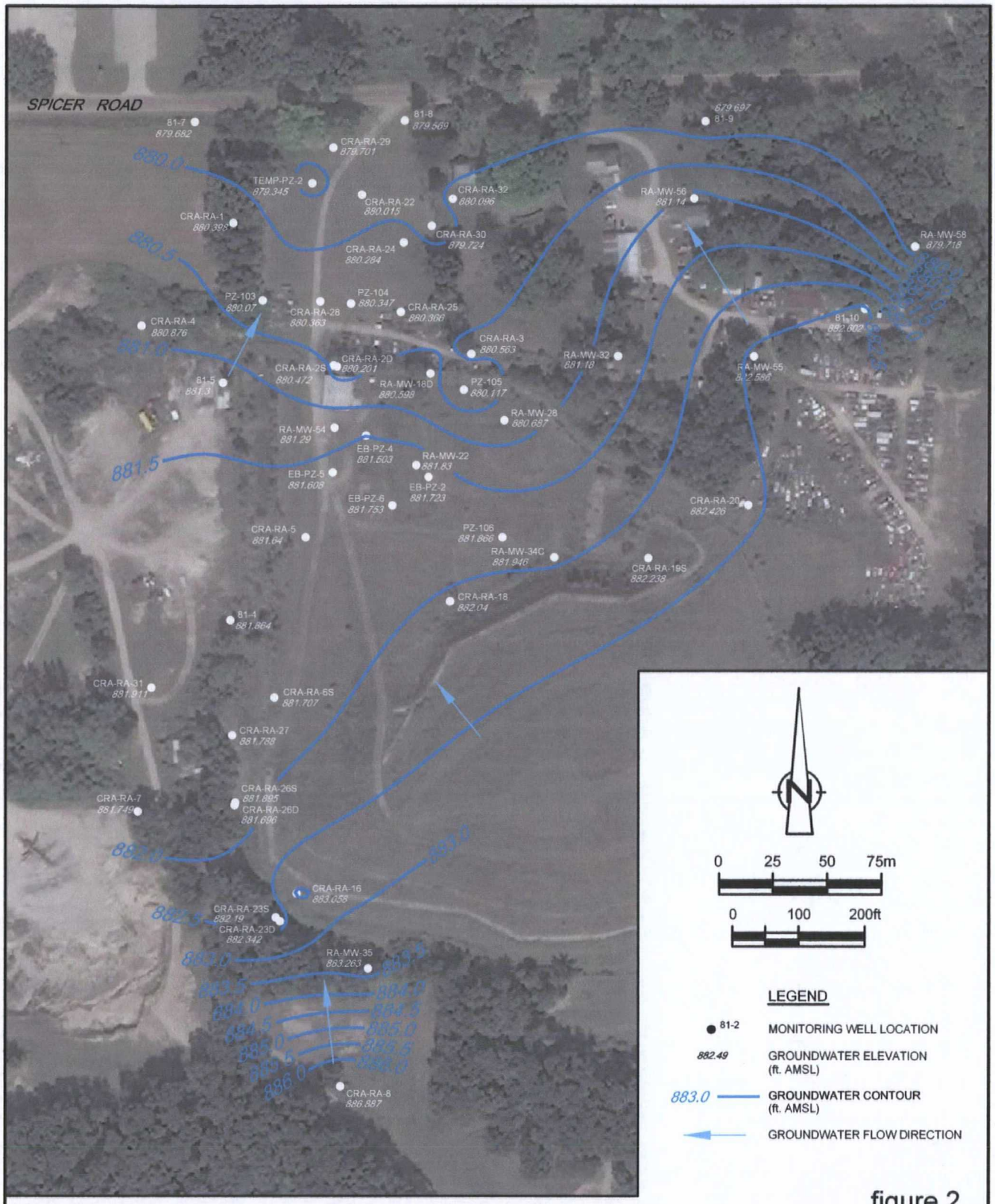



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
MARCH 2013
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN031)GN-WA001 APR 16/2013

# TABLE 1

## ANALYTICAL RESULTS - NORTHERN PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-22*<br>*GW-SR-1610*<br>*5/24/2012* | *CRA-RA-22*<br>*GW-SR-1648*<br>*9/14/2012* | *CRA-RA-22*<br>*GW-SR-1667*<br>*12/5/2012* | *CRA-RA-22*<br>*GW-SR-1686*<br>*3/22/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 8.2 | 7.3 | 8.9 | 12 | Up 3.1 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-24*<br>*GW-SR-1607*<br>*5/23/2012* | *CRA-RA-24*<br>*GW-SR-1646*<br>*9/13/2012* | *CRA-RA-24*<br>*GW-SR-1663*<br>*12/5/2012* | *CRA-RA-24*<br>*GW-SR-1664*<br>*12/5/2012*<br>*Duplicate* | *CRA-RA-24*<br>*GW-SR-1683*<br>*3/22/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 4.4 | 3.5 | 5.3 | 5.6 | 7.4 | Up 1.8 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-25 GW-SR-1407 08/26/2010* | *CRA-RA-25 GW-SR-1408 08/26/2010 Duplicate* | *CRA-RA-25 GW-SR-1546 8/24/2011* | *CRA-RA-25 GW-SR-1547 8/24/2011 Duplicate* | *CRA-RA-25 GW-SR-1645 9/13/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 1.4 | 1.4 | 1.0 | ND(1) | 1.2 | Up 0.2 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-28*<br>*GW-SR-1605*<br>*5/23/2012* | *CRA-RA-28*<br>*GW-SR-1643*<br>*9/13/2012* | *CRA-RA-28*<br>*GW-SR-1661*<br>*12/4/2012* | *CRA-RA-28*<br>*GW-SR-1681*<br>*3/21/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 2.2 | 1.5 | 1.4 | 1.5 | Up 0.1 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 1.8 | 1.0 | 1.4 | 1.7 | Up 0.43 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-29 GW-SR-1612 5/24/2012* | *CRA-RA-29 GW-SR-1650 9/14/2012* | *CRA-RA-29 GW-SR-1669 12/5/2012* | *CRA-RA-29 GW-SR-1689 3/23/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-30*<br>*GW-SR-1608*<br>*5/24/2012* | *CRA-RA-30*<br>*GW-SR-1647*<br>*9/13/2012* | *CRA-RA-30*<br>*GW-SR-1665*<br>*12/5/2012* | *CRA-RA-30*<br>*GW-SR-1684*<br>*3/22/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 5.9 | 3.5 | 4.2 | 5.6 | Up 1.4 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-32*<br>*GW-SR-1609*<br>*5/24/2012* | *CRA-RA-32*<br>*GW-SR-1654*<br>*9/14/2012* | *CRA-RA-32*<br>*GW-SR-1655*<br>*9/14/2012*<br>*Duplicate* | *CRA-RA-32*<br>*GW-SR-1666*<br>*12/5/2012* | *CRA-RA-32*<br>*GW-SR-1685*<br>*3/22/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *PZ-104*<br>*GW-SR-1606*<br>*5/23/2012* | *PZ-104*<br>*GW-SR-1644*<br>*9/13/2012* | *PZ-104*<br>*GW-SR-1662*<br>*12/5/2012* | *PZ-104*<br>*GW-SR-1682*<br>*3/21/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 3.9 | 3.2 | 3.1 | 4.3 | Up 1.2 µg/L |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | 1.3 | Up 0.3 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *TEMP-PZ-2*<br>*GW-SR-1611*<br>*5/24/2012* | *TEMP-PZ-2*<br>*GW-SR-1649*<br>*9/14/2012* | *TEMP-PZ-2*<br>*GW-SR-1668*<br>*12/5/2012* | *TEMP-PZ-2*<br>*GW-SR-1687*<br>*3/23/2013* | *TEMP-PZ-2*<br>*GW-SR-1688*<br>*3/23/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *81-8*<br>*GW-SR-1613*<br>*5/24/2012* | *81-8*<br>*GW-SR-1614*<br>*5/24/2012*<br>*Duplicate* | *81-8*<br>*GW-SR-1651*<br>*9/14/2012* | *81-8*<br>*GW-SR-1672*<br>*12/6/2012* | *81-8*<br>*GW-SR-1690*<br>*3/23/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 1.1 | 1.1 | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 2**

**ANALYTICAL RESULTS -FDSLD AREA PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-2D GW-SR-1604 5/23/2012* | *CRA-RA-2D GW-SR-1629 9/10/2012* | *CRA-RA-2D GW-SR-1656 12/4/2012* | *CRA-RA-2D GW-SR-1680 3/21/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(13) | ND(20) | ND(20) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(13) | ND(20) | ND(20) | |
| ACETONE | µg/L | 730 | ND(10) | ND(13) | ND(20) | ND(20) | |
| BENZENE | µg/L | 5 | 1.1 | ND(1.3) | ND(2.0) | ND(2.0) | |
| CHLOROBENZENE | µg/L | 100 | 31.3 | 42 | 40 | 49 | Up 9 µg/L |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.3) | ND(2.0) | ND(2.0) | |
| VINYL CHLORIDE | µg/L | 2 | 1.5 | ND(1.3) | ND(2.0) | ND(2.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) J | ND(1.3) | ND(2.0) | ND(2.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 2**

**ANALYTICAL RESULTS -PDSLD AREA PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-18*<br>*GW-SR-1617*<br>*6/20/2012* | *CRA-RA-18*<br>*GW-SR-1638*<br>*9/12/2012* | *CRA-RA-18*<br>*GW-SR-1639*<br>*9/12/2012*<br>*(Duplicate)* | *CRA-RA-18*<br>*GW-SR-1659*<br>*12/4/2012* | *CRA-RA-18*<br>*GW-SR-1697*<br>*3/24/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 86.3 | 90 | 78 | 100 | 120 | Up 20 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(29) | ND(40) | ND(50) | ND(40) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(29) | ND(40) | ND(50) | ND(40) | |
| ACETONE | µg/L | 730 | ND(10) | ND(29) | ND(40) | ND(50) | ND(40) | |
| BENZENE | µg/L | 5 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| TRICHLOROETHENE | µg/L | 5 | 2.0 | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(2.9) | ND(4.0) | ND(5) | ND(4) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 2**

**ANALYTICAL RESULTS -PDSLD AREA PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *EB-PZ-4*<br>*GW-SR-1309*<br>*08/27/2009* | *EB-PZ-4*<br>*GW-SR-1310*<br>*08/27/2009*<br>*Duplicate* | *EB-PZ-4*<br>*GW-SR-1445*<br>*9/3/2010* | *EB-PZ-4*<br>*GW-SR-1548*<br>*8/24/2011* | *EB-PZ-4*<br>*GW-SR-1630*<br>*9/10/2012* | *EB-PZ-4*<br>*GW-SR-1657*<br>*12/4/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | 1.42 | ND(1) | ND(1.0) | ND(2.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | ND(20) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.0) | |
| CHLOROBENZENE | µg/L | 100 | 28 | 27 | 29 | 38.7 | 39 | 39 | Stable |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |
| VINYL CHLORIDE | µg/L | 2 | 3.6 | 3.6 | ND(1) | ND(1) | 3.3 | 4.0 | Up 0.7 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | ND(2.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

TABLE 2

ANALYTICAL RESULTS -PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *PZ-106*<br>*GW-SR-1208*<br>*8/26/2008*<br>*Duplicate* | *PZ-106*<br>*GW-SR-1314*<br>*1/9/2009* | *PZ-106*<br>*GW-SR-1399*<br>*08/25/2010* | *PZ-106*<br>*GW-SR-1549*<br>*8/25/2011* | *PZ-106*<br>*GW-SR-1640*<br>*9/12/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Stable; all |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Non- |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | Detect |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 2**

**ANALYTICAL RESULTS -PDSLD AREA PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *RA-MW-28*<br>*GW-SR-1618*<br>*6/20/2012* | *RA-MW-28*<br>*GW-SR-1642*<br>*9/13/2012* | *RA-MW-28*<br>*GW-SR-1660*<br>*12/4/2012* | *RA-MW-28*<br>*GW-SR-1696*<br>*3/24/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 12.4 | 10 | 9.8 | 11.0 | Up 1.2 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1) | ND(1) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1) | ND(1) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.
U - Qualified as Not Detected at the report limit indicated in parenthesis.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-5 GW-SR-1615 6/19/2012* | *CRA-RA-5 GW-SR-1631 9/10/2012* | *CRA-RA-5 GW-SR-1658 12/4/2012* | *CRA-RA-5 GW-SR-1693 3/23/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 24.2 | 30 | 23 | 30 | Up 7 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | 1.2 | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-6S GW-SR-1625 6/21/2012* | *CRA-RA-6S GW-SR-1626 6/21/2012 Duplicate* | *CRA-RA-6S GW-SR-1632 9/10/2012* | *CRA-RA-6S GW-SR-1673 12/5/2012* | *CRA-RA-6S GW-SR-1692 3/23/2012* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1) | ND(1.0) | 1.1 | 1.3 | Up 0.2 µg/L |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 1.8 | 1.9 | ND(1.0) | ND(1.0) | 1.0 | Up 1.0 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-7 GW-SR-1627 6/21/2012* | *CRA-RA-7 GW-SR-1653 9/14/2012* | *CRA-RA-7 GW-SR-1671 12/6/2012* | *CRA-RA-7 GW-SR-1695 3/24/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-27*<br>*GW-SR-1620*<br>*6/20/2012* | *CRA-RA-27*<br>*GW-SR-1633*<br>*9/11/2012* | *CRA-RA-27*<br>*GW-SR-1674*<br>*12/6/2012* | *CRA-RA-27*<br>*GW-SR-1675*<br>*12/6/2012*<br>*Duplicate* | *CRA-RA-27*<br>*GW-SR-1691*<br>*3/23/2013* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 12.2 | 13 | 13 | 13 | 17 | Up 1.2 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-31*<br>*GW-SR-1616*<br>*6/19/2012* | *CRA-RA-31*<br>*GW-SR-1652*<br>*9/14/2012* | *CRA-RA-31*<br>*GW-SR-1670*<br>*12/6/2012* | *CRA-RA-31*<br>*GW-SR-1694*<br>*3/24/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *81-4*<br>*GW-SR-1634*<br>*9/11/2012* | *81-4*<br>*GW-SR-1679*<br>*12/10/2012* | *81-4*<br>*GW-SR-1576*<br>*3/25/2013* | *Change* |
|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | 3.1 | 3.3 | 3.6 | Up 0.3 µg/L |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

UJ - Nondetect with an estimated reporting limit.

# TABLE 4

## ANALYTICAL RESULTS - SOUTHERN TCE PLUME
## RASMUSSEN LANDFILL SITE
## LIVINGSTON COUNTY, MICHIGAN

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-23D GW-SR-1624 6/21/2012* | *CRA-RA-23D GW-SR-1637 9/11/2012* | *CRA-RA-23D GW-SR-1678 12/10/2012* | *CRA-RA-23D GW-SR-1701 3/25/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | 5.9 | 4.9 | 4.4 | 5.5 | Up 1.0 µg/L |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 4**

**ANALYTICAL RESULTS - SOUTHERN TCE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-26D GW-SR-1623 6/21/2012* | *CRA-RA-26D GW-SR-1636 9/11/2012* | *CRA-RA-26D GW-SR-1677 12/6/2012* | *CRA-RA-26D GW-SR-1700 3/24/2013* | *Change* |
|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(10) | ND(10) | ND(10) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(10) | ND(10) | ND(10) | |
| ACETONE | µg/L | 730 | ND(10) | ND(10) | ND(10) | ND(10) | |
| BENZENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | Stable; all Non-Detect |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| TRICHLOROETHENE | µg/L | 5 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(1.0) | ND(1.0) | ND(1.0) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 4**

**ANALYTICAL RESULTS - SOUTHERN TCE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location*<br>*Sample ID*<br>*Date Sampled*<br><br>*Parameter* | *Units* | *Michigan Part 201 Groundwater Criteria* | *CRA-RA-26S GW-SR-1622 6/21/2012* | *CRA-RA-26S GW-SR-1635 9/11/2012* | *CRA-RA-26S GW-SR-1676 12/6/2012* | *CRA-RA-26S GW-SR-1698 3/24/2013* | *CRA-RA-26S GW-SR-1699 3/24/2013 Duplicate* | *Change* |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organics*** | | | | | | | | |
| 1,1,1-TRICHLOROETHANE | µg/L | 200 | 2.2 | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | Stable |
| 1,2-DICHLOROETHENE (TOTAL) | µg/L | 70 (1) | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| 2-BUTANONE | µg/L | 13,000 | ND(10) | ND(57) | ND(33) | ND(33) | ND(29) | |
| 4-METHYL-2-PENTANONE | µg/L | 1,800 | ND(10) | ND(57) | ND(33) | ND(33) | ND(29) | |
| ACETONE | µg/L | 730 | ND(10) | ND(57) | ND(33) | ND(33) | ND(29) | |
| BENZENE | µg/L | 5 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| CHLOROBENZENE | µg/L | 100 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| ETHYLBENZENE | µg/L | 74 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| METHYLENE CHLORIDE | µg/L | 5 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| TOLUENE | µg/L | 790 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| TRICHLOROETHENE | µg/L | 5 | 133 | 100 | 90 | 97 | 99 | Up 8 µg/L |
| VINYL CHLORIDE | µg/L | 2 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |
| XYLENES (TOTAL) | µg/L | 280 | ND(1) | ND(5.7) | ND(3.3) | ND(3.3) | ND(2.9) | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 5**

**2013 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | *Additional Routine Samples* | | | |
|---|---|---|---|---|
| | *Q1* | *Q2* | *Q3* | *Q4* |
| 81-4 | | | | |
| 81-8 | | | | |
| CRA-RA-2D | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-5 | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-18 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only)[1] | |
| CRA-RA-22 | | CRA-RA-19S | | |
| CRA-RA-23D | | CRA-RA-20 | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

Note:

1 - As of Q3 2012 there is a leak in the plumbing for the New Rasmussen Water Supply Well and the well is unavailable for sampling. CRA will collect a sample when the plumbing is repaired and then resume routine annual sampling.

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | JAN. 3, 2013 | JAN 11, 2013 | JAN 17, 2013 | JAN. 25, 2013 | JAN 31, 2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A Rapai | A Rapai | A Rapai | A Rapai | A Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 79969 | 80160 | | 80494 | 80637 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 55 | 55 | 55 | 52 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 65 | 70 | 70 |
| Holding Tank Pressure psi | 44 | 42 | 42 | 44 | 40 |
| Run Time hours | 79969 | 80159.9 | | 80494.2 | 80637.1 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 7 | 7 | 8 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 40 | 32 | 32 | 40 | 32 |
| Regulator #2 psi | 25 | 23 | 22 | 25 | 22 |
| Alarm Reading ppm, O3 | — | — | — | — | — |
| Zone On | 3 | 2 | 2 | 3 | 1 |
| Zone Time hours | 2 | 1/2 | 1/2 | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** JAN. 11, ZONE 2 SOLENOID NOT FUNCTIONING - REPLACED "O" RING & CLEANED INSIDE OF VALVE - VALVE FUNCTION NORMAL AFTER SERVICE.

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | FEB. 9, 2013 | FEB. 11, 2013 | FEB 20, 2013 | MARCH 1, 2013 | MARCH 5 2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A. Rapai | A. Rapai | A. Rapai | A. Rapai | A. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | | 81119 | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 55 | 56 | 56 | 56 |
| Feed Air Pressure psi | 70 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 110 | 65 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 44 | 42 | 44 | 42 |
| Run Time hours | | | 81119.3 | | |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 8 | 8 | 7 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 32 | 36 | 36 | 32 | 34 |
| Regulator #2 psi | 22 | 22 | 24 | 22 | 24 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 3 | 2 | 1 | 3 |
| Zone Time hours | 1/2 | 2 | 1/2 | 1/2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | MARCH 15, 2013 | | | | |
| **OPERATOR SIGNATURE** | A Rapai | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Compressor** | | | | | |
| | | | | | |
| Output Pressure psi | 110 | | | | |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Sep** | | | | | |
| | | | | | |
| Receiver Pressure psi | 54 | | | | |
| Feed Air Pressure psi | 110 | | | | |
| Cycle Pressure psi | 90 | | | | |
| Holding Tank Pressure psi | 40 | | | | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Dryer** | | | | | |
| | | | | | |
| Temp. Indicator - color | GREEN | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Ozone Generator** | | | | | |
| | | | | | |
| Oxygen Supply, LPM | 6 | | | | |
| % O3 capacity | 45 | | | | |
| Regulator #1 psi | 30 | | | | |
| Regulator #2 psi | 20 | | | | |
| Alarm Reading ppm, O3 | - | | | | |
| Zone On | 2 | | | | |
| Zone Time hours | 1/2 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Distribution Panel** | | | | | |
| | | | | | |
| CFM | 0.8 | | | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** ON MARCH 19, BEGAN WORK ON AIRSEP TO REBUILD ALL SOLENOID VALVES (TIME FOR RECOMMENDED REBUILD & WASTE VALVE/S ARE LEAKING). REBUILD MADE WASTE VALVES LEAK WORSE - TROUBLE SHOOTING WITH AIRSEP - VALVES NEED TO BE REPLACED - SYSTEM OFF UNTIL ~~FURTHE~~ REPLACEMENT VALVES ARRIVE (4-5 WEEKS)

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | JAN 10, 2013 | | DATE: | FEB 11, 2013 | | DATE: | SYSTEM WENT DOWN IN MID MARCH | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 6 | SW-1 | 0.8 | 6 | SW-1 | | |
| SW-2 | 0.8 | 5 | SW-2 | 0.8 | 6 | SW-2 | | |
| SW-3 | 0.8 | 12 | SW-3 | 0.8 | 12 | SW-3 | | |
| SW-4 | 0.8 | 12 | SW-4 | 0.8 | 14 | SW-4 | | |
| SW-5 | 0.6 | 15 | SW-5 | 0.8 | 15 | SW-5 | | |
| SW-6 | 0.8 | 16 | SW-6 | 0.7 | 15 | SW-6 | | |
| SW-7 | 0.8 | 14 | SW-7 | 0.8 | 16 | SW-7 | | |
| SW-8 | – | – | SW-8 | x | x | SW-8 | | |
| SW-9 | – | – | SW-9 | x | x | SW-9 | | |
| SW-10 | – | – | SW-10 | x | x | SW-10 | | |
| SW-11 | – | – | SW-11 | x | x | SW-11 | | |
| SW-12 | 0.8 | 21 | SW-12 | 0.8 | 18 | SW-12 | | |
| SW-13 | 0.8 | 4 | SW-13 | 0.6 | 5 | SW-13 | | |
| SW-14 | – | – | SW-14 | x | x | SW-14 | | |
| SW-15 | – | – | SW-15 | x | x | SW-15 | | |
| SW-16 | – | – | SW-16 | x | x | SW-16 | | |
| SW-17 | 0.8 | 15 | SW-17 | 0.8 | 19 | SW-17 | | |
| SW-18 | 0.8 | 21 | SW-18 | 0.8 | 18 | SW-18 | | |
| SW-19 | 0.8 | 16 | SW-19 | 0.6 | 18 | SW-19 | | |
| SW-20 | 0.8 | 20 | SW-20 | 0.8 | 20 | SW-20 | | |
| SW-21 | – | – | SW-21 | x | x | SW-21 | | |
| SW-22 | 0.8 | 15 | SW-22 | 0.8 | 16 | SW-22 | | |
| SW-23 | 0.8 | 15 | SW-23 | 0.7 | 15 | SW-23 | | |
| SW-24 | 0.8 | 18 | SW-24 | 0.8 | 16 | SW-24 | | |
| SW-25 | 0.6 | 12 | SW-25 | 0.8 | 15 | SW-25 | | |
| SW-26 | 0.8 | 6 | SW-26 | 0.8 | 4 | SW-26 | | |
| SW-27 | 0.8 | 5 | SW-27 | 0.8 | 5 | SW-27 | | |
| SW-28 | 0.8 | 6 | SW-28 | 0.8 | 5 | SW-28 | | |
| SW-29 | 0.5 | 5 | SW-29 | 0.8 | 6 | SW-29 | | |
| SW-30 | x | x | SW-30 | x | x | SW-30 | | |

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 1/11/13
**Time:** 3:00PM

**Weather Conditions:** RAIN 52°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY - 6"

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:** GOOD - WET

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 1/31/2013
**Time:** 10:30 AM

**Weather Conditions:** WIND, HEAVY SNOW 24°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:**

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE - STAN RASMUSSEN WILL PLOW ROADS

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** FEB. 11, 2013
**Time:** 3:00PM

**Weather Conditions:** 33° TEMPS FALLING, +50 MPH WIND GUSTS

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:**

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** MARCH 1, 2013
**Time:** 2:45 PM

**Weather Conditions:** CLOUDY 30°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:** PLOWED

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** MARCH 29, 2013
**Time:** 11:00 AM

**Weather Conditions:** CLOUDY 40°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

12/27/12 — 32504.25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 36.56 |
| MW-56 | 34.36 |
| MW-58 | 21.60 |
| EB-PZ-2 | 40.09 |
| EB-PZ-4 | 53.36 |
| EB-PZ-5 | 55.05 |
| EB-PZ-6 | 54.82 |
| PZ-103 | 57.09 |
| PZ-104 | 54.82 |
| PZ-105 | 51.59 |
| PZ-106 | 39.20 |
| TEMP-PZ-2 | 58.50 |



32504.25 — 3/21/13

TASK: BEGIN 1ST QTR SAMPLE EVENT
CRA: STEVE RAPA
WEATHER: SNOW 28°
H&S: LEVEL D
CALIBRATION OF HORIBA NF0439
pH=4.06, COND=4.44, TURB=0.0, D.O.=9.54, TEMP=15.89°C

SAMPLE OF CRA-RA-2D

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1300 | 6.68 | 1.52 | 7.1 | 10.82 | 10.99 |
| 1310 | 7.15 | 1.56 | 4.2 | 7.34 | 10.86 |
| 1320 | 6.89 | 1.57 | 1.3 | 6.12 | 10.85 |
| 1325 | 6.65 | 1.58 | 1.1 | 4.91 | 10.81 |
| 1330 | 6.66 | 1.59 | 1.2 | 4.90 | 10.81 |
| 1335 | 6.66 | 1.59 | 1.1 | 4.90 | 10.82 |

SAMPLED @ 1336 ID: GW-32504-032113-SR-1680

SAMPLE OF CRA-RA-2B

| | | | | | |
|---|---|---|---|---|---|
| 1405 | 6.67 | 0.937 | 3.1 | 7.80 | 11.02 |
| 1415 | 6.63 | 0.948 | 3.9 | 6.03 | 11.05 |
| 1425 | 6.57 | 0.966 | 2.5 | 6.03 | 11.04 |
| 1430 | 6.49 | 0.970 | 1.7 | 5.49 | 11.03 |
| 1435 | 6.51 | 0.967 | 1.5 | 4.83 | 11.02 |

CONTINUED ON NEXT PAGE

3/21/13 32504-25

SAMPLE OF CRA-RA-28 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1440 | 6.58 | 0.967 | 2.7 | 4.93 | 11.01 |
| 1445 | 6.58 | 0.966 | 1.8 | 4.94 | 11.00 |
| 1450 | 6.58 | 0.966 | 1.5 | 4.93 | 11.00 |

SAMPLED @ 1451 ID: GW-32504-032113-SR-1681

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1505 | 6.86 | 0.96 | 2.4 | 9.26 | 11.12 |
| 1515 | 6.75 | 1.04 | 3.8 | 7.30 | 11.04 |
| 1525 | 6.77 | 1.13 | 1.1 | 6.82 | 11.06 |
| 1535 | 6.76 | 1.13 | 1.4 | 6.49 | 11.06 |
| 1540 | 6.76 | 1.14 | 1.2 | 6.48 | 11.07 |
| 1550 | 6.76 | 1.14 | 1.0 | 6.48 | 11.06 |

SAMPLED @ 1551 ID: GW-32504-032113-SR-1682



32504-25 3/22/13

TASK: CONTINUE 4-LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY 34°

H2S: LEVEL D

CALIBRATION OF HORIBA NFO 4389

pH = 4.00, COND. = 4.49, TURB = 0.0, D.O. = 10.27, TEMP = 14.76 °C

SAMPLE OF CRA-RA-24

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1315 | 6.18 | 0.905 | 10.6 | 10.88 | 11.24 |
| 1325 | 6.50 | 0.868 | 4.1 | 7.92 | 11.11 |
| 1335 | 6.50 | 0.884 | 3.5 | 6.84 | 11.26 |
| 1340 | 6.52 | 0.885 | 2.7 | 6.52 | 11.11 |
| 1345 | 6.53 | 0.885 | 3.1 | 6.51 | 11.10 |
| 1350 | 6.53 | 0.885 | 2.9 | 6.52 | 11.10 |

SAMPLED @ 1351 ID: GW-32504-032213-SR-1683

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 6.55 | 0.926 | 12.8 | 7.99 | 10.87 |
| 1425 | 6.20 | 0.964 | 4.1 | 6.43 | 10.82 |
| 1435 | 6.21 | 0.968 | 3.6 | 4.54 | 10.81 |
| 1440 | 6.22 | 0.969 | 2.2 | 4.54 | 10.81 |
| 1445 | 6.21 | 0.969 | 2.1 | 4.53 | 10.81 |

SAMPLED @ 1446 ID: GW-32504-032213-SR-1684

3/22/13 32504-25

SAMPLE OF CBA-RA-32

| TIME | pH | COND. | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| TUBING FROZEN - HAD TO THAW TOP 2' | | | | | |
| BY BRINGING INTO TRUCK. | | | | | |
| 1520 | 6.63 | 0.842 | 8.8 | 7.21 | 10.86 |
| 1530 | 6.50 | 0.847 | 3.1 | 6.12 | 10.85 |
| 1540 | 6.62 | 0.846 | 2.0 | 6.11 | 10.86 |
| 1545 | 6.63 | 0.846 | 1.7 | 6.11 | 10.85 |
| 1550 | 6.62 | 0.846 | 1.5 | 6.12 | 10.86 |

SAMPLED @ 1551 ID: GW-32504-032213-SR-1685

SAMPLE OF CBA-RA-22

| | | | | | |
|---|---|---|---|---|---|
| 1605 | 6.69 | 1.18 | 22.5 | 8.64 | 11.14 |
| 1615 | 6.43 | 1.20 | 13.9 | 6.77 | 11.21 |
| 1625 | 6.46 | 1.20 | 6.2 | 5.37 | 11.15 |
| 1630 | 6.47 | 1.20 | 4.4 | 5.29 | 11.14 |
| 1635 | 6.47 | 1.20 | 3.9 | 5.28 | 11.14 |
| 1640 | 6.46 | 1.20 | 3.7 | 5.28 | 11.13 |

SAMPLED @ 1641 ID: GW-32504-032213-SR-1686



32504-25 3/23/13

TASK: CONTINUE 1/4 LY SAMPLING

CBA: STONE RANCH

WEATHER: CLOUDY 28°

H2S: LEVEL D

CALIBRATION OF HORIBA NFO 4389

pH=4.00, COND=4.49, TURB=0.0, D.O.=10.05

TEMP.=15.23°C

| TIME | pH | COND. | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 0900 | 6.43 | 1.66 | 6.3 | 10.81 | 10.76 |
| 0910 | 6.80 | 1.58 | 2.4 | 7.95 | 10.71 |
| 0920 | 6.77 | 1.55 | 0.6 | 7.09 | 10.73 |
| 0925 | 6.78 | 1.50 | 0.5 | 6.19 | 10.78 |
| 0930 | 6.77 | 1.65 | 1.1 | 5.49 | 10.75 |
| 0935 | 6.77 | 1.63 | 2.3 | 5.36 | 10.75 |
| 0940 | 6.78 | 1.64 | 1.2 | 5.20 | 10.77 |
| 0945 | 6.77 | 1.64 | 1.4 | 4.96 | 10.75 |
| 0950 | 6.79 | 1.64 | 1.3 | 4.82 | 10.77 |
| 0955 | 6.78 | 1.63 | 0.9 | 4.51 | 10.76 |
| 1000 | 6.78 | 1.64 | 0.8 | 4.60 | 10.76 |

SAMPLED @ 1001 ID: GW-32504-032313-SR-1687

SAMPLED @ 1010 ID: GW-32504-032313-SR-1688

3/23/13 32504-25

SAMPLE OF CRA-RA-29

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1020 | 6.95 | 1.12 | 2.5 | 9.81 | 10.33 |
| 1030 | 6.75 | 1.02 | 1.6 | 8.67 | 10.59 |
| 1040 | 6.76 | 1.02 | 1.8 | 8.50 | 10.70 |
| 1045 | 6.76 | 1.02 | 1.7 | 8.49 | 10.71 |
| 1050 | 6.76 | 1.02 | 1.5 | 8.50 | 10.70 |

SAMPLED @ 1051 ID: GW-32504-032313-SR-1689

SAMPLE OF B1-B

| | | | | | |
|---|---|---|---|---|---|
| 1105 | 7.91 | 0.594 | 1.4 | 7.72 | 9.80 |
| 1115 | 7.17 | 0.595 | 0.7 | 6.69 | 9.34 |
| 1125 | 7.17 | 0.605 | 4.2 | 6.22 | 9.24 |
| 1130 | 7.16 | 0.607 | 2.1 | 6.18 | 9.23 |
| 1135 | 7.16 | 0.607 | 1.8 | 6.19 | 9.23 |
| 1140 | 7.16 | 0.607 | 1.5 | 6.17 | 9.23 |

SAMPLED @ 1141 ID: GW-32504-032313-SR-1690

SAMPLE OF CRA-RA-27

| | | | | | |
|---|---|---|---|---|---|
| 1305 | 7.14 | 1.80 | 4.8 | 8.88 | 10.50 |
| 1315 | 6.73 | 1.89 | 0.4 | 6.10 | 11.03 |
| 1325 | 6.72 | 1.90 | 3.4 | 5.92 | 11.12 |
| 1330 | 6.72 | 1.91 | 1.9 | 5.80 | 11.12 |
| 1335 | 6.72 | 1.91 | 1.4 | 5.76 | 11.11 |
| 1340 | 6.72 | 1.92 | 1.2 | 5.77 | 11.11 |



32504-25 3/23/13

SAMPLE OF CRA-RA-6

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1355 | 6.74 | 1.14 | 2.3 | 7.29 | 11.43 |
| 1405 | 6.70 | 1.15 | 0.4 | 5.13 | 11.43 |
| 1415 | 6.70 | 1.15 | 0.9 | 4.28 | 11.42 |
| 1420 | 6.70 | 1.15 | 2.1 | 3.99 | 11.46 |
| 1425 | 6.70 | 1.15 | 1.8 | 3.88 | 11.46 |
| 1430 | 6.70 | 1.15 | 1.2 | 3.87 | 11.46 |
| 1435 | 6.70 | 1.15 | 0.9 | 3.88 | 11.46 |

SAMPLED @ 1436 ID: GW-32504-032313-SR-1692

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 6.84 | 1.40 | 4.9 | 7.27 | 10.99 |
| 1500 | 6.84 | 1.28 | 4.5 | 4.84 | 10.93 |
| 1510 | 6.84 | 1.27 | 1.6 | 4.08 | 11.07 |
| 1515 | 6.84 | 1.27 | 0.6 | 4.01 | 11.05 |
| 1520 | 6.85 | 1.26 | 0.5 | 3.95 | 11.05 |
| 1525 | 6.84 | 1.26 | 0.8 | 3.93 | 11.05 |
| 1530 | 6.85 | 1.26 | 0.0 | 3.94 | 11.04 |
| 1535 | 6.84 | 1.27 | 0.3 | 3.93 | 11.05 |

SAMPLED @ 1536 ID: GW-32504-032313-SR-1693

SAMPLES PACKED IN COOLER WITH ICE.

3/24/13 32504.25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STOVE RAPA1

WEATHER: CLOUDY 28°

H&S: LEVEL D

CALIBRATION OF HORIBA NFO 4389

pH: 4.00, COND: 4.49, TURB: 0.0, D.O: 10.06, TEMP: 13.45°C

SAMPLE OF CRA.RA.31

TUBING FROZEN PULLED TO 4' INTO TRUCK TO THAW

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1000 | 6.55 | 0.503 | 7.6 | 12.48 | 10.50 |
| 1010 | 6.98 | 0.506 | 4.0 | 9.45 | 10.55 |
| 1020 | 7.06 | 0.510 | 0.5 | 7.52 | 10.46 |
| 1025 | 7.07 | 0.511 | 0.0 | 6.98 | 10.52 |
| 1030 | 7.06 | 0.511 | 0.3 | 6.94 | 10.55 |
| 1035 | 7.07 | 0.510 | 0.1 | 6.95 | 10.55 |
| 1040 | 7.07 | 0.511 | 0.3 | 6.94 | 10.55 |

SAMPLED @ 1041 ID: GW32504-032413-SR-1694

SAMPLE OF CRA.RA.7

FROZEN TUBING

| | | | | | |
|---|---|---|---|---|---|
| 1120 | 7.40 | 0.317 | 2.9 | 8.71 | 10.96 |
| 1130 | 7.37 | 0.312 | 1.6 | 7.93 | 10.99 |



32504.25 3/24/13

SAMPLE OF CRA.RA.7 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1140 | 7.36 | .309 | 0.7 | 7.92 | 10.99 |
| 1145 | 7.36 | .309 | 0.9 | 7.95 | 10.99 |
| 1150 | 7.36 | .309 | 1.0 | 7.92 | 10.99 |

SAMPLED @ 1151 ID: GW32504-032413-SR-1695

SAMPLE OF RA.MW.28

| | | | | | |
|---|---|---|---|---|---|
| 1220 | 7.04 | .697 | 3.9 | 12.33 | 10.72 |
| 1230 | 6.88 | 0.696 | 3.6 | 8.28 | 10.66 |
| 1240 | 6.84 | 0.694 | 3.0 | 6.22 | 10.77 |
| 1245 | 6.85 | 0.697 | 3.5 | 5.70 | 10.77 |
| 1250 | 6.85 | 0.697 | 1.6 | 5.42 | 10.79 |
| 1255 | 6.85 | 0.697 | 1.5 | 5.24 | 10.77 |
| 1300 | 6.85 | 0.697 | 1.8 | 5.23 | 10.78 |
| 1305 | 6.85 | 0.697 | 1.4 | 5.22 | 10.77 |

SAMPLED @ 1306 ID: GW32504-032413-SR-1696

SAMPLE OF CRA.RA.18

| | | | | | |
|---|---|---|---|---|---|
| 1315 | 6.74 | 1.65 | 3.8 | 8.77 | 10.46 |
| 1325 | 6.71 | 1.64 | 3.6 | 6.50 | 10.57 |
| 1335 | 6.72 | 1.64 | 4.2 | 6.14 | 10.59 |
| 1340 | 6.70 | 1.64 | 3.7 | 5.94 | 10.56 |
| 1345 | 6.70 | 1.64 | 3.0 | 5.91 | 10.56 |

CONTINUED ON NEXT PAGE

3/24/13 32504-25

SAMPLE OF CRA-RA-18 (CONTINUED)

| TIME | pH | COND | TURB | DO | TEMP |
|---|---|---|---|---|---|
| 1350 | 6.71 | 1.64 | 2.5 | 5.83 | 10.60 |
| 1355 | 6.71 | 1.64 | 1.9 | 5.82 | 10.60 |
| 1400 | 6.71 | 1.64 | 0.0 | 5.82 | 10.60 |

SAMPLED @ 1401 ID: GW-32504-032413-SR-~~1678~~ 1697

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 6.79 | 1.46 | 1.4 | 9.38 | 10.62 |
| 1425 | 6.72 | 1.51 | 2.0 | 8.61 | 10.50 |
| 1435 | 6.72 | 1.51 | 2.4 | 8.25 | 10.55 |
| 1440 | 6.72 | 1.51 | 0.9 | 8.32 | 10.55 |
| 1445 | 6.72 | 1.51 | 1.1 | 8.30 | 10.56 |
| 1450 | 6.72 | 1.51 | 0.8 | 8.31 | 10.55 |

SAMPLED @ 1451 ID: GW-32504-032413-SR-~~1679~~ 98

SAMPLED @ 1455 ID: GW-32504-032413-SR-~~1680~~ 99

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1500 | 7.07 | 1.68 | 2.1 | 12.52 | 10.58 |
| 1510 | 6.78 | 1.77 | 1.7 | 7.88 | 10.64 |
| 1520 | 6.79 | 1.77 | 3.6 | 5.84 | 10.68 |
| 1525 | 6.79 | 1.77 | 1.4 | 5.85 | 10.67 |
| 1530 | 6.79 | 1.77 | 0.7 | 5.84 | 10.67 |

SAMPLED @ 1531 ID: GW-32504-032413-SR-~~1682~~ 1700



32504-25 3/25/13

SAMP TASK: FINISH HYDROSAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: LT. SNOW, WIND, 31°

H&S: LEVEL D

CALIBRATION OF HORIBA NFO 43889

pH = 4.00, COND = 4.49, TURB = 0.0, DO = 10.77, TEMP = 13.49°C

SAMPLE OF CRA-RA-23D

| TIME | pH | COND | TURB | DO | TEMP |
|---|---|---|---|---|---|
| 1230 | 5.25 | 0.838 | 12.3 | 11.95 | 11.10 |
| 1240 | 6.09 | 0.847 | 7.1 | 8.63 | 10.61 |
| 1250 | 6.48 | 0.846 | 3.6 | 6.11 | 10.51 |
| 1255 | 6.49 | .838 | 0.9 | 5.49 | 10.42 |
| 1300 | 6.53 | .838 | 0.5 | 5.47 | 10.41 |
| 1305 | 6.54 | .838 | 1.0 | 5.47 | 10.41 |
| 1310 | 6.54 | .838 | 0.8 | 5.48 | 10.41 |

SAMPLED @ 1311 ID: GW-32504-032513-SR-~~1694~~ 1701

SAMPLE OF 81-4

| | | | | | |
|---|---|---|---|---|---|
| 1330 | 7.09 | 1.32 | 24.7 | 13.20 | 10.77 |
| 1340 | 6.81 | 1.29 | 5.0 | 9.41 | 10.99 |
| 1350 | 6.66 | 1.29 | 3.2 | 4.10 | 11.11 |
| 1355 | 6.59 | 1.30 | 2.1 | 3.68 | 11.14 |

CONTINUED ON NEXT PAGE

3/25/13 32504.25

SAMPLE OF B1-4 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1400 | 6.58 | 1.30 | 1.1 | 3.42 | 11.16 |
| 1405 | 6.57 | 1.29 | 1.4 | 3.39 | 11.15 |
| 1410 | 6.57 | 1.30 | 1.2 | 3.37 | 11.15 |
| 1415 | 6.57 | 1.29 | 0.9 | 3.38 | 11.16 |

SAMPLED @ 1416 ID: GW-32504-032513-02 ~~1415~~ 1702

MS/MSD

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504.25 3/29/13

TASK: MLY WATER LEVELS

CLIA: STEVE RAPAI

WEATHER: SUN 40°

H&S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| B1-4 | 29.96 |
| B1-5 | 34.47 |
| B1-7 | 46.63 |
| B1-8 | 43.62 |
| B1-9 | 16.30 |
| B1-10 | 32.71 |
| RA-1 | 69.11 |
| RA-2D | 56.19 |
| RA-2S | 55.68 |
| RA-3 | 52.79 |
| RA-4 | 23.75 |
| RA-5 | 54.85 |
| RA-6 | 59.32 |
| RA-7 | 32.72 |
| RA-8 | 16.00 |
| RA-16 | 58.08 |
| RA-18 | 41.53 |
| RA-18D | 56.22 |
| RA-19D | 50.20 |

3/29/13 32504-25

| WELL ID | LEVEL |
|---|---|
| RA-19S | 47.50 |
| RA-20 | 58.86 |
| RA-22 | 36.11 |
| RA-23D | 32.72 |
| RA-23S | 33.00 |
| RA-24 | 56.76 |
| RA-25 | 54.24 |
| RA-26D | 49.99 |
| RA-26S | 49.87 |
| RA-27 | 61.70 |
| RA-28 | 54.45 |
| RA-29 | 46.10 |
| RA-30 | 58.37 |
| RA-31 | 31.77 |
| RA-32 | 57.25 |
| MW-27 | 42.11 |
| MW-28 | 42.23 |
| MW-32 | 34.97 |
| MW-34C | 41.85 |
| MW-35 | 23.66 |
| MW-41 | 47.07 |
| MW-42 | 63.11 |
| MW-47 | 53.33 |
| MW-54 | 56.00 |



32504-25 3/29/13

| WELL ID | LEVEL |
|---|---|
| MW-55 | 37.06 |
| MW-56 | 33.25 |
| MW-58 | 21.66 |
| EB-PZ-2 | 40.39 |
| EB-PZ-4 | 53.50 |
| EB-PZ-5 | 55.18 |
| EB-PZ-6 | 54.94 |
| PZ-103 | 57.20 |
| PZ-104 | 55.05 |
| PZ-105 | 57.92 |
| PZ-106 | 39.41 |
| TEMP-PZ-2 | 53.08 |

CONESTOGA-ROVERS
& ASSOCIATES

200 W. Allegan Street, Suite 300
Plainwell, Michigan 49080-1397
Telephone: (269) 685-5181 Fax: (269) 685-5223
www.CRAworld.com

July 10, 2013

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 123
Groundwater and Landfill RD/RA
Reporting Period: April 1through June 30, 2013
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 INTRODUCTION

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree ("CD"), Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 ACTIVITIES PERFORMED DURING THIS REPORTING PERIOD

### 2.1 OPERATION AND MAINTENANCE

Figure 1 is a Site location map showing the wells included in the Groundwater Remediation Monitoring Program and the annual Landfill Monitoring Program. CRA began collecting the quarterly groundwater samples on May 23, 2013. There were then several maintenance issues and repairs that need to be made to the treatment system, as discussed in Sections 4.0 and 5.0 below. After these problems were addressed and the treatment system was functioning again, CRA completed the quarterly sampling on June 11, 13, and 17 through 20, 2013, consistent with the Groundwater Remediation Monitoring Program and the annual Landfill Monitoring Program. The results from these samples are discussed in Section 3.0 below.

Quarterly groundwater elevations were measured on June 30, 2013. The corresponding groundwater contour map is provided on Figure 1.

Equal
Employment Opportunity
Employer

REGISTERED COMPANY FOR
ISO 9001
ENGINEERING DESIGN

Worldwide Engineering, Environmental, Construction, and IT Services

## 2.2 REPORTS

Quarterly Progress Report No. 122 was submitted to United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ) on April 10, 2013.

## 3.0 SUMMARY OF FINDINGS

The results of the first quarter 2013 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in the Groundwater Remediation Monitoring Program.

During the second quarter 2013 sampling, seven of the 21 monitoring wells sampled detected Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the seven monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 9 µg/L vinyl chloride |
| CRA-RA-23D | 6.5 µg/L vinyl chloride |
| CRA-RA-24 | 7.4 µg/L vinyl chloride |
| CRA-RA-26S | 110µg/L trichloroethene |
| CRA-RA-27 | 13 µg/L vinyl chloride |
| CRA-RA-30 | 4.5 µg/L vinyl chloride |
| 81-4 | 2.8 µg/L vinyl chloride |

Groundwater samples from these seven monitoring wells had COCs above Part 201 DWC during the first quarter 2013.

CRA was unable to collect the annual Rasmussen residential well sample because there is a leak in the plumbing system and the well is currently turned off. If the leak is repaired by the home owner CRA will collect the annual Rasmussen residential well sample in the third quarter 2013.

The results of the 2013 round of the annual Landfill Monitoring Programs are provided in Table 5. Semi-volatile organic compounds were not detected in any of the groundwater samples included in the Landfill Monitoring Program. Volatile organic compounds were detected in the groundwater samples collected for the Landfill Monitoring Program but concentrations did not exceed their respective Part 201 DWC. Cadmium and lead were not detected in the Landfill Monitoring Program samples.

## 4.0 PROBLEMS ENCOUNTERED

On Thursday, May 9, 2013, during a routine site inspection CRA discovered that a section of tubing inside of the O3 generator had pulled out of its stainless steel fitting. The leaking ozone had damaged the plastic on/off switch on the generator. After the tubing had been repaired, the unit was unable to be powered back on due to the damaged switch.

CRA received an alarm call from the Site on Friday, May 24, 2013 due to a power failure. Upon arrival at the Site, CRA discovered that the circuit breaker for the compressor had tripped due to the power interruption at the Site. Upon resetting the breaker, the compressor motor malfunctioned and the breaker re-tripped. The compressor motor was damaged during the power failure and required replacement. CRA called Ingersoll Rand, the compressor manufacturer, for service and ordered a new motor.

On Monday, June 3, 2013, CRA discovered a major oil leak from the compressor. CRA contacted Ingersoll Rand for service and a technician arrived at the Site later that afternoon. The technician discovered that the main oil line to the compressor radiator had began to leak and needed to be replaced. The Ingersoll Rand technician recommended that all of the hoses be replaced because they were rigid and brittle. The Ingersoll Rand Technician ordered new hoses.

## 5.0 CORRECTIVE MEASURES TO RECTIFY PROBLEMS

After completing repairs to the ozone generator tubing, CRA contacted the system vendor (Ozonology) to initiate replacement of the on/off switch. CRA installed a new contact block, lamp module, and selector switch on Monday, May 13, 2013. Following installation of the replacement parts CRA restarted the system and it functioned properly.

On Thursday, May 30, 2013, Ingersoll Rand arrived on site to make repairs to the compressor. The new motor was installed and normal system operation was restored by late afternoon on May 30, 2013.

On Tuesday, June 11, 2013, Ingersoll Rand arrived at the site with replacement oil hoses. The new hoses were installed and the system was restarted and functioning normally later that afternoon.

## 6.0 CONTACTS AND SIGNIFICANT CORRESPONDENCE WITH PUBLIC REPRESENTATIVES

| Communication | Date | Subject of Correspondence/Discussion |
|---|---|---|
| Quarterly Report | April 18, 2013 | Report No. 122 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDNRE) |
| email | April 5, 2013 | From A. Deal to H. Caine proposing alternate VAS and monitoring well locations |
| email | April 26, 2013 | From H. Caine to A. Deal approving alternate VAS and monitoring well locations |
| email | April 27, 2013 | From A. Deal to H. Caine outlining schedule for June 2013 field work |
| email | May 28, 2013 | From A. Deal to H. Caine postponing June 2013 field work |

## 7.0 PLANNED UPCOMING ACTIVITIES/SCHEDULE

Landfill and groundwater component activities planned for the third quarter of 2013:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The third quarter groundwater sampling event is scheduled for the week of August 5, 2013
- The wells to be sampled in the third quarter of 2013 are listed in Table 6
- Propose alternative locations for proposed VAS boreholes and monitoring wells following access refusal by the property owner

CONESTOGA-ROVERS
& ASSOCIATES

July 10, 2013 Reference No. 032504-15



Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

for Steven Rapai

Bart Bartholomy

AJD/cb/32
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Steven Nadeau, Honigman Miller

# FIGURES AND TABLES

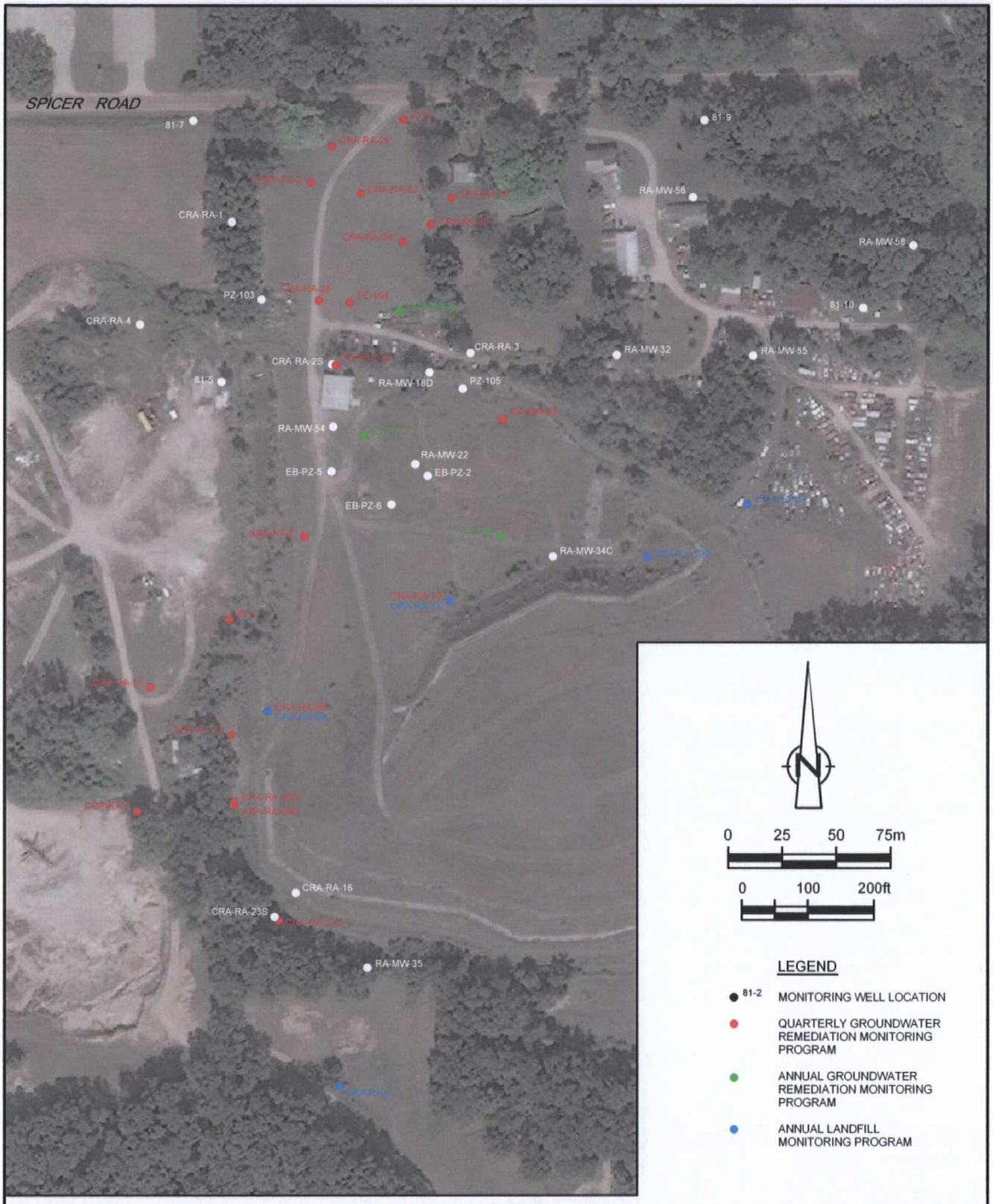



figure 1

2013 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN032)GN-WA001 JUL 5/2013

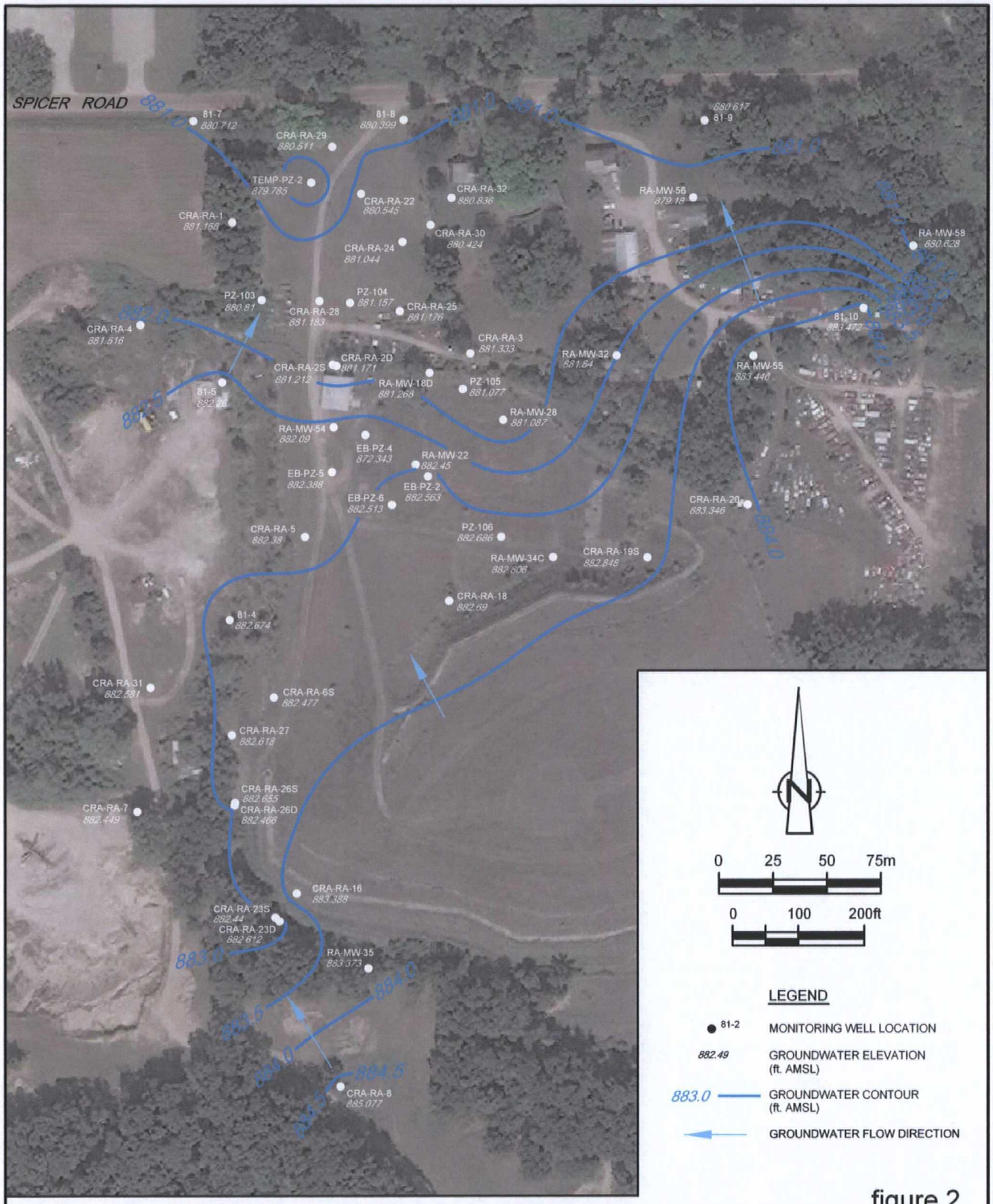



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
JUNE 2013
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN032)GN-WA002 JUL 5/2013

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,1-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 750 | 5 | 2 | 200 |
| CRA-RA-22 | GW-SR-1648 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.5 | ND(1.0) |
| CRA-RA-22 | GW-SR-1667 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| CRA-RA-22 | GW-SR-1686 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-22 | GW-SR-1629 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 9.0 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 3 µg/L | |
| CRA-RA-24 | GW-SR-1646 | 9/13/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.5 | ND(1.0) |
| CRA-RA-24 | GW-SR-1663 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| CRA-RA-24 | GW-SR-1664 | 12/5/2012 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| CRA-RA-24 | GW-SR-1683 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.4 | ND(1.0) |
| CRA-RA-24 | GW-SR-1624 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.5 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 0.1 µg/L | |
| CRA-RA-25 | GW-SR-1407 | 08/26/2010 | | ND(1) | 1.4 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1408 | 08/26/2010 | Duplicate | ND(1) | 1.4 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1366 | 8/26/2011 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1367 | 8/26/2011 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1445 | 9/13/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Up 0.2 µg/L | | | | | | | | | | | |
| CRA-RA-28 | GW-SR-1645 | 9/13/2012 | | ND(1.0) | 1.5 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.0 | ND(1.0) |
| CRA-RA-28 | GW-SR-1661 | 12/4/2012 | | ND(1.0) | 1.4 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.4 | ND(1.0) |
| CRA-RA-28 | GW-SR-1681 | 3/21/2013 | | ND(1.0) | 1.3 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.7 | ND(1.0) |
| CRA-RA-28 | GW-SR-1622 | 6/11/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.4 | ND(1.0) |
| | | | Change | | Down 0.3 µg/L | | | | | | | | | | Down 0.3 µg/L | |
| CRA-RA-29 | GW-SR-1650 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1669 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1689 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-30 | GW-SR-1647 | 9/13/2012 | | ND(1.0) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1665 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.2 | ND(1.0) |
| CRA-RA-30 | GW-SR-1684 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| CRA-RA-30 | GW-SR-1625 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.3 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.9 µg/L | |
| CRA-RA-32 | GW-SR-1654 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1655 | 9/14/2012 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1666 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1685 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1626 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| PZ-104 | GW-SR-1644 | 9/13/2012 | | ND(1.0) | 3.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1662 | 12/5/2012 | | ND(1.0) | 3.1 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1682 | 3/21/2013 | | ND(1.0) | 4.3 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.3 | ND(1.0) |
| PZ-104 | GW-SR-1623 | 6/11/2013 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Down 0.7 µg/L | | | | | | | | | | Down 0.3 µg/L | |
| TEMP-PZ-2 | GW-SR-1649 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1668 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1687 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1688 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1632 | 6/13/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| S1-8 | GW-SR-1651 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-8 | GW-SR-1672 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-8 | GW-SR-1690 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-8 | GW-SR-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 2

ANALYTICAL RESULTS - PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 750 | 5 | 2 | 200 |
| CRA-RA-2D | GW-SR-1629 | 9/10/2012 | | | ND(1.3) | ND(1.3) | ND(13) | ND(13) | ND(13) | ND(1.3) | 42 | ND(1.3) | ND(1.3) | ND(1.3) | ND(1.3) | ND(1.3) | ND(1.3) |
| CRA-RA-2D | GW-SR-1656 | 12/4/2012 | | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 40 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1680 | 3/21/2013 | | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 49 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1703 | 5/23/2013 | | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | 1.1 | 52 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| | | | Change | | | | | | | | Up 3 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-1658 | 9/12/2012 | | | 90 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| CRA-RA-18 | GW-SR-1659 | 9/12/2012 | Duplicate | | 78 | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) |
| CRA-RA-18 | GW-SR-1679 | 12/4/2012 | | | 100 | ND(5) | ND(50) | ND(50) | ND(50) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) |
| CRA-RA-18 | GW-SR-1697 | 3/26/2013 | | | 120 | ND(4) | ND(40) | ND(40) | ND(40) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) |
| CRA-RA-18 | GW-SR-1633 | 6/17/2013 | | | 88 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| CRA-RA-18 | GW-SR-1634 | 6/17/2013 | Duplicate | | 90 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| | | | Change | | Down 31 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1309 | 08/27/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 28 | ND(1) | ND(1) | ND(1) | ND(1) | 3.6 | ND(1) |
| EB-PZ-4 | GW-SR-1310 | 08/27/2009 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 27 | ND(1) | ND(1) | ND(1) | ND(1) | 3.6 | ND(1) |
| EB-PZ-4 | GW-SR-1443 | 9/3/2010 | | | ND(1) | 1.42 | ND(10) | ND(10) | ND(10) | ND(1) | 29 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 38.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| | | | Change | | | | | | | | Stable | | | | | Up 0.7 µg/L | |
| PZ-106 | GW-SR-1314 | 1/9/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1399 | 08/25/2010 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Stability all Non-Detect | | | | | | | | | | | | |
| RA-MW-2B | GW-SR-1642 | 9/13/2012 | | | 10 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1660 | 12/4/2012 | | | 9.8 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| RA-MW-2B | GW-SR-1696 | 3/26/2013 | | | 11.0 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| RA-MW-2B | GW-SR-1618 | 6/17/2013 | | | 9.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Down 2 µg/L | | | | | | | | | | | | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| *Sample Location* | *Sample ID* | *Date Sampled* | *Parameter* | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Units* | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | *Michigan Part 201 Groundwater Criteria* | 200 | 70 (1) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-5 | GW-SR-1631 | 9/10/2012 | | 30 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1658 | 12/4/2012 | | 23 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1695 | 3/25/2013 | | 30 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1704 | 5/25/2013 | | 23 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | Down 7 µg/L | | | | | | | | | | | | |
| CRA-RA-65 | GW-SR-1652 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1673 | 12/5/2012 | | 1.1 | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1692 | 3/25/2012 | | 1.3 | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.0 | ND(1.0) |
| CRA-RA-65 | GW-SR-1705 | 5/23/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| CRA-RA-65 | GW-SR-1706 | 5/23/2013 | *Duplicate* | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| | | | *Change* | | | | | | | | | | | | Up 0.1 µg/L | |
| CRA-RA-7 | GW-SR-1653 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1671 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1695 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1658 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-27 | GW-SR-1633 | 9/11/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1674 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1675 | 12/6/2012 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1691 | 3/25/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 17 | ND(1.0) |
| CRA-RA-27 | GW-SR-1710 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 4 µg/L | |
| CRA-RA-31 | GW-SR-1652 | 9/14/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1670 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1694 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1657 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| 81-4 | GW-SR-1634 | 9/11/2012 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 3.1 | ND(1) |
| 81-4 | GW-SR-1679 | 12/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| 81-4 | GW-SR-1576 | 3/25/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| 81-4 | GW-SR-1711 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.8 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 0.8 µg/L | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| | | | | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Sample Location | Sample ID | Date Sampled | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-25D | GW-SR-1657 | 9/11/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.9 | ND(1.0) | ND(1.0) |
| CRA-RA-25D | GW-SR-1678 | 12/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.4 | ND(1.0) | ND(1.0) |
| CRA-RA-25D | GW-SR-1701 | 3/25/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.5 | ND(1.0) | ND(1.0) |
| CRA-RA-25D | GW-SR-1712 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.5 | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | | | | | Up 1.0 µg/L | | |
| CRA-RA-26D | GW-SR-1656 | 9/11/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1677 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1700 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1709 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1655 | 9/11/2012 | | ND(5.7) | ND(5.7) | ND(57) | ND(57) | ND(57) | ND(5.7) | ND(5.7) | ND(5.7) | ND(5.7) | ND(5.7) | 100 | ND(5.7) | ND(5.7) |
| CRA-RA-26S | GW-SR-1676 | 12/6/2012 | | ND(3.5) | ND(3.5) | ND(35) | ND(35) | ND(35) | ND(3.5) | ND(3.5) | ND(3.5) | ND(3.5) | ND(3.5) | 90 | ND(3.5) | ND(3.5) |
| CRA-RA-26S | GW-SR-1698 | 3/24/2013 | | ND(3.5) | ND(3.5) | ND(35) | ND(35) | ND(35) | ND(3.5) | ND(3.5) | ND(3.5) | ND(3.5) | ND(3.5) | 97 | ND(3.5) | ND(3.5) |
| CRA-RA-26S | GW-SR-1699 | 3/24/2013 | Duplicate | ND(2.9) | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | 99 | ND(2.9) | ND(2.9) |
| CRA-RA-26S | GW-SR-1708 | 6/19/2013 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 110 | ND(4.0) | ND(4.0) |
| | | | Change | | | | | | | | | | | Up 11 µg/L | | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLES

ANALYTICAL RESULTS - LANDFILL MONITORING PROGRAM
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sample | | Parameter | Volatile Organics | | | | | | | | | | | | | Semi-volatile Organics | | | Metals | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1,1,1-TRICHLOROETHANE | DICHLOROETHENE | 2-BUTANONE | PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) | 2-METHYLPHENOL | BIS(2-ETHYLHEXYL)PHTHALATE | 4-BROMOPHENYL | CADMIUM, DISSOLVED | CADMIUM, TOTAL | LEAD, DISSOLVED | LEAD, TOTAL |
| | | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (t) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 200 | 370 | 6 | 500 | 5 | | 4 | |
| | | | | Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| CRA-RA-4S | GW-SB-1103 | 6/9/2009 | Duplicate | | ND(1) | 1 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2 | 2.9 | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1292 | 6/2/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.8 | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1293 | 6/2/2009 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.8 | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1386 | 6/14/2010 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.2 | ND(1) | ND(5.1) | ND(5.1) | ND(5.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1825 | 6/14/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.8 | ND(1) | ND(9) | ND(9) | ND(9) | ND(1) | ND(1) | ND(9) | ND(9) |
| | | | Change | | | | | | | | | | | | | Up 0.6 ug/L | | | | | | | | |
| CRA-RA-5 | GW-SB-1292 | 6/13/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | 3 | ND(1) | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-5 | GW-SB-1291 | 6/2/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1386 | 6/14/2010 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.2 | ND(1) | ND(5.1) | ND(5.1) | ND(5.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1825 | 6/14/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.6 | ND(1) | ND(5.1) | ND(5.1) | ND(5.1) | ND(1.0) | ND(1.0) | 3 | 69.2 |
| CRA-RA-4S | GW-SB-1827 | 6/17/2011 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.5 | ND(1) | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1638 | 6/21/2012 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.6 | ND(1) | ND(2.1) | ND(2.1) | ND(2.1) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| CRA-RA-4S | GW-SB-1636 | 6/21/2012 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.9 | ND(1) | ND(2.2) | ND(2.2) | ND(2.2) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| CRA-RA-4S | GW-SB-1450 | 6/13/2013 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) | ND(0.0) | ND(0.0) | ND(0.0) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-4S | GW-SB-1451 | 6/13/2013 | Duplicate | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) | ND(9.1) | ND(9.1) | ND(9.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| | | | Change | | | | | | | | | | | | | Down 0.6 ug/L | | | | | | | | |
| CRA-RA-6 | GW-SB-1389 | 6/16/2010 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(5.1) | ND(5.1) | ND(5.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-6 | GW-SB-1821 | 6/15/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(5.2) | ND(5.2) | ND(5.2) | ND(1.0) | ND(1.0) | ND(0.0) | ND(0.0) |
| CRA-RA-6 | GW-SB-1822 | 6/15/2011 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(5.0) | ND(5.0) | ND(5.0) | ND(1.0) | ND(1.0) | ND(0.0) | ND(0.0) |
| CRA-RA-6 | GW-SB-1880 | 6/29/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-6 | GW-SB-1884 | 6/29/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-6 | GW-SB-1638 | 6/21/2012 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.0) | ND(2.0) | ND(2.0) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-6 | GW-SB-1797 | 6/19/2013 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| | | | Change | | | | | | | | | | | | | Stable; All Non-Detect | | | | | | | | |
| CRA-RA-15 | GW-SB-1386 | 6/5/2009 | | | 77 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.5 | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-15 | GW-SB-1386 | 6/16/2010 | | | 110 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(5.1) | ND(5.1) | ND(5.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-15 | GW-SB-1825 | 6/10/2011 | | | 107 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(5.0) | ND(5.0) | ND(5.0) | ND(1.0) | ND(1.0) | 8.1 | ND(0.0) |
| CRA-RA-15 | GW-SB-1826 | 6/10/2011 | Duplicate | | 107 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(5.0) | ND(5.0) | ND(5.0) | ND(1.0) | ND(1.0) | 4.9 | ND(0.0) |
| CRA-RA-15 | GW-SB-1838 | 8/18/2011 | | | 90.5 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | 1.3 | ND(1) | 2.0 | ND(1) | ND(1) | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-15 | GW-SB-1637 | 6/20/2012 | | | 84.5 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.0 | ND(1) | ND(1) | ND(2.2) | ND(2.2) | ND(2.2) | ND(0.0.007) | ND(0.0.007) | ND(1.7) | ND(1.7) |
| CRA-RA-15 | GW-SB-1455 | 6/17/2013 | | | 88 | ND(3.3) | ND(20) | ND(20) | ND(20) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(4.9) | ND(4.9) | ND(4.9) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| CRA-RA-15 | GW-SB-1454 | 6/17/2013 | Duplicate | | 90 | ND(3.3) | ND(20) | ND(20) | ND(20) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(4.8) | ND(4.8) | ND(4.8) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| | | | Change | | Up 2.7 ug/L | | | | | | | | | | | | | | | | | | | |
| CRA-RA-19S | GW-SB-1387 | 6/16/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-19S | GW-SB-1388 | 6/16/2009 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9.2) | ND(9.2) | ND(9.2) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-19S | GW-SB-1387 | 6/16/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(5.2) | ND(5.2) | ND(5.2) | ND(1.0) | ND(1.0) | 4.9 | 3.0 |
| CRA-RA-19S | GW-SB-1881 | 6/29/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-19S | GW-SB-1882 | 6/29/2011 | Duplicate | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(9) | ND(9) |
| CRA-RA-19S | GW-SB-1639 | 6/20/2012 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.1) | ND(2.1) | ND(2.1) | ND(0.2) | ND(0.2) | ND(9) | ND(9) |
| CRA-RA-19S | GW-SB-1456 | 6/17/2013 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| | | | Change | | | | | | | | | | | | | Stable; all non-detect | | | | | | | | |
| CRA-RA-20 | GW-SM-419 | 11/28/2000 | | | 7 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9.2) | ND(9.2) | ND(9.2) | ND(0.2) | ND(0.2) | ND(9.2) | ND(9) |
| CRA-RA-20 | GW-SM-497 | 11/19/2001 | | | 11 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | MA | MA |
| CRA-RA-20 | GW-SB-488 | 12/11/2002 | | | 8 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(1) | ND(1) |
| | | | | | | | | | | | | | | | | Insufficient Groundwater to Collect Sample | | | | | | | | |

**TABLE 6**

**2013 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | *Additional Routine Samples* | | | |
|---|---|---|---|---|
| | *Q1* | *Q2* | *Q3* | *Q4* |
| 81-4 | | | | |
| 81-8 | | | | |
| CRA-RA-2D | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-5 | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-18 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only)[1] | |
| CRA-RA-22 | | CRA-RA-19S | | |
| CRA-RA-23D | | CRA-RA-20 | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

Note:

1 - As of Q3 2012 there is a leak in the plumbing for the New Rasmussen Water Supply Well and the well is unavailable for sampling. CRA will collect a sample when the plumbing is repaired and then resume routine annual sampling.

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 4-3-2013 | 4-12-2013 | 4-19-2013 | 4-25-2013 | 5-1-2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | Steve Rapai | S. Rapai | S Rapai | S Rapai | Steve Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | – | – | – | – | – |
| Run Time hours | 81791 | | | | 82463 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 55 | 57 | 55 | 55 | 55 |
| Feed Air Pressure psi | 115 | 110 | 65 ↑ | 110 | 110 |
| Cycle Pressure psi | 70 | 65 | 115 ↓ | 70 | 65 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | 81791.3 | | | | 82463.1 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 8 | 8 | 8 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 37 | 30 | 35 | 37 | 32 |
| Regulator #2 psi | 22 | 21 | 22 | 25 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 1 | 2 | 3 | 2 |
| Zone Time hours | 1/2 | 1/2 | 1/2 | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | +300 | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 5-9-2013 | 5-13-2013 | 5-24-2013 | 5-30-2013 | 6-13-2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A Rapai | A Rapai | A Rapai | A Rapai | A Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | SYSTEM | | COMPRESSOR | | |
| | DOWN DUE | | MOTOR HAS | | |
| Output Pressure psi | TO ISSUES | 110 | BEEN DESTROYED | 105 | 110 |
| Temperature F | WITH O3 | — | BY POWER | — | — |
| Run Time hours | GENERATOR | | ISSUES AT SITE | 82919 | 83060 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | | 55 | | 55 | 54 |
| Feed Air Pressure psi | | 110 | | 110 | 110 |
| Cycle Pressure psi | | 65 | | 65 | 70 |
| Holding Tank Pressure psi | | 42 | | 42 | 42 |
| Run Time hours | | | | 82918.6 | 83059.8 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | | GREEN | | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | | 8 | | 7 | 8 |
| % O3 capacity | | 45 | | 45 | 45 |
| Regulator #1 psi | | 35 | | 36 | 35 |
| Regulator #2 psi | | 22 | | 24 | 22 |
| Alarm Reading ppm, O3 | | — | | — | — |
| Zone On | | 1 | | 3 | 1 |
| Zone Time hours | | 1/2 | | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | | 0.8 | | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** ON MAY 9, DISCOVERED BROKEN TUBING IN O3 GEN. LEAKING OZONE HAS DESTROYED PLASTIC ON/OFF SWITCH. OZONOLOGY WAS CONTACTED FOR REPLACEMENT PARTS. NEW SWITCH INSTALLED ON MAY 9 - SYSTEM RESTARTED.
POWER ISSUES AT THE SITE HAVE DESTROYED COMPRESSOR MOTOR ON MAY 24. NEW MOTOR INSTALLED ON MAY 30 - SYSTEM RESTARTED.
MAJOR OIL LEAK DISCOVERED ON COMPRESSOR ON JUNE 3 - SYSTEM DOWN. ALL OIL LINES REPLACED ON JUNE 11 & SYSTEM WAS RESTARTED.

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | 6-20-2013 | 6-25-2013 | | | |
| **OPERATOR SIGNATURE** | A. Rapai | A. Rapai | | | |

| **Air Compressor** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | | | |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| **Air Sep** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 55 | 55 | | | |
| Feed Air Pressure psi | 110 | 110 | | | |
| Cycle Pressure psi | 70 | 70 | | | |
| Holding Tank Pressure psi | 42 | 42 | | | |
| Run Time hours | | | | | |

| **Air Dryer** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | | | |

| **Ozone Generator** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 7 | | | |
| % O3 capacity | 45 | 45 | | | |
| Regulator #1 psi | 36 | 35 | | | |
| Regulator #2 psi | 22 | 22 | | | |
| Alarm Reading ppm, O3 | – | – | | | |
| Zone On | 1 | 2 | | | |
| Zone Time hours | 1/2 | 1/2 | | | |

| **Distribution Panel** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | APRIL 25 | | DATE: | MAY 22 & 23 | | DATE: | JUNE 18, 19, & 20 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 6 | SW-1 | 0.8 | 5 | SW-1 | 0.8 | 7 |
| SW-2 | 0.8 | 6 | SW-2 | 0.8 | 5 | SW-2 | 0.8 | 8 |
| SW-3 | 0.8 | 12 | SW-3 | 0.8 | 10 | SW-3 | 0.8 | 15 |
| SW-4 | 0.8 | 12 | SW-4 | 0.6 | 14 | SW-4 | 0.8 | 16 |
| SW-5 | 0.8 | 14 | SW-5 | 0.6 | 14 | SW-5 | 0.8 | 15 |
| SW-6 | 0.6 | 14 | SW-6 | 0.8 | 14 | SW-6 | 0.6 | 16 |
| SW-7 | 0.6 | 13 | SW-7 | 0.8 | 16 | SW-7 | 0.6 | 18 |
| SW-8 | – | – | SW-8 | – | – | SW-8 | – | – |
| SW-9 | – | – | SW-9 | – | – | SW-9 | – | – |
| SW-10 | – | – | SW-10 | – | – | SW-10 | – | – |
| SW-11 | – | – | SW-11 | – | – | SW-11 | – | – |
| SW-12 | 0.8 | 18 | SW-12 | 0.8 | 16 | SW-12 | 0.8 | 22 |
| SW-13 | 0.6 | 3 | SW-13 | 0.8 | 4 | SW-13 | 0.5 | 5 |
| SW-14 | – | – | SW-14 | – | – | SW-14 | – | – |
| SW-15 | – | – | SW-15 | – | – | SW-15 | – | – |
| SW-16 | – | – | SW-16 | – | – | SW-16 | – | – |
| SW-17 | 0.8 | 15 | SW-17 | 0.8 | 19 | SW-17 | 0.6 | 21 |
| SW-18 | 0.8 | 20 | SW-18 | 0.8 | 16 | SW-18 | 0.8 | 22 |
| SW-19 | 0.8 | 16 | SW-19 | 0.6 | 17 | SW-19 | 0.6 | 20 |
| SW-20 | 0.6 | 18 | SW-20 | 0.8 | 18 | SW-20 | 0.8 | 22 |
| SW-21 | – | – | SW-21 | – | – | SW-21 | – | – |
| SW-22 | 0.6 | 15 | SW-22 | 0.8 | 16 | SW-22 | 0.8 | 18 |
| SW-23 | 0.8 | 15 | SW-23 | 0.7 | 16 | SW-23 | 0.6 | 20 |
| SW-24 | 0.8 | 18 | SW-24 | 0.6 | 14 | SW-24 | 0.8 | 17 |
| SW-25 | 0.8 | 13 | SW-25 | 0.6 | 14 | SW-25 | 0.8 | 19 |
| SW-26 | 0.6 | 6 | SW-26 | 0.8 | 4 | SW-26 | 0.8 | 6 |
| SW-27 | 0.8 | 6 | SW-27 | 0.7 | 4 | SW-27 | 0.8 | 6 |
| SW-28 | 0.6 | 6 | SW-28 | 0.6 | 4 | SW-28 | 0.8 | 10 |
| SW-29 | 0.6 | 6 | SW-29 | 0.6 | 4 | SW-29 | 0.8 | 8 |
| SW-30 | – | – | SW-30 | – | – | SW-30 | – | – |

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** APRIL 5, 2013
**Time:** 2:00PM

**Weather Conditions:** SUN 47°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

–

**Recommendations:**

–

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** APRIL 25, 2013
**Time:** 1:45 PM

**Weather Conditions:** CLOUDY 50°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** TURNING GREEN

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 5/9/2013
**Time:** 11:30 AM

**Weather Conditions:** CLEAR 69°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** GREENING - OK

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** MAY 30, 2013
**Time:** 10:00 AM

**Weather Conditions:** CLEAR 74° - STORMS LATER.

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** JUNE 25, 2013
**Time:** 3:00 PM

**Weather Conditions:** DRIZZLE 88°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY - WET

**Drainage Spillways & Outfalls:** WET - FLOWING

**Roadways:** WET

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPA **Signature:** Steve Rapa

**Date:** JUNE 11, 2013
**Time:** 2:00PM

**Weather Conditions:** SUN, HUMID, 80°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET

**Drainage Spillways & Outfalls:** WET

**Roadways:** WET

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

5/23/13 32504-25

TASK: BEGIN 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: RAIN 58°F, FALLING TEMPS

H&S LEVEL D

CALIBRATION OF HORIBA NF03845

pH=4.00, COND.=4.49 mS/cm, TURB.=0.1 NTU; D.O.=8.14 mg/L, TEMP=28.46

SAMPLE OF CRA-RA-2D

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1245 | 5.69 | 1.39 | 3.9 | 8.02 | 11.71 |
| 1255 | 6.70 | 1.64 | 3.4 | 7.19 | 11.58 |
| 1305 | 6.74 | 1.61 | 2.9 | 1.84 | 11.52 |
| 1310 | 6.77 | 1.64 | 3.1 | 1.13 | 11.49 |
| 1315 | 6.78 | 1.64 | 3.1 | 1.01 | 11.49 |
| 1320 | 6.81 | 1.65 | 3.2 | 0.99 | 11.49 |
| 1325 | 6.81 | 1.66 | 3.3 | 1.00 | 11.49 |
| 1330 | 6.80 | 1.66 | 3.3 | 1.01 | 11.49 |

SAMPLED @ 1331 ID: GW-32504-052313-SR-1703

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1425 | 6.78 | 1.40 | 3.7 | 3.71 | 11.27 |
| 1435 | 6.76 | 1.31 | 4.0 | 2.42 | 11.28 |
| 1440 | 6.78 | 1.31 | 4.1 | 2.36 | 11.25 |
| 1445 | 6.80 | 1.31 | 4.1 | 2.39 | 11.30 |

CONTINUED ON NEXT PAGE



32504-25 5/23/13

SAMPLE OF CRA-RA-5 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1450 | 6.80 | 1.31 | 4.0 | 3.69 | 11.28 |
| 1455 | 6.82 | 1.31 | 4.1 | 3.72 | 11.27 |
| 1500 | 6.82 | 1.32 | 4.1 | 2.84 | 11.25 |
| 1505 | 6.82 | 1.31 | 4.0 | 2.82 | 11.26 |
| 1510 | 6.83 | 1.31 | 4.0 | 2.84 | 11.25 |

SAMPLED @ 1511 ID: GW-32504-052313-SR-1704

SAMPLE OF CRA-RA-6S

| | | | | | |
|---|---|---|---|---|---|
| 1545 | 6.84 | 1.21 | 3.6 | 2.79 | 11.81 |
| 1555 | 6.72 | 1.19 | 3.4 | 2.84 | 11.75 |
| 1605 | 6.72 | 1.19 | 3.9 | 2.44 | 11.86 |
| 1610 | 6.73 | 1.19 | 3.5 | 2.39 | 11.80 |
| 1615 | 6.73 | 1.19 | 3.1 | 2.46 | 11.80 |
| 1620 | 6.73 | 1.19 | 3.1 | 2.43 | 11.80 |

SAMPLED AT 1621 FOR VOC, SVOC, TOTAL & DISSOLVED METALS: ID: GW-32504-052313-SR-1705

SAMPLED AT 1640 FOR VOC, SVOC, TOTAL & DISSOLVED METALS: ID: GW-32504-052313-SR-1706

6/12/13 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: MOSTLY CLOUDY, HUMID, 75°

H&S: LEVEL D

CALIBRATION OF HORIBA NF03845

pH: 4.00, COND. = 4.49, TURB = 0.0, D.O. = 9.08, TEMP = 20.30

SAMPLE OF CRA-RA-28

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 10:40 | 6.58 | 1.03 | 36.2 | 4.92 | 11.78 |
| 10:50 | 6.70 | 1.01 | 11.5 | 2.46 | 11.64 |
| 11:00 | 6.77 | 1.00 | 6.2 | 2.24 | 11.75 |
| 11:05 | 6.77 | 1.01 | 3.5 | 2.20 | 11.77 |
| 11:10 | 6.81 | 1.01 | 4.2 | 2.13 | 11.68 |
| 11:15 | 6.83 | 1.01 | 4.3 | 2.11 | 11.69 |
| 11:20 | 6.87 | 1.00 | 4.1 | 2.08 | 11.70 |
| 11:25 | 6.87 | 1.00 | 4.0 | 2.09 | 11.70 |
| 11:30 | 6.86 | 1.00 | 3.6 | 2.10 | 11.69 |

SAMPLED @ 11:31 ID: GW-32504-061113-SR-1622

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 11:50 | 7.67 | 1.26 | 21.7 | 7.53 | 13.09 |
| 12:00 | 6.98 | 1.33 | 7.7 | 2.86 | 12.35 |
| 12:10 | 7.00 | 1.34 | 3.9 | 2.30 | 12.39 |

CONTINUED ON NEXT PAGE



32504-25 6/11/13

SAMPLE OF PZ-104 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1220 | 7.02 | 1.34 | 7.4 | 2.18 | 12.35 |
| 1230 | 7.03 | 1.35 | 2.3 | 2.03 | 12.24 |
| 1235 | 7.04 | 1.35 | 3.1 | 1.96 | 12.34 |
| 1240 | 7.04 | 1.35 | 3.6 | 1.99 | 12.34 |

SAMPLED @ 1241 ID: GW-32504-061113-SR-1623

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1255 | 7.01 | 1.06 | 2.9 | 3.64 | 12.32 |
| 1305 | 7.02 | 1.06 | 3.6 | 2.44 | 12.11 |
| 1320 | 7.02 | 1.06 | 3.3 | 2.06 | 12.22 |
| 1325 | 7.03 | 1.06 | 2.7 | 2.05 | 12.15 |
| 1330 | 7.03 | 1.06 | 2.9 | 2.04 | 12.16 |
| 1335 | 7.03 | 1.06 | 2.8 | 2.05 | 12.15 |

SAMPLED @ 1336 ID: GW-32504-061113-SR-1624

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1540 | 7.11 | 1.13 | 9.8 | 5.10 | 11.72 |
| 1550 | 7.05 | 1.14 | 5.8 | 2.27 | 11.80 |
| 1600 | 7.06 | 1.12 | 3.7 | 1.87 | 11.70 |
| 1605 | 7.06 | 1.13 | 3.5 | 1.90 | 11.70 |
| 1610 | 7.06 | 1.13 | 3.6 | 1.90 | 11.71 |

SAMPLED @ 1611 ID: GW-32504-061113-SR-1625

SAMPLES PACKED IN COOLER WITH ICE

6/13/13 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE PAPA

WEATHER: PARTLY CLOUDY, HIGH 77°F

VERY HEAVY RAIN LAST NIGHT, .42"

H&S: LEVEL D

CALIBRATION OF HORIBA NF 03845

pH=4.00, COND=4.49, TURB=0.0, DO=6.93,

TEMP=25.94

| TIME | pH | COND | TURB | DO | TEMP |
|---|---|---|---|---|---|
| SAMPLE OF CRA-RA-32 | | | | | |
| 9:40 | 6.82 | 0.727 | 0.0 | 4.94 | 11.36 |
| 9:55 | 6.73 | 0.727 | 0.0 | 4.01 | 11.34 |
| 10:10 | 6.82 | 0.727 | 0.0 | 3.32 | 11.30 |
| 10:15 | 6.87 | 0.727 | 0.0 | 2.79 | 11.32 |
| 10:20 | 6.88 | 0.726 | 0.0 | 2.43 | 11.35 |
| 10:25 | 6.90 | 0.727 | 0.0 | 2.28 | 11.35 |
| 10:30 | 6.88 | 0.727 | 0.0 | 2.24 | 11.35 |
| 10:35 | 6.88 | 0.727 | 0.0 | 2.25 | 11.35 |
| SAMPLED @ 1036 ID: GW-32504-061313-SR-1622 | | | | | |
| SAMPLE OF 81-8 | | | | | |
| 1045 | 7.00 | 0.771 | 6.5 | 6.13 | 11.93 |
| 1055 | 7.14 | 0.761 | 4.9 | 8.58 | 13.76 |
| 1105 | 7.05 | 0.759 | 2.7 | 15.86 | 14.66 |
| 1110 | 7.02 | 0.769 | 2.4 | +19.99 | 12.95 |

CONTINUED ON NEXT PAGE



32504-25 6/13/13

SAMPLE OF 81-8 (CONTINUED)

| TIME | pH | COND | TURB | DO | TEMP |
|---|---|---|---|---|---|
| 1115 | 7.03 | 0.766 | 0.3 | +19.99 | 13.23 |
| 1120 | 7.03 | 0.765 | 0.6 | +19.99 | 13.27 |
| 1125 | 7.03 | 0.765 | 0.9 | +19.99 | 13.22 |
| SAMPLED @ 1126 ID: GW-32504-061313-SR-1623 | | | | | |
| SAMPLE OF CRA-RA-29 | | | | | |
| 1135 | 7.21 | 0.869 | 12.7 | 10.63 | 13.06 |
| 1145 | 6.95 | 0.861 | 0.0 | 8.63 | 12.31 |
| 1155 | 6.94 | 0.851 | 0.0 | 8.56 | 12.81 |
| 1200 | 6.94 | 0.850 | 0.0 | 8.57 | 12.67 |
| 1205 | 6.94 | 0.850 | 0.0 | 8.59 | 12.50 |
| 1210 | 6.95 | 0.850 | 0.0 | 8.58 | 12.49 |
| 1215 | 6.95 | 0.850 | 0.0 | 8.58 | 12.50 |
| SAMPLED @ 1216 ID: GW-32504-061313-SR-1628 | | | | | |
| SAMPLE OF CRA-RA-22 | | | | | |
| 1225 | 6.90 | 0.892 | 0.4 | 4.06 | 11.97 |
| 1235 | 6.91 | 0.838 | 6.7 | 2.83 | 11.91 |
| 1245 | 6.93 | 0.856 | 4.5 | 2.87 | 11.99 |
| 1250 | 6.92 | 0.858 | 4.2 | 2.91 | 11.91 |
| 1255 | 6.93 | 0.858 | 4.2 | 2.91 | 11.90 |
| 1300 | 6.93 | 0.859 | 4.2 | 2.91 | 11.89 |
| SAMPLED @ 1301 ID: GW-32504-061313-SR-1629 | | | | | |

6/13/13 32504-25

RESAMPLE OF CRA-RA-65

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1315 | 6.95 | 0.921 | 0.0 | 6.03 | 14.08 |
| 1325 | 6.80 | 0.923 | 0.0 | 2.61 | 13.70 |
| 1335 | 6.81 | 0.930 | 0.0 | 2.11 | 13.50 |
| 1340 | 6.81 | 0.928 | 0.0 | 2.04 | 13.44 |
| 1345 | 6.81 | 0.928 | 0.0 | 2.01 | 1342 |
| 1350 | 6.81 | 0.928 | 0.0 | 2.02 | 1343 |

SAMPLED @ 1351 ID: GW-32504-061313-SR-1630

SAMPLED @ 1356 ID: GW-32504-061313-SR-1631

SAMPLE OF TEMP-PZ-2

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 7.03 | 1.72 | 26.0 | 4.65 | 11.71 |
| 1425 | 7.02 | 1.75 | 9.0 | 3.35 | 11.85 |
| 1435 | 7.03 | 1.82 | 4.5 | 2.84 | 11.82 |
| 1440 | 7.02 | 1.83 | 3.8 | 2.77 | 11.77 |
| 1445 | 7.03 | 1.83 | 3.4 | 2.71 | 11.70 |
| 1450 | 7.02 | 1.83 | 3.1 | 2.70 | 11.71 |
| 1455 | 7.03 | 1.83 | 3.0 | 2.71 | 11.70 |

SAMPLE OF 1456 ID: GW-32504-061313-SR-1632

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504-25 6/13/13

TASK: CONTINUE MTHLY SAMPLE EVENT

CRA: STEVE RAPAI

H&S: LEVEL D

WEATHER: SUN, HIGH 84, STORMS LATER

CALIBRATION OF HORIBA NF03845

pH=4.00, COND.=450, TURB=0.0, D.O.=7.87, TEMP=33.95

SAMPLE OF CRA-RA-18

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1215 | 6.51 | 1.34 | 2.1 | 13.91 | 11.40 |
| 1225 | 6.66 | 1.33 | 3.4 | 18.48 | 11.29 |
| 1235 | 6.71 | 1.33 | 3.2 | 15.24 | 11.30 |
| 1240 | 6.73 | 1.33 | 3.6 | 12.49 | 11.33 |
| 1245 | 6.76 | 1.33 | 3.5 | 12.31 | 11.26 |
| 1250 | 6.77 | 1.33 | 3.7 | 12.29 | 11.28 |
| 1255 | 6.77 | 1.33 | 3.6 | 12.30 | 11.27 |

SAMPLED @ 1256 ID: GW-32504-061713-SR-1633

SAMPLED @ 1305 ID: GW-32504-061713-SR-1634

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1330 | 6.91 | 0.483 | 12.9 | 8.20 | 11.74 |
| 1340 | 6.79 | 0.477 | 9.9 | 5.62 | 11.64 |
| 1350 | 6.78 | 0.477 | 6.9 | 5.63 | 11.63 |
| 1355 | 6.80 | 0.478 | 5.2 | 6.21 | 11.59 |

CONTINUED ON NEXT PAGE

6/17/13 32504-25

SAMPLE OF RA-MW-28 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1400 | 6.80 | 0.480 | 2.9 | 5.97 | 11.55 |
| 1405 | 6.79 | 0.480 | 3.1 | 6.00 | 11.57 |
| 1410 | 6.80 | 0.479 | 3.1 | 6.00 | 11.56 |
| 1415 | 6.80 | 0.480 | 3.0 | 5.99 | 11.57 |

SAMPLED @ 1416 ID: GW-32504-061713-SR-1635

SAMPLE OF CRA-RA-195

| | | | | | |
|---|---|---|---|---|---|
| 1435 | 6.68 | 0.658 | 2.9 | 6.17 | 10.96 |
| 1445 | 6.66 | 0.662 | 36.5 | 3.51 | 11.15 |
| 1455 | 6.67 | 0.739 | 9.7 | 2.57 | 11.11 |
| 1505 | 6.68 | 0.745 | 7.1 | 2.22 | 11.10 |
| 1510 | 6.68 | 0.741 | 5.0 | 2.19 | 11.07 |
| 1515 | 6.68 | 0.742 | 3.9 | 2.18 | 11.07 |
| 1520 | 6.68 | 0.742 | 3.6 | 2.18 | 11.07 |

SAMPLED @ 1521 ID: GW-32504-061713-SR-1636

SAMPLES PACKED IN COOLER WITH ICE



32504-25 6/18/13

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: SUN 74°

H2S: LEVEL D

CALIBRATION OF HORIBA NF 03845

pH=4.00, COND=4.49, TURB=0.0, D.O.=7.36, TEMP=29.09

SAMPLE OF CRA-RA-31

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1400 | 6.27 | 0.366 | 0.0 | 9.39 | 11.76 |
| 1410 | 6.87 | 0.354 | 2.5 | 2.65 | 11.41 |
| 1420 | 6.92 | 0.354 | 2.9 | 4.06 | 11.39 |
| 1430 | 6.96 | 0.351 | 2.4 | 1.79 | 11.46 |
| 1440 | 7.00 | 0.352 | 2.6 | 1.65 | 11.40 |
| 1445 | 6.99 | 0.352 | 2.4 | 1.66 | 11.41 |
| 1450 | 6.99 | 0.352 | 2.5 | 1.65 | 11.40 |

SAMPLED @ 1451 ID: GW-32504-061813-SR-1637

SAMPLE OF CRA-RA-7 SAMPLED @ 1536 ID: GW-32504-061813-SR-1638

| | | | | | |
|---|---|---|---|---|---|
| 1505 | 7.32 | 0.226 | 2.2 | 7.57 | 11.27 |
| 1515 | 7.24 | 0.216 | 3.7 | 7.88 | 11.06 |
| 1525 | 7.26 | 0.213 | 3.4 | 8.57 | 11.06 |
| 1530 | 7.27 | 0.213 | 3.2 | 8.56 | 11.06 |
| 1535 | 7.26 | 0.213 | 3.3 | 8.57 | 11.06 |

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX

6/19/13 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: SUN 76°

H&S LEVEL D

CALIBRATION OF HORIBA NF 0384.5

pH=4.00, COND=4.49, TURB=0.0, D.O.=8.36,

TEMP=28.51

SAMPLE OF CRA-RA-8

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1300 | 6.52 | 0.306 | 3.1 | 12.31 | 9.19 |
| 1310 | 6.90 | 0.315 | 3.4 | 10.39 | 9.21 |
| 1320 | 6.93 | 0.316 | 3.4 | 10.55 | 9.18 |
| 1325 | 6.97 | 0.315 | 3.3 | 10.61 | 9.18 |
| 1330 | 6.98 | 0.315 | 3.1 | 10.62 | 9.18 |
| 1335 | 6.98 | 0.315 | 3.2 | 10.60 | 9.18 |

SAMPLED @ 1336 ID: GW-32504-061913-SR-~~1639~~ 1707

SAMPLED FOR VOC, SVOC, TOTAL & DISSOLVED METALS

MS/MSD

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1435 | 6.81 | 0.878 | 3.6 | +19.99 | 12.36 |
| 1445 | 6.66 | 0.838 | 1.9 | +19.99 | 11.63 |
| 1455 | 6.68 | 0.854 | 1.9 | +19.99 | 11.62 |
| 1500 | 6.68 | 0.867 | 2.4 | +19.99 | 11.60 |



32504-25 6/19/13

SAMPLE OF CRA-RA-26S (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1505 | 6.69 | 0.866 | 2.5 | +19.99 | 11.55 |
| 1510 | 6.69 | 0.869 | 3.5 | +19.99 | 11.56 |
| 1515 | 6.69 | 0.868 | 2.1 | +19.99 | 11.55 |
| 1520 | 6.69 | 0.869 | 1.9 | +19.99 | 11.55 |

SAMPLED @ 1521 ID: GW-32504-061913-SR-~~1640~~ 1708

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1530 | 6.83 | 1.24 | 4.4 | 10.18 | 11.77 |
| 1540 | 6.73 | 1.27 | 4.0 | 3.47 | 11.86 |
| 1545 | 6.76 | 1.27 | 3.9 | 1.98 | 11.68 |
| 1550 | 6.76 | 1.27 | 3.9 | 1.91 | 11.67 |
| 1555 | 6.76 | 1.27 | 4.1 | 1.90 | 11.67 |
| 1600 | 6.76 | 1.27 | 3.9 | 1.81 | 11.68 |
| 1605 | 6.76 | 1.27 | 3.9 | 1.80 | 11.67 |
| 1610 | 6.76 | 1.27 | 3.8 | 1.81 | 11.67 |

SAMPLED @ 1611 ID: GW-32504-061913-SR-~~1641~~ 1709

SAMPLES PACKED IN COOLER WITH ICE

6/20/13 32504-25

TASK: COMPLETE MILY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: SUN, HIGH 79°

HES: LEVEL D

CALIBRATION OF HORIBA NFO 3845

pH=4.00, COND.=4.49, TURB=0.0, D.O.=8.44, TEMP=27.75

SAMPLE OF CRA-RA-27

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1015 | 6.27 | 1.31 | 4.9 | 4.92 | 11.44 |
| 1025 | 6.44 | 1.27 | 3.1 | 3.23 | 11.99 |
| 1035 | 6.53 | 1.26 | 0.6 | 1.25 | 11.98 |
| 1040 | 6.54 | 1.27 | 2.1 | 8.38 | 12.08 |
| 1045 | 6.54 | 1.27 | 2.3 | 11.77 | 12.17 |
| 1050 | 6.55 | 1.27 | 3.8 | 4.65 | 12.11 |
| 1055 | 6.55 | 1.26 | 1.6 | 3.36 | 11.97 |
| 1100 | 6.56 | 1.25 | 2.6 | 1.93 | 11.90 |
| 1105 | 6.56 | 1.25 | 2.5 | 1.68 | 11.97 |
| 1110 | 6.58 | 1.26 | 4.1 | 1.38 | 12.07 |

PURGED FOR OVER ONE HOUR WITHOUT D.O. STABILIZATION

SAMPLED @ 1111 ID: GW-32504-06-2013-SR-1692

1710



32504-25 6/20/13

SAMPLE OF ~~CRA~~ 81-4

BEGAN PURGING AT 11:35

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1140 | 6.72 | 0.92 | 2.6 | 4.55 | 11.87 |
| 1145 | 6.61 | 0.739 | 1.8 | 1.84 | 11.82 |
| 1150 | 6.62 | 0.769 | 4.7 | 1.26 | 11.97 |
| 1200 | 6.64 | 0.757 | 1.3 | 1.08 | 11.83 |
| 1205 | 6.64 | 0.752 | 1.4 | 1.04 | 11.83 |
| 1210 | 6.64 | 0.752 | 2.1 | 1.03 | 11.83 |
| 1215 | 6.64 | 0.751 | 1.4 | 1.03 | 11.83 |

SAMPLED @ 1216 ID: GW-32504-06-2013-SR-1711

SAMPLE OF CRA-RA-23D

| | | | | | |
|---|---|---|---|---|---|
| 1300 | 7.10 | 0.499 | 0.0 | 12.72 | 11.39 |
| 1315 | 6.73 | 0.507 | 1.7 | 6.12 | 10.70 |
| 1325 | 6.73 | 0.510 | 3.5 | 5.47 | 10.72 |
| 1330 | 6.73 | 0.510 | 3.6 | 5.49 | 10.71 |
| 1335 | 6.73 | 0.510 | 3.2 | 5.50 | 10.72 |
| 1340 | 6.73 | 0.510 | 3.6 | 5.50 | 10.74 |

SAMPLED @ 1341 ID: GW-32504-06-2013-SR-1712

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA.

6/30/13 32504.25

TASK: 1/4 MILY WATER LEVELS

CRA: STEVE RAPAI

WEATHER: MOSTLY SUNNY, 75°

H&S: LEVEL D

| WELL ID | DEPTH |
|---|---|
| BI-4 | 29.15 |
| BI-5 | 33.51 |
| BI-7 | 45.60 |
| BI-8 | 42.79 |
| BI-9 | 15.38 |
| BI-10 | 31.84 |
| RA-1 | 68.34 |
| RA-2D | 55.22 |
| RA-2S | 54.94 |
| RA-3 | 52.02 |
| RA-4 | 23.11 |
| RA-5 | 54.11 |
| RA-6 | 58.55 |
| RA-7 | 32.02 |
| RA-8 | 17.81 |
| RA-16 | 57.75 |
| RA-18 | 40.88 |
| RA-18D | 55.55 |
| RA-19D | 49.44 |



32504.25 6/30/13

| WELL ID | LEVEL |
|---|---|
| RA-19S | 46.89 |
| RA-20 | 57.94 |
| RA-22 | 53.13 |
| RA-23D | 32.45 |
| RA-23S | 32.75 |
| RA-24 | 56.00 |
| RA-25 | 53.43 |
| RA-26D | 49.22 |
| RA-26S | 49.11 |
| RA-27 | 60.87 |
| RA-28 | 53.63 |
| RA-29 | 45.29 |
| RA-30 | 57.67 |
| RA-31 | 31.10 |
| RA-32 | 56.51 |
| MW-22 | 41.49 |
| MW-28 | 41.83 |
| MW-32 | 34.31 |
| MW-34C | 40.99 |
| MW-35 | 23.55 |
| MW-41 | 46.92 |
| MW-42 | 62.94 |
| MW-47 | 53.13 |
| MW-54 | 55.21 |

6/30/13 32504.25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 36.20 |
| MW-56 | 35.24 |
| MW-58 | 20.75 |
| EB-PZ-2 | 39.55 |
| EB-PZ-4 | 62.56 |
| EB-PZ-5 | 54.40 |
| EB-PZ-6 | 54.18 |
| PZ-103 | 56.46 |
| PZ-104 | 54.24 |
| PZ-105 | 50.96 |
| PZ-106 | 38.59 |
| TEMP-PZ-2 | 52.64 |

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

October 11, 2013

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 124
Groundwater and Landfill RD/RA
Reporting Period: July 1through September 30, 2013
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 INTRODUCTION

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree ("CD"), Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 ACTIVITIES PERFORMED DURING THIS REPORTING PERIOD

### 2.1 OPERATION AND MAINTENANCE

The quarterly round of groundwater elevations were measured on September 30, 2013. The corresponding groundwater contour map is provided on Figure 1.

Quarterly groundwater samples were collected on July 24 and 25 and August 16, 22 and 26 through 28, 2013 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

### 2.2 REPORTS

Quarterly Progress Report No. 123 was submitted to United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ) on July 10, 2013.

## 3.0 SUMMARY OF FINDINGS

*Q3 2013 Results*

The results of the third quarter 2012 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in Groundwater Remediation Monitoring Program.

During the third quarter 2013 sampling, eight of the 27 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the eight monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 7.3 μg/L vinyl chloride |
| CRA-RA-23D | 5.9 μg/L trichloroethene |
| CRA-RA-24 | 5 μg/L vinyl chloride |
| CRA-RA-26S | 95 μg/L trichloroethene |
| CRA-RA-27 | 12 μg/L vinyl chloride |
| CRA-RA-30 | 3.3 μg/L vinyl chloride |
| EB-PZ-4 | 2.2 μg/L vinyl chloride |
| 81-4 | 2.5 μg/L vinyl chloride |

There were seven monitoring wells that had COCs above Part 201 DWC during the second quarter 2013. EB-PZ-4 is sampled annually, usually in the third quarter. Vinyl chloride in the groundwater samples collected from EB-PZ-4 decreased from 4.0 μg/L in 2012 to 2.2 μg/L in 2013.

Lower Aquifer monitoring well RA-MW-47 serves as a sentry well for the Lower Aquifer. An annual groundwater sample was collected from RA-MW-47 during the third quarter 2013 sampling. No COCs were detected in the groundwater samples collected from this well.

CRA collected the annual Rasmussen residential water well sample in the third quarter. No COCs were detected in the groundwater sample collected from this well.

*COC Contours*

The Rasmussen Site Remediation Group (RSRG) provides contour maps of current COC distribution following completion of the third quarter sampling. CRA prepared an update of COC distribution based on data collected in 2012 that was included in Progress Report No. 1XX (CRA, October 2012). The 2012 COC plume map is provided on Figure 3. A COC plume map including data collected in 2013 is provided on Figure 4. There were very minor changes in the concentration of COCs in 2013 as compared to 2012, as follows:

*Vinyl Chloride*

| Monitoring Well | Q3 2012 Result (ug/L) | Q3 2013 Result (ug/L) |
|---|---|---|
| CRA-RA-22 | 7.4 | 7.3 |
| CRA-RA-24 | 3.5 | 5 |
| CRA-RA-27 | 13 | 12 |
| CRA-RA-28 | 1.0 | 1.1 |
| CRA-RA-30 | 3.5 | 3.3 |
| EB-PZ-4 | 3.3 | 2.2 |
| 81-4 | 3.1 | 2.5 |

*Trichloroethene*

| Monitoring Well | Q3 2012 Result (ug/L) | Q3 2013 Result (ug/L) |
|---|---|---|
| CRA-RA-23D | 4.9 | 5.9 |
| CRA-RA-26S | 100 | 95 |

The COC plumes are relatively stable plume and the 2013 concentration contours are very similar to the 2012 COC concentration contours.

*Trend Analysis*

CRA completed trend analysis for benzene, TCE and vinyl chloride data from monitoring wells included in the Groundwater Remediation Monitoring Program and the Annual Landfill Monitoring Program. Analysis of trends in the last eight monitoring events provides insight into recent changes in COC concentrations. Tables 6 through 8 provide a summary of the trend analyses.

CRA did not identify any increasing or decreasing trends in the analysis of the last eight monitoring rounds, which reflects relatively stable plume conditions over the last two years.

## 4.0 PROBLEMS ENCOUNTERED

No problems were encountered with respect to the operation and maintenance of the ozone treatment system during the third quarter 2013.

## 5.0 CORRECTIVE MEASURES TO RECTIFY PROBLEMS

No corrective measures were implemented with respect to the operation and maintenance of the ozone treatment system during the third quarter 2013.

## 6.0 CONTACTS AND SIGNIFICANT CORRESPONDENCE WITH PUBLIC REPRESENTATIVES

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | June 10, 2013 | Report No. 123 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDNRE) |
| Emails | July 10, 2013 | H. Caine inquiring regarding access for VAS borings and proposed monitoring well locations |
| Emails | July 18, 2013 | H. Caine scheduling Site visit. |

## 7.0 PLANNED UPCOMING ACTIVITIES/SCHEDULE

Landfill and groundwater component activities planned for the fourth quarter of 2012:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The fourth quarter groundwater sampling event is scheduled for the week of November 11, 2013
- The wells to be sampled in the fourth quarter of 2013 are listed in Table 5
- Obtain property access to install vertical aquifer sampling (VAS) boreholes and monitoring wells
- Pending access and seasonal weather, install VAS boreholes and monitoring wells this fall

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven Rapai

For Bart Bartholomy

AJD/ac/28
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Steven Nadeau, Honigman Miller

# TABLES AND FIGURES

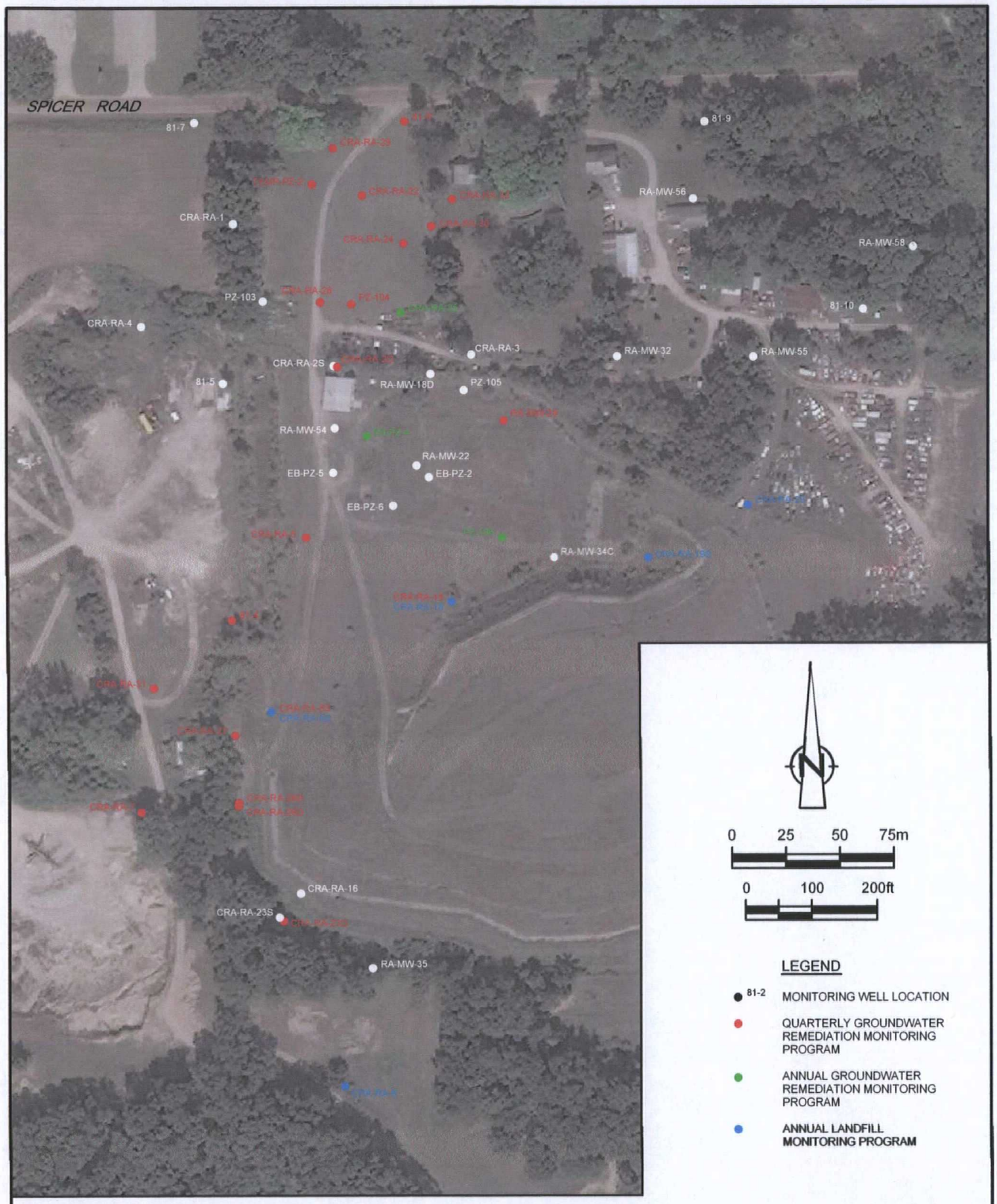



figure 1

2013 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN033)GN-WA001 OCT 4/2013

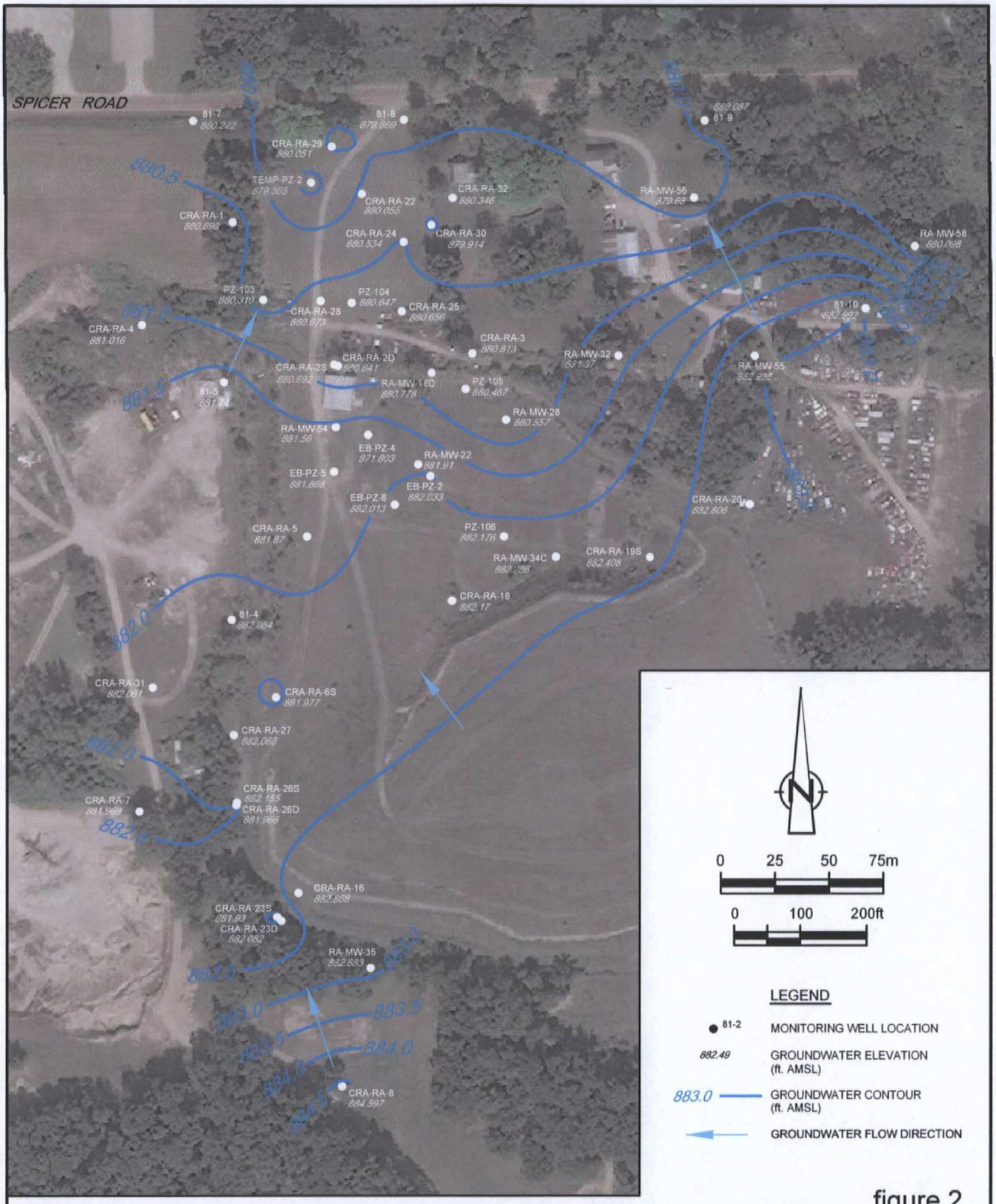
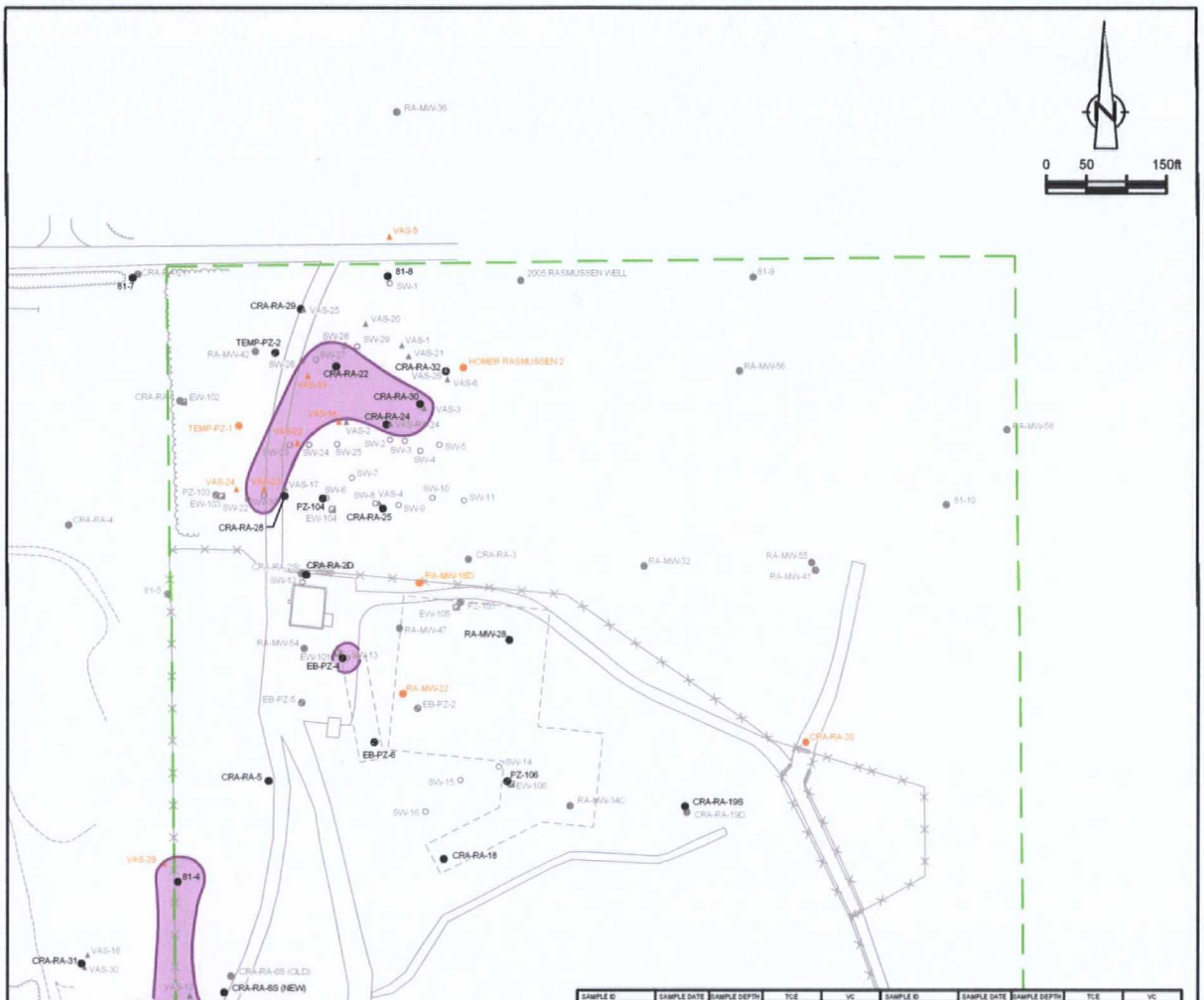



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
SEPTEMBER 2013
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-35(CAIN033)GN-WA002 OCT 4/2013




| SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC | SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC |
|---|---|---|---|---|---|---|---|---|---|
| 81-4 | 09/11/12 | - | ND(1) | 3.1 | VAS-11 | 07/24/00 | 55 | 120 | ND(1) |
| 81-7 | 06/26/11 | - | ND(1) | ND(1) | VAS-11 | 07/25/00 | 65 | 40 | ND(1) |
| 81-8 | 09/14/12 | - | ND(1) | ND(1) | VAS-11 | 07/25/00 | 75 | 1 | ND(1) |
| CRA-RA-16 | 01/21/00 | - | ND(1) | ND(1) | VAS-11 | 07/25/00 | 85 | 440 | ND(1) |
| CRA-RA-18 | 09/12/12 | - | ND(2.9) | ND(2.9) | VAS-11 | 07/25/00 | 95 | ND(1) | ND(1) |
| CRA-RA-19S | 06/20/12 | - | ND(1) | ND(1) | VAS-11 | 07/25/00 | 95 | ND(1) | ND(1) |
| CRA-RA-20 | 12/12/02 | - | ND(1) | ND(1) | VAS-12 | 08/07/00 | 75 | ND(1) | ND(1) |
| CRA-RA-21 | 03/01/00 | - | ND(1) | ND(1) | VAS-12 | 08/07/00 | 85 | ND(1) | 2.0 |
| CRA-RA-22 | 09/14/12 | - | ND(1) | 7.3 | VAS-12 | 08/07/00 | 95 | ND(1) | ND(1) |
| CRA-RA-23D | 09/11/12 | - | 4.9 | ND(1) | VAS-12 | 08/07/00 | 105 | ND(1) | 1.0 |
| CRA-RA-24 | 09/13/12 | - | ND(1) | ND(1) | VAS-12 | 08/07/00 | 115 | ND(1) | ND(1) |
| CRA-RA-25 | 09/13/12 | - | ND(1) | ND(1) | VAS-14 | 09/07/00 | 120 | ND(1) | 2.0 |
| CRA-RA-26D | 09/11/12 | - | ND(1) | ND(1) | VAS-15 | 09/08/00 | 70 | ND(1) | 6.0 |
| CRA-RA-26S | 09/11/12 | - | 100 | ND(1) | VAS-15 | 09/08/00 | 80 | ND(1) | 4.0 |
| CRA-RA-27 | 09/11/12 | - | ND(1) | 13 | VAS-18 | 07/31/02 | 70 | ND(1) | ND(1) |
| CRA-RA-28 | 09/13/12 | - | ND(1) | 1.0 | VAS-18 | 07/31/02 | 90 | ND(1) | ND(1) |
| CRA-RA-29 | 09/14/12 | - | ND(1) | ND(1) | VAS-18 | 07/31/02 | 80 | ND(1) | 1.0 |
| CRA-RA-2D | 09/10/12 | - | ND(1) | ND(1) | VAS-19 | 07/30/02 | 60 | ND(1) | 8.0 |
| CRA-RA-2S | 02/22/00 | - | ND(1) | 1.6 | VAS-19 | 07/30/02 | 70 | ND(1) | 4.0 |
| CRA-RA-3 | 06/12/02 | - | ND(1) | ND(1) | VAS-19 | 07/30/02 | 70 | ND(1) | ND(1) |
| CRA-RA-30 | 09/13/12 | - | ND(1) | 3.5 | VAS-19 | 07/30/02 | 80 | ND(1) | 8.0 |
| CRA-RA-31 | 09/14/12 | - | ND(1) | ND(1) | VAS-20 | 07/30/02 | 60 | ND(1) | ND(1) |
| CRA-RA-32 | 09/14/12 | - | ND(1) | ND(1) | VAS-20 | 07/30/02 | 70 | ND(1) | ND(1) |
| CRA-RA-4 | 03/02/00 | - | ND(1) | ND(1) | VAS-20 | 07/30/02 | 80 | ND(1) | ND(1) |
| CRA-RA-5 | 09/10/12 | - | ND(1) | ND(1) | VAS-21 | 07/31/02 | 75 | ND(1) | ND(1) |
| CRA-RA-6S | 09/10/12 | - | ND(1) | ND(1) | VAS-21 | 07/31/02 | 85 | ND(1) | 1.0 |
| CRA-RA-7 | 09/14/12 | - | ND(1) | ND(1) | VAS-22 | 10/03/02 | 57 | ND(1) | 4.0 |
| CRA-RA-8 | 06/21/12 | - | ND(1) | ND(1) | VAS-22 | 10/03/02 | 77 | ND(1) | 2.0 |
| EB-PZ-2 | 04/17/02 | - | ND(1) | ND(1) | VAS-22 | 10/03/02 | 77 | ND(1) | 71.0 |
| EB-PZ-4 | 09/10/12 | - | ND(1) | 3.3 | VAS-22 | 10/03/02 | 87 | ND(1) | 73.0 |
| EB-PZ-6 | 12/15/99 | - | 2 | ND(1) | VAS-23 | 10/03/02 | 60 | ND(1) | ND(1) |
| EV-102 | 04/25/96 | - | ND(1) | ND(1) | VAS-23 | 10/03/02 | 67 | ND(1) | ND(1) |
| EV-103 | 11/11/99 | - | ND(1) | ND(1) | VAS-23 | 10/03/02 | 77 | ND(1) | ND(1) |
| EV-105 | 11/11/99 | - | ND(1) | ND(1) | VAS-23 | 10/03/02 | 87 | ND(1) | 16.0 |
| EV-106 | 12/15/99 | - | 2 | ND(1) | VAS-23 | 10/03/02 | 97 | ND(1) | 20.0 |
| EW-107 | 11/11/99 | - | 44 | ND(1) | VAS-24 | 10/02/02 | 62 | ND(1) | ND(1) |
| FORMER RASMUSSEN | 06/30/05 | - | ND(1) | ND(1) | VAS-24 | 10/02/02 | 72 | ND(1) | ND(1) |
| NEWRASMUSSEN | 09/19/06 | - | ND(1) | ND(1) | VAS-24 | 10/02/02 | 82 | ND(1) | ND(1) |
| PZ-104 | 09/13/12 | - | ND(1) | ND(1) | VAS-26 | 11/09/04 | 65 | ND(1) | ND(1) |
| PZ-106 | 09/12/12 | - | ND(1) | ND(1) | VAS-26 | 11/09/04 | 75 | ND(1) | ND(1) |
| RA-MW-18D | 05/23/02 | - | 1 | ND(1) | VAS-26 | 11/09/04 | 85 | ND(1) | ND(1) |
| RA-MW-22 | 05/30/02 | - | ND(1) | ND(1) | VAS-26 | 11/09/04 | 85 | ND(1) | ND(1) |
| RA-MW-28 | 09/13/12 | - | ND(1) | ND(1) | VAS-26 | 11/09/04 | 95 | ND(1) | ND(1) |
| RA-MW-32 | 02/29/00 | - | ND(1) | ND(1) | VAS-27 | 08/09/04 | 44 - 45.4 | ND(1) | ND(1) |
| RA-MW-34C | 02/29/00 | - | ND(1) | ND(1) | VAS-27 | 08/09/04 | 54 - 55.5 | ND(1) | ND(1) |
| RA-MW-54 | 03/13/96 | - | ND(1) | ND(1) | VAS-27 | 08/09/04 | 64 - 65.5 | ND(1) | ND(1) |
| TEMP-PZ-1 | 09/12/02 | - | ND(1) | ND(1) | VAS-27 | 08/09/04 | 74 - 75.5 | ND(1) | ND(1) |
| TEMP-PZ-2 | 09/14/12 | - | ND(1) | ND(1) | VAS-27 | 08/09/04 | 84 - 85.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 45 - 46.5 | ND(1) | ND(1) | VAS-27 | 08/09/04 | 94-95.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 55 - 56.5 | ND(1) | ND(1) | VAS-27 | 08/09/04 | 104 - 105.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 65 - 66.5 | ND(1) | ND(1) | VAS-28 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 75 - 76.5 | ND(1) | ND(1) | VAS-28 | 08/10/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-107-EAST | 01/21/00 | 93 | 62 | ND(1) | VAS-28 | 08/10/04 | 64 - 65.5 | ND(1) | ND(1) |
| VAS-107-WEST | 01/26/00 | 94.5 | 42 | ND(1) | VAS-28 | 08/10/04 | 74 - 75.5 | ND(1) | ND(1) |
| VAS-107-WEST | 01/26/00 | 104.5 | 70 | ND(1) | VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 2.0 |
| VAS-5 | 06/09/99 | 44.7 | ND(1) | ND(1) | VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 3.0 |
| VAS-5 | 06/09/99 | 49.9 | ND(1) | ND(1) | VAS-29 | 08/11/04 | 54 -55.5 | ND(1) | 2.0 |
| VAS-5 | 06/09/99 | 54.9 | ND(1) | ND(1) | VAS-29 | 08/11/04 | 64 - 65.5 | ND(1) | 3.0 |
| VAS-5 | 06/09/99 | 59.9 | ND(1) | ND(1) | VAS-29 | 08/11/04 | 74 - 75.5 | ND(1) | 2.0 |
| VAS-7 | 07/14/00 | 102 | ND(1) | 13.0 | VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-7 | 07/14/00 | 110 | ND(1) | 23.0 | VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) | VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) | VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 90 -91.5 | ND(1) | ND(1) | VAS-30 | 08/10/04 | 59 - 60.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 100 - 101.5 | ND(1) | ND(1) | VAS-30 | 08/10/04 | 69 - 70.5 | ND(1) | ND(1) |
| | | | | | VAS-30 | 08/10/04 | 77.5 - 79 | ND(1) | ND(1) |

## LEGEND

- RASMUSSEN SITE BOUNDARY (APPROXIMATE)
- MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- SPARGE POINT LOCATION
- COMPLETED VAS LOCATION
- EXTRACTION WELL LOCATION
- LIMIT OF 2012 VINYL CHLORIDE PLUME (2 ug/L)
- LIMIT OF 2012 TCE PLUME (5 ug/L)
- 2012 DATA USED FOR CONTOURING
- 1999-2005 DATA USED FOR CONTOURING

figure 3

2012 COC CONTOURS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN033)GN-WA001 SEP 18/2013

**TABLE 1**

**ANALYTICAL RESULTS - NORTHERN PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-22 | GW-SR-1667 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| CRA-RA-22 | GW-SR-1686 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-22 | GW-SR-1629 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 9.0 | ND(1.0) |
| CRA-RA-22 | GW-SR-1721 | 8/21/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.4 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 1.6 µg/L | |
| CRA-RA-24 | GW-SR-1663 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.3 | ND(1.0) |
| CRA-RA-24 | GW-SR-1664 | 12/5/2012 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.6 | ND(1.0) |
| CRA-RA-24 | GW-SR-1683 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.4 | ND(1.0) |
| CRA-RA-24 | GW-SR-1624 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.5 | ND(1.0) |
| CRA-RA-24 | GW-SR-1718 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 2.5 µg/L | |
| CRA-RA-25 | GW-SR-1546 | 8/24/2011 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1547 | 8/24/2011 | *Duplicate* | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1645 | 9/13/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-25 | GW-SR-1716 | 7/25/2013 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1717 | 7/25/2013 | *Duplicate* | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| | | | *Change* | | Down 0.2 µg/L | | | | | | | | | | | |
| CRA-RA-28 | GW-SR-1661 | 12/4/2012 | | ND(1.0) | 1.4 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.4 | ND(1.0) |
| CRA-RA-28 | GW-SR-1681 | 3/21/2013 | | ND(1.0) | 1.5 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.7 | ND(1.0) |
| CRA-RA-28 | GW-SR-1622 | 6/11/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.4 | ND(1.0) |
| CRA-RA-28 | GW-SR-1714 | 7/25/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) |
| | | | *Change* | | Stable | | | | | | | | | | Down 0.3 µg/L | |
| CRA-RA-29 | GW-SR-1669 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1689 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1723 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-30 | GW-SR-1665 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.2 | ND(1.0) |
| CRA-RA-30 | GW-SR-1684 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.6 | ND(1.0) |
| CRA-RA-30 | GW-SR-1625 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1719 | 8/16/2013 | | ND(1.0) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 1.2 µg/L | |
| CRA-RA-32 | GW-SR-1666 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1685 | 3/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1626 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1720 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| PZ-104 | GW-SR-1662 | 12/5/2012 | | ND(1.0) | 3.1 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1682 | 3/21/2013 | | ND(1.0) | 4.3 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.3 | ND(1.0) |
| PZ-104 | GW-SR-1623 | 6/11/2013 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1715 | 7/25/2013 | | ND(1.0) | 3.5 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | Down 0.1 µg/L | | | | | | | | | | | |
| TEMP-PZ-2 | GW-SR-1668 | 12/5/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1687 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1688 | 3/23/2013 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1632 | 6/13/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1722 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| 81-8 | GW-SR-1672 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| 81-8 | GW-SR-1690 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| 81-8 | GW-SR-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| 81-8 | GW-SR-1726 | 8/26/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 2**

**ANALYTICAL RESUTLS - PDSLD AREA PLUMES**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE ( | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-1656 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 40 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1680 | 3/21/2013 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 49 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1703 | 5/23/2013 | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | 1.1 | 52 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| CRA-RA-2D | GW-SR-1713 | 7/24/2013 | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | ND(17) | 46 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| | | | *Change* | | | | | | | Down 6 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-1659 | 12/4/2012 | | 100 | ND(5) | ND(50) | ND(50) | ND(50) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) |
| CRA-RA-18 | GW-SR-1697 | 3/24/2013 | | 120 | ND(4) | ND(40) | ND(40) | ND(40) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) | ND(4) |
| CRA-RA-18 | GW-SR-1633 | 6/17/2013 | | 88 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| CRA-RA-18 | GW-SR-1634 | 6/17/2013 | *Duplicate* | 90 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| CRA-RA-18 | GW-SR-1730 | 8/27/2013 | | 74 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| | | | *Change* | Down 15 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1445 | 9/3/2010 | | ND(1) | 1.42 | ND(10) | ND(10) | ND(10) | ND(1) | 29 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 38.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| EB-PZ-4 | GW-SR-1729 | 8/27/2013 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 41 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | 2.2 | ND(1.4) |
| | | | *Change* | | | | | | | Up 2 µg/L | | | | | Down 1.8 µg/L | |
| PZ-106 | GW-SR-1730 | 8/27/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1399 | 08/25/2010 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1731 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1732 | 8/27/2013 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | | Stable; all Non-Detect | | | | | | |
| RA-MW-28 | GW-SR-1660 | 12/4/2012 | | 9.8 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| RA-MW-28 | GW-SR-1696 | 3/24/2013 | | 11.0 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| RA-MW-28 | GW-SR-1618 | 6/17/2013 | | 9.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1734 | 8/27/2013 | | 11 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | Up 2 µg/L | | | | | | | | | | | | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 3**

**ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Sample Location* | *Sample ID* | *Date Sampled* | *Parameter* | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Units* | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | *Michigan Part 201 Groundwater Criteria* | | 200 | 70 (1) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-5 | GW-SR-1658 | 12/4/2012 | | 23 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1693 | 3/23/2013 | | 30 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1704 | 5/23/2013 | | 23 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1728 | 8/26/2013 | | 27 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | Up 4 µg/L | | | | | | | | | | | | |
| CRA-RA-6S | GW-SR-1673 | 12/5/2012 | | 1.1 | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1692 | 3/23/2012 | | 1.3 | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.0 | ND(1.0) |
| CRA-RA-6S | GW-SR-1705 | 5/23/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| CRA-RA-6S | GW-SR-1706 | 5/23/2013 | *Duplicate* | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| CRA-RA-6S | GW-SR-1727 | 8/26/2013 | | 1.2 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | Up 0.2 µg/L | | | | | | | | | | | Down 0.1 µg/L | |
| CRA-RA-7 | GW-SR-1671 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1695 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1638 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1726 | 8/26/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-27 | GW-SR-1674 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1675 | 12/6/2012 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1691 | 3/23/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 17 | ND(1.0) |
| CRA-RA-27 | GW-SR-1633 | 9/11/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1735 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 1 µg/L | |
| CRA-RA-31 | GW-SR-1670 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1694 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1637 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1725 | 8/26/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.6) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| 81-4 | GW-SR-1679 | 12/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| 81-4 | GW-SR-1576 | 3/25/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| 81-4 | GW-SR-1711 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.8 | ND(1.0) |
| 81-4 | GW-SR-1739 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| | | | *Change* | | | | | | | | | | | | Down 0.3 µg/L | |

Notes:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 4**

**ANALYTICAL RESULTS - SOUTHERN TCE PLUME**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| | | | | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Parameter* | *1,1,1-TRICHLOROETHANE* | *1,2-DICHLOROETHENE (TOTAL)* | *2-BUTANONE* | *4-METHYL-2-PENTANONE* | *ACETONE* | *BENZENE* | *CHLOROBENZENE* | *ETHYLBENZENE* | *METHYLENE CHLORIDE* | *TOLUENE* | *TRICHLOROETHENE* | *VINYL CHLORIDE* | *XYLENES (TOTAL)* |
| | | | *Units* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* | *µg/L* |
| *Sample Location* | *Sample ID* | *Date Sampled* | *Michigan Part 201 Groundwater Criteria* | *200* | *70 (1)* | *13,000* | *1,800* | *730* | *5* | *100* | *74* | *5* | *790* | *5* | *2* | *280* |
| CRA-RA-23D | GW-SR-1678 | 12/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.4 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1701 | 3/25/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.5 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1712 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.5 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1738 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | | | | | | Down 0.6 µg/L | | |
| CRA-RA-26D | GW-SR-1677 | 12/6/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1700 | 3/24/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1709 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1737 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1676 | 12/6/2012 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 90 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1698 | 3/24/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 97 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1699 | 3/24/2013 | *Duplicate* | ND(2.9) | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | 99 | ND(2.9) | ND(2.9) |
| CRA-RA-26S | GW-SR-1708 | 6/19/2013 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 110 | ND(4.0) | ND(4.0) |
| CRA-RA-26S | GW-SR-1736 | 8/27/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| | | | *Change* | | | | | | | | | | | Down 15 µg/L | | |

Note:

(1) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 5**

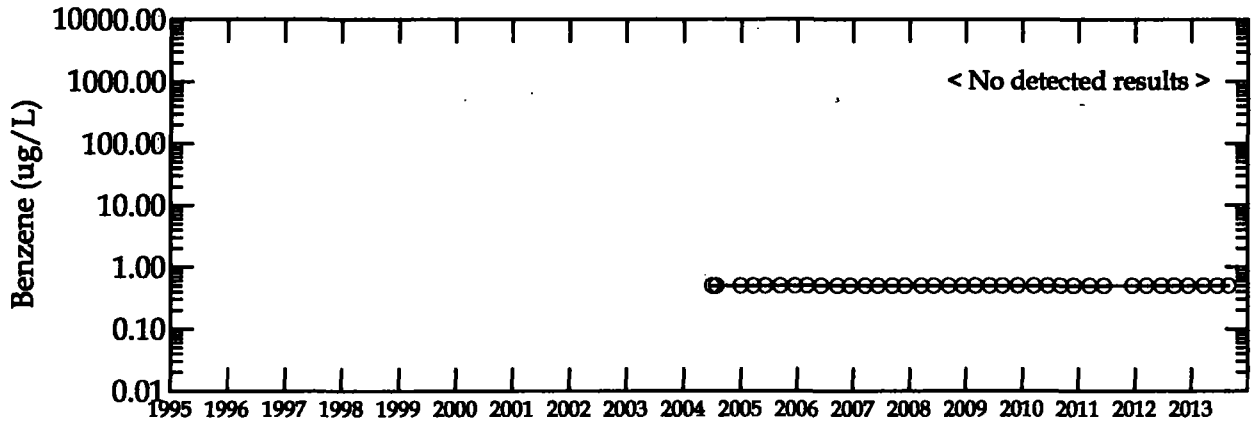
**2012 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

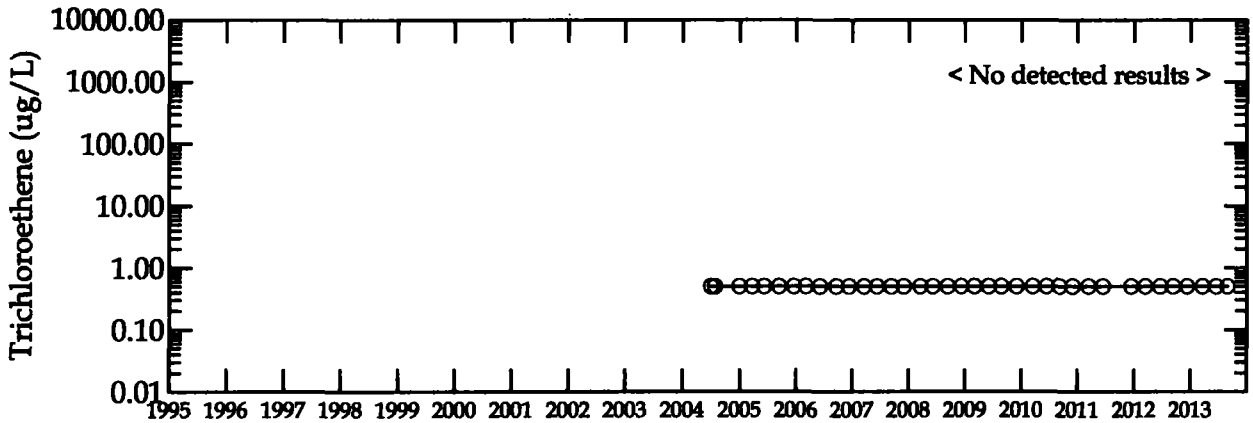
| *Quarterly Sampling - VOCs* | *Q1* | *Q2* | *Q3* | *Q4* |
|---|---|---|---|---|
| 81-4 | | | | |
| 81-8 | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-2D | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-5 | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only) | |
| CRA-RA-18 | | CRA-RA-19S | | |
| CRA-RA-22 | | CRA-RA-20 | | |
| CRA-RA-23D | | | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

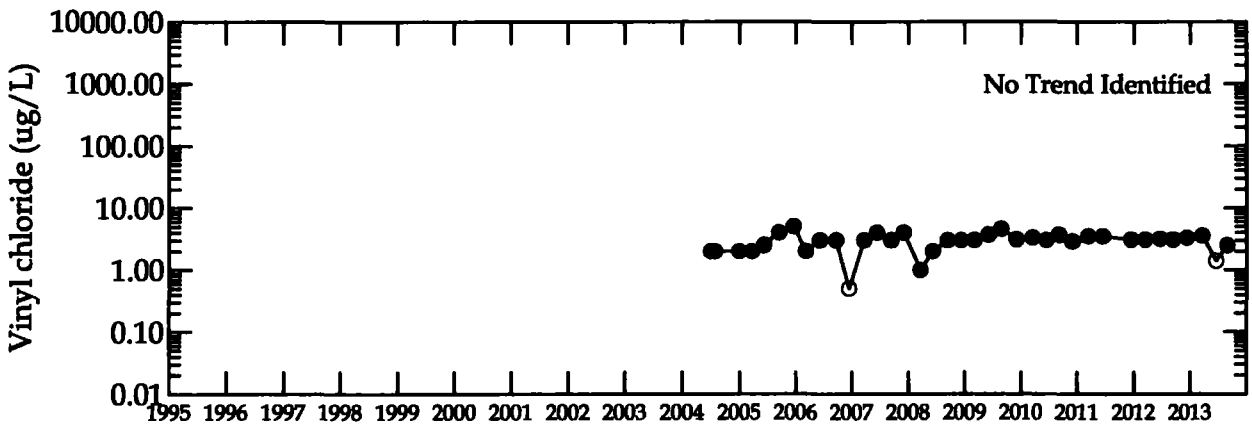
**TABLE 6**

**CONCENTRATION vs. TIME TREND TESTS RESULTS**
**FOR CURRENT GROUNDWATER MONITORING DATA (LAST 8 RESULTS)**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| | | | Benzene | | | |
|---|---|---|---|---|---|---|
| | | | *Mann-Kendall Trend test* | | | *2012* |
| *Well* | *Number of Samples* | *Percent Non-Detect* | *Statistic* | *Probability* | *Conclusion* | *Concusion* |
| 81-4 | 8 | 100% | – | – | No detected results | No detected results |
| 81-8 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-2D | 8 | 63% | – | – | Over 50% non-detects | No trend identified |
| CRA-RA-5 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-6S | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-7 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-8 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-18 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-19S | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-20 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-22 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-23D | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-24 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-25 | 8 | 75% | – | – | Over 50% non-detects | Over 50% non-detects |
| CRA-RA-26D | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-26S | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-27 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-28 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-29 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-30 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-31 | 8 | 100% | – | – | No detected results | No detected results |
| CRA-RA-32 | 8 | 100% | – | – | No detected results | No detected results |
| EB-PZ-4 | 8 | 100% | – | – | No detected results | No detected results |
| PZ-104 | 8 | 100% | – | – | No detected results | No detected results |
| PZ-106 | 8 | 100% | – | – | No detected results | No detected results |
| RA-MW-28 | 8 | 100% | – | – | No detected results | No detected results |
| RA-MW-47 | 8 | 100% | – | – | No detected results | No detected results |
| Stanley Rasmussen | 8 | 100% | – | – | No detected results | No detected results |
| TEMP-PZ-2 | 8 | 100% | – | – | No detected results | No detected results |




Legend:

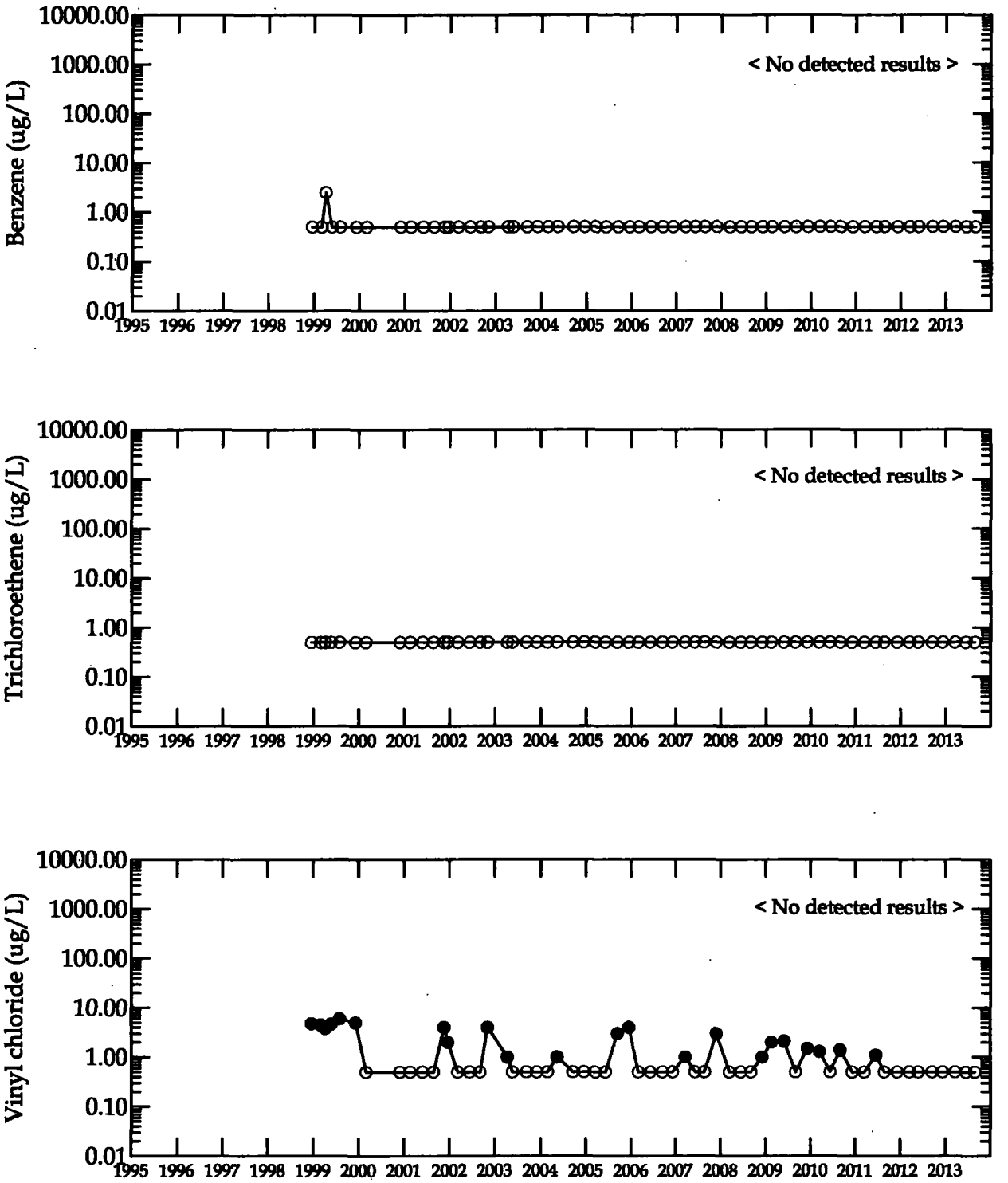
● Detected Concentration

○ Non-Detect Concentration

figure 1

Concentration vs. Time Graphs
Monitoring Well 81-4
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

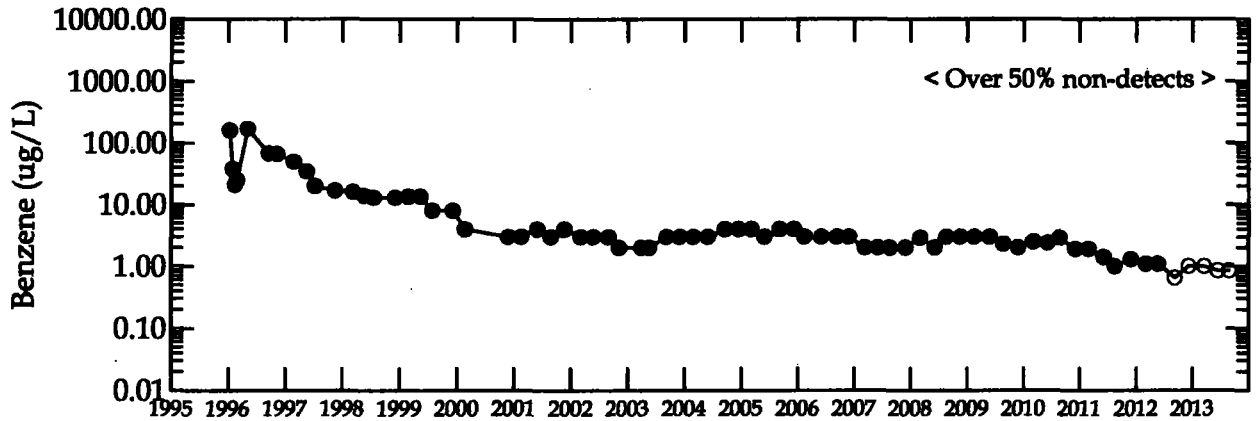
● Detected Concentration

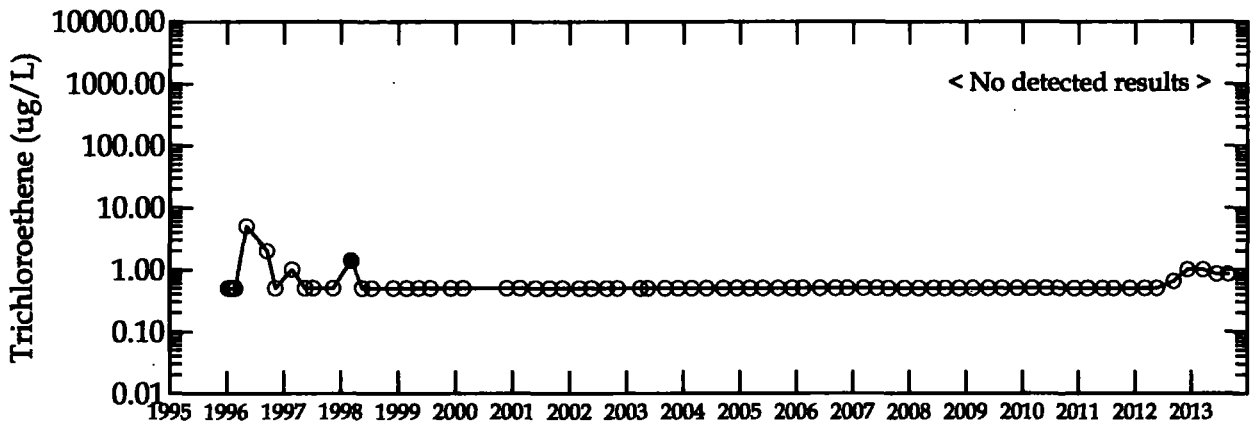
○ Non-Detect Concentration

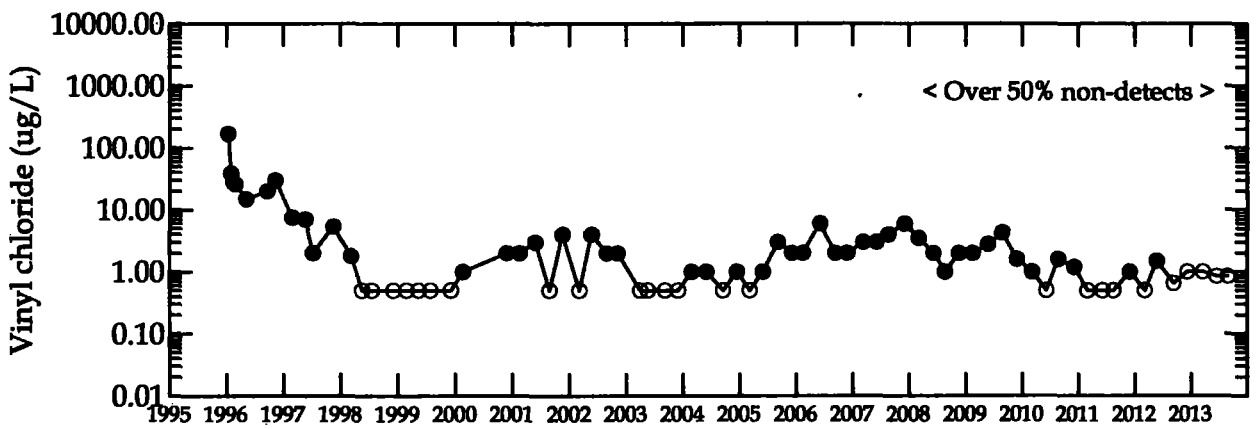
figure 2

Concentration vs. Time Graphs
Monitoring Well 81-8
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

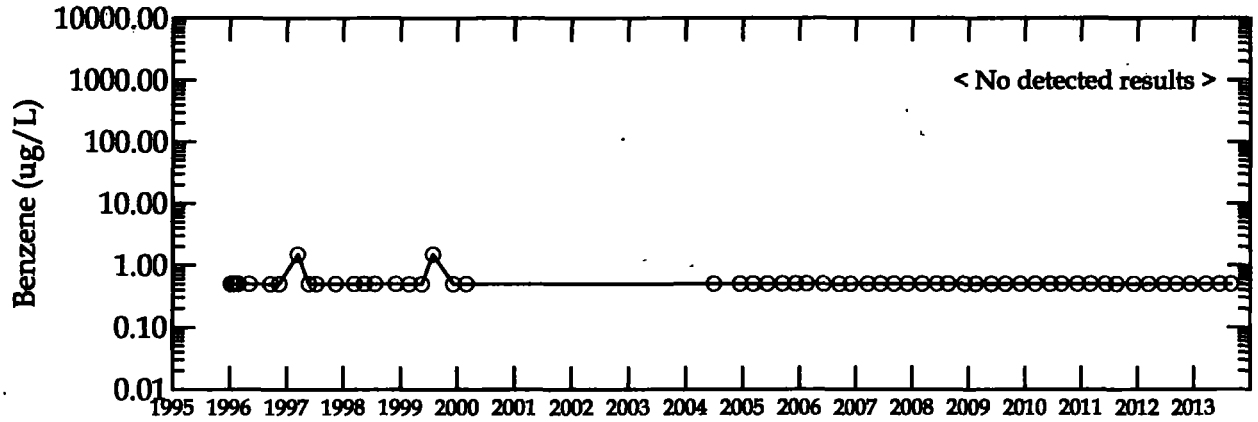
● Detected Concentration

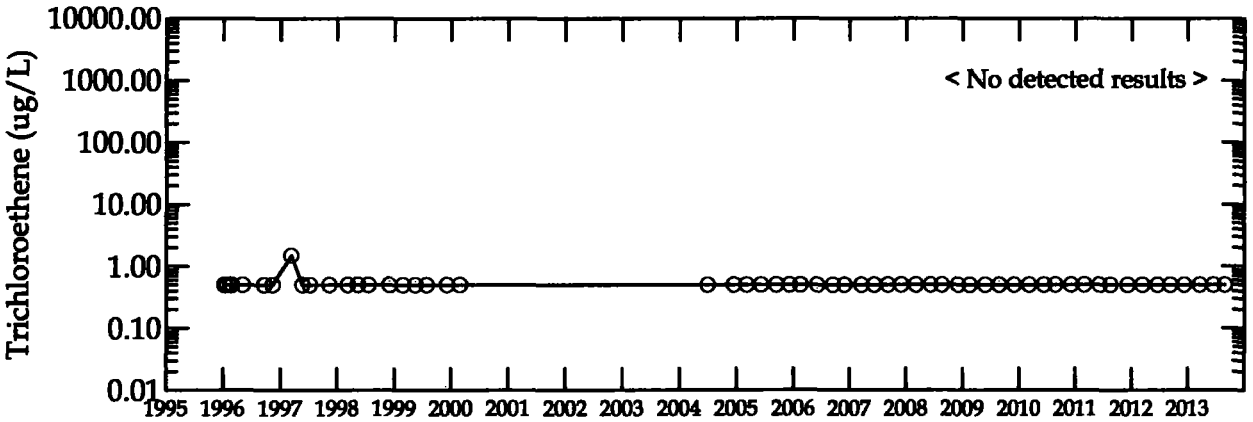
○ Non-Detect Concentration

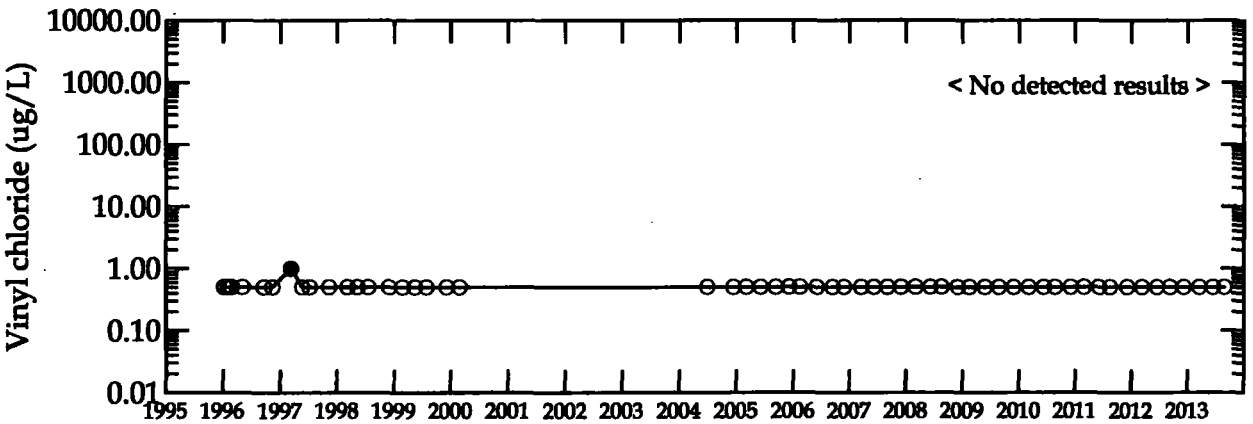
figure 3

Concentration vs. Time Graphs
Monitoring Well CRA-RA-2D
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

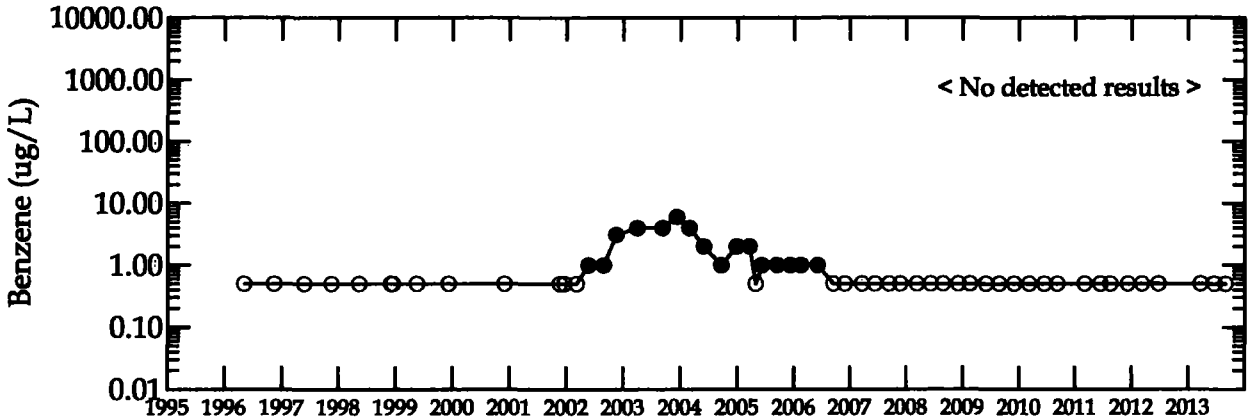
● Detected Concentration

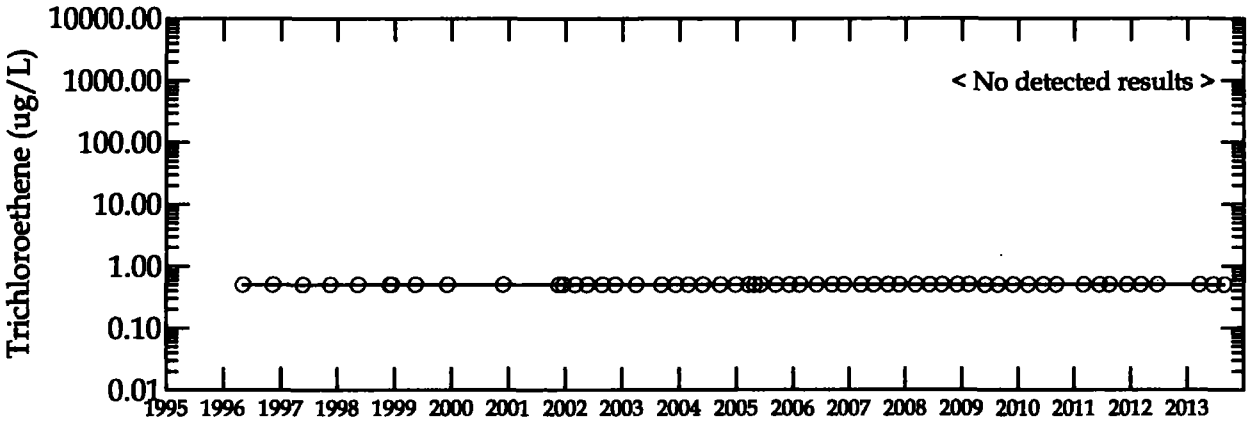
○ Non-Detect Concentration

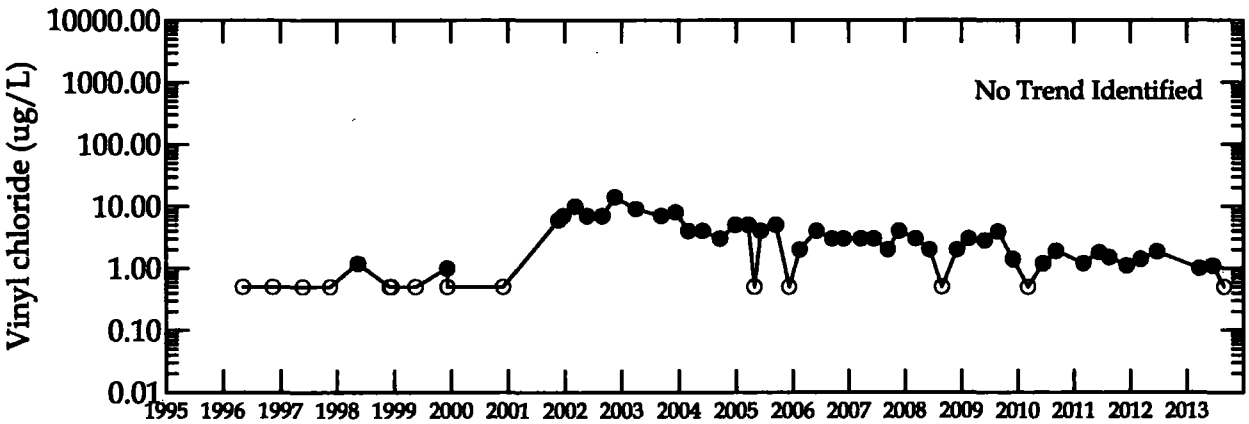
figure 4

Concentration vs. Time Graphs
Monitoring Well CRA-RA-5
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

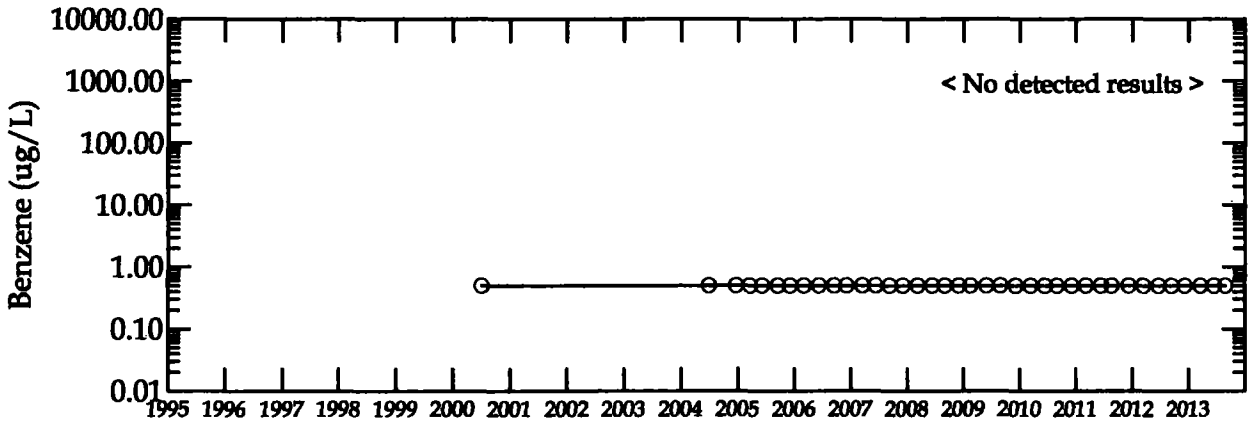
● Detected Concentration

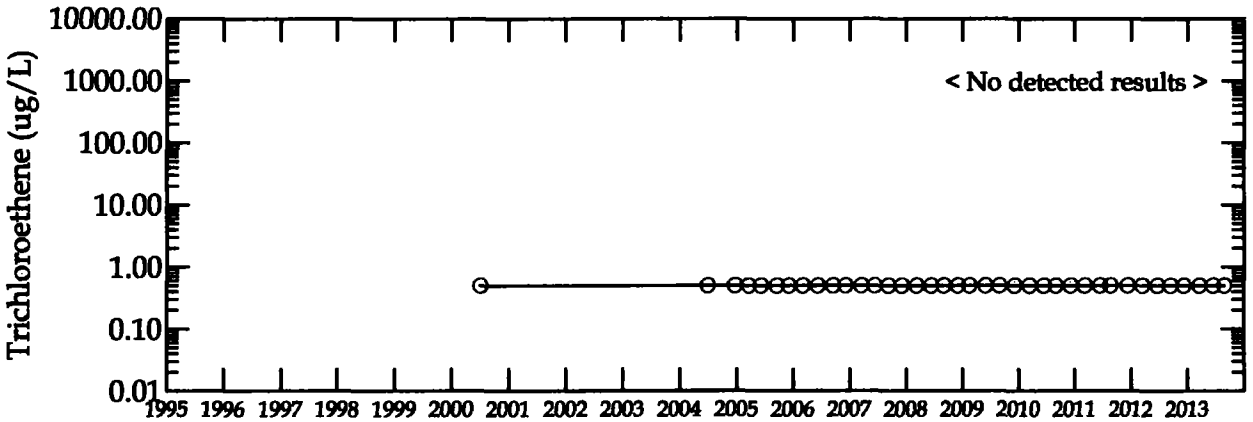
○ Non-Detect Concentration

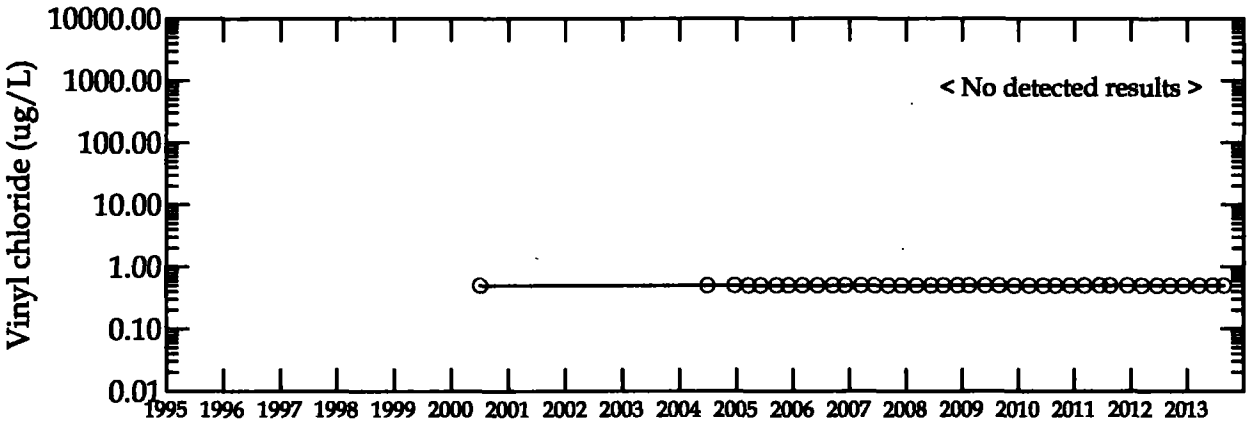
figure 5

Concentration vs. Time Graphs
Monitoring Well CRA-RA-6S
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

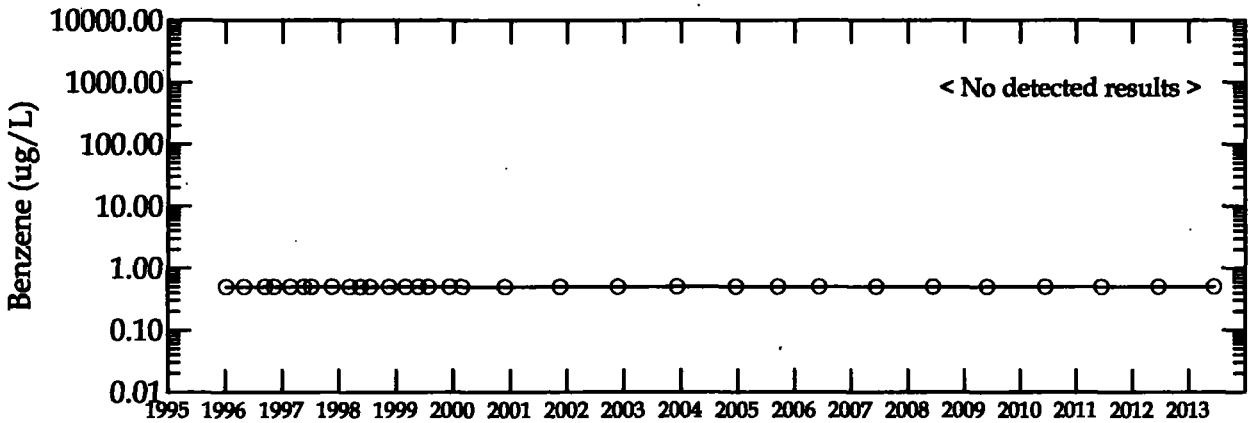
● Detected Concentration

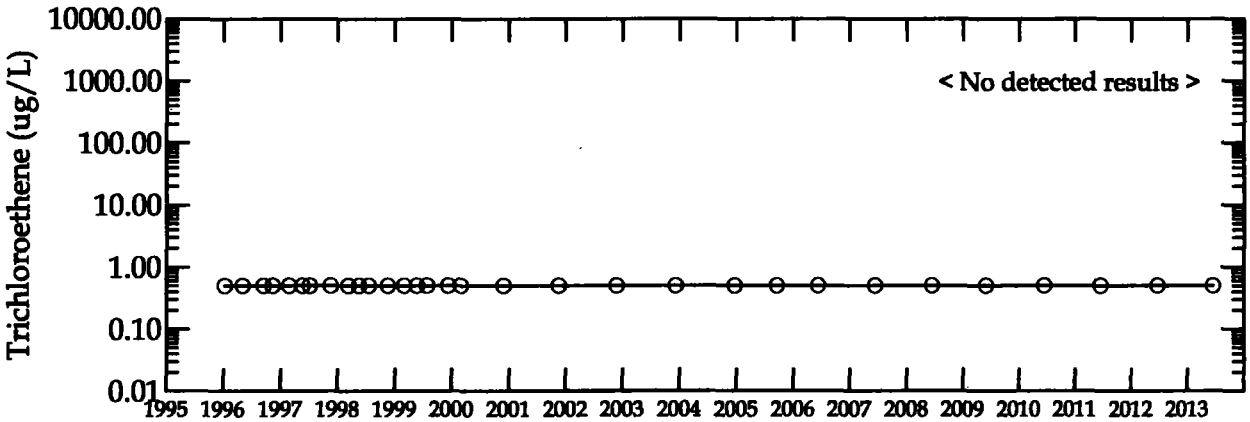
○ Non-Detect Concentration

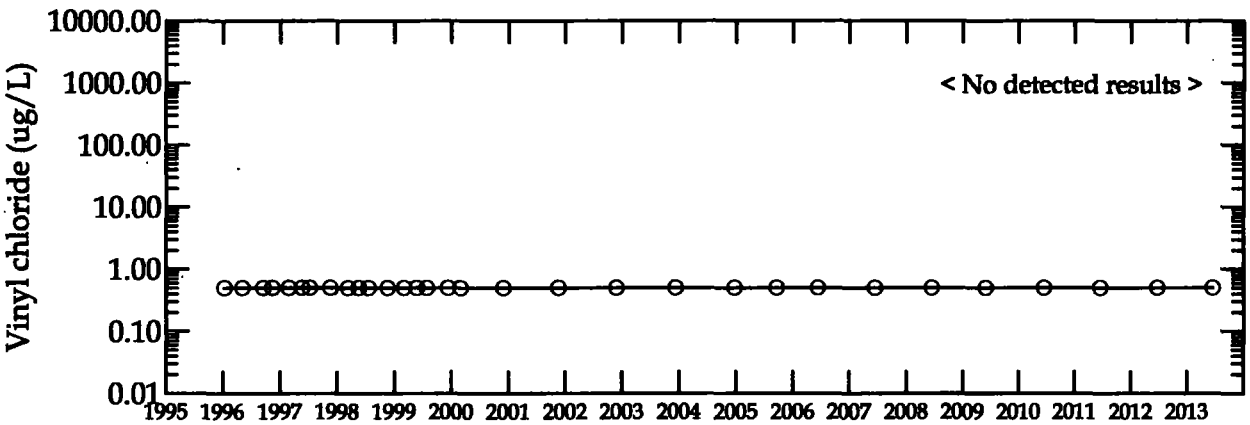
figure 6

Concentration vs. Time Graphs
Monitoring Well CRA-RA-7
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

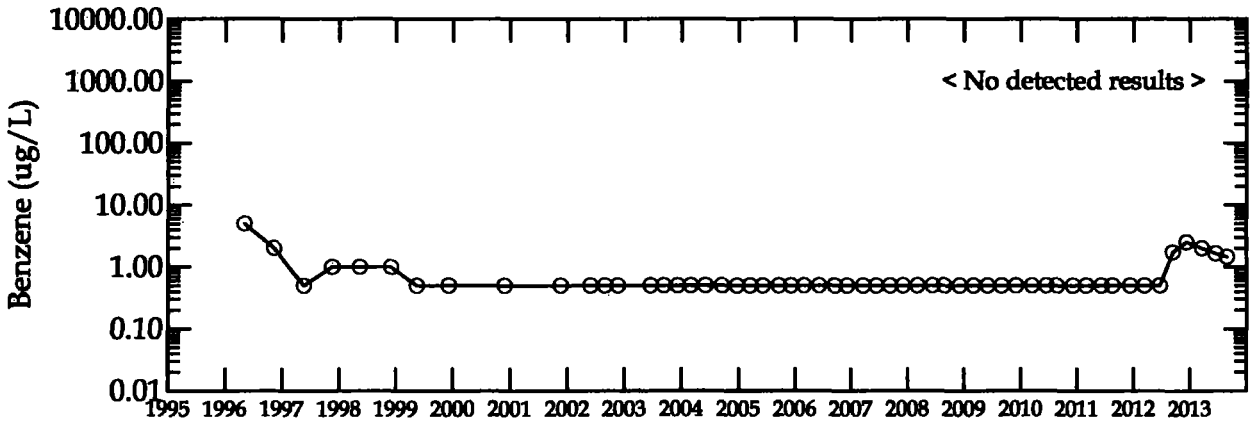
● Detected Concentration

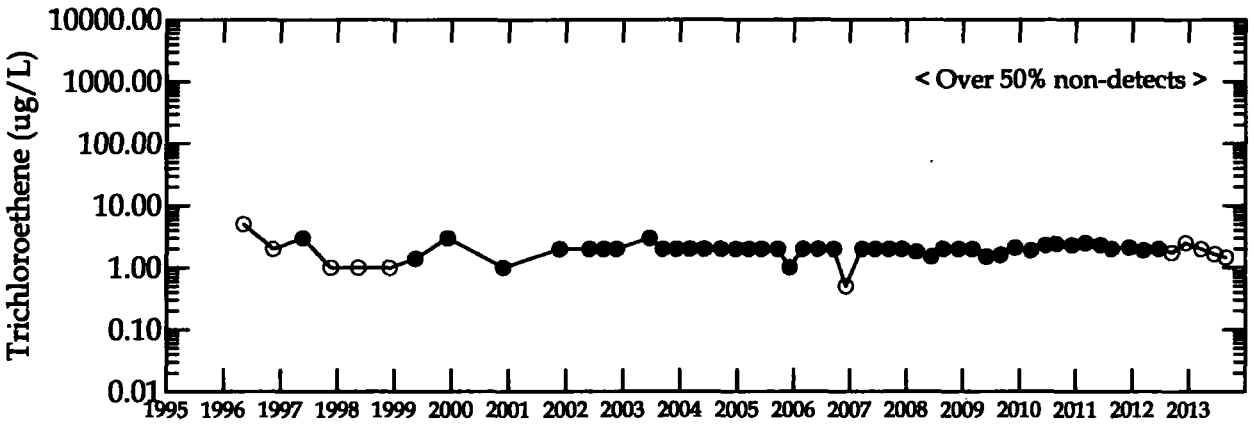
○ Non-Detect Concentration

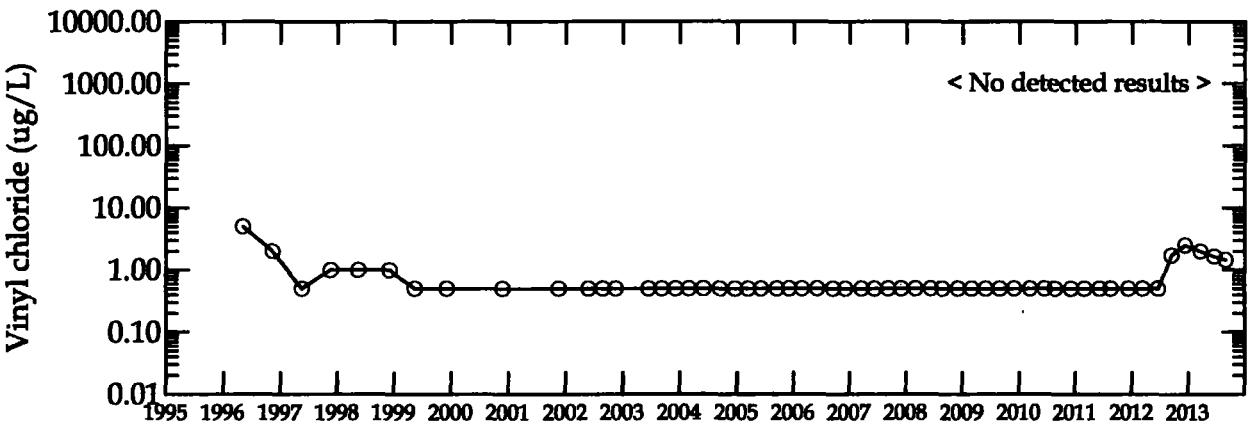
figure 7

Concentration vs. Time Graphs
Monitoring Well CRA-RA-8
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

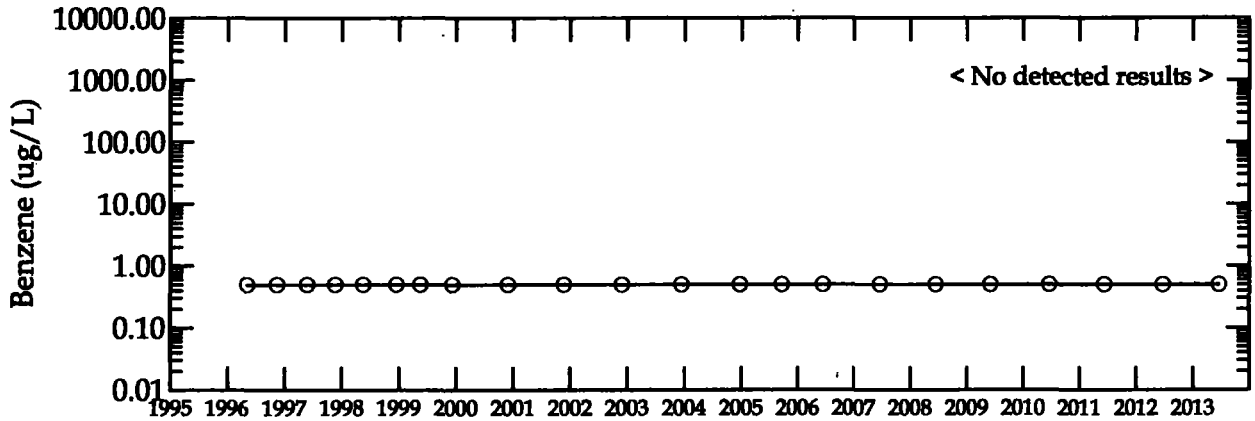
● Detected Concentration

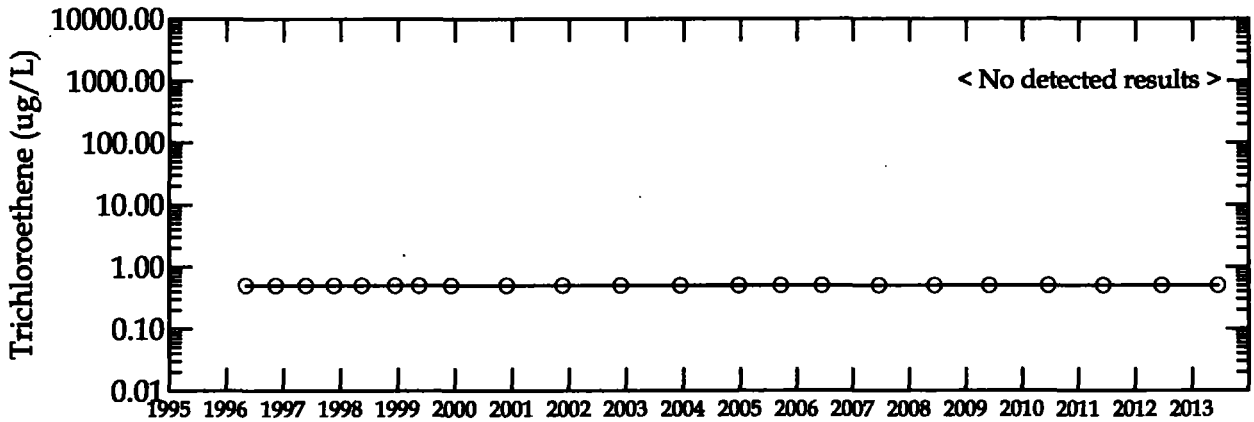
○ Non-Detect Concentration

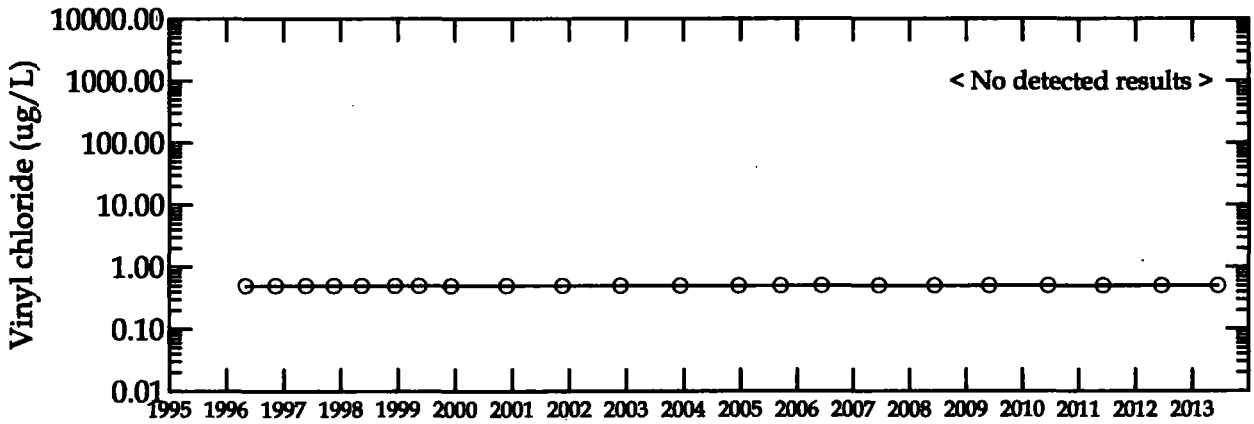
figure 8

Concentration vs. Time Graphs
Monitoring Well CRA-RA-18
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

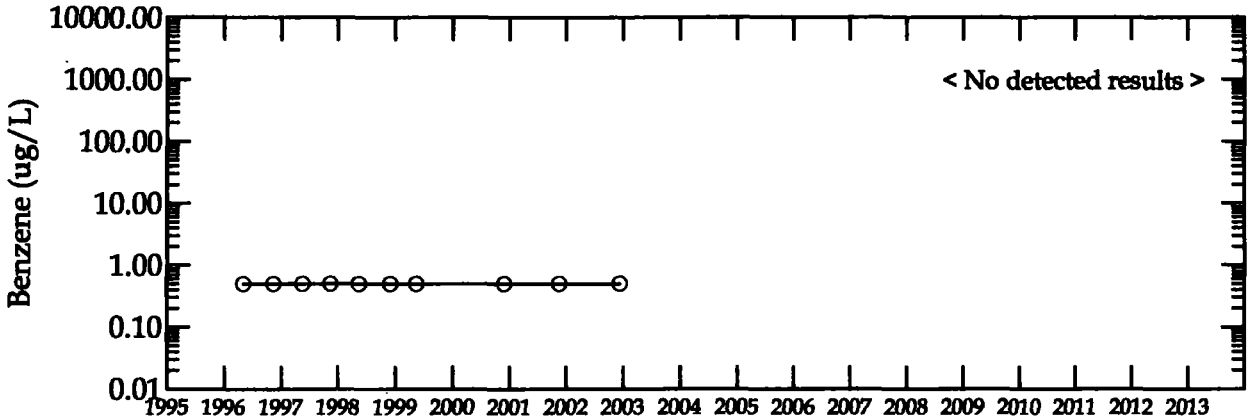
● Detected Concentration

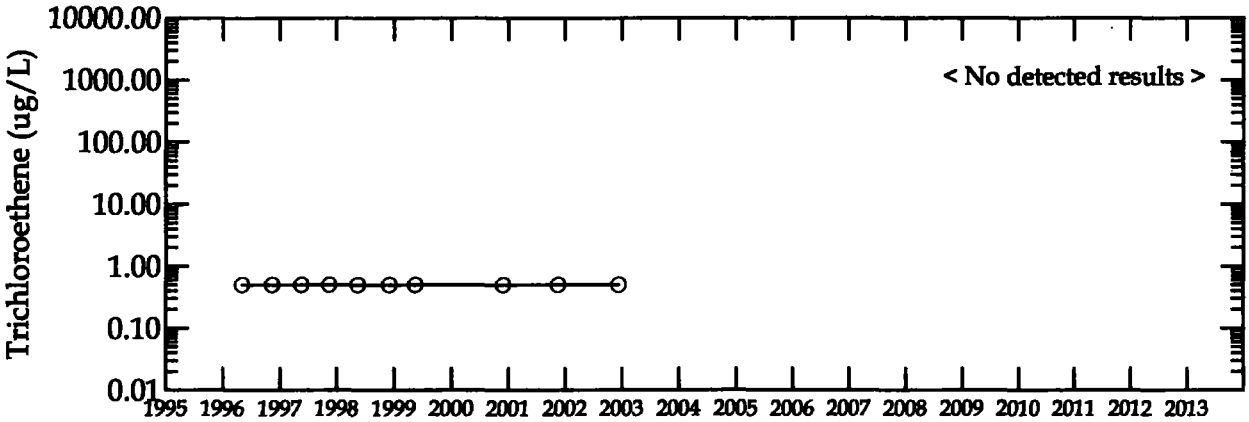
○ Non-Detect Concentration

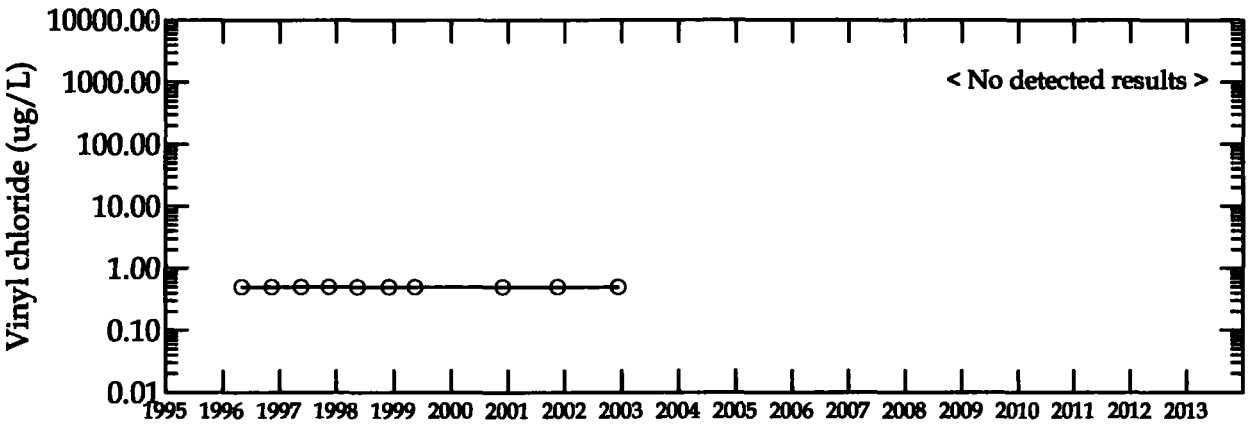
figure 9

Concentration vs. Time Graphs
Monitoring Well CRA-RA-19S
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

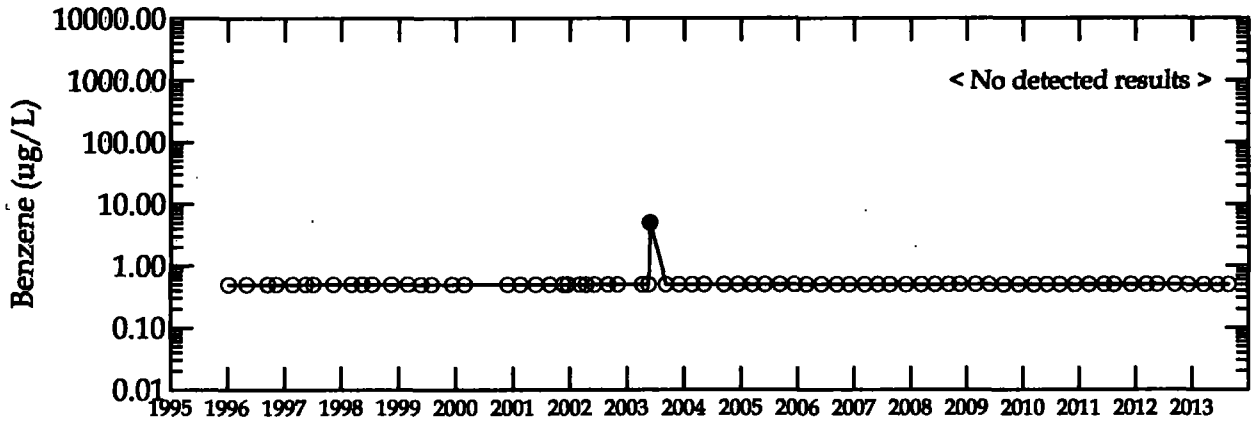
● Detected Concentration

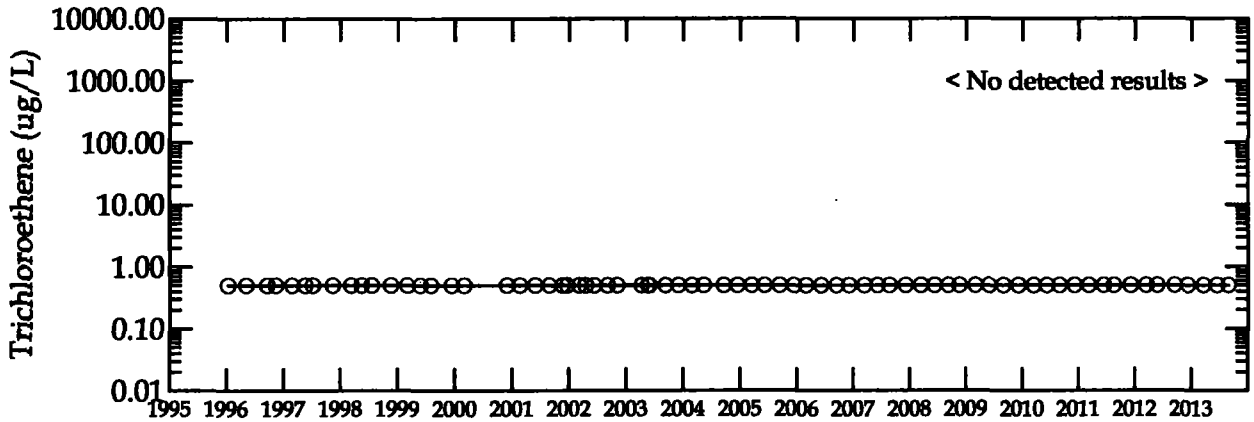
○ Non-Detect Concentration

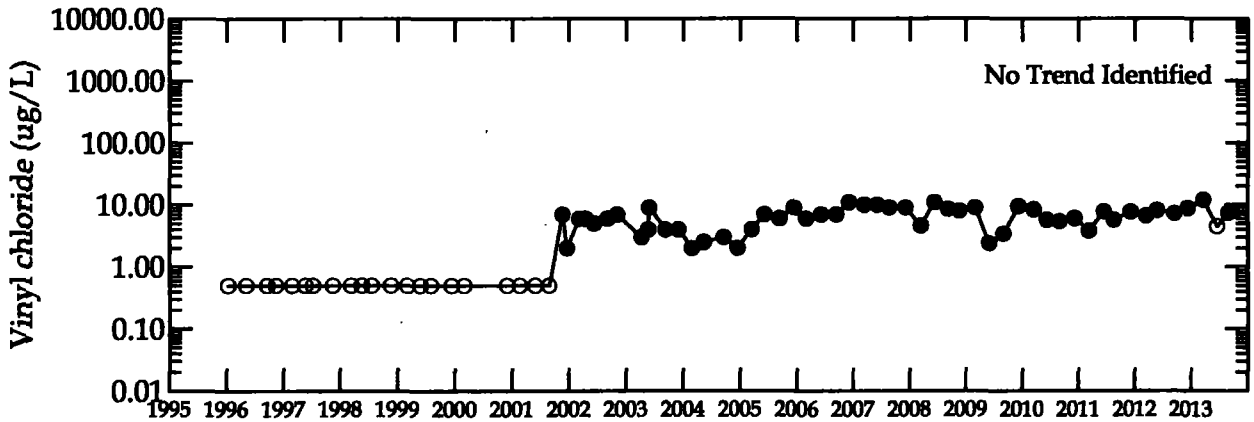
figure 10

Concentration vs. Time Graphs
Monitoring Well CRA-RA-20
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

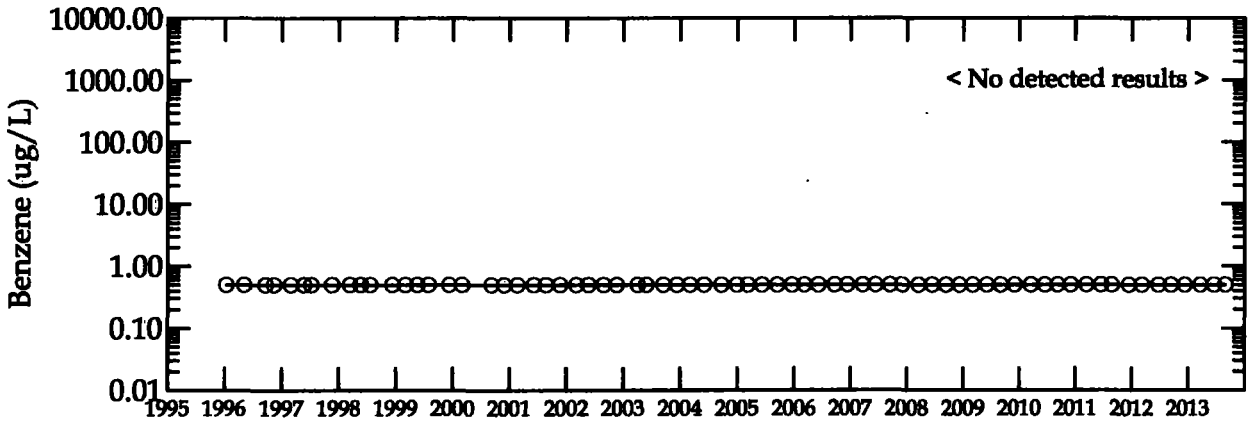
● Detected Concentration

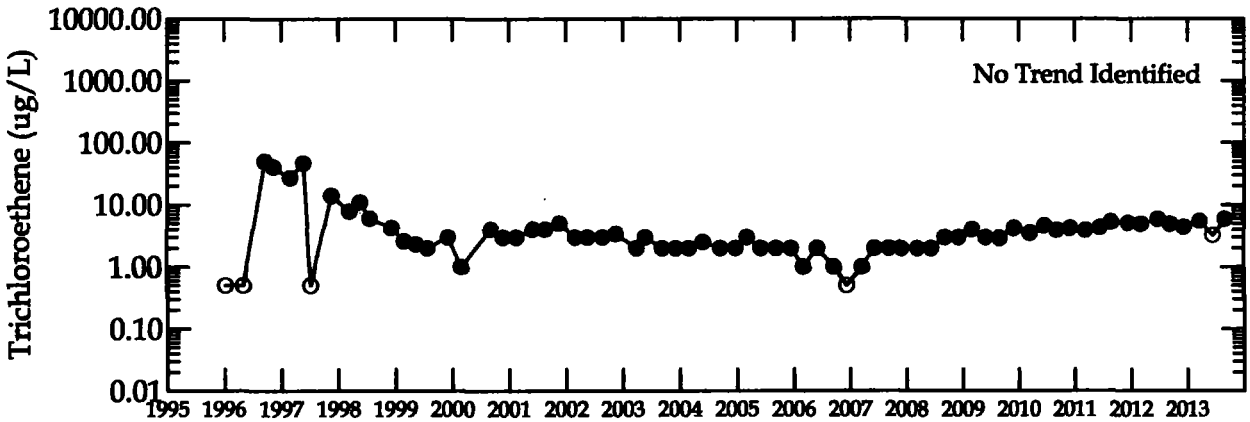
○ Non-Detect Concentration

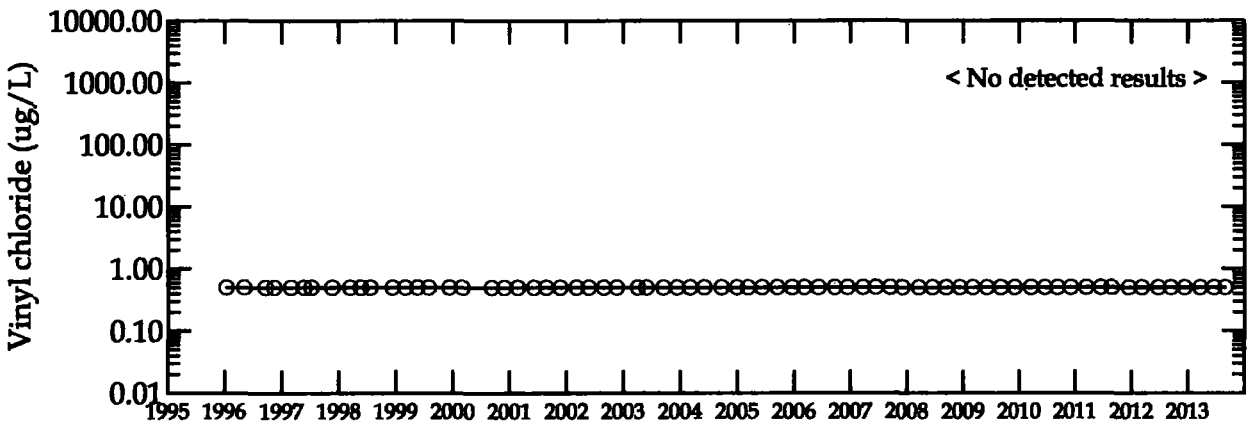
figure 11

Concentration vs. Time Graphs
Monitoring Well CRA-RA-22
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.



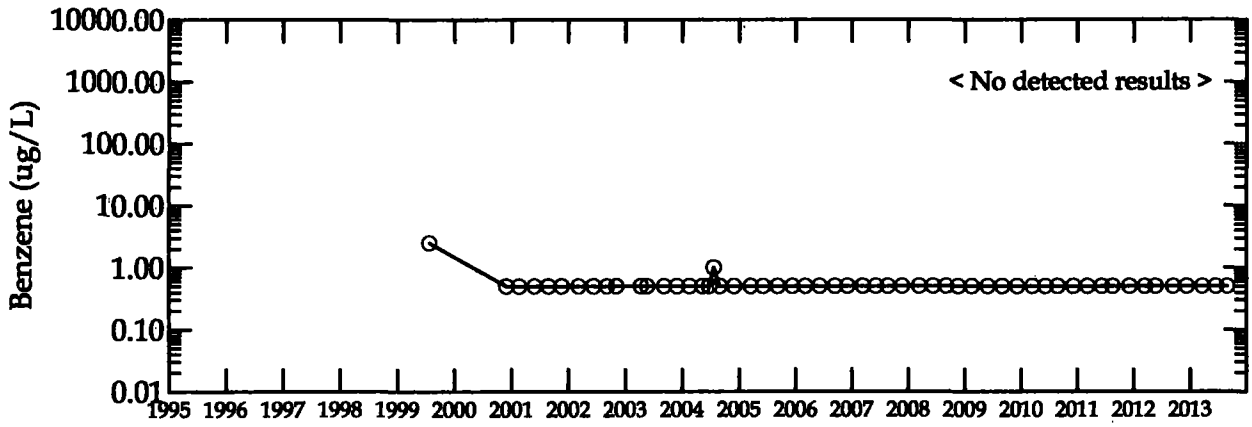



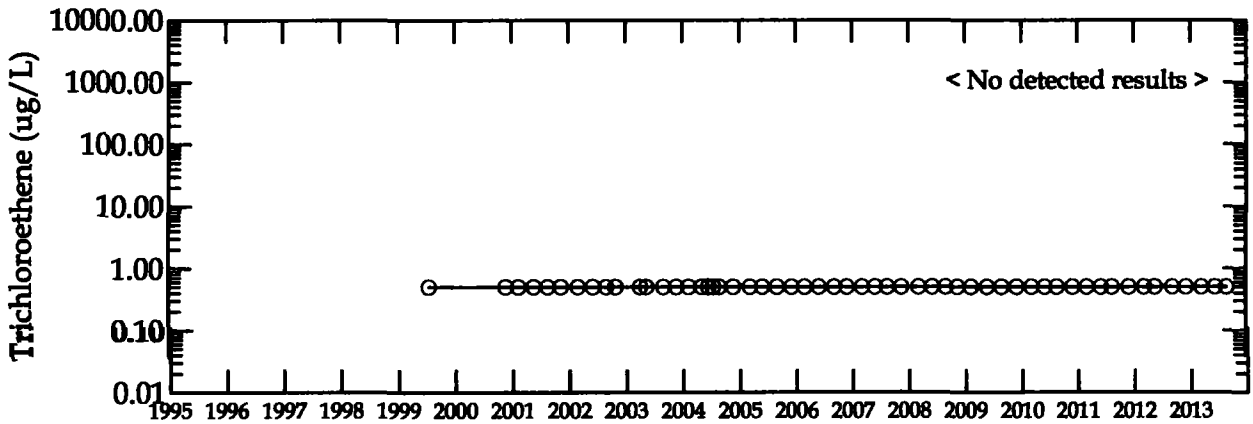

Legend:

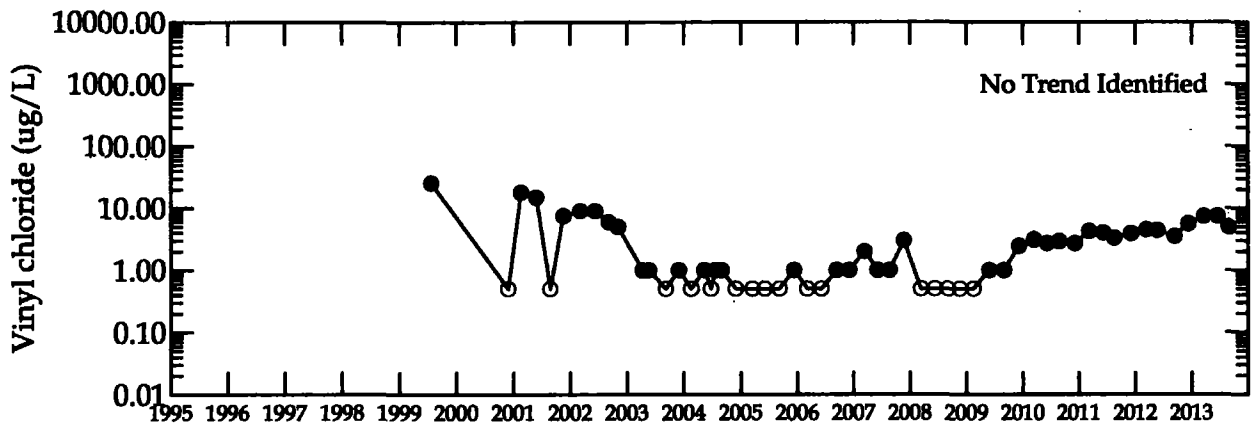
- ● Detected Concentration
- o Non-Detect Concentration

figure 12
Concentration vs. Time Graphs
Monitoring Well CRA-RA-23D
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

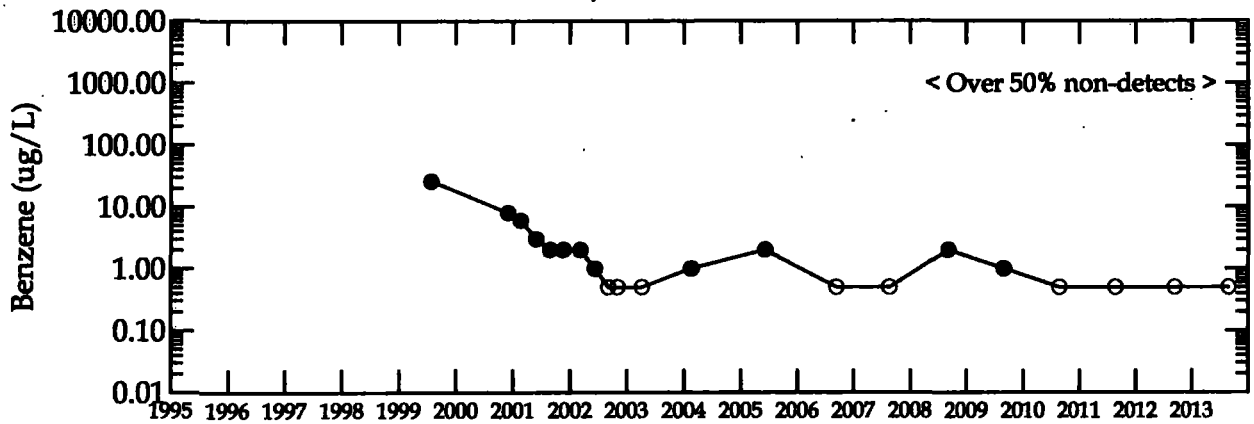
● Detected Concentration

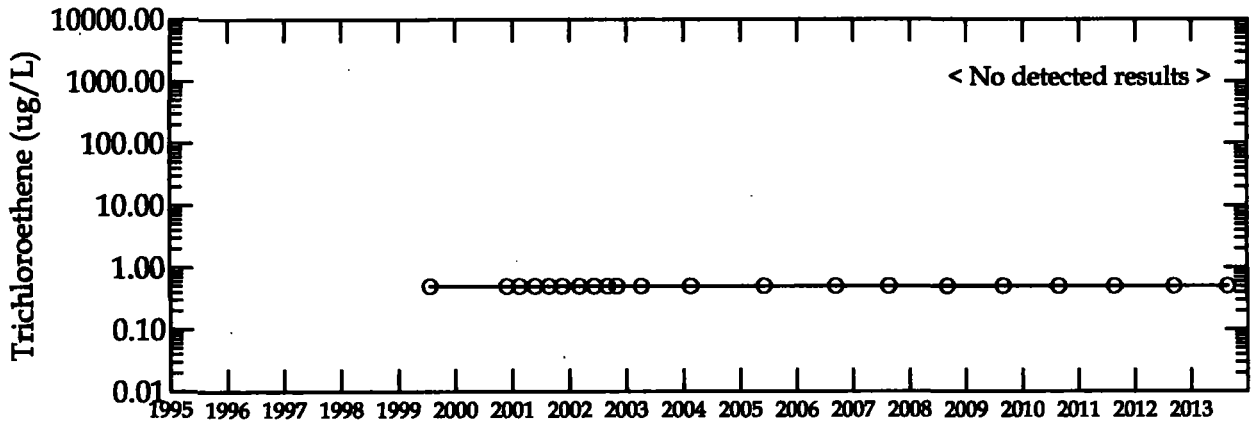
○ Non-Detect Concentration

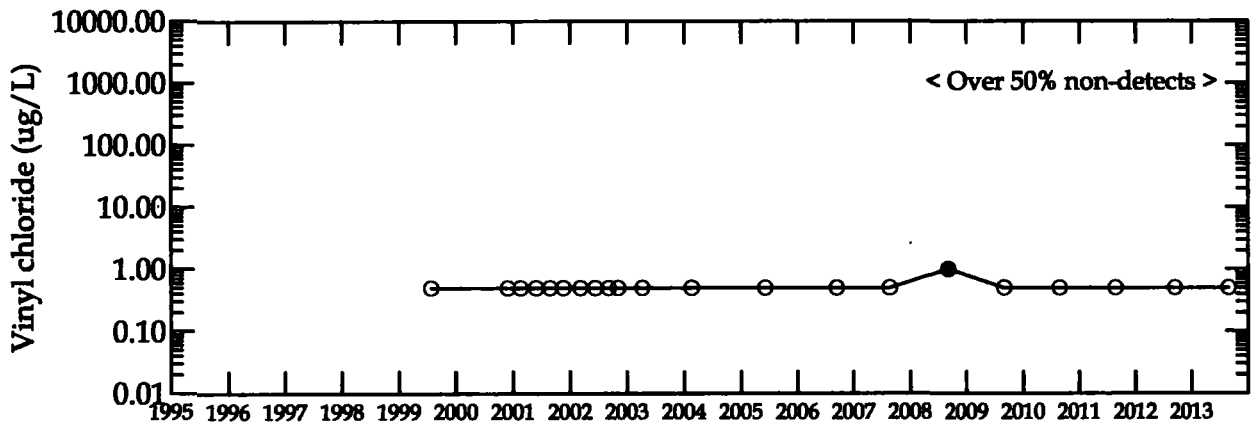
figure 13

Concentration vs. Time Graphs
Monitoring Well CRA-RA-24
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

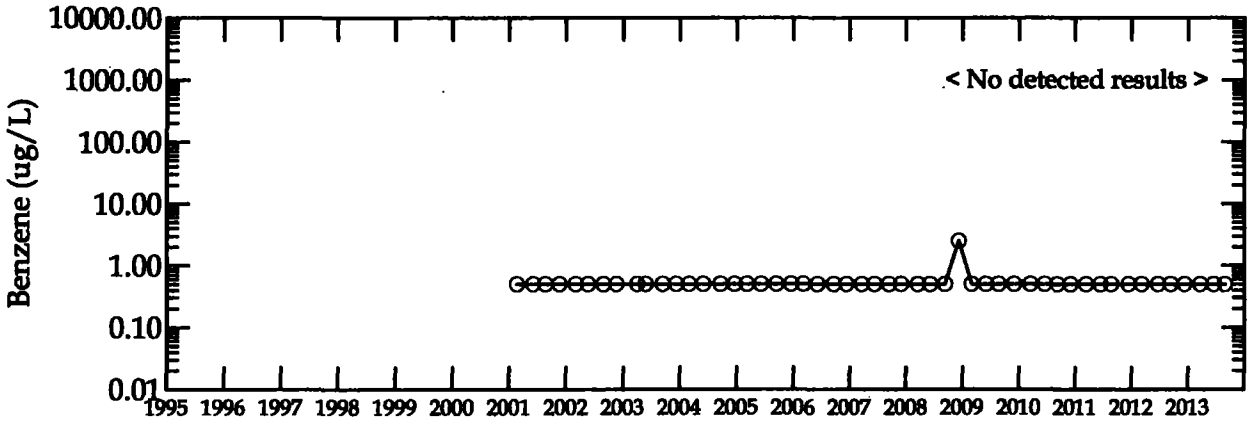
● Detected Concentration

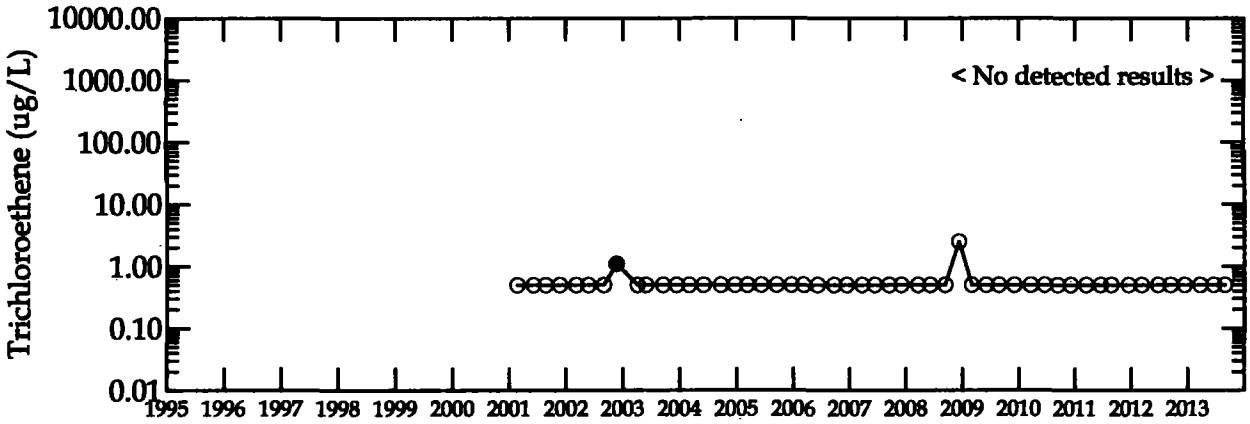
o Non-Detect Concentration

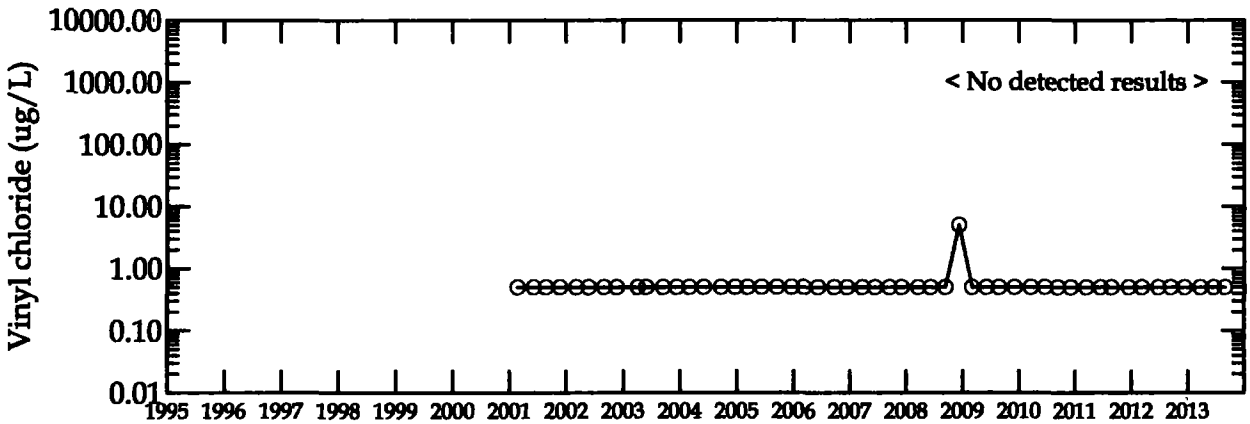
figure 14

Concentration vs. Time Graphs
Monitoring Well CRA-RA-25
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.



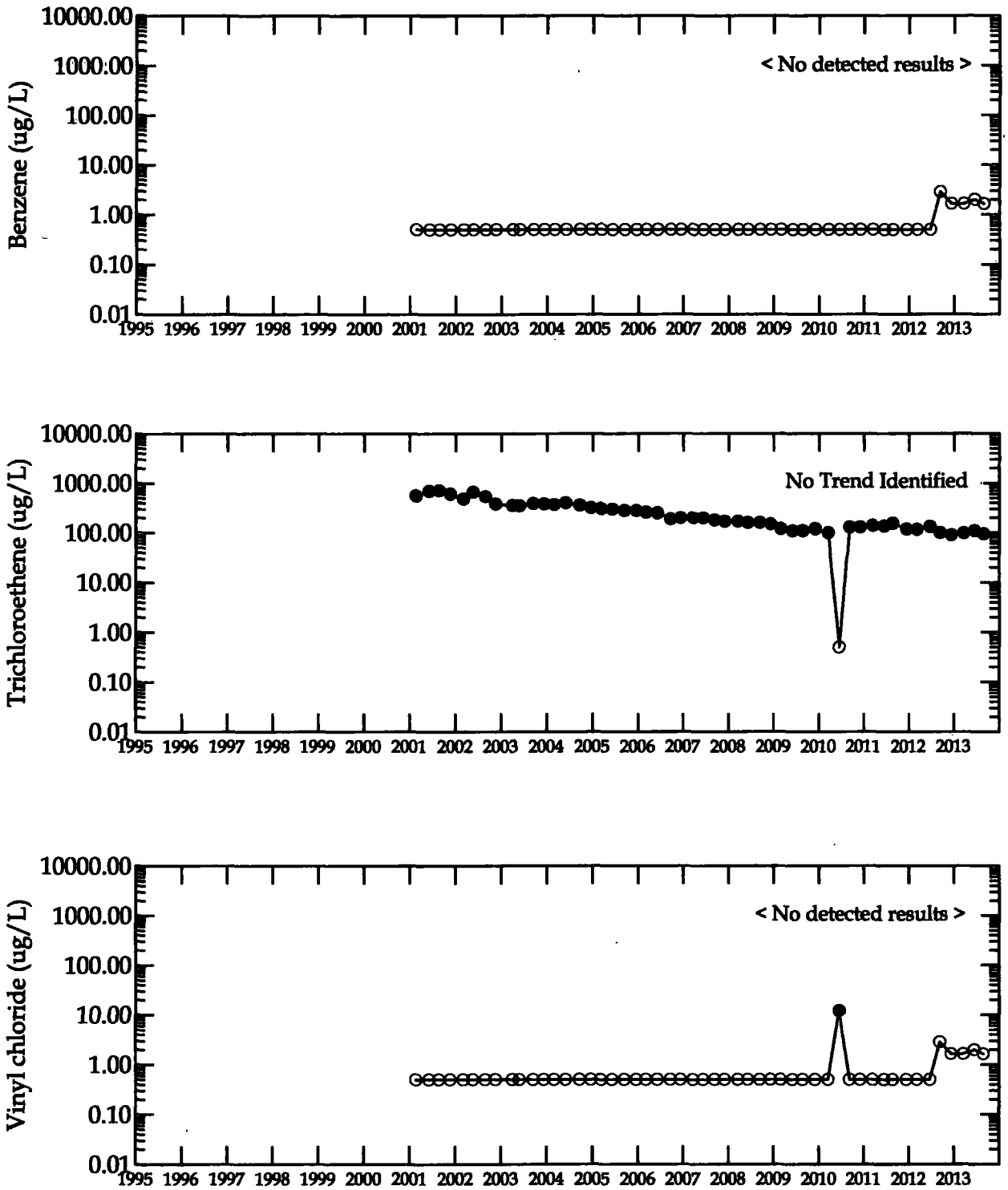




Legend:

- ● Detected Concentration
- ○ Non-Detect Concentration

figure 15
Concentration vs. Time Graphs
Monitoring Well CRA-RA-26D
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.

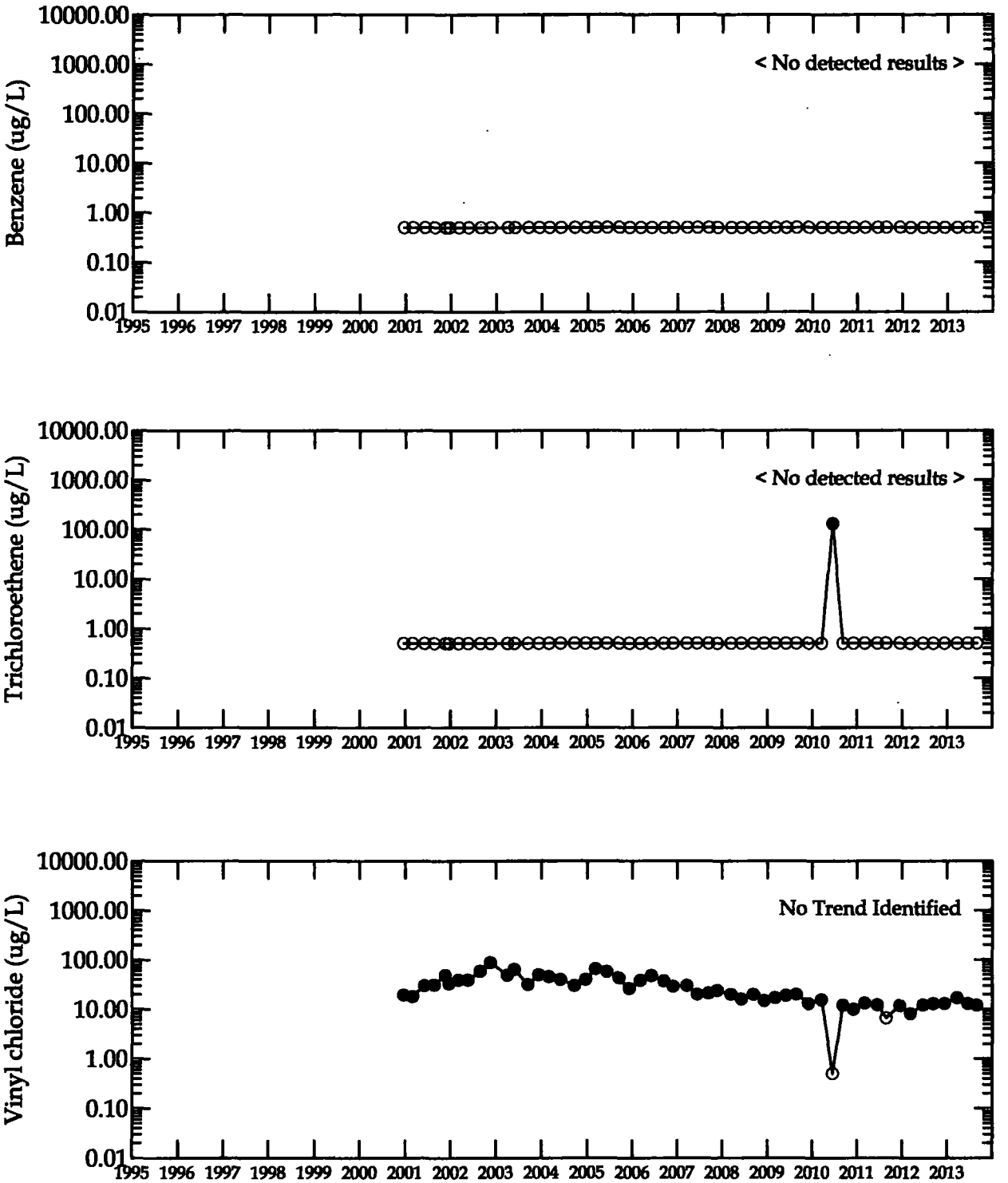



Legend:

- ● Detected Concentration
- ○ Non-Detect Concentration

figure 16
Concentration vs. Time Graphs
Monitoring Well CRA-RA-26S
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

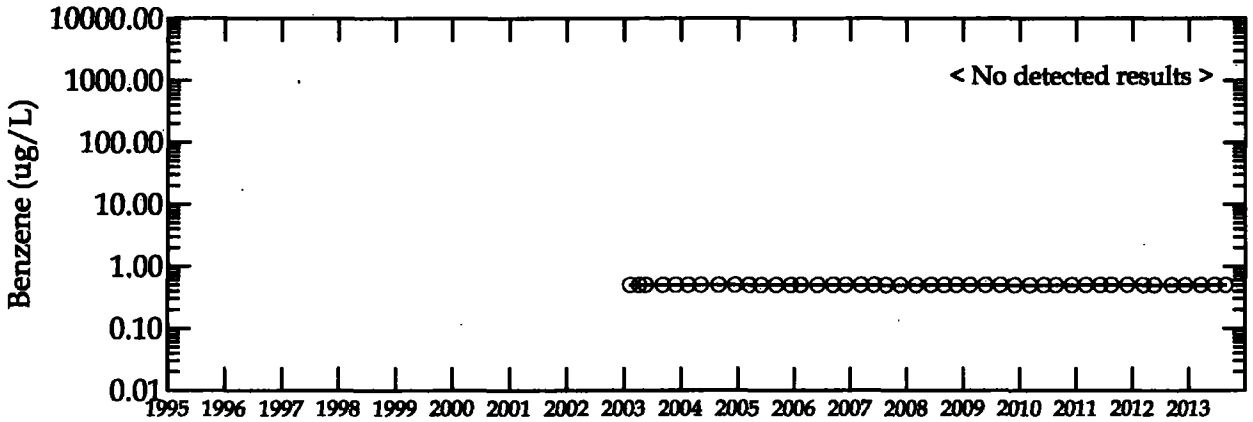
● Detected Concentration

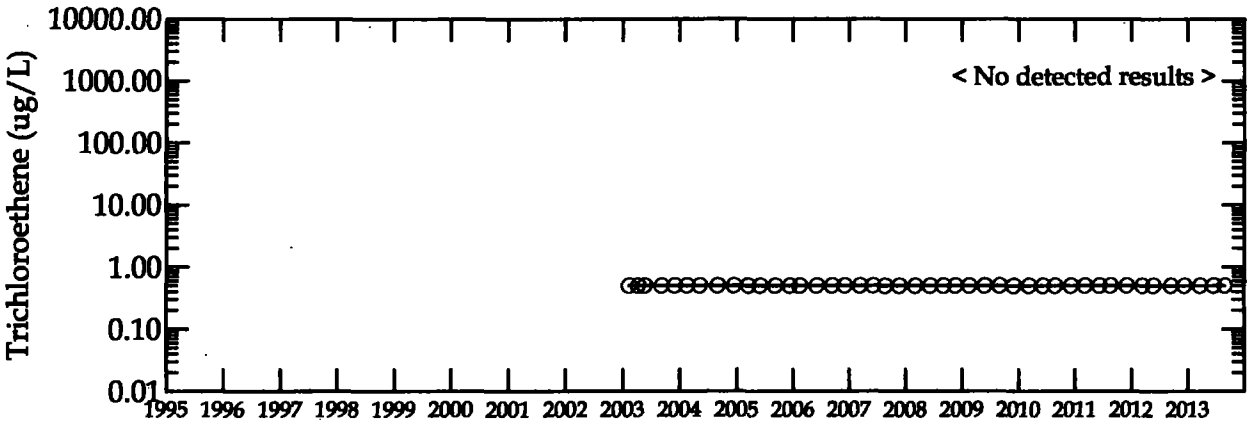
○ Non-Detect Concentration

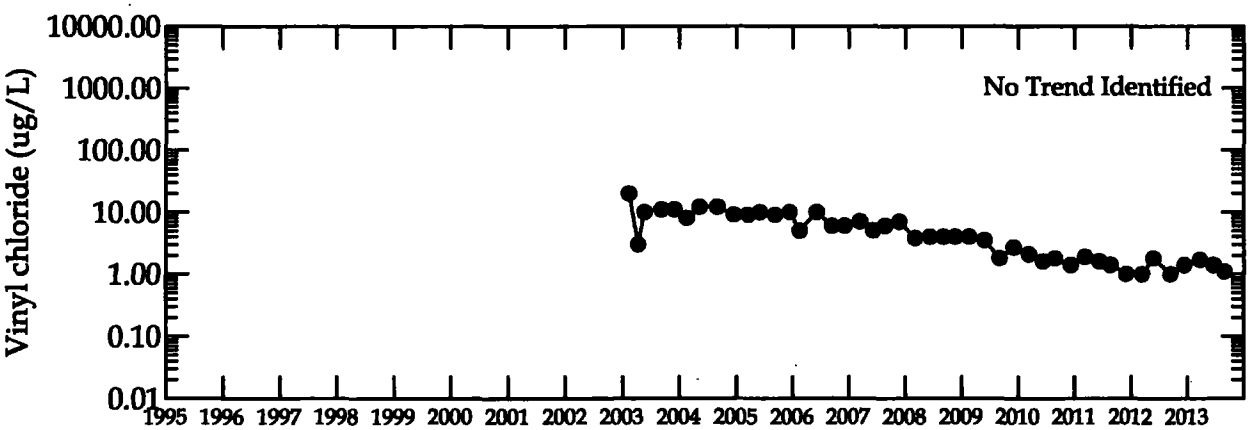
figure 17

Concentration vs. Time Graphs
Monitoring Well CRA-RA-27
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

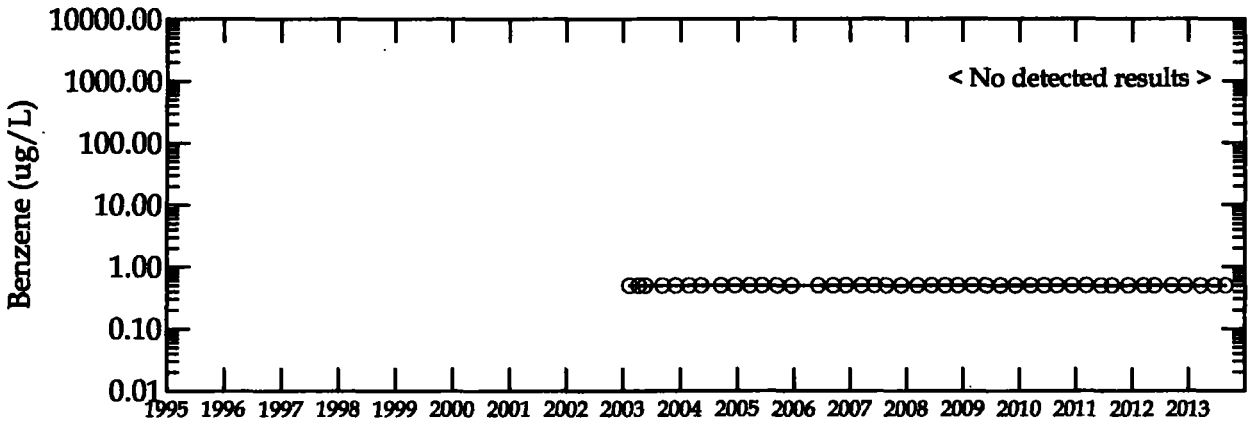
● Detected Concentration

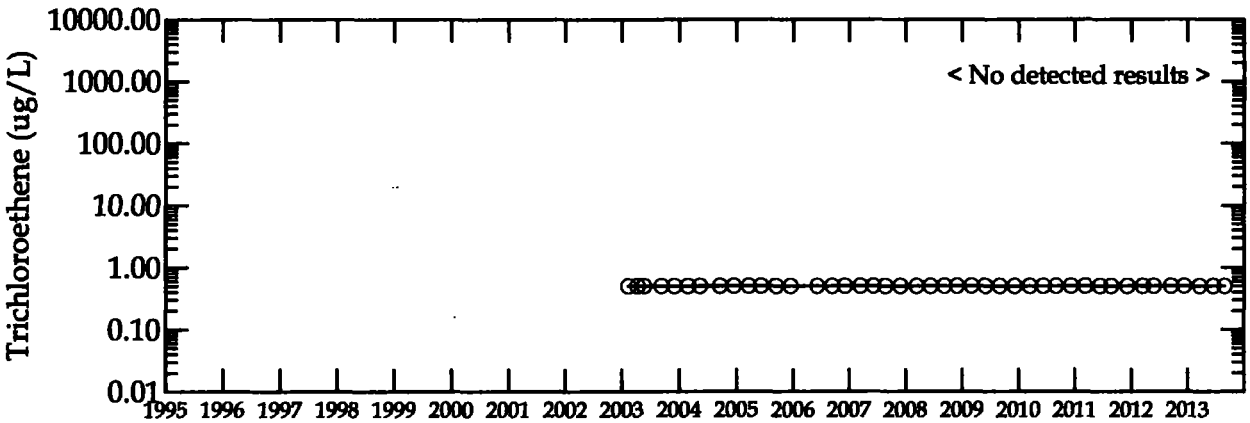
○ Non-Detect Concentration

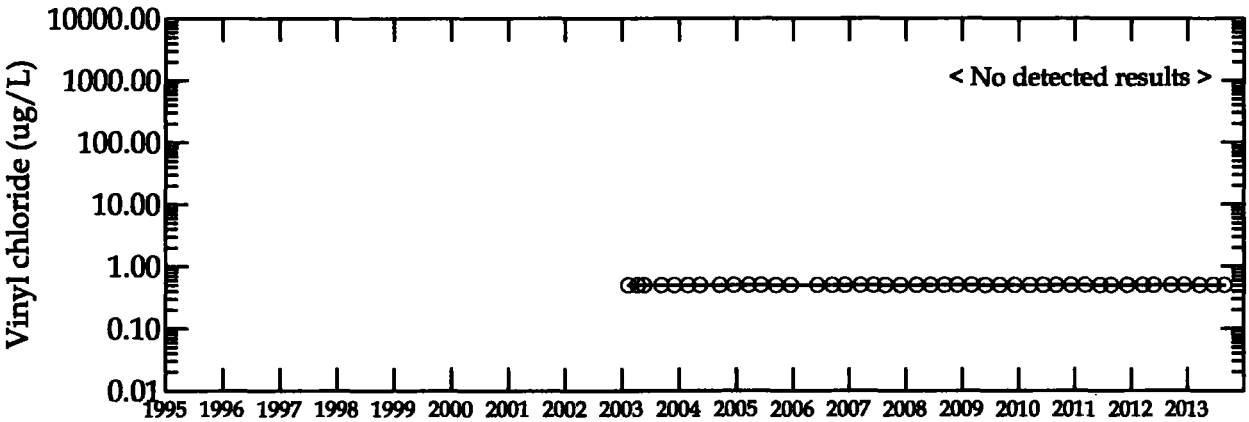
figure 18

Concentration vs. Time Graphs
Monitoring Well CRA-RA-28
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.



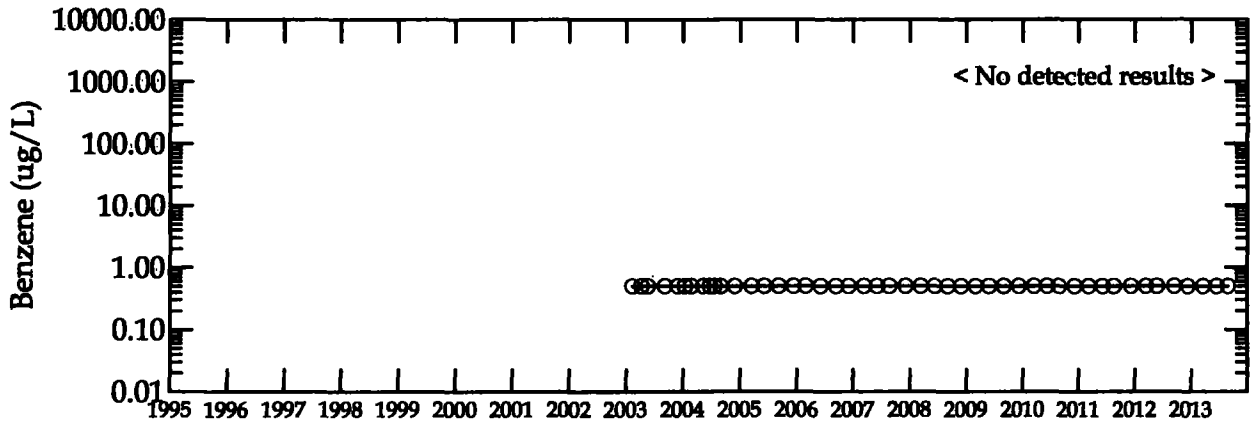

Legend:

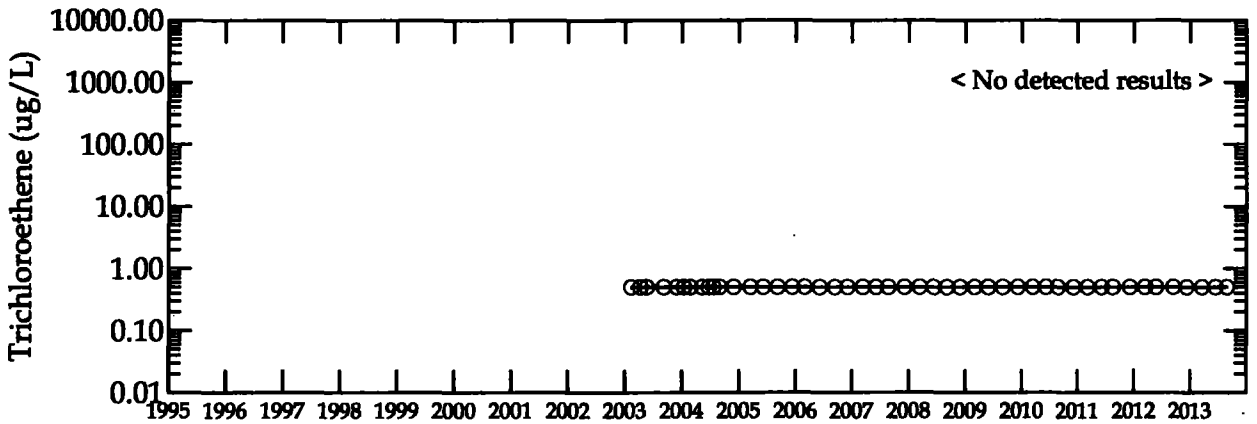
- ● Detected Concentration
- ○ Non-Detect Concentration

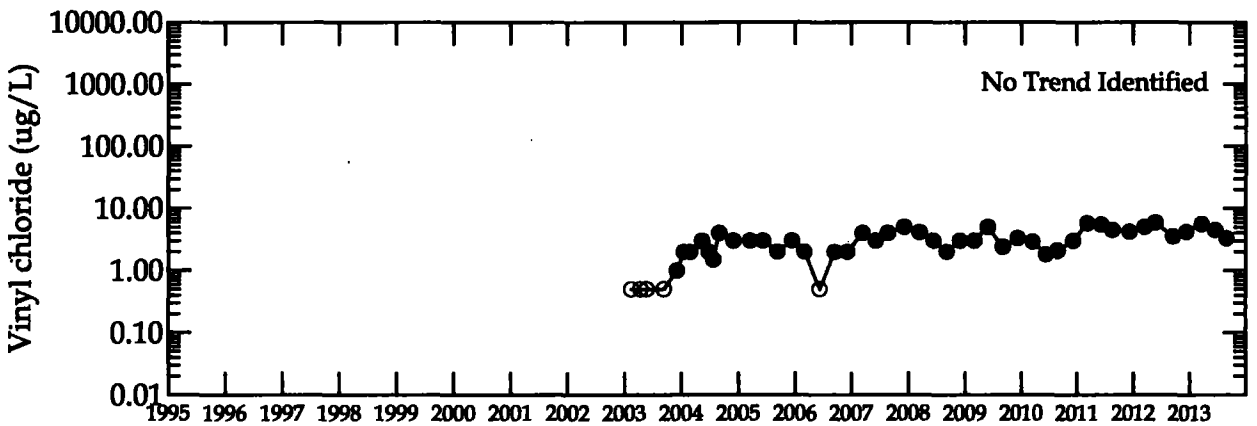
figure 19

Concentration vs. Time Graphs
Monitoring Well CRA-RA-29
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

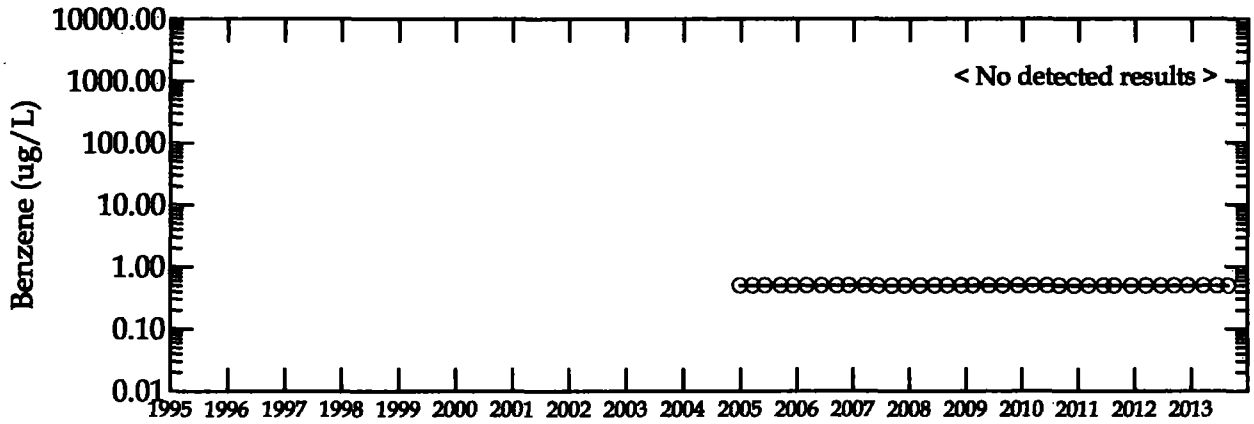
● Detected Concentration

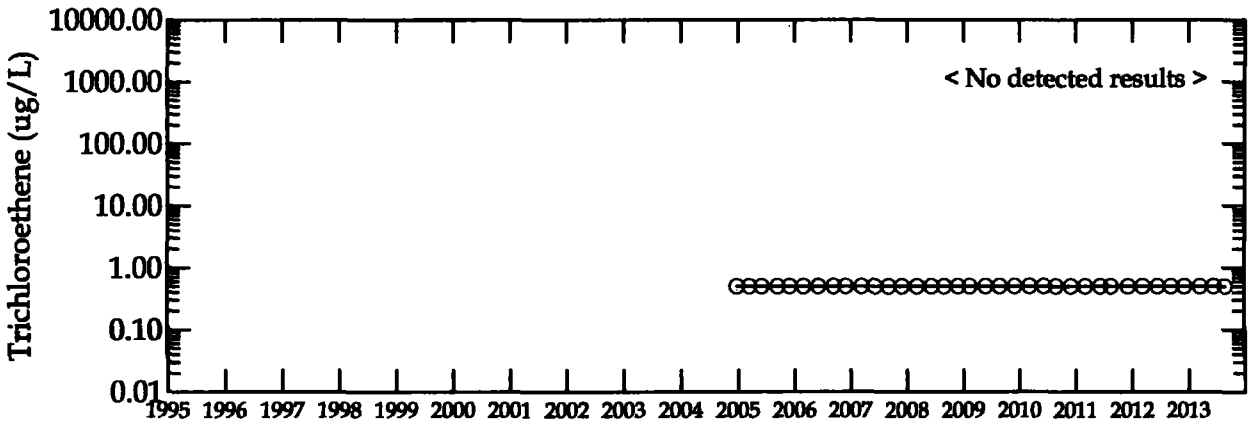
○ Non-Detect Concentration

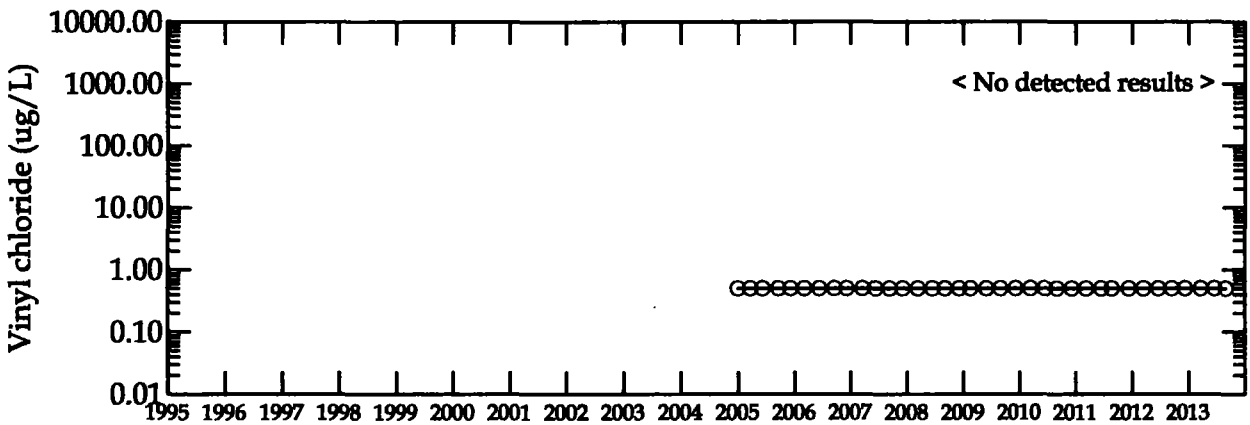
figure 20

Concentration vs. Time Graphs
Monitoring Well CRA-RA-30
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.



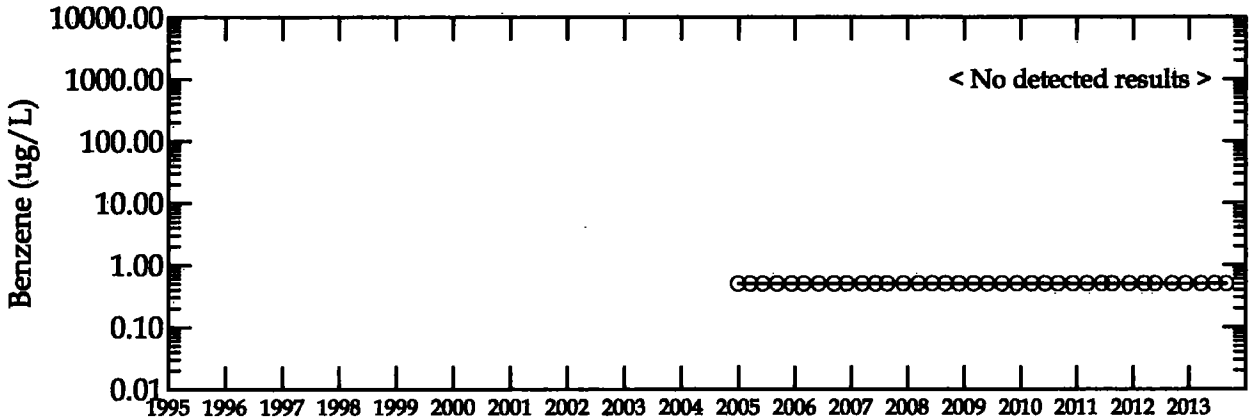

Legend:

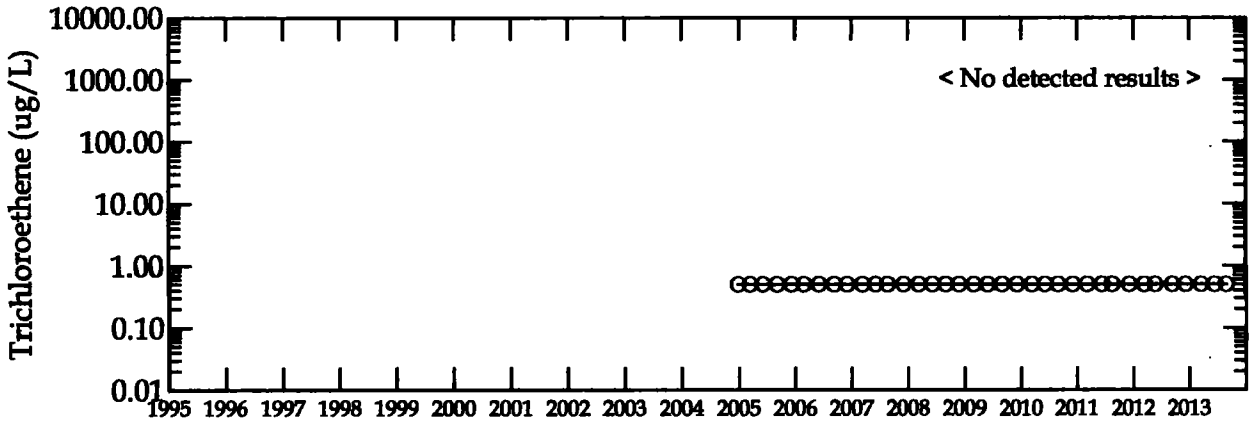
- ● Detected Concentration
- o Non-Detect Concentration

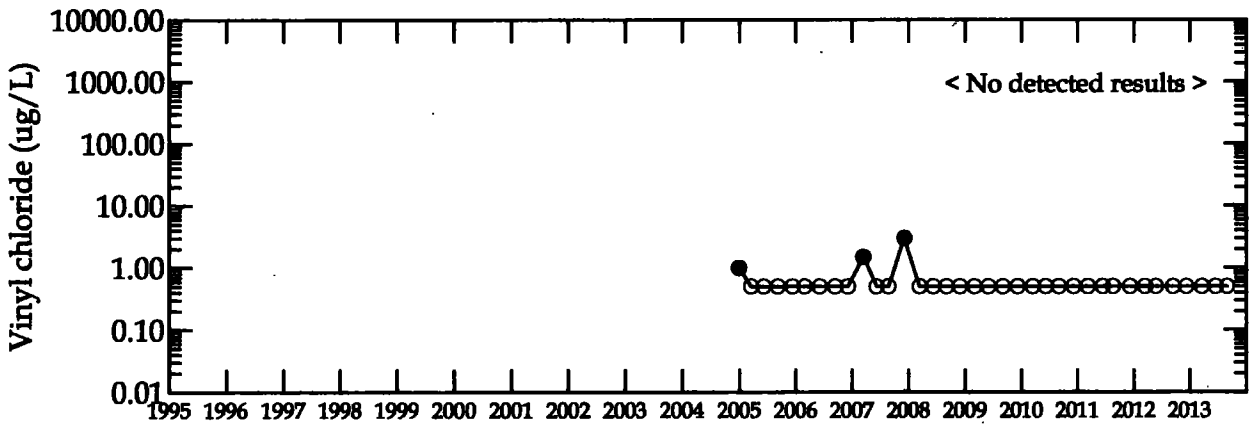
figure 21

Concentration vs. Time Graphs
Monitoring Well CRA-RA-31
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

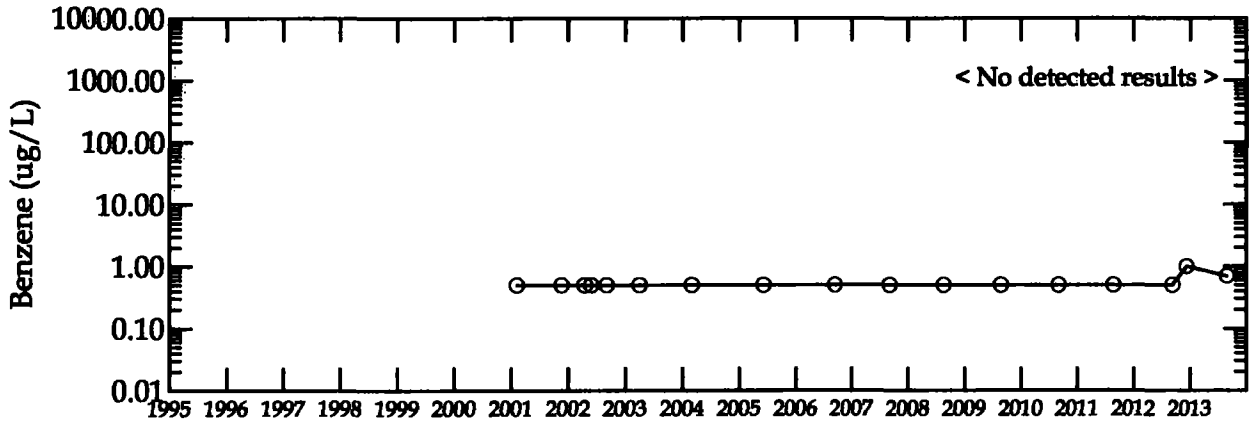
● Detected Concentration

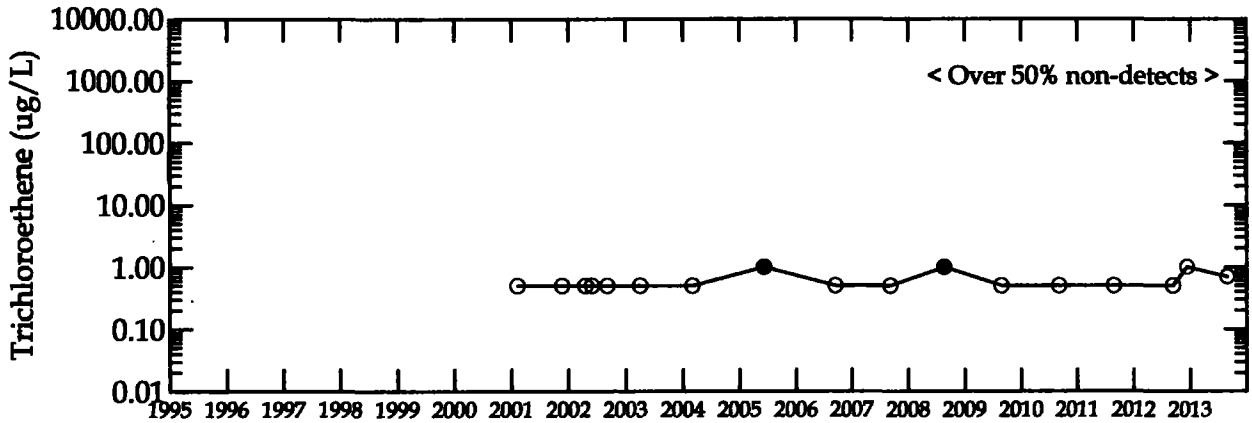
○ Non-Detect Concentration

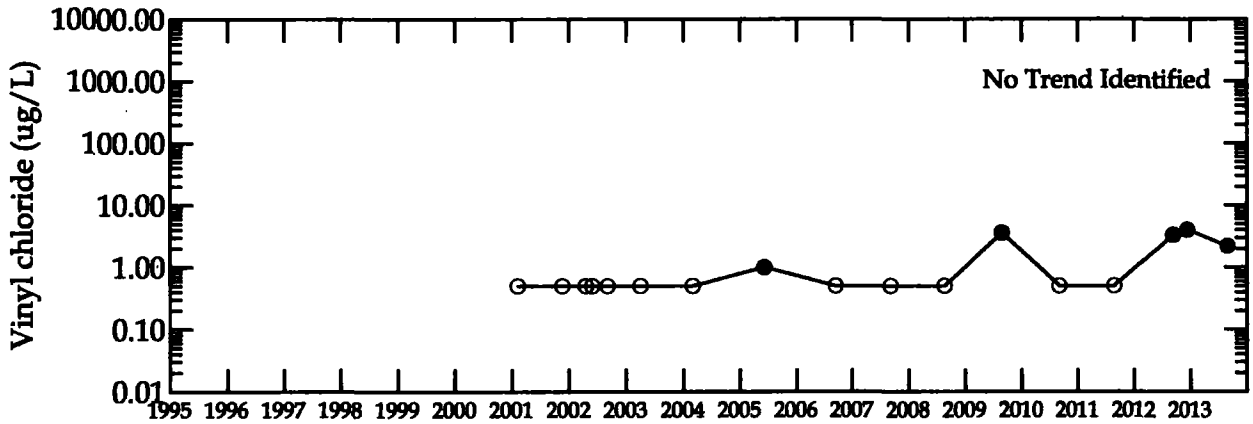
figure 22

Concentration vs. Time Graphs
Monitoring Well CRA-RA-32
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

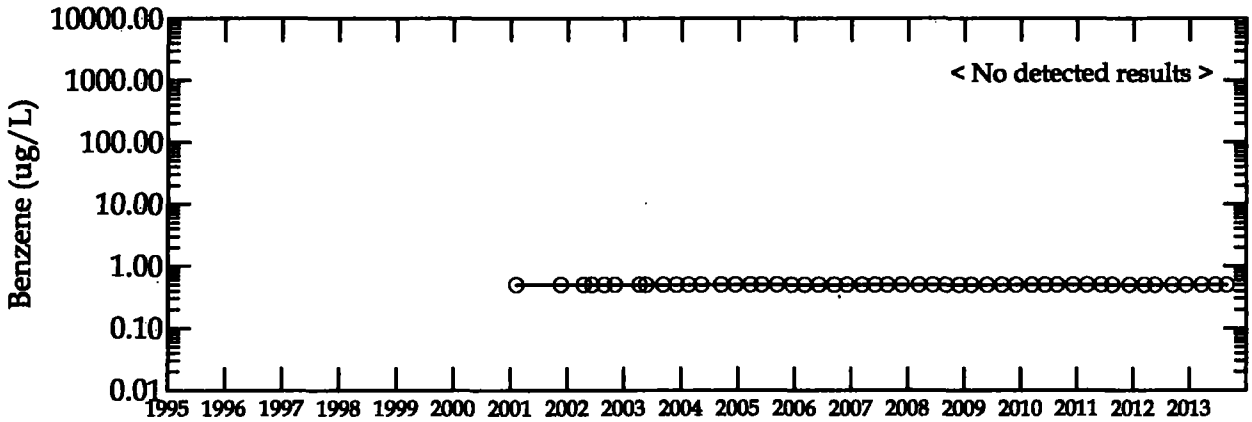
● Detected Concentration

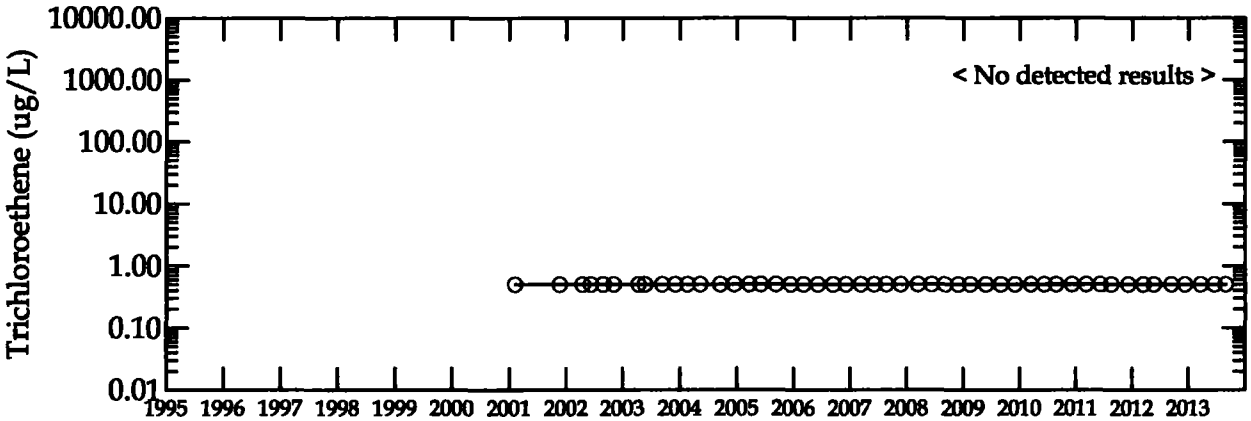
○ Non-Detect Concentration

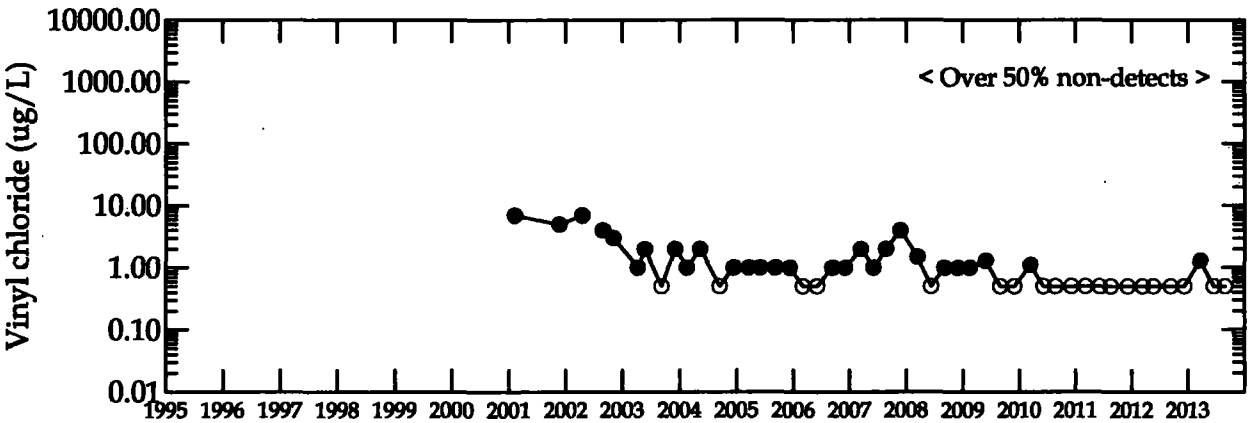
figure 23

Concentration vs. Time Graphs
Monitoring Well EB-PZ-4
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

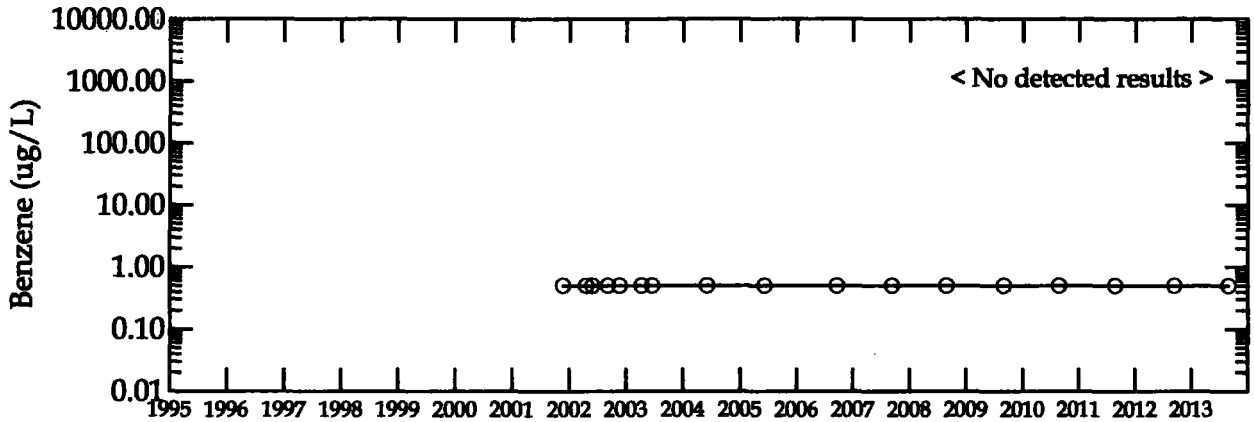
● Detected Concentration

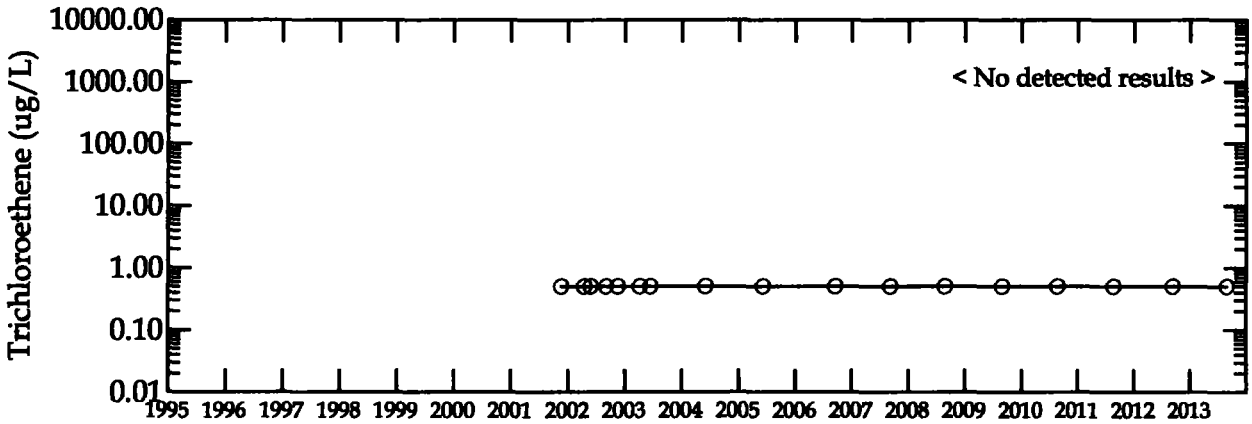
○ Non-Detect Concentration

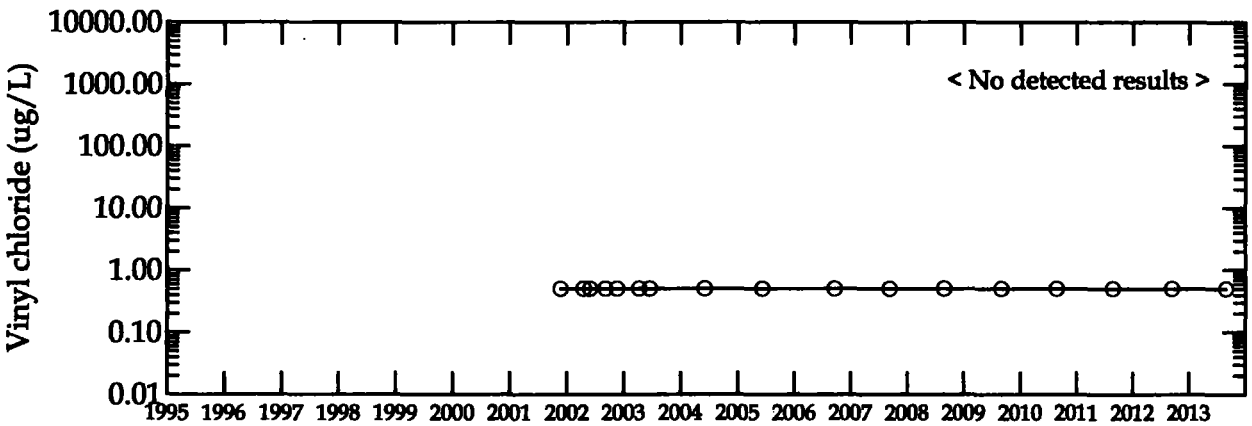
figure 24

Concentration vs. Time Graphs
Monitoring Well PZ-104
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

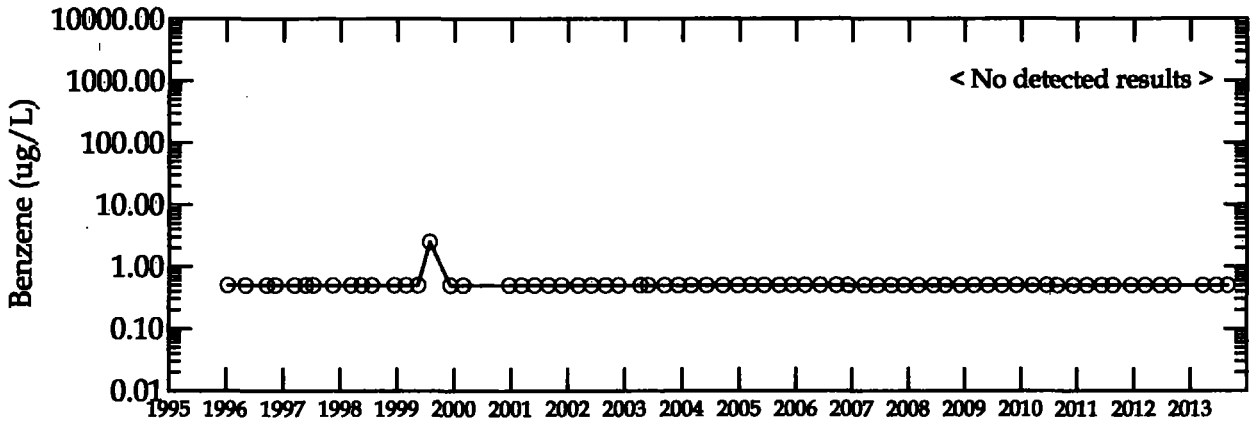
● Detected Concentration

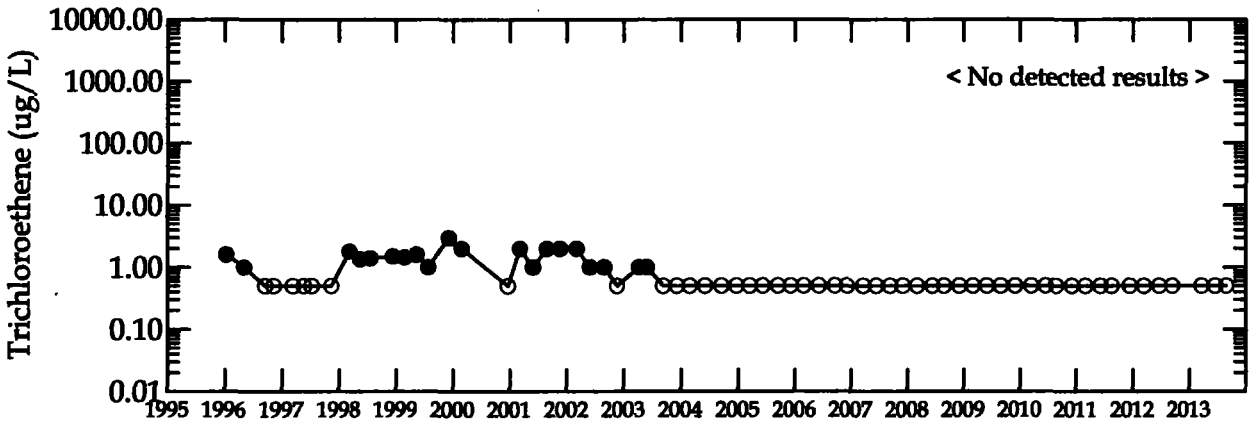
○ Non-Detect Concentration

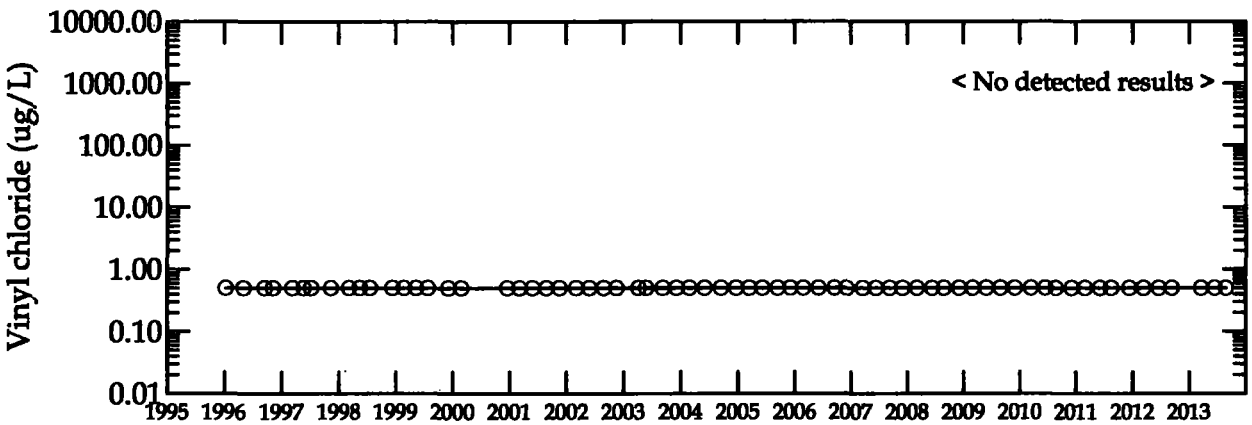
figure 25

Concentration vs. Time Graphs
Monitoring Well PZ-106
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

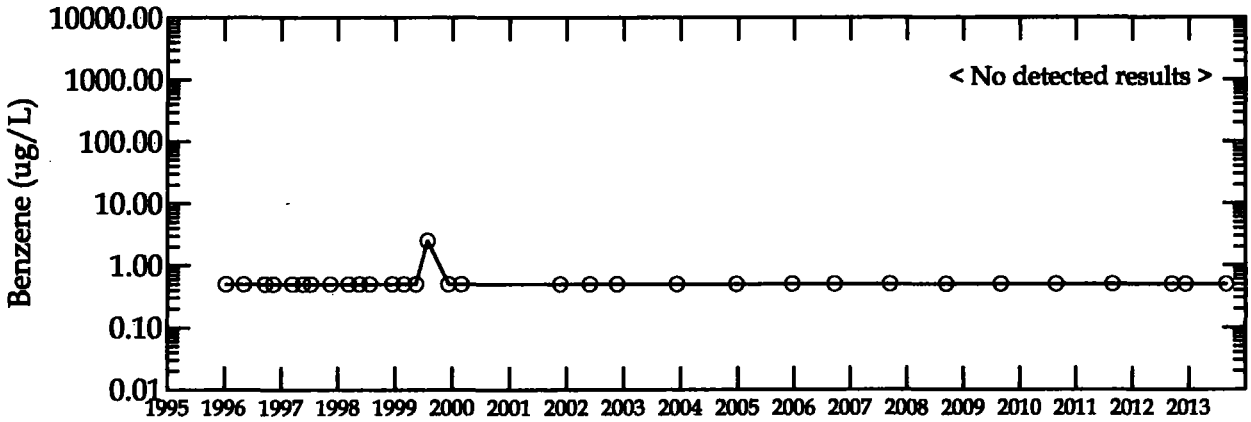
● Detected Concentration

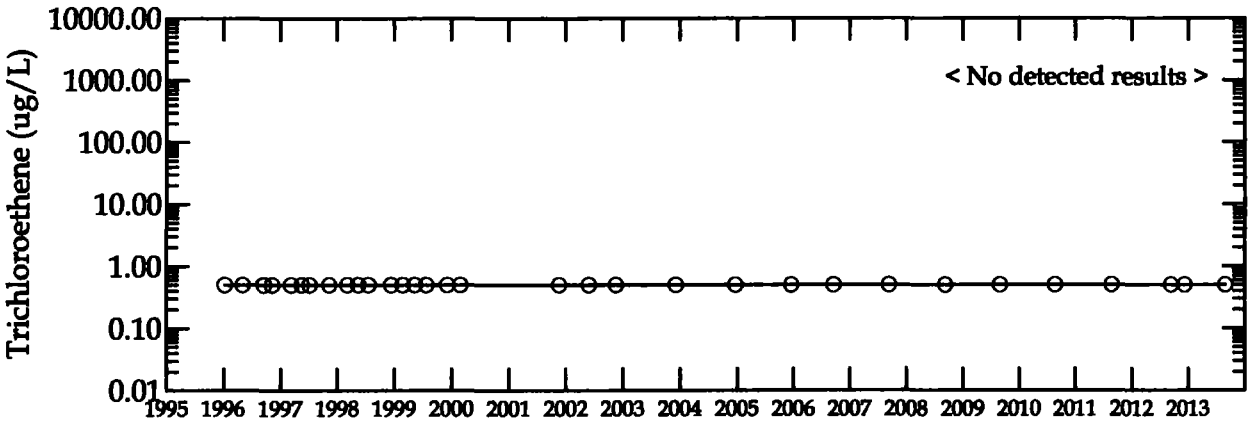
○ Non-Detect Concentration

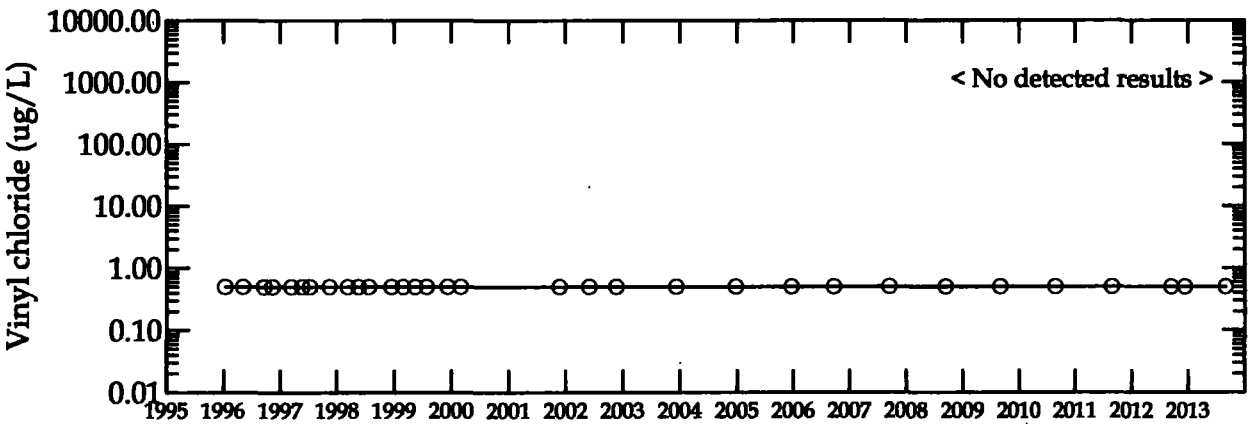
figure 26

Concentration vs. Time Graphs
Monitoring Well RA-MW-28
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

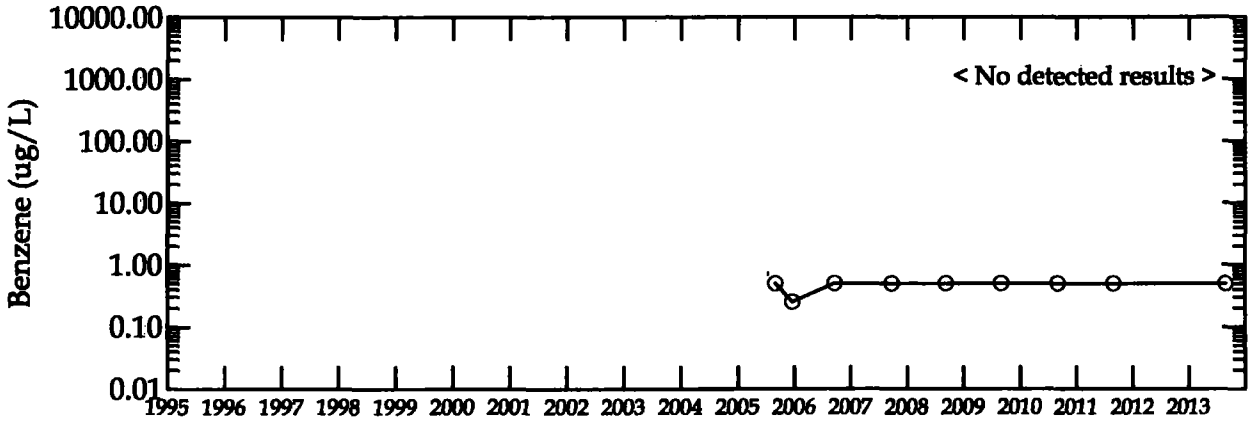
● Detected Concentration

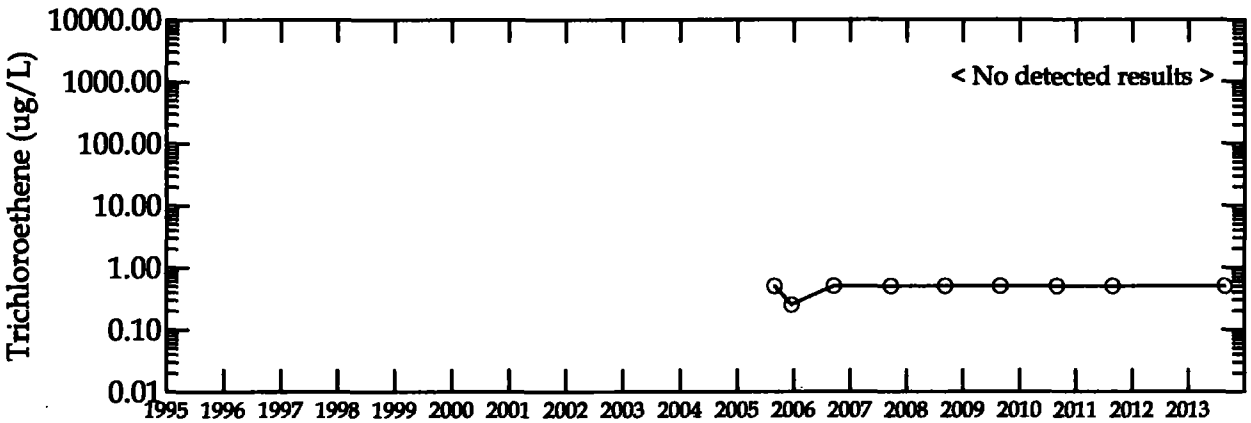
o Non-Detect Concentration

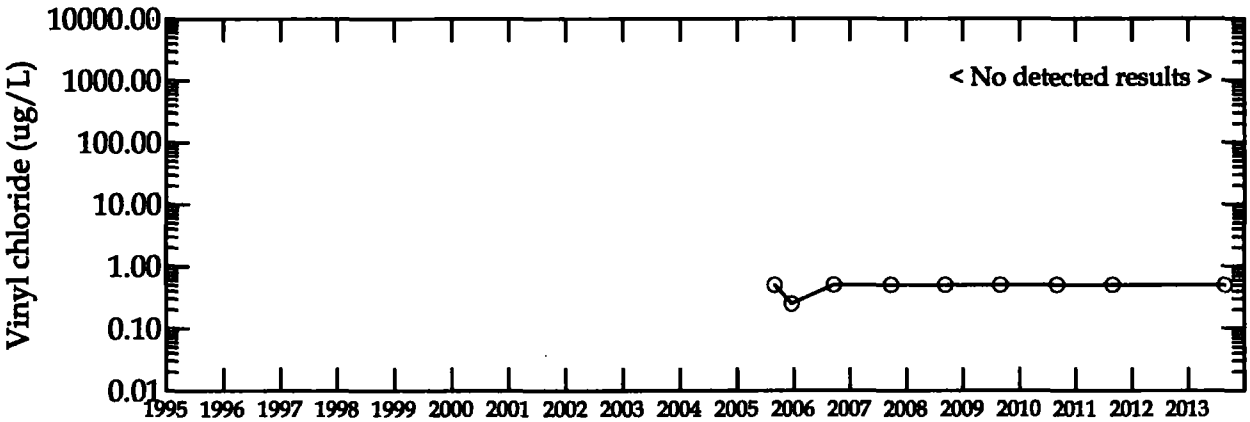
figure 27

Concentration vs. Time Graphs
Monitoring Well RA-MW-47
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

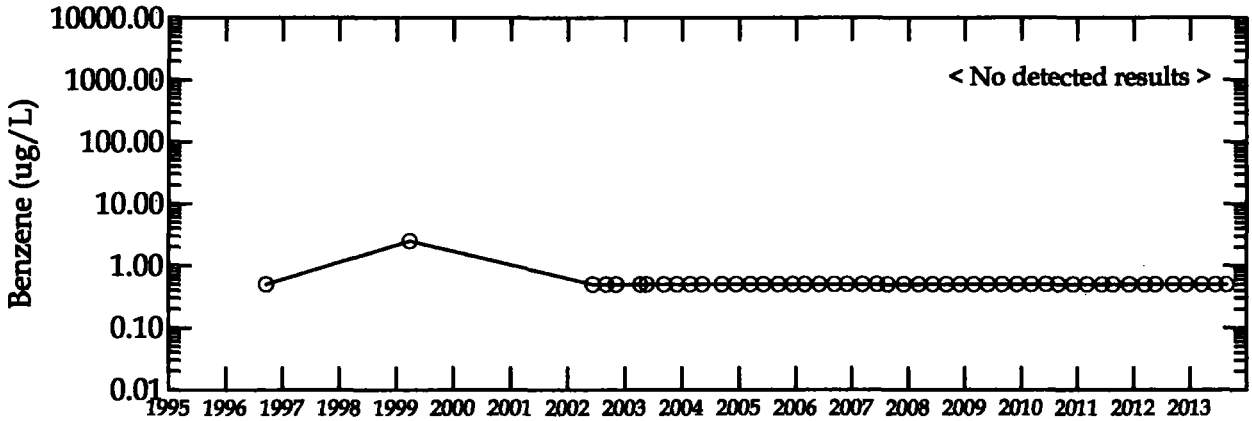
● Detected Concentration

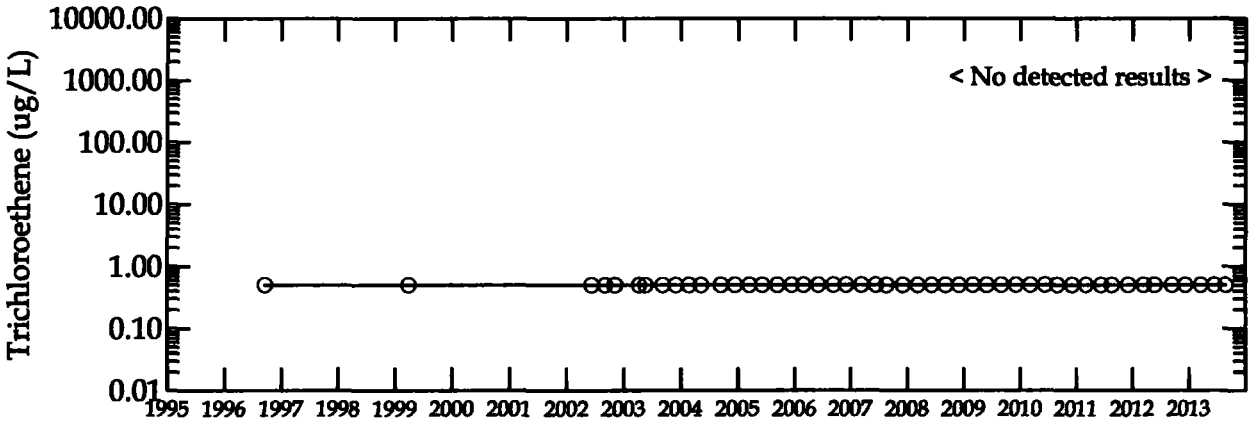
○ Non-Detect Concentration

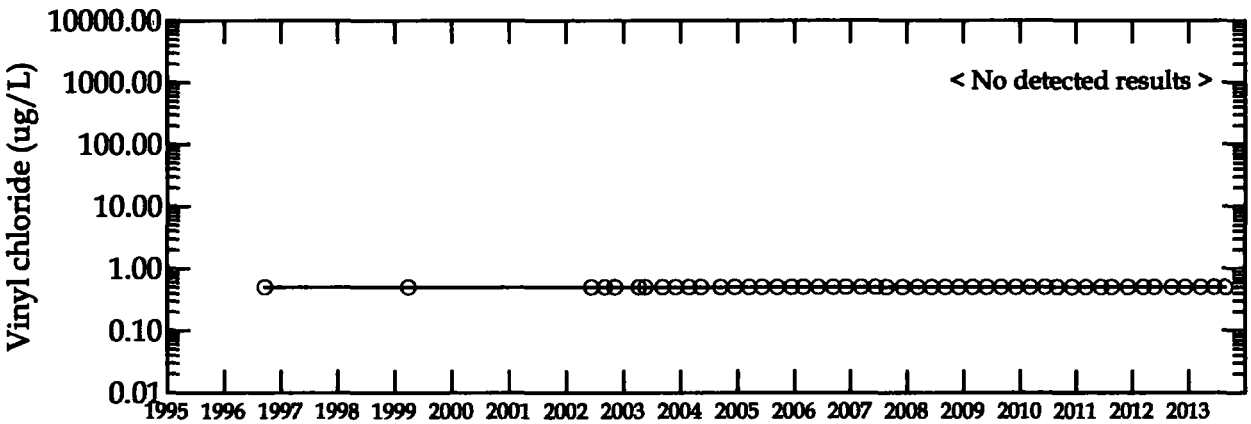
figure 28

Concentration vs. Time Graphs
Monitoring Well Stanley Rasmussen
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.




Legend:

- ● Detected Concentration
- ○ Non-Detect Concentration

figure 29
Concentration vs. Time Graphs
Monitoring Well TEMP-PZ-2
Rasmussen Landfill Site
*Livingston County, Michigan*

Notes:
Non-detects are shown as one half the laboratory detection limit.
Trends results are shown for the last 8 data points.

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | July 10, 2013 | July 15, 2013 | July 25, 213 | July 29, 2013 | Aug 1, 2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L. Rapai | L. Rapai | L. Rapai | L. Rapai | L. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 58 | 55 | 58 | 58 | 58 |
| Feed Air Pressure psi | 110 | 105 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 65 | 70 |
| Holding Tank Pressure psi | 40 | 42 | 42 | 42 | 44 |
| Run Time hours | | | | | 84232.9 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 7 | 7 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | 35 | 34 | 34 | 35 |
| Regulator #2 psi | 20 | 23 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | — | — | — | — | — |
| Zone On | 3 | 2 | 1 | 1 | 3 |
| Zone Time hours | 2 | 1/2 | 1/2 | 1/2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** WEEK OF JULY 15, HAD DIFFICULT TIME KEEPING SYSTEM RUNNING DUE TO EXCESSIVE HEAT.

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | Aug 10, 2013 | Aug 16, 2013 | Aug 23, 2013 | Aug 28 2013 | Sept 5, 2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | John York | A Rapai | A Rapai | A Rapai | A Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 56 | 58 | 56 | 58 |
| Feed Air Pressure psi | 110 | 110 | 100 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | | 84595.4 | 84762.1 | | 85074.4 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 7 | 8 | 8 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 32 | 33 | 34 | 35 | 35 |
| Regulator #2 psi | 22 | 21 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 1 | 1 | 2 | 2 |
| Zone Time hours | 1½ | 1½ | 1½ | 1½ | 1½ |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | SEPT. 27, 2013 | | | | |
| **OPERATOR SIGNATURE** | A Rapai | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Compressor** | | | | | |
| | | | | | |
| Output Pressure psi | 110 | | | | |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Sep** | | | | | |
| | | | | | |
| Receiver Pressure psi | 54 | | | | |
| Feed Air Pressure psi | 110 | | | | |
| Cycle Pressure psi | 70 | | | | |
| Holding Tank Pressure psi | 42 | | | | |
| Run Time hours | 85533.6 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Dryer** | | | | | |
| | | | | | |
| Temp. Indicator - color | GREEN | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Ozone Generator** | | | | | |
| | | | | | |
| Oxygen Supply, LPM | 7 | | | | |
| % O3 capacity | 45 | | | | |
| Regulator #1 psi | 34 | | | | |
| Regulator #2 psi | 24 | | | | |
| Alarm Reading ppm, O3 | – | | | | |
| Zone On | 2 | | | | |
| Zone Time hours | 1/2 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Distribution Panel** | | | | | |
| | | | | | |
| CFM | 0.8 | | | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | July 10, 2013 | | DATE: | August 14 & 15, 2013 | | DATE: | Sept. 13 & 19, 2013 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 10 | SW-1 | 0.8 | 8 | SW-1 | 0.8 | 9 |
| SW-2 | 0.8 | 5 | SW-2 | 0.8 | 6 | SW-2 | 0.8 | 7 |
| SW-3 | 0.8 | 13 | SW-3 | 0.8 | 14 | SW-3 | 0.8 | 14 |
| SW-4 | 0.7 | 15 | SW-4 | 0.8 | 16 | SW-4 | 0.8 | 16 |
| SW-5 | 0.8 | 15 | SW-5 | 0.8 | 15 | SW-5 | 0.8 | 16 |
| SW-6 | 0.7 | 17 | SW-6 | 0.8 | 16 | SW-6 | 0.8 | 18 |
| SW-7 | 0.6 | 12 | SW-7 | 0.8 | 14 | SW-7 | 0.7 | 16 |
| SW-8 | - | - | SW-8 | - | - | SW-8 | - | - |
| SW-9 | - | - | SW-9 | - | - | SW-9 | - | - |
| SW-10 | - | - | SW-10 | - | - | SW-10 | - | - |
| SW-11 | - | - | SW-11 | - | - | SW-11 | - | - |
| SW-12 | 0.7 | 18 | SW-12 | 0.6 | 16 | SW-12 | 0.7 | 14 |
| SW-13 | 0.6 | 2 | SW-13 | 0.6 | 3 | SW-13 | 0.6 | 3 |
| SW-14 | - | - | SW-14 | - | - | SW-14 | - | - |
| SW-15 | - | - | SW-15 | - | - | SW-15 | - | - |
| SW-16 | - | - | SW-16 | - | - | SW-16 | - | - |
| SW-17 | 0.7 | 18 | SW-17 | 0.8 | 18 | SW-17 | 0.8 | 18 |
| SW-18 | 0.8 | 19 | SW-18 | 0.7 | 18 | SW-18 | 0.8 | 16 |
| SW-19 | 0.8 | 17 | SW-19 | 0.8 | 18 | SW-19 | 0.8 | 16 |
| SW-20 | 0.8 | 18 | SW-20 | 0.8 | 18 | SW-20 | 0.6 | 18 |
| SW-21 | - | - | SW-21 | - | - | SW-21 | - | - |
| SW-22 | 0.6 | 15 | SW-22 | 0.7 | 14 | SW-22 | 0.6 | 12 |
| SW-23 | 0.6 | 16 | SW-23 | 0.6 | 14 | SW-23 | 0.8 | 16 |
| SW-24 | 0.8 | 17 | SW-24 | 0.8 | 18 | SW-24 | 0.8 | 16 |
| SW-25 | 0.8 | 15 | SW-25 | 0.6 | 14 | SW-25 | 0.7 | 16 |
| SW-26 | 0.8 | 5 | SW-26 | 0.6 | 4 | SW-26 | 0.7 | 5 |
| SW-27 | 0.7 | 6 | SW-27 | 0.8 | 6 | SW-27 | 0.8 | 6 |
| SW-28 | 0.7 | 6 | SW-28 | 0.8 | 6 | SW-28 | 0.8 | 11 |
| SW-29 | 0.6 | 6 | SW-29 | 0.6 | 8 | SW-29 | 0.8 | 8 |
| SW-30 | - | - | SW-30 | - | - | SW-30 | - | - |

# RASMUSSEN LANDFILL SITE
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPA **Signature:** Steve Rapa

**Date:** JULY 10, 2013
**Time:** 2:00PM

**Weather Conditions:** SUN, HUMID 87°F

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** JULY 29, 2013
**Time:** 3:00 PM

**Weather Conditions:** SUN 75°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** VERY WET SUMMER - GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 8/23/13
**Time:** 12:00

**Weather Conditions:** SUN 76°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** GOOD - BRUSH WORK NEEDE ON CAP

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**
CUT BACK WOODY GROWTH ON CAP

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 8/13/13
**Time:** 11:00 AM

**Weather Conditions:** CLOUDY 60'

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**
BRUSH WORK ON CAP

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** _____ **Signature:** _____

**Date:** _____
**Time:** _____

**Weather Conditions:** _____

**Observations**

**Erosion-North Face:** _____

**Erosion-South Face:** _____

**Erosion-East Face:** _____

**Erosion-West Face:** _____

**Erosion-Misc.:** _____

**Storm Water Ponds:** _____

**Drainage Spillways & Outfalls:** _____

**Roadways:** _____

**Vegetation:** _____

**Signs, Gates, & Fences:** _____

**Actions Taken:**

_____
_____
_____

**Recommendations:**

_____
_____
_____

# RASMUSSEN LANDFILL SITE
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** SEPT 27, 2013
**Time:** 3:30 PM

**Weather Conditions:** SUN 76°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**
CUT SOME BRUSH AROUND BUILDING & CAP

**Recommendations:**
BRUSH ON CAP

6/30/13 32504-25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 36.20 |
| MW-56 | 35.84 |
| MW-58 | 20.75 |
| EB-PZ-2 | 39.55 |
| EB-PZ-4 | 62.56 |
| EB-PZ-5 | 54.40 |
| EB-PZ-6 | 54.78 |
| PZ-103 | 56.46 |
| PZ-104 | 54.24 |
| PZ-105 | 50.96 |
| PZ-106 | 38.59 |
| TEMP-PZ-2 | 52.64 |



32504-25 7/24/13

TASK: BEGIN AREA SAMPLE EVENT
CRA: STEVE RAPAI
WEATHER: SUN 75°F
H&S: LEVEL D
CALIBRATION OF HORIBA NF OH259
pH=4.00, COND=1.49, TURB=0.0
D.O.=8.78, TEMP=22.58

SAMPLE OF CRA-RA-2D

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1425 | 6.54 | 1.65 | 21.6 | 0.67 | 12.06 |
| 1435 | 6.69 | 1.69 | 8.1 | 0.25 | 11.72 |
| 1445 | 6.70 | 1.66 | 5.05 | 0.20 | 11.78 |
| 1450 | 6.73 | 1.65 | 4.2 | 0.18 | 11.73 |
| 1455 | 6.77 | 1.65 | 3.9 | 0.17 | 11.75 |
| 1500 | 6.78 | 1.65 | 3.6 | 0.17 | 11.75 |
| 1505 | 6.78 | 1.65 | 3.5 | 0.18 | 11.73 |

SAMPLED @ 1506 ID GW-32504-072413-SR-1313

SET UP AT CRA-RA-2B AND WELL WIZARD CONTROL BOX WOULD NOT FUNCTION. WILL LOOK AT PLYMOUTH OFFICE FOR RENTAL CONTROL BOX.

7/25/13 32504-25

TASK: CONTINUE 1/4 MW SAMPLE

CRA: STEVE RAPAI

WEATHER: SUN 75°

HIS: LEVEL D

CALIBRATION OF HORIBA NF04293

pH=4.00; COND=14.49; TURB=0.0, D.O.=8.40

TEMP=27.17°C

SAMPLE OF CRA-RA-28

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| SAMPLE OF CRA-RA-28 | | | | | |
| 1020 | 6.06 | 0.657 | 159 | 1.36 | 12.03 |
| 1035 | 6.29 | 0.938 | 29.1 | 0.29 | 11.57 |
| 1040 | 6.31 | 0.930 | 14.3 | 0.24 | 11.57 |
| 1045 | 6.34 | 0.883 | 8.9 | 0.21 | 11.50 |
| 1050 | 6.35 | 0.867 | 4.4 | 0.19 | 11.48 |
| 1055 | 6.38 | 0.865 | 4.6 | 0.18 | 11.46 |
| 1100 | 6.41 | 0.877 | 3.5 | 0.16 | 11.45 |
| 1105 | 6.42 | 0.876 | 3.6 | 0.17 | 11.45 |
| 1110 | 6.42 | 0.877 | 3.9 | 0.17 | 11.45 |

SAMPLED @ 1111 ID: GW-32504-072513-SR-1714

| | | | | | |
|---|---|---|---|---|---|
| SAMPLE OF RA-104 | | | | | |
| 1120 | 6.82 | 0.862 | 126.0 | 2.53 | 12.15 |
| 1130 | 6.75 | 1.48 | 8.9 | 0.21 | 11.87 |
| 1140 | 6.81 | 1.07 | 4.8 | 0.18 | 11.65 |
| 1150 | 6.89 | 1.08 | 4.8 | 0.18 | 11.87 |



32504-25 7/25/13

SAMPLE OF RA-104 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 11:55 | 6.93 | 1.09 | 3.1 | 0.17 | 11.86 |
| 12:00 | 6.92 | 1.09 | 3.2 | 0.18 | 11.87 |
| 12:05 | 6.92 | 1.09 | 3.1 | 0.18 | 11.87 |

SAMPLED @ 12:06 ID: GW-32504-072513-SR-1715

| | | | | | |
|---|---|---|---|---|---|
| SAMPLE OF CRA-RA-25 | | | | | |
| 1325 | 7.36 | 0.611 | 71.3 | 1.82 | 13.52 |
| 1345 | 6.56 | 1.35 | 4.9 | 0.33 | 12.15 |
| 1355 | 6.53 | 1.13 | 4.7 | 0.28 | 12.10 |
| 1400 | 6.50 | 1.24 | 4.2 | 0.26 | 12.13 |
| 1410 | 6.48 | 0.95 | 3.4 | 0.26 | 12.10 |
| 1415 | 6.49 | 0.93 | 3.1 | 0.26 | 12.10 |
| 1420 | 6.48 | 0.92 | 3.1 | 0.26 | 12.11 |
| 1425 | 6.49 | 0.92 | 3.0 | 0.25 | 12.10 |

SAMPLED @ 1426 ID: GW-32504-072513-SR-1716

SAMPLED @ 1435 ID: GW-32504-072513-SR-1717

SAMPLES PACKED IN COOLER WITH ICE

8/16/13 32504-05

TASK: CONTINUE 1/4 QTR SAMPLE EVENT

CRA: STEVE PAPA

WEATHER: SUN 60° ; HIGH OF 78°

HYS: LEVEL D

CALIBRATION OF HORIBA NF 04295

pH=4.00, COND=4.49, TURB=0.0, D.O=8.10,

TEMP=27.35

SAMPLE OF CRA-RA-24

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1100 | 6.50 | 1.53 | 1.8 | 2.05 | NOT WORKING |
| 1110 | 6.36 | 1.97 | 0.12 | 0.69 | |
| 1120 | 6.45 | 1.52 | 0.1 | 0.46 | |
| 1130 | 6.50 | 1.50 | 0.0 | 0.36 | |
| 1135 | 6.51 | 1.52 | 0.0 | 0.33 | |
| 1145 | 6.53 | 1.51 | 0.0 | 0.29 | |
| 1150 | 6.56 | 1.58 | 0.0 | 0.26 | |
| 1155 | 6.58 | 1.67 | 0.0 | 0.25 | |
| 1200 | 6.57 | 1.79 | 0.0 | 0.26 | |

PURGED WELL FOR OVER ONE HOUR

SAMPLED @ 1201 GW-32504-081613-SP-1718

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1225 | 6.79 | 1.54 | 1.7 | 0.52 | NOT WORKING |
| 1235 | 6.78 | 1.60 | 1.3 | 0.26 | |

CONTINUED ON NEXT PAGE



32504-05 8/16/13

SAMPLE OF CRA-RA-30 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1245 | 6.77 | 1.75 | 0.8 | 0.23 | NOT WORKING |
| 1250 | 6.79 | 1.84 | 0.6 | 0.24 | |
| 1255 | 6.79 | 1.90 | 0.8 | 0.23 | |
| 1300 | 6.81 | 1.92 | 0.5 | 0.22 | |
| 1305 | 6.81 | 1.92 | 0.5 | 0.23 | |
| 1310 | 6.81 | 1.92 | 0.8 | 0.22 | |

SAMPLED @ 1311 ID: GW-32504-081613-SP-1719

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1420 | 7.00 | 1.30 | 0.5 | 0.50 | X |
| 1430 | 6.98 | 1.94 | 0.1 | 0.38 | X |
| 1440 | 6.95 | 2.10 | 0.0 | 0.28 | X |
| 1445 | 6.95 | 2.36 | 0.0 | 0.26 | X |
| 1450 | 6.95 | 2.43 | 0.0 | 0.26 | X |
| 1455 | 6.94 | 2.45 | 0.0 | 0.25 | X |
| 1500 | 6.95 | 2.45 | 0.0 | 0.26 | X |
| 1505 | 6.95 | 2.45 | 0.0 | 0.25 | X |

SAMPLED @ 1506 ID: GW-32504-081613-SP-1720

8/21/13 32504.25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: PARTLY CLOUDY, HIGH 86, HUMID

H&S: LEVEL D

CALIBRATION OF HORIBA NF 04293

pH=4.00, COND.=1.49, TURB=0.0, TEMP=35.87

DO.=7.58

SAMPLE OF CRA-RA-22

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1425 | 6.27 | 1.29 | 39.3 | 0.95 | 12.84 |
| 1435 | 6.55 | 2.26 | 18.0 | 0.36 | 12.22 |
| 1445 | 6.68 | 4.34 | 9.0 | 0.21 | 12.03 |
| 1455 | 6.73 | 5.18 | 2.9 | 0.16 | 12.02 |
| 1500 | 6.76 | 5.22 | 1.9 | 0.16 | 12.03 |
| 1505 | 6.78 | 5.27 | 2.4 | 0.15 | 12.04 |
| 1510 | 6.76 | 5.27 | 1.8 | 0.15 | 12.04 |
| 1515 | 6.76 | 5.27 | 1.7 | 0.16 | 12.04 |

SAMPLED @ 1516 ID: GW-32504-082113-SP-1921

STORMS APPROACHING FROM WEST.

STORMS HIT JUST AS I WAS FINISHED SAMPLING CRA-RA-22. SWA USED



32504.25 8/22/13

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY, 86° HUMID, CHANCE OF STORM

H&S: LEVEL D

CALIBRATION OF HORIBA NF 04293

pH=4.00, COND.=1.49, TURB=0.0, D.O.=7.22, TEMP=31.80

SAMPLE OF TEMP-RE-2

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1335 | 6.23 | 2.13 | 38.3 | 2.78 | 12.07 |
| 1345 | 6.57 | 2.06 | 10.6 | 1.22 | 11.88 |
| 1355 | 6.71 | 3.96 | 5.0 | 0.57 | 11.88 |
| 1400 | 6.73 | 5.27 | 3.7 | 0.38 | 11.90 |
| 1405 | 6.75 | 6.58 | 3.2 | 0.32 | 11.91 |
| 1410 | 6.77 | 7.47 | 2.7 | 0.28 | 11.90 |
| 1415 | 6.79 | 8.05? | 2.9 | 0.27 | 11.91 |
| 1420 | 6.78 | 8.40? | 1.6 | 0.28 | 11.90 |

SAMPLED @ 1421 ID: GW-32504-082213-SP-1922

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1430 | 6.92 | 0.567 | 2.7 | 6.07 | 12.43 |
| 1440 | 6.79 | 0.676 | 1.8 | 7.09 | 12.14 |
| 1455 | 6.79 | 0.563 | 2.4 | 7.12 | 12.03 |
| 1500 | 6.79 | 0.562 | 2.2 | 7.13 | 12.04 |

CONTINUED ON NEXT PAGE

8/22/13 32504-25

SAMPLE OF CRA-RA-29 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1505 | 6.79 | 0.563 | 1.9 | 7.11 | 12.04 |

SAMPLED @ 1506 ID: GW-32504-082213-SP-1723

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504-25 8/26/13

TASK: CONTINUE 1/4 MILE SAMPLING,

CRA: STEVE RAPAI

WEATHER: SUN, HIGH 80°, AFTERNOON STORMS

HES LEVEL D

CALIBRATION OF HORIBA: pH = 4.00, COND = 1.49, TURB = 0.0, D.O. = 6.66, TEMP = 29.06

HORIBA NF 04293.

SAMPLE OF 81-8

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 0950 | 6.41 | 1.21 | 10.1 | 2.53 | 12.45 |
| 1000 | 7.00 | 1.18 | 3.5 | 8.88 | 14.14 |
| 1010 | 7.24 | 0.811 | 8.1 | +19.99 | 14.17 |
| 1015 | 7.26 | 0.810 | 1.1 | +19.99 | 14.19 |
| 1020 | 7.27 | 0.810 | 0.9 | +19.99 | 14.18 |
| 1025 | 7.26 | 0.810 | 7.0 | +19.99 | 14.18 |

SAMPLED @ 1026 ID: GW-32504-082613-SP-1724

SAMPLE OF CRA-RA-31

| | | | | | |
|---|---|---|---|---|---|
| 1040 | 7.40 | 0.632 | 1.1 | 2.27 | 11.90 |
| 1050 | 7.26 | 5.80 | 0.3 | 0.52 | 11.86 |
| 1100 | 7.15 | 8.99 ? | 0.2 | 0.48 | 11.88 |
| 1105 | 7.14 | 21.1 ? | 0.1 | 0.44 | 11.88 |
| 1110 | 7.14 | 24.9 ? | 0.1 | 0.44 | 11.88 |
| 1115 | 7.14 | 26.4 ? | 0.1 | 0.43 | 11.89 |

SAMPLED @ 1116 ID: GW-32504-082613-SP-1725

8/26/13 32504-25

SAMPLE OF CRA-RA-7

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1125 | 7.35 | 0.356 | 5.3 | 5.52 | 11.03 |
| 1135 | 7.38 | 0.346 | 2.7 | 6.35 | 11.03 |
| 1145 | 7.37 | 0.345 | 0.7 | 6.51 | 10.97 |
| 1150 | 7.38 | 0.347 | 0.6 | 6.46 | 10.95 |
| 1155 | 7.38 | 0.345 | 0.4 | 6.45 | 10.94 |
| 1200 | 7.38 | 0.345 | 0.4 | 6.46 | 10.94 |

SAMPLED @ 1201 ID: GW-32504-082613-SR-1726

SAMPLE OF CRA-RA-6S

| | | | | | |
|---|---|---|---|---|---|
| 1300 | 6.97 | 1.18 | 0.3 | 2.34 | 13.84 |
| 1310 | 6.69 | 3.52 | 0.0 | 1.02 | 13.46 |
| 1320 | 6.68 | 5.49 ? | 0.0 | 0.81 | 13.41 |
| 1325 | 6.69 | 6.77 ? | 0.0 | 0.78 | 13.26 |
| 1330 | 6.68 | 6.95 ? | 0.0 | 0.78 | 13.25 |
| 1335 | 6.68 | 7.57 ? | 0.0 | 0.78 | 13.13 |
| 1340 | 6.69 | 7.31 ? | 0.0 | 0.79 | 13.19 |
| 1345 | 6.69 | 7.11 ? | 0.0 | 0.79 | 13.18 |
| 1350 | 6.69 | 8.56 ? | 0.0 | 0.79 | 13.20 |

SAMPLED @ 1351 ID: GW-32504-082613-SR-1727

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 7.02 | 1.42 | 0.0 | 2.42 | 12.47 |
| 1410 | 6.82 | 6.67 | 0.0 | 0.45 | 12.27 |

CONTINUED ON NEXT PAGE



32504-25 8/26/13

SAMPLE OF CRA-RA-5 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1420 | 6.85 | 18.6 ? | 0.0 | 0.69 | 12.19 |
| 1425 | 6.85 | 16.9 ? | 0.0 | 0.80 | 12.23 |
| 1430 | 6.86 | 14.2 ? | 0.0 | 0.86 | 12.15 |
| 1435 | 6.86 | 13.6 ? | 0.0 | 0.86 | 12.16 |
| 1440 | 6.86 | 13.6 ? | 0.0 | 0.87 | 12.16 |

SAMPLED @ 1441 ID: GW-32504-082613-SR-1728

SAMPLE OF EB-PZ-4

| | | | | | |
|---|---|---|---|---|---|
| 1510 | 7.22 | 0.908 | 77.7 | 0.96 | 12.74 |
| 1520 | 7.16 | 4.69 | 22.4 | 0.45 | 12.49 |
| 1530 | 7.14 | 3.45 | 9.6 | 1.20 | 12.54 |
| 1540 | 7.12 | 1.04 | 5.8 | 2.38 | 12.59 |
| 1550 | 7.12 | 0.881 | 4.7 | 3.13 | 12.72 |
| 1600 | 7.13 | 0.905 | 3.9 | 3.25 | 12.67 |
| 1610 | 7.14 | 0.904 | 3.5 | 3.32 | 12.55 |

PURGED WELL FOR OVER 1 HOUR.

SAMPLED @ 1615 ID: GW-32504-082613-SR-1729

8/26/13 32504-25

SAMPLE OF CRA-RA-7

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1125 | 7.35 | 0.356 | 5.3 | 5.52 | 11.03 |
| 1135 | 7.38 | 0.346 | 2.7 | 6.35 | 11.03 |
| 1145 | 7.37 | 0.345 | 0.7 | 6.51 | 10.97 |
| 1150 | 7.38 | 0.347 | 0.6 | 6.46 | 10.95 |
| 1155 | 7.38 | 0.345 | 0.4 | 6.45 | 10.94 |
| 1200 | 7.38 | 0.345 | 0.4 | 6.46 | 10.94 |

SAMPLED @ 1201 ID: GW-32504-082613-SR-1726

SAMPLE OF CRA-RA-6S

| | | | | | |
|---|---|---|---|---|---|
| 1300 | 6.97 | 1.18 | 0.3 | 2.34 | 13.84 |
| 1310 | 6.69 | 3.52 | 0.0 | 1.02 | 13.46 |
| 1320 | 6.68 | 5.49 ? | 0.0 | 0.84 | 13.41 |
| 1325 | 6.69 | 6.77 ? | 0.0 | 0.78 | 13.26 |
| 1330 | 6.68 | 6.95 ? | 0.0 | 0.78 | 13.25 |
| 1335 | 6.68 | 7.57 ? | 0.0 | 0.78 | 13.13 |
| 1340 | 6.69 | 7.31 ? | 0.0 | 0.79 | 13.19 |
| 1345 | 6.69 | 7.11 ? | 0.0 | 0.79 | 13.18 |
| 1350 | 6.69 | 8.56 ? | 0.0 | 0.79 | 13.20 |

SAMPLED @ 1351 ID: GW-32504-082613-SR-1727

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 7.02 | 1.42 | 0.0 | 2.42 | 12.97 |
| 1410 | 6.82 | 6.67 | 0.0 | 0.49 | 12.27 |

CONTINUED ON NEXT PAGE



32504-25 8/26/13

SAMPLE OF CRA-RA-5 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1420 | 6.85 | 18.6 ? | 0.0 | 0.69 | 12.19 |
| 1425 | 6.85 | 16.9 ? | 0.0 | 0.80 | 12.23 |
| 1430 | 6.86 | 14.2 ? | 0.0 | 0.86 | 12.15 |
| 1435 | 6.86 | 13.6 ? | 0.0 | 0.86 | 12.16 |
| 1440 | 6.86 | 13.6 ? | 0.0 | 0.87 | 12.16 |

SAMPLED @ 1441 ID: GW-32504-082613-SR-1728

SAMPLE OF EB-PZ-4

| | | | | | |
|---|---|---|---|---|---|
| 1510 | 7.22 | 0.908 | 77.7 | 0.96 | 12.71 |
| 1520 | 7.16 | 4.69 | 22.4 | 0.45 | 12.49 |
| 1530 | 7.14 | 3.45 | 9.6 | 1.20 | 12.54 |
| 1540 | 7.12 | 1.04 | 5.8 | 2.38 | 12.59 |
| 1550 | 7.12 | 0.881 | 4.7 | 3.13 | 12.72 |
| 1600 | 7.13 | 0.905 | 3.9 | 3.25 | 12.67 |
| 1610 | 7.14 | 0.904 | 3.5 | 3.32 | 12.55 |

PURGED WELL FOR OVER 1 HOUR

SAMPLED @ 1615 ID: GW-32504-082613-SR-1729

8/27/13 32504-25

TASK: CONTINUE DAILY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: MORNING STORMS, HIGH 90°, HUMID, CHANCE OF AFTERNOON STORMS

H&S: LEVEL D

CALIBRATION OF HORIBA NE04293

pH=4.00, COND=4.50, TURB.=0.0, D.O.=7.86, TEMP.=31.15

SET UP AT CRA-RA-18 AFTER 2 HOUR DELAY FROM HEAVY RAIN/LIGHTNING.

SAMPLE OF CRA-RA-18

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0950 | 6.22 | 1.79 | 1.7 | 7.20 | 11.37 |
| 1000 | 6.50 | 1.75 | 4.5 | 6.76 | 10.90 |
| 1010 | 6.60 | 1.73 | 3.3 | 6.60 | 10.85 |
| 1020 | 6.64 | 1.73 | 3.2 | 6.58 | 10.84 |
| 1025 | 6.65 | 1.72 | 3.7 | 6.57 | 10.84 |
| 1030 | 6.65 | 1.72 | 3.2 | 6.57 | 10.84 |

SAMPLED @ 1031 ID: GW-32504-082713-SR-1730

SAMPLE OF PZ-106

| | | | | | |
|---|---|---|---|---|---|
| 1040 | 6.92 | 1.23 | 3.2 | 4.82 | 12.85 |
| 1055 | 6.61 | 6.48 | 31.8 | 0.40 | 12.67 |
| 1110 | 6.64 | 33.7? | 15.8 | 0.31 | 12.75 |
| 1120 | 6.64 | 21.3? | 10.8 | 0.23 | 14.13 |

CONTINUED ON NEXT PAGE



32504-25 8/27/13

SAMPLE OF PZ-106 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1130 | 6.64 | 16.3? | 9.5 | 0.24 | 14.85 |
| 1135 | 6.64 | 10.6? | 7.4 | 0.28 | 14.57 |
| 1140 | 6.64 | 7.1? | 6.2 | 0.27 | 14.23 |

PURGED FOR MORE THAN ONE HOUR

SAMPLED @ 1145 ID: GW-32504-082713-SR-1731

SAMPLED @ 1150 ID: GW-32504-082713-SR-1732

SAMPLE OF RA-MW-43

TUBING AT WELL CAP WAS BROKEN & HAD TO BE REPAIRED BEFORE SAMPLING.

| | | | | | |
|---|---|---|---|---|---|
| 1210 | 7.03 | 0.90 | 5.3 | 1.82 | 13.17 |
| 1220 | 7.03 | 3.27 | 5.5 | 1.40 | 12.64 |
| 1230 | 7.09 | 2.78 | 1.8 | 1.87 | 12.43 |
| 1240 | 7.14 | 1.86 | 4.8 | 2.19 | 12.40 |
| 1250 | 7.19 | 1.55 | 4.4 | 2.20 | 12.51 |
| 1255 | 7.20 | 1.84 | 4.4 | 2.17 | 12.52 |
| 1300 | 7.20 | 1.85 | 4.8 | 2.18 | 12.52 |

SAMPLED @ 1301 ID: GW-32504-082713-SR-1733

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1310 | 7.28 | 0.707 | 8.4 | 2.75 | 11.85 |
| 1320 | 6.93 | 1.07 | 6.5 | 2.87 | 11.51 |

CONTINUED ON NEXT PAGE

8/27/13 32504.25

SAMPLE OF RA-MW-28 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1335 | 6.83 | 1.02 | 3.6 | 3.01 | 11.52 |
| 1340 | 6.83 | 1.02 | 3.1 | 3.01 | 11.53 |
| 1345 | 6.83 | 1.01 | 3.0 | 2.99 | 11.52 |

SAMPLED @ 1346 ID: GW-32504-082713-SR-1734

SAMPLE OF CRA-RA-27

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 7.03 | 1.72 | 5.2 | 2.48 | 12.17 |
| 1410 | 6.64 | 7.97 ? | 4.4 | 0.27 | 11.87 |
| 1420 | 6.63 | 8.41 ? | 4.4 | 0.23 | 11.88 |
| 1425 | 6.62 | 8.66 ? | 4.2 | 0.20 | 11.89 |
| 1430 | 6.62 | 7.76 ? | 4.2 | 0.19 | 11.88 |
| 1435 | 6.62 | 7.03 ? | 4.1 | 0.20 | 11.88 |

SAMPLED @ 1436 ID: GW-32504-082713-SR-1735

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 6.83 | 1.30 | 3.5 | 7.46 | 12.52 |
| 1500 | 6.66 | 1.29 | 4.3 | 5.81 | 11.95 |
| 1510 | 6.64 | 1.31 | 4.3 | 6.88 | 11.71 |
| 1515 | 6.64 | 1.31 | 4.3 | 7.22 | 11.73 |
| 1520 | 6.64 | 1.32 | 4.3 | 7.71 | 11.75 |
| 1530 | 6.64 | 1.32 | 4.3 | 7.72 | 11.96 |
| 1535 | 6.64 | 1.32 | 4.3 | 7.72 | 11.75 |

SAMPLED @ 1536 ID: GW-32504-082713-SR-1736

SAMPLES PACKED IN COOLER [illegible]



32504.25 8/28/13

TASK: FINISH 1/4 QTR SAMPLE EVENT

CRA: STEVE RAPP

WEATHER: CLOUDY, 78°, HUMID!, HIGH 86°

HSA: LEVEL D

CALIBRATION OF HORIBA NF 04293

pH=4.00, COND.=4.49, TURB.=0.0, D.O.=7.89, TEMP.=31.02

SAMPLE OF CRA-RA-26D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0945 | 5.85 | 1.73 | 34.3 | 6.54 | 11.94 |
| 0955 | 6.56 | 8.42 ? | 7.1 | 0.40 | 11.45 |
| 1005 | 6.64 | 18.0 ? | 6.2 | 0.27 | 11.46 |
| 1015 | 6.66 | 14.1 ? | 4.7 | 0.27 | 11.46 |
| 1025 | 6.68 | 11.8 ? | 3.6 | 0.25 | 11.44 |
| 1030 | 6.67 | 8.6 ? | 3.1 | 0.25 | 11.45 |

SAMPLED @ 1031 ID: GW-32504-082813-SR-1737

SAMPLE OF CRA-RA-23D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1100 | 7.08 | 0.80 | 14.6 | 6.56 | 10.87 |
| 1110 | 6.70 | 0.90 | 6.4 | 4.69 | 10.69 |
| 1120 | 6.70 | 0.98 | 5.7 | 4.51 | 10.67 |
| 1125 | 6.70 | 0.99 | 4.9 | 4.46 | 10.67 |
| 1130 | 6.70 | 0.97 | 4.2 | 4.44 | 10.66 |

CONTINUED ON NEXT PAGE

8/28/13 32504-25

SAMPLE OF CRA RA-23D (CONTINUED)

| TIME | pH | COND. | TURB. | DO | TEMP. |
|---|---|---|---|---|---|
| 1135 | 6.70 | 0.98 | 3.9 | 4.46 | 10.69 |

SAMPLED @ 1136 ID: GW-32504-082813-SR-1738

SAMPLE OF 81-4

| | | | | | |
|---|---|---|---|---|---|
| 1205 | 6.78 | 245 | 20.1 | 0.69 | 11.81 |
| 1215 | 6.76 | 5.07? | 9.1 | 0.46 | 11.73 |
| 1225 | 6.69 | 6.87? | 4.6 | 0.43 | 11.88 |
| 1230 | 6.68 | 6.73? | 3.5 | 0.41 | 11.88 |
| 1235 | 6.68 | 6.80? | 3.9 | 0.40 | 11.88 |
| 1240 | 6.68 | 6.35? | 3.5 | 0.40 | 11.88 |

SAMPLED @ 1241 ID: GW-32504-082813-SR-1739

SAMPLE OF THE RASMUSSEN RESIDENTIAL WELL. SAMPLE COLLECTED FROM OUTSIDE SPIGOT. ALLOWED WELL TO RUN FOR APPROXIMATELY 25 MINUTES BEFORE COLLECTING SAMPLE.

SAMPLED @ 1400 ID: GW-32504-082813-SR-1740

MS/MSD

SAMPLES PACKED IN COOLER WITH ICE FOR FEDEX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504-25 9/30/13

TASK: 1/4 LY WATER LEVELS

CRA: STEVE RAPAI

WEATHER: PARTLY CLOUDY 72°F

H&S: LEVEL D

| WELL ID | DEPTH |
|---|---|
| 81-4 | 29.74 |
| 81-5 | 34.03 |
| 81-7 | 46.09 |
| 81-8 | 48.82 |
| 81-9 | 15.91 |
| 81-10 | 32.32 |
| RA-1 | 68.81 |
| RA-2D | 55.75 |
| RA-2S | 55.46 |
| RA-3 | 52.54 |
| RA-4 | 23.61 |
| RA-5 | 54.62 |
| RA-6 | 59.05 |
| RA-7 | 32.50 |
| RA-8 | 18.29 |
| RA-16 | 58.27 |
| RA-18 | 41.40 |
| RA-18D | 56.04 |
| RA-19D | 49.96 |

9/30/13

32504.25

| WELL ID | LEVEL |
|---|---|
| RA-19S | 47.33 |
| RA-20 | 58.48 |
| RA-22 | 53.62 |
| RA-23D | 32.98 |
| RA-23S | 33.26 |
| RA-24 | 56.51 |
| RA-25 | 53.95 |
| RA-26D | 49.92 |
| RA-26S | 49.61 |
| RA-27 | 61.42 |
| RA-28 | 54.14 |
| RA-29 | 45.75 |
| RA-30 | 58.18 |
| RA-31 | 31.67 |
| RA-32 | 57.00 ~~34.78~~ |
| MW-22 | 42.03 |
| MW-28 | 42.36 |
| MW-32 | 34.78 |
| MW-34C | 41.51 |
| MW-35 | 24.04 ~~47.44~~ |
| MW-41 | 47.44 |
| MW-42 | 63.43 |
| MW-47 | 53.53 |
| MW-54 | 55.74 |



32504.25

9/30/13

| WELL ID | LEVEL |
|---|---|
| MW-55 | 36.71 |
| MW-56 | 35.71 |
| MW-58 | 21.28 |
| EB-PZ-2 | 40.08 |
| EB-PZ-4 | 53.20 |
| EB-PZ-5 | 54.92 |
| EB-PZ-6 | 54.68 |
| PZ-103 | 56.96 |
| PZ-104 | 54.75 |
| PZ-105 | 51.55 |
| PZ-106 | 39.10 |
| TEMP-PZ-2 | 53.12 |

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

January 13, 2014

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 125
Groundwater and Landfill RD/RA
Reporting Period: October 1 through December 31, 2013
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 Introduction

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree ("CD"), Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 Activities Performed During this Reporting Period

### 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on December 31, 2013. The corresponding groundwater contour map is provided on Figure 1.

Quarterly groundwater samples were collected on November 6, 7 and 11 through 14, 2013 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

### 2.2 Reports

Quarterly Progress Report No. 124 was submitted to United States Environmental Protection Agency (USEPA) and Michigan Department of Environmental Quality (MDEQ) on October 11, 2013.

## 3.0 Summary of Findings

The results of the fourth quarter 2013 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in Groundwater Remediation Monitoring Program.

During the fourth quarter 2013 sampling, seven of the 27 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the seven monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 8.5/8.4 µg/L vinyl chloride (duplicate sample) |
| CRA-RA-23D | 5.1 µg/L trichloroethene |
| CRA-RA-24 | 6.5 µg/L vinyl chloride |
| CRA-RA-26S | 95 µg/L trichloroethene |
| CRA-RA-27 | 11 µg/L vinyl chloride |
| CRA-RA-30 | 4.5 µg/L vinyl chloride |
| 81-4 | 2.6/2.5 µg/L vinyl chloride (duplicate sample) |

There were eight monitoring wells that had COCs above Part 201 DWC during the third quarter 2013. EB-PZ-4 is sampled annually, usually in the third quarter. Vinyl chloride in the groundwater samples collected from EB-PZ-4 decreased from 4.0 µg/L in 2012 to 2.2 µg/L in 2013.

## 4.0 Problems Encountered

No problems were encountered with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2013.

## 5.0 Corrective Measures to Rectify Problems

No corrective measures were implemented with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2013.

## 6.0 Contacts and Significant Correspondence with Public Representatives

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | October 11, 2013. | Report No. 124 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDNRE) |
| email | October 18, 2013 | Mr. H. Caine inquires about Site visit |
| email | October 22, 2013 | Mr. B. Bartholomy replies |

## 7.0 Planned Upcoming Activities/Schedule

Landfill and groundwater component activities planned for the first quarter of 2014:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The first quarter groundwater sampling event is scheduled for the week of February 17, 2014
- The wells to be sampled in the first quarter of 2014 are listed in Table 5
- Obtain property access to install vertical aquifer sampling (VAS) boreholes and monitoring wells

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven Rapai

For Bart Bartholomy

AJD/cb/34
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Steven Nadeau, Honigman Miller

# TABLES AND FIGURES

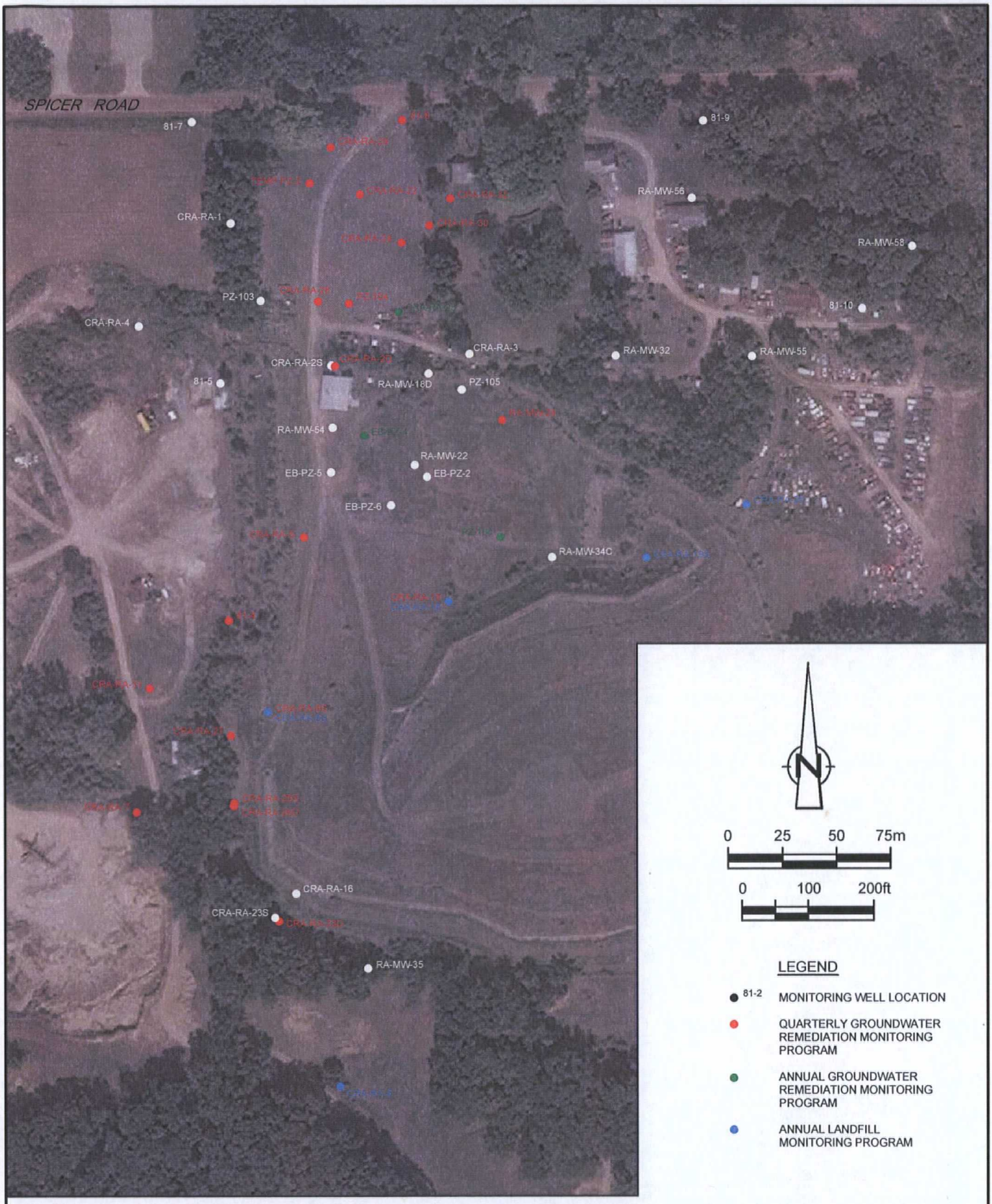



figure 1

2013 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN034)GN-WA001 JAN 8/2014

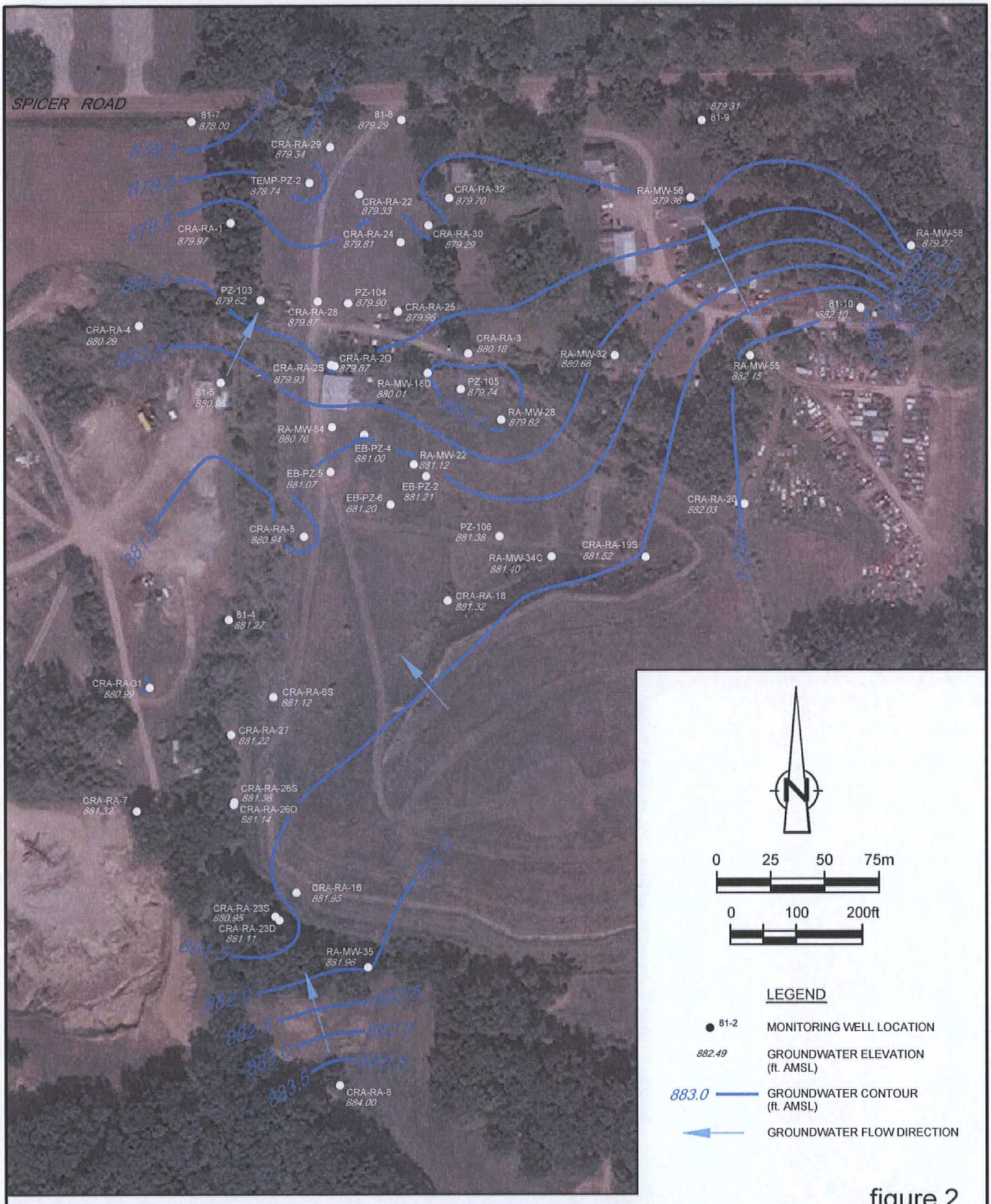



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
DECEMBER 2013
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN034)GN-WA002 JAN 8/2014

# LOG FORM COPIES

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | OCTOBER 16, 2013 | | DATE: | NOV. 5, 2013 | | DATE: | DECEMBER 13 & 17, 2013 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 8 | SW-1 | 0.8 | 10 | SW-1 | 0.8 | 10 |
| SW-2 | 0.8 | 6 | SW-2 | 0.7 | 7 | SW-2 | 0.8 | 5 |
| SW-3 | 0.8 | 13 | SW-3 | 0.8 | 14 | SW-3 | 0.8 | 14 |
| SW-4 | 0.8 | 14 | SW-4 | 0.8 | 15 | SW-4 | 0.7 | 15 |
| SW-5 | 0.7 | 15 | SW-5 | 0.7 | 18 | SW-5 | 0.8 | 15 |
| SW-6 | 0.7 | 17 | SW-6 | 0.8 | 17 | SW-6 | 0.8 | 16 |
| SW-7 | 0.7 | 16 | SW-7 | 0.6 | 15 | SW-7 | 0.8 | 16 |
| SW-8 | - | - | SW-8 | - | - | SW-8 | - | - |
| SW-9 | - | - | SW-9 | - | - | SW-9 | - | - |
| SW-10 | - | - | SW-10 | - | - | SW-10 | - | - |
| SW-11 | - | - | SW-11 | - | - | SW-11 | - | - |
| SW-12 | 0.6 | 15 | SW-12 | 0.6 | 15 | SW-12 | 0.7 | 15 |
| SW-13 | 0.6 | 3 | SW-13 | 0.6 | 2 | SW-13 | 0.7 | 2 |
| SW-14 | - | - | SW-14 | - | - | SW-14 | - | - |
| SW-15 | - | - | SW-15 | - | - | SW-15 | - | - |
| SW-16 | - | - | SW-16 | - | - | SW-16 | - | - |
| SW-17 | 0.8 | 18 | SW-17 | 0.7 | 18 | SW-17 | 0.8 | 18 |
| SW-18 | 0.8 | 18 | SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 |
| SW-19 | 0.8 | 17 | SW-19 | 0.8 | 18 | SW-19 | 0.8 | 17 |
| SW-20 | 0.8 | 18 | SW-20 | 0.8 | 17 | SW-20 | 0.7 | 17 |
| SW-21 | - | - | SW-21 | - | - | SW-21 | - | - |
| SW-22 | 0.7 | 13 | SW-22 | 0.6 | 13 | SW-22 | 0.7 | 13 |
| SW-23 | 0.6 | 16 | SW-23 | 0.7 | 14 | SW-23 | 0.7 | 15 |
| SW-24 | 0.7 | 18 | SW-24 | 0.7 | 16 | SW-24 | 0.7 | 13 |
| SW-25 | 0.8 | 14 | SW-25 | 0.8 | 15 | SW-25 | 0.8 | 14 |
| SW-26 | 0.6 | 4 | SW-26 | 0.8 | 5 | SW-26 | 0.8 | 4 |
| SW-27 | 0.8 | 6 | SW-27 | 0.8 | 6 | SW-27 | 0.7 | 6 |
| SW-28 | 0.7 | 7 | SW-28 | 0.8 | 8 | SW-28 | 0.8 | 7 |
| SW-29 | 0.7 | 6 | SW-29 | 0.8 | 8 | SW-29 | 0.8 | 7 |
| SW-30 | - | - | SW-30 | - | - | SW-30 | - | - |

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 10-1-2013 | 10-11-2013 | 10/18/13 | 10/25/13 | 11/1/2013 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L Rapai | L Rapai | L Rapai | L Rapai | L Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | - | - | - | - | - |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 55 | 55 | 55 | 55 | 58 |
| Feed Air Pressure psi | 110 | 110 | 110 | 105 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 46 |
| Run Time hours | | 85869.1 | 86037.0 | 86205.3 | 86373.7 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 7 | 7 | 8 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 36 | 35 | 32 | 35 | 35 |
| Regulator #2 psi | 24 | 22 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | - | - | - | - | - |
| Zone On | 1 | 3 | 1 | 3 | 1 |
| Zone Time hours | 1/2 | 2 | 1/2 | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 11/6/13 | 11/14/13 | 11/20/13 | 11/27/13 | 12/6/13 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L Rapai | L Rapai | L Rapai | L Rapai | L Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | - | - | - | - | - |
| Run Time hours | | | | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 54 | 54 | 58 | 55 | 60 |
| Feed Air Pressure psi | 110 | 110 | 110 | 105 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 44 | 42 | 42 |
| Run Time hours | | 86682.7 | 86827.3 | 86992.7 | 87209.7 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 7 | 8 | 8 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | 34 | 37 | 33 | 35 |
| Regulator #2 psi | 22 | 21 | 22 | 21 | 22 |
| Alarm Reading ppm, O3 | - | - | - | - | - |
| Zone On | 2 | 1 | 2 | 1 | 1 |
| Zone Time hours | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| DATE | 12/13/13 | 12/17/13 | 12/23/13 | 12/31/13 | |
| OPERATOR SIGNATURE | L Rapai | L Rapai | L Rapai | L Rapai | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Compressor** | | | | | |
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | |
| Temperature F | - | - | | - | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Sep** | | | | | |
| | | | | | |
| Receiver Pressure psi | 60 | 55 | 56 | 60 | |
| Feed Air Pressure psi | 100 | 110 | 110 | 110 | |
| Cycle Pressure psi | 70 | 65 | 70 | 70 | |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | |
| Run Time hours | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Dryer** | | | | | |
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | |

| | | | | | |
|---|---|---|---|---|---|
| **Ozone Generator** | | | | | |
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | 7 | 8 | |
| % O3 capacity | 45 | 45 | 45 | 45 | |
| Regulator #1 psi | 33 | 35 | 33 | 38 | |
| Regulator #2 psi | 22 | 22 | 22 | 24 | |
| Alarm Reading ppm, O3 | - | - | - | - | |
| Zone On | 2 | 1 | 2 | 2 | |
| Zone Time hours | 1/2 | 1/2 | 1/2 | 1/2 | |

| | | | | | |
|---|---|---|---|---|---|
| **Distribution Panel** | | | | | |
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** OCT. 11, 2013
**Time:** 2:30 PM

**Weather Conditions:** CLEAR 70°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** OK

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
BRUSH WORK NEEDED ON STEEP SLOPES

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 10/25/2013
**Time:** 12:00 NOON

**Weather Conditions:** CLOUDY 45°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** OK

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
BRUSH WORK NEEDED ON STEEP SLOPES.

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** NOV. 6, 2013
**Time:** 2:00PM

**Weather Conditions:** RAIN 58°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET - NO STANDING WATER

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:** WET - GOOD

**Vegetation:** GOING DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
CREW CLEARED BRUSH ON AND AROUND CAP LAST WEEK.

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** Nov. 27, 2013
**Time:** 10:00 AM

**Weather Conditions:** CLEAR 25°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** DEC. 13, 2013
**Time:** 10:30 AM

**Weather Conditions:** CLOUDY 20°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** DEC. 31, 2013
**Time:** 3:00PM

**Weather Conditions:** 20° LT. SNOW, SUB ZERO WIND CHILLS

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

11/6/13 32504-25

TASK: BEGIN 1/4 LY SAMPLE EVENT
CRA: STEVE RAPAI
WEATHER: RAIN, 55°, WINDY
H&S: LEVEL D
CALIBRATION OF HORIBA NE0503
pH=4.00, COND.=4.49, TURB.=0.0, D.O.=10.21,
TEMP.=12.97

SAMPLE OF CRA-RA-2D

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1240 | 6.35 | 1.41 | 0.0 | 11.20 | 14.49 |
| 1250 | 6.60 | 1.52 | 2.3 | 8.83 | 13.62 |
| 1300 | 6.58 | 1.55 | 2.4 | 6.58 | 12.97 |
| 1305 | 6.68 | 1.56 | 4.2 | 5.43 | 12.80 |
| 1310 | 6.82 | 1.57 | 3.5 | 4.46 | 12.64 |
| 1315 | 6.91 | 1.55 | 2.9 | 3.79 | 12.47 |
| 1320 | 7.01 | 1.57 | 2.7 | 3.14 | 12.36 |
| 1330 | 7.20 | 1.56 | 1.8 | 2.01 | 12.11 |
| 1335 | 7.22 | 1.56 | 1.8 | 1.91 | 12.18 |
| 1340 | 7.21 | 1.57 | 1.5 | 1.66 | 12.01 |

PURGED WELL FOR OVER ONE HOUR
SAMPLED @ 1341 ID: GW-32504-110613-SR-1741



32504-25 11/6/13

SAMPLE OF CRA-RA-2B

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1400 | 7.41 | 0.943 | 7.4 | 0.50 | 11.86 |
| 1410 | 7.33 | 0.947 | 7.3 | 0.19 | 11.66 |
| 1420 | 7.31 | 0.957 | 6.4 | 0.16 | 11.60 |
| 1425 | 7.31 | 0.960 | 5.1 | 0.15 | 11.58 |
| 1430 | 7.31 | 0.962 | 4.8 | 0.13 | 11.57 |
| 1435 | 7.31 | 0.965 | 4.6 | 1.39 | 11.55 |
| 1440 | 7.32 | 0.966 | 4.4 | 1.37 | 11.55 |
| 1445 | 7.32 | 0.969 | 4.8 | 1.05 | 11.55 |
| 1450 | 7.31 | 0.970 | 4.7 | 0.83 | 11.56 |
| 1455 | 7.31 | 0.971 | 4.7 | 0.69 | 11.55 |

PURGED FOR OVER 1 HOUR
SAMPLED @ 1501 ID: GW-32504-110613-SR-1742

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1515 | 6.67 | 1.39 | 2.3 | 12.20 | 11.94 |
| 1525 | 7.12 | 1.38 | 2.5 | 8.88 | 11.25 |
| 1535 | 7.13 | 1.31 | 1.6 | 2.87 | 11.25 |
| 1540 | 7.14 | 1.31 | 1.4 | 2.01 | 11.24 |
| 1545 | 7.14 | 1.31 | 1.2 | 1.64 | 11.24 |
| 1550 | 7.14 | 1.30 | 1.4 | 1.32 | 11.24 |
| 1555 | 7.14 | 1.31 | 1.4 | 1.31 | 11.24 |
| 1600 | 7.14 | 1.30 | 1.5 | 1.31 | 11.24 |

SAMPLED @ 1601 ID: GW-32504-110613-SR-1743

11/7/13 32504-25

TASK: CONTINUE 1/4 HY SAMPLE EVENT
CRA: STEVE RAPAI
WEATHER: SUN, WINDY, 38°F
H&S: LEVEL D
CALIBRATION OF RENTAL HORIBA NF05036
pH=4.00, COND.=4.49, TURB.=0, D.O.=9.50
TEMP. 21.71°C

SAMPLE OF PZ-104

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1310 | 5.88 | 1.14 | 0.0 | 2.22 | 14.46 |
| 1320 | 6.37 | 1.21 | 0.0 | 0.37 | 13.18 |
| 1330 | 6.49 | 1.23 | 0.0 | 0.29 | 13.02 |
| 1335 | 6.60 | 1.24 | 1.2 | 0.29 | 12.84 |
| 1340 | 6.69 | 1.24 | 1.7 | 0.29 | 12.79 |
| 1345 | 6.70 | 1.25 | 1.1 | 0.29 | 12.79 |
| 1350 | 6.70 | 1.25 | 1.1 | 0.29 | 12.78 |

SAMPLED @ 1351 ID: GW-32504-110713-SR-1744

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1405 | 6.85 | 0.984 | 5.1 | 4.02 | 13.46 |
| 1415 | 6.75 | 0.991 | 2.7 | 3.23 | 13.20 |
| 1425 | 6.73 | 1.00 | 2.1 | 1.86 | 12.80 |
| 1430 | 6.74 | 1.01 | 1.7 | 1.52 | 12.69 |
| 1435 | 6.70 | 1.02 | 1.6 | 1.09 | 12.26 |

CONTINUED ON NEXT PAGE



32504-25 11/7/13

SAMPLE OF CRA-RA-24 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1440 | 6.63 | 1.03 | 2.2 | 0.85 | 12.10 |
| 1445 | 6.49 | 1.03 | 0.0 | 0.69 | 11.78 |
| 1450 | 6.75 | 1.03 | 0.0 | 0.52 | 11.76 |
| 1455 | 6.79 | 1.03 | 0.0 | 0.44 | 11.66 |
| 1500 | 6.80 | 1.04 | 0.0 | 0.36 | 11.50 |

PURGED WELL FOR OVER ONE HOUR.
SAMPLED @ 1501 ID: GW-32504-110713-SR-1745

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1525 | 6.89 | 0.976 | 2.2 | 0.19 | 11.08 |
| 1535 | 6.99 | 0.992 | 0.0 | 0.13 | 11.01 |
| 1545 | 7.07 | 0.998 | 0.0 | 0.11 | 10.87 |
| 1550 | 7.10 | 1.00 | 0.0 | 0.10 | 10.79 |
| 1555 | 7.11 | 1.00 | 0.0 | 0.11 | 10.78 |
| 1600 | 7.10 | 1.00 | 0.0 | 0.10 | 10.78 |

SAMPLED @ 1601 ID: GW-32504-110713-SR-1746

11/11/13 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: RAIN 43°F, FALLING TEMPS

H&S: LEVEL D

CALIBRATION OF RENTM HORIBA NF05036

pH=4.01, COND.=4.49, TURB=0.0, D.O.=9.98,

TEMP.=22.0°C

SAMPLE OF CRA-RA-32

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 11:40 | 6.44 | 0.892 | 2.0 | 0.57 | 11.39 |
| 11:50 | 6.79 | 0.898 | 0.0 | 0.27 | 11.07 |
| 12:00 | 6.84 | 0.900 | 0.0 | 0.23 | 10.98 |
| 12:05 | 6.87 | 0.901 | 0.0 | 0.21 | 10.93 |
| 12:10 | 6.90 | 0.901 | 0.0 | 0.22 | 10.93 |
| 12:15 | 6.91 | 0.901 | 0.0 | 0.21 | 10.93 |
| 1220 | 6.91 | 0.901 | 0.0 | 0.21 | 10.92 |

SAMPLED @ 1221 ID: GW-32504-111113-SR-1747

SAMPLE OF CRA-RA-22

| | | | | | |
|---|---|---|---|---|---|
| 1235 | 7.30 | 1.14 | 2.0 | 2.24 | 11.10 |
| 1245 | 6.97 | 1.14 | 0.0 | 0.75 | 11.14 |
| 1255 | 7.16 | 1.13 | 0.0 | 0.74 | 11.01 |
| 1300 | 6.68 | 1.13 | 0.0 | 0.31 | 10.[illegible] |
| 1305 | 7.15 | 1.14 | 0.0 | 0.14 | 11.10 |

CONTINUED ON NEXT PAGE



32504-25 11/11/13

SAMPLE OF CRA-RA-22 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1310 | 7.14 | 1.14 | 0.0 | 0.12 | 11.15 |
| 1315 | 7.15 | 1.14 | 0.0 | 0.12 | 11.15 |
| 1320 | 7.15 | 1.14 | 0.0 | 0.12 | 11.15 |

SAMPLED @ 1321 ID: GW-32504-111113-SR-1748

SAMPLED @ 1326 ID: GW-32504-111113-SR-1749

SAMPLE OF TEMP-PZ-2

| | | | | | |
|---|---|---|---|---|---|
| 1340 | 7.43 | 1.77 | 5.4 | 11.32 | 10.94 |
| 1350 | 7.43 | 1.78 | 3.9 | 9.63 | 10.92 |
| 1405 | 7.43 | 1.87 | 1.8 | 10.50 | 10.81 |
| 1410 | 7.43 | 1.87 | 1.9 | 11.01 | 10.84 |
| 1415 | 7.46 | 1.88 | 5.8 | 10.77 | 10.89 |
| 1420 | 7.50 | 1.89 | 0.7 | 11.01 | 10.83 |
| 1425 | 7.42 | 1.86 | 0.9 | 10.63 | 10.88 |
| 1430 | 7.41 | 1.85 | 0.0 | 10.56 | 10.84 |
| 1435 | 7.41 | 1.85 | 0.0 | 10.53 | 10.83 |
| 1440 | 7.41 | 1.84 | 0.0 | 10.52 | 10.83 |

SAMPLED @ 1441 ID: GW-32504-111113-SR-1750

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 7.30 | 0.488 | 3.2 | 7.33 | 9.56 |
| 1500 | 7.40 | 0.982 | 1.7 | 8.28 | 10.81 |

CONTINUED ON NEXT PAGE

11/11/13 32504-25

SAMPLE OF CRA-2A-29 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1510 | 7.31 | 0.984 | 3.8 | 8.63 | 10.83 |
| 1515 | 7.30 | 0.985 | 3.4 | 8.60 | 10.82 |
| 1520 | 7.30 | 0.985 | 3.2 | 8.64 | 10.83 |
| 1525 | 7.30 | 0.985 | 2.6 | 8.63 | 10.83 |

SAMPLED @ 1526 ID: GW-32504-111113-SR-1751

SAMPLES ARE PACKED IN COOLER WITH ICE FOR FEX EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504-25 11/12/13

TASK: CONTINUE 1/4 HR SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: MOSTLY CLOUDY 34°F

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA NEOSOBS, pH=4.00, COND.=4.49, TURB=0.0, D.O.=10.00, TEMP.=21.8°C

SAMPLE OF 81-8

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1320 | 7.11 | 0.495 | 0.0 | 4.61 | 11.18 |
| 1330 | 7.44 | 0.491 | 0.0 | 9.02 | 10.41 |

COMPRESSOR STOPPED WORKING, HAD TO ADJUST BELT TENSION BY ADJUSTING POSITION OF MOTOR. RESTARTED

| | | | | | |
|---|---|---|---|---|---|
| 1405 | 7.17 | 0.484 | 0.0 | 22.76 | 10.10 |
| 1415 | 7.20 | 0.480 | 0.0 | 24.48 | 9.65 |
| 1420 | 7.20 | 0.478 | 0.0 | 24.79 | 9.74 |
| 1425 | 7.30 | 0.477 | 0.0 | 25.62 | 9.89 |
| 1430 | 7.40 | 0.476 | 0.0 | 25.97 | 9.75 |
| 1435 | 7.43 | 0.475 | 0.0 | 27.49 | 9.74 |
| 1440 | 7.44 | 0.475 | 0.0 | 26.19 | 9.73 |
| 1445 | 7.44 | 0.476 | 0.0 | 26.02 | 9.73 |

SAMPLED @ 1446 ID: GW-32504-811213-SR-1752

11/12/13 32504-25

SAMPLE OF CRA-RA-31

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1455 | 7.85 | 0.449 | 0.0 | 1.65 | 10.45 |
| 1505 | 7.21 | 0.452 | 0.0 | 0.73 | 10.57 |
| 1510 | 7.35 | 0.451 | 0.0 | 0.67 | 10.58 |
| 1520 | 7.44 | 0.453 | 0.0 | 0.69 | 10.58 |
| 1525 | 7.45 | 0.454 | 0.0 | 0.67 | 10.58 |
| 1530 | 7.46 | 0.454 | 0.0 | 0.69 | 10.57 |
| 1535 | 7.45 | 0.454 | 0.0 | 0.68 | 10.58 |

SAMPLED @ 1536 ID: GW-32504-111213-SR-1753

SAMPLE OF CRA-RA-7

| | | | | | |
|---|---|---|---|---|---|
| 1545 | 7.56 | 0.267 | 0.0 | 8.47 | 10.35 |
| 1555 | 7.59 | 0.259 | 0.0 | 8.27 | 10.41 |
| 1605 | 7.68 | 0.259 | 0.0 | 7.79 | 10.43 |
| 1610 | 7.70 | 0.259 | 0.0 | 7.75 | 10.42 |
| 1615 | 7.71 | 0.260 | 0.0 | 7.74 | 10.41 |
| 1620 | 7.71 | 0.259 | 0.0 | 7.74 | 10.41 |

SAMPLED @ 1621 ID: GW-32504-111213-SR-1754

SAMPLES PACKED IN COOLER WITH ICE



32504-25 11/13/13

TASK: CONTINUE 4QUX SAMPLE EVENT

CRA: STEVE RARA1

WEATHER: SUN 18°, HIGH 39°F

H&S LEVEL D

CALIBRATION OF RENTAL HORIBA NF05036

pH = 4.00, COND. = 4.49, TURB = 0.0, D.O. = 10.59

TEMP. = 17.92

SAMPLE OF RA-MW-28

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1000 | 6.19 | 0.534 | 9.5 | 2.04 | 11.23 |
| 1010 | 6.54 | 0.516 | 0.0 | 2.56 | 10.67 |
| 1020 | 6.32 | 0.520 | 0.0 | 2.49 | 10.56 |
| 1025 | 6.18 | 0.521 | 0.0 | 2.54 | 10.52 |
| 1030 | 6.18 | 0.521 | 0.0 | 2.52 | 10.52 |
| 1035 | 6.17 | 0.520 | 0.0 | 2.52 | 10.52 |

SAMPLED @ 1036 ID: GW-32504-111313-SR-1755

SAMPLE OF CRA-RA-18

| | | | | | |
|---|---|---|---|---|---|
| 1050 | 6.26 | 0.952 | 0.0 | 7.11 | 9.96 |
| 1100 | 6.18 | 1.25 | 0.0 | 4.84 | 9.84 |
| 1120 | 6.17 | 1.28 | 0.0 | 4.51 | 9.80 |
| 1125 | 6.19 | 1.29 | 0.0 | 4.61 | 9.79 |
| 1130 | 6.23 | 1.29 | 0.0 | 4.51 | 9.82 |

CONTINUED ON NEXT PAGE

11/13/13 32504-25

SAMPLE OF CRA-RA-18

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1135 | 6.29 | 1.29 | 0.0 | 4.50 | 9.79 |
| 1140 | 6.36 | 1.29 | 0.0 | 4.48 | 9.78 |
| 1145 | 6.39 | 1.29 | 0.0 | 4.52 | 9.78 |

PURGED WELL FOR 1 HOUR

SAMPLED @ 1151 ID: GW-32504-111313-SR-1756

SAMPLE OF CRA-RA-65

| | | | | | |
|---|---|---|---|---|---|
| 1155 | 6.94 | 0.829 | 0.0 | 2.16 | 11.02 |
| 1205 | 7.06 | 0.817 | 0.0 | 0.47 | 11.58 |
| 1215 | 7.33 | 0.814 | 0.0 | 0.36 | 11.62 |
| 1220 | 7.39 | 0.813 | 0.0 | 0.41 | 11.64 |
| 1225 | 7.39 | 0.812 | 0.0 | 0.35 | 11.61 |
| 1230 | 7.39 | 0.812 | 0.0 | 0.36 | 11.2 |

SAMPLED @ 1231 ID: GW-32504-111313-SR-1757

SAMPLE OF CRA-RA-27

| | | | | | |
|---|---|---|---|---|---|
| 1240 | 6.09 | 0.989 | 0.0 | 1.71 | 11.25 |
| 1250 | 7.03 | 1.29 | 0.0 | 0.10 | 11.15 |
| 1300 | 6.83 | 1.30 | 0.0 | 0.10 | 11.14 |
| 1305 | 6.78 | 1.30 | 0.0 | 0.10 | 11.14 |
| 1310 | 6.83 | 1.31 | 0.0 | 0.09 | 11.13 |
| 1315 | 6.82 | 1.31 | 0.0 | 0.09 | 11.12 |
| 1320 | 6.82 | 1.31 | 0.0 | 0.09 | 11.13 |



32504-25 11/13/13

SAMPLE OF CRA-RA-26S

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1405 | 7.36 | 1.00 | 0.0 | 9.62 | 10.58 |
| 1415 | 7.07 | 1.01 | 0.0 | 10.90 | 10.56 |
| 1425 | 7.06 | 1.01 | 0.0 | 13.04 | 10.57 |
| 1430 | 7.06 | 1.01 | 0.0 | 13.48 | 10.59 |
| 1435 | 7.08 | 1.02 | 0.0 | 14.51 | 10.59 |
| 1440 | 7.07 | 1.02 | 0.0 | 15.58 | 10.59 |

SAMPLED @ 1441 ID: GW-32504-111313-SR-1759

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 7.25 | 1.26 | 0.0 | 1.65 | 10.70 |
| 1500 | 7.19 | 1.27 | 0.0 | 0.14 | 10.76 |
| 1510 | 7.07 | 1.27 | 0.0 | 0.10 | 10.79 |
| 1515 | 7.06 | 1.27 | 0.0 | 0.10 | 10.79 |
| 1520 | 7.07 | 1.27 | 0.0 | 0.09 | 10.79 |
| 1525 | 7.07 | 1.27 | 0.0 | 0.10 | 10.79 |

SAMPLED @ 1526 ID: GW-32504-111313-SR-1760

SAMPLES PACKED IN COOLER WITH ICE.

11/14/13 32504-25

TASK: FINISH 11/4LY SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: CLEAR 30°, HIGH 44°F

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA NF05036

pH=4.00, COND.=4.49, TURB=0.0, D.O.=10.49

TEMP=18.28

SAMPLE OF CRA-RA-23D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1020 | 6.06 | 0.524 | 0.0 | 4.35 | 10.58 |
| 1030 | 6.50 | 0.560 | 0.0 | 3.75 | 10.19 |
| 1040 | 6.43 | 0.581 | 0.0 | 3.72 | 10.11 |
| 1050 | 6.26 | 0.591 | 0.0 | 3.67 | 10.11 |
| 1055 | 6.14 | 0.596 | 0.0 | 3.69 | 10.10 |
| 1100 | 6.07 | 0.600 | 0.0 | 3.69 | 10.07 |
| 1105 | 6.08 | 0.602 | 0.0 | 3.69 | 10.04 |
| 1110 | 6.09 | 0.603 | 0.0 | 3.69 | 10.04 |
| 1115 | 6.09 | 0.603 | 0.0 | 3.69 | 10.04 |

SAMPLED @ 1116 ID: GW-32504-111413-SR-1761

MS/MSD

SAMPLE OF 81-4

BEGAN PURGING WELL @ 11:30 AM.

CONTINUED ON NEXT PAGE



32504-25 11/14/13

SAMPLE OF 81-4 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1150 | 7.02 | 0.959 | 0.0 | 10.23 | 11.07 |
| 1205 | 6.42 | 0.961 | 0.0 | 3.33 | 11.25 |
| 1210 | 6.42 | 0.958 | 0.0 | 10.24 | 11.23 |
| 1215 | 6.42 | 0.959 | 0.0 | 10.61 | 11.23 |
| 1220 | 6.42 | 0.959 | 0.0 | 10.60 | 11.23 |
| 1225 | 6.42 | 0.958 | 0.0 | 10.61 | 11.23 |

SAMPLED @ 1226 ID: GW-32504-111413-SR-1762

SAMPLED @ 1236 ID: GW-32504-111413-SR-1763

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.

12/31/13 32504-25

TASK: QUARTERLY WATER LEVELS

CRA: STEVE BARAI

WEATHER: 20° MOSTLY CLOUDY, WINDY

H&S: LEVEL D - SUB ZERO WIND CHILL

| WELL ID | LEVEL |
|---|---|
| 81-4 | 30.55 |
| 81-5 | 34.81 |
| 81-7 | 48.31 |
| 81-8 | 43.90 |
| 81-9 | 16.69 |
| 81-10 | 33.21 |
| RA-1 | 69.54 |
| RA-2D | 56.52 |
| RA-2S | 56.22 |
| RA-3 | 53.17 |
| RA-4 | 24.34 |
| RA-5 | 55.55 |
| RA-6 | 59.91 |
| RA-7 | ~~18.89~~ 33.15 |
| RA-8 | ~~59.19~~ 18.89 |
| RA-16 | 59.19 |
| RA-18 | 42.25 |
| RA-18D | 56.81 |
| RA-19D | 50.77 |



32504-25 12/31/13

| WELL ID | LEVEL |
|---|---|
| RA-19S | 48.22 |
| RA-20 | 59.26 |
| RA-22 | 54.35 |
| RA-23D | 33.95 |
| RA-23S | 34.24 |
| RA-24 | 57.23 |
| RA-25 | 54.65 |
| RA-26D | 50.55 |
| RA-26S | 50.41 |
| RA-27 | 62.27 |
| RA-28 | 54.94 |
| RA-29 | 46.46 |
| RA-30 | 58.80 |
| RA-31 | 32.69 |
| RA-32 | 57.65 |
| MW-22 | 42.82 |
| MW-28 | 43.10 |
| MW-32 | 35.49 |
| MW-34C | 42.40 |
| MW-35 | 24.96 |
| MW-41 | 47.70 |
| MW-42 | 63.60 |
| MW-47 | 53.95 |
| MW-54 | 56.54 |

| | | | |
|---|---|---|---|
| 12/31/13 | | | 32504.25 |
| WELL HD | | | LEVEL |
| MW-55 | | | 37.50 |
| MW-56 | | | 35.03 |
| MW-58 | | | 22.11 |
| CB-PZ-3 | | | 40.90 |
| CB-PZ-4 | | | 54.00 |
| CB-PZ-5 | | | 55.72 |
| CB-PZ-6 | | | 55.49 |
| PZ-103 | | | 57.65 |
| PZ-104 | | | 56.50 |
| PZ-105 | | | 52.30 |
| PZ-106 | | | 39.90 |
| TEMP. PZ-2 | | | 53.69 |

# CURVE TABLES

## HOW TO USE CURVE TABLES

Table I. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

***EXAMPLE***

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20′ to the R. at Station 542 + 72.

Ext. in Tab. I opposite 23° 20′ = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

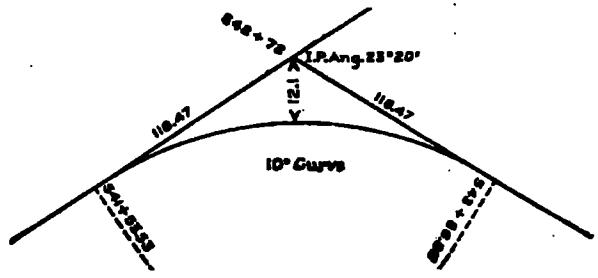
Tan. in Tab. I opp. 23° 20′ = 1183.1
1183.1 ÷ 10 = 118.31.

Correction for A. 23° 20′ for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20′ = 23.33° ÷ 10 = 2.3333 = L. C.

| | | | |
|---|---|---|---|
| 2° 19½′ = def. for sta. | 542 | I. P. = sta. | 542 + 72 |
| 4° 49½′ = " " " | + 50 | Tan. = | 1 .18.47 |
| 7° 19½′ = " " " | 543 | B. C. = sta. | 541 + 53.53 |
| 9° 49½′ = " " " | + 50 | L. C. = | 2 .33.33 |
| 11° 40′ = " " " | 543 + | | |
| | 86.86 | E. C. = Sta. | 543 + 86.86 |

100 − 53.53 = 46.47 × 3′ (def. for 1 ft. of 10° Cur.) = 139.41′ =
2° 19½′ = def. for sta. 542.
Def. for 50 ft. = 2° 30′ for a 10° Curve.
Def. for 36.86 ft. = 1° 50½′ for a 10° Curve.



CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

May 10, 2014

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 126
Groundwater and Landfill RD/RA
Reporting Period: January 1 through March 31, 2014
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 Introduction

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree, Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 Activities Performed During this Reporting Period

### 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on April XX, 2014. The corresponding groundwater contour map is provided on Figure 1.

Quarterly groundwater samples were collected on March 12 and 13, April 8 through 11 and April 14, 2014 consistent with the Groundwater Remediation Monitoring Program. Several wells located close to roadways were accessed on March 12 and 13, 2014 but the rest of the wells remained in accessible due to a combination of thick snow pack overlying wet soft ground making the wells inaccessible by vehicles. Because of these unsafe conditions and in consultation with the United States Environmental Protection Agency (USEPA), CRA postponed

the Q1 2014 groundwater monitoring event until ground conditions improved in April 2014. The results from these samples are discussed below.

### 2.2 Reports

Quarterly Progress Report No. 125 was submitted to USEPA and Michigan Department of Environmental Quality (MDEQ) on January 10, 2014.

## 3.0 Summary of Findings

The results of the first quarter 2014 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in Groundwater Remediation Monitoring Program.

During the first quarter 2014 sampling, six of the 27 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the six monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 7.8 μg/L vinyl chloride |
| CRA-RA-23D | 5.9 μg/L trichloroethene |
| CRA-RA-24 | 6.2 μg/L vinyl chloride |
| CRA-RA-26S | 100 μg/L trichloroethene |
| CRA-RA-27 | 10 μg/L vinyl chloride |
| CRA-RA-30 | 4.5 μg/L vinyl chloride |

There were seven monitoring wells that had COCs above Part 201 DWC during the fourth quarter 2013. Vinyl chloride in groundwater samples from monitoring well 81-4 decreased from 2.6/2.5 μg/L (duplicate sample) in November 2013 to 2.0 μg/L in April 2014, which equals the current DWC of 2 μg /L.

## 4.0 Problems Encountered

No problems were encountered with respect to the operation and maintenance of the ozone treatment system during the first quarter 2014.

## 5.0 Corrective Measures to Rectify Problems

No corrective measures were implemented with respect to the operation and maintenance of the ozone treatment system during the first quarter 2014.

## 6.0 Contacts and Significant Correspondence with Public Representatives

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | January 10, 2014 | Report No. 125 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDEQ) |
| email | March 17, 2014 | Mr. Deal (CRA) advises Mr. H. Caine (USEPA) of unsafe field conditions and postponement of Q1 2014 groundwater monitoring |
| email | March 18, 2014 | Mr. H. Caine (USEPA) concurs |

## 7.0 Planned Upcoming Activities/Schedule

Landfill and groundwater component activities planned for the second quarter of 2014:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The second quarter groundwater sampling event is scheduled for the week of June 1, 2014
- The wells to be sampled in the second quarter of 2014 are listed in Table 5
- Obtain property access to install vertical aquifer sampling (VAS) boreholes and monitoring wells

CONESTOGA-ROVERS
& ASSOCIATES

May 10, 2014 Reference No. 032504-15



Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Steven Rapsai

For Bart Bartholomy

AJD/cb/35
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Michael Simpson
Steven Nadeau, Honigman Miller

# TABLES AND FIGURES

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUMES
RAMSDEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 13,000 | 1,000 | 700 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-22 | GW-SB-1629 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 9.0 | ND(1.0) |
| CRA-RA-22 | GW-SB-1721 | 8/21/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.4 | ND(1.0) |
| CRA-RA-22 | GW-SB-1748 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.5 | ND(1.0) |
| CRA-RA-22 | GW-SB-1749 | 11/11/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.4 | ND(1.0) |
| CRA-RA-22 | GW-SB-1766 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.2 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.9 µg/L | |
| CRA-RA-24 | GW-SB-1624 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.3 | ND(1.0) |
| CRA-RA-24 | GW-SB-1718 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5. | ND(1.0) |
| CRA-RA-24 | GW-SB-1745 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.5 | ND(1.0) |
| CRA-RA-24 | GW-SB-1769 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.2 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.8 µg/L | |
| CRA-RA-25 | GW-SB-1546 | 8/24/2011 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SB-1547 | 8/24/2011 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SB-1645 | 6/13/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-25 | GW-SB-1716 | 7/23/2013 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SB-1717 | 7/23/2013 | Duplicate | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| | | | Change | | Down 0.2 µg/L | | | | | | | | | | | |
| CRA-RA-28 | GW-SB-1622 | 6/11/2013 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.4 | ND(1.0) |
| CRA-RA-28 | GW-SB-1714 | 7/23/2013 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) |
| CRA-RA-28 | GW-SB-1742 | 11/6/2013 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.2 | ND(1.0) |
| CRA-RA-28 | GW-SB-1767 | 4/8/2014 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Stable | | | | | | | | | | Down 0.1 µg/L | |
| CRA-RA-29 | GW-SB-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SB-1723 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SB-1751 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SB-1772 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-30 | GW-SB-1625 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SB-1719 | 8/16/2013 | | ND(1.0) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| CRA-RA-30 | GW-SB-1746 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SB-1770 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.6 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Stable | |
| CRA-RA-32 | GW-SB-1626 | 6/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SB-1720 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SB-1747 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SB-1771 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| PZ-104 | GW-SB-1628 | 6/11/2013 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SB-1715 | 7/23/2013 | | ND(1.0) | 3.5 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SB-1744 | 11/6/2013 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SB-1768 | 4/8/2014 | | ND(1.0) | 3.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Up 0.2 µg/L | | | | | | | | | | | |
| TEMP-PZ-2 | GW-SB-1692 | 8/13/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SB-1722 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SB-1750 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SB-1765 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| B1-8 | GW-SB-1627 | 6/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SB-1726 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(0.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SB-1752 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SB-1773 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria

(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 2

ANALYTICAL RESUTLS - PDSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-1703 | 5/23/2013 | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | 1.1 | 52 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| CRA-RA-2D | GW-SR-1713 | 7/24/2013 | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | ND(17) | 46 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| CRA-RA-2D | GW-SR-1741 | 11/6/2013 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 55 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1764 | 3/12/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 60 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| | | | Change | | | | | | | Up 5 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-1633 | 6/17/2013 | | 88 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| CRA-RA-18 | GW-SR-1634 | 6/17/2013 | Duplicate | 90 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| CRA-RA-18 | GW-SR-1730 | 8/27/2013 | | 74 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| CRA-RA-18 | GW-SR-1756 | 11/13/2013 | | 95 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-18 | GW-SR-1777 | 4/9/2014 | | 79 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| | | | Change | Down 16 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1445 | 9/3/2010 | | ND(1) | 1.42 | ND(10) | ND(10) | ND(10) | ND(1) | 29 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 38.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| EB-PZ-4 | GW-SR-1729 | 8/27/2013 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 41 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | 2.2 | ND(1.4) |
| | | | Change | | | | | | | Up 2 µg/L | | | | | Down 1.8 µg/L | |
| PZ-106 | GW-SR-1730 | 8/27/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1399 | 08/25/2010 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1731 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1732 | 8/27/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| RA-MW-28 | GW-SR-1618 | 6/17/2013 | | 9.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1734 | 8/27/2013 | | 11 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1755 | 11/13/2013 | | 9.6 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1778 | 4/9/2014 | | 8.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Down 1.6 µg/L | | | | | | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC(1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-5 | GW-SR-1704 | 5/23/2013 | | 23 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1728 | 8/26/2013 | | 27 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1743 | 11/6/2013 | | 22 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1779 | 4/10/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Down 1 µg/L | | | | | | | | | | | | |
| CRA-RA-6S | GW-SR-1705 | 5/23/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| CRA-RA-6S | GW-SR-1706 | 5/23/2013 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) |
| CRA-RA-6S | GW-SR-1727 | 8/26/2013 | | 1.2 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1757 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1780 | 4/10/2014 | | 1.4 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Up 0.4 µg/L | | | | | | | | | | | | |
| CRA-RA-7 | GW-SR-1638 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1726 | 8/26/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1754 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1776 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-27 | GW-SR-1633 | 9/11/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 13 | ND(1.0) |
| CRA-RA-27 | GW-SR-1735 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-27 | GW-SR-1758 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 11 | ND(1.0) |
| CRA-RA-27 | GW-SR-1781 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 10 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 1 µg/L | |
| CRA-RA-31 | GW-SR-1637 | 6/18/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1725 | 8/26/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.6) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1753 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1774 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1775 | 4/9/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| 11-4 | GW-SR-1711 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.8 | ND(1.0) |
| 11-4 | GW-SR-1739 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| 11-4 | GW-SR-1762 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.6 | ND(1.0) |
| 11-4 | GW-SR-1763 | 11/14/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| 11-4 | GW-SR-1785 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.0 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.5 µg/L | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria.
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| | | | | Volatile Organics | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Sample Location | Sample ID | Date Sampled | DWC (1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-23D | GW-SR-1712 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.5 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1738 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1761 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1786 | 4/14/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | | | | | Up 0.8 µg/L | | |
| CRA-RA-26D | GW-SR-1709 | 6/19/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1737 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1760 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1783 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1784 | 4/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1708 | 6/19/2013 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 110 | ND(4.0) | ND(4.0) |
| CRA-RA-26S | GW-SR-1736 | 8/27/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1676 | 11/13/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1782 | 4/11/2014 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 100 | ND(4.0) | ND(4.0) |
| | | | Change | | | | | | | | | | | Up 5 µg/L | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 5**

**2014 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | *Q1* | *Q2* | *Q3* | *Q4* |
|---|---|---|---|---|
| 81-4 | | | | |
| 81-8 | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-2D | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-5 | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only) | |
| CRA-RA-18 | | CRA-RA-19S | | |
| CRA-RA-22 | | CRA-RA-20 | | |
| CRA-RA-23D | | | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

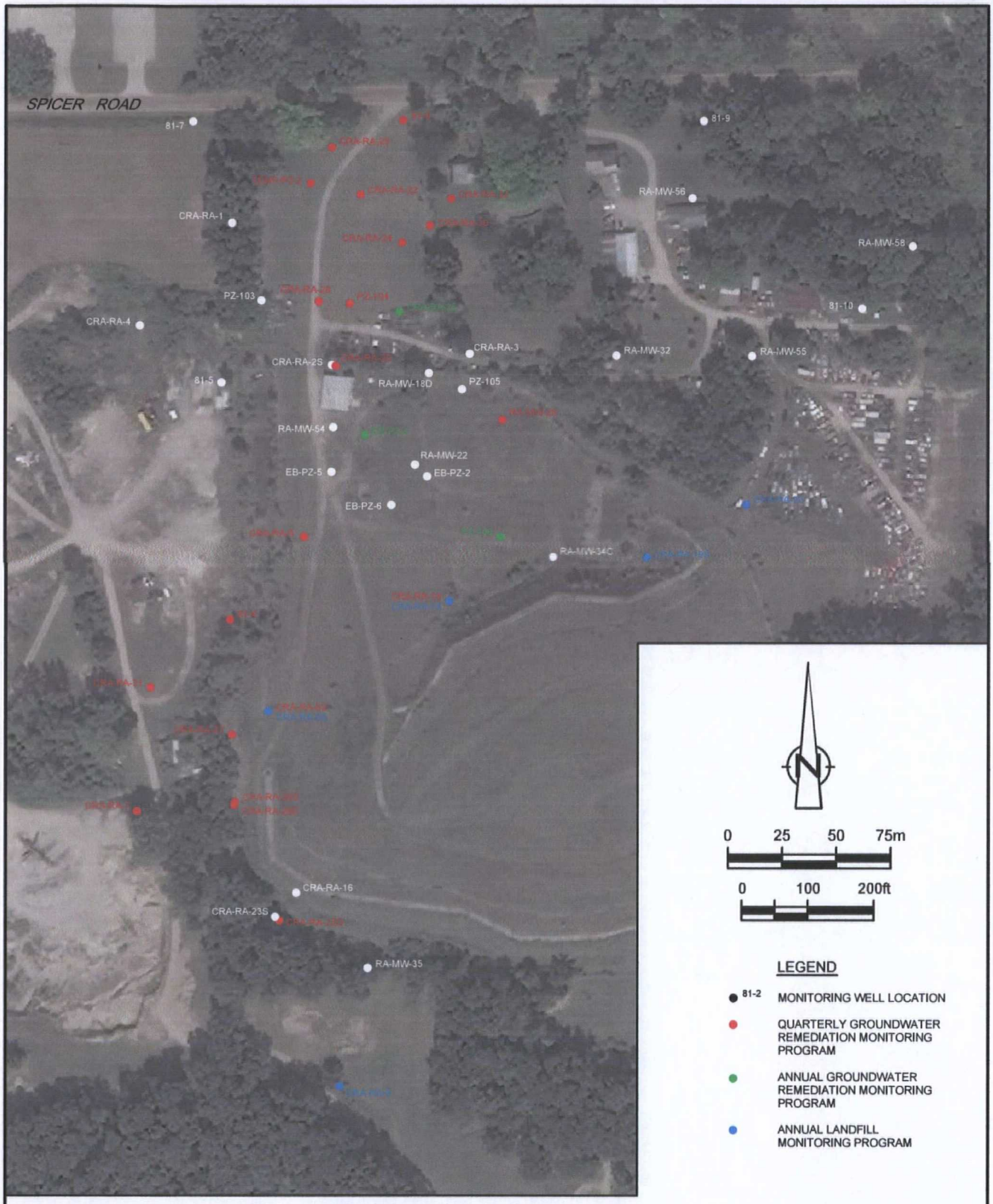



figure 1

# 2014 GROUNDWATER MONITORING PROGRAMS
# RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN035)GN-WA001 MAY 2/2014

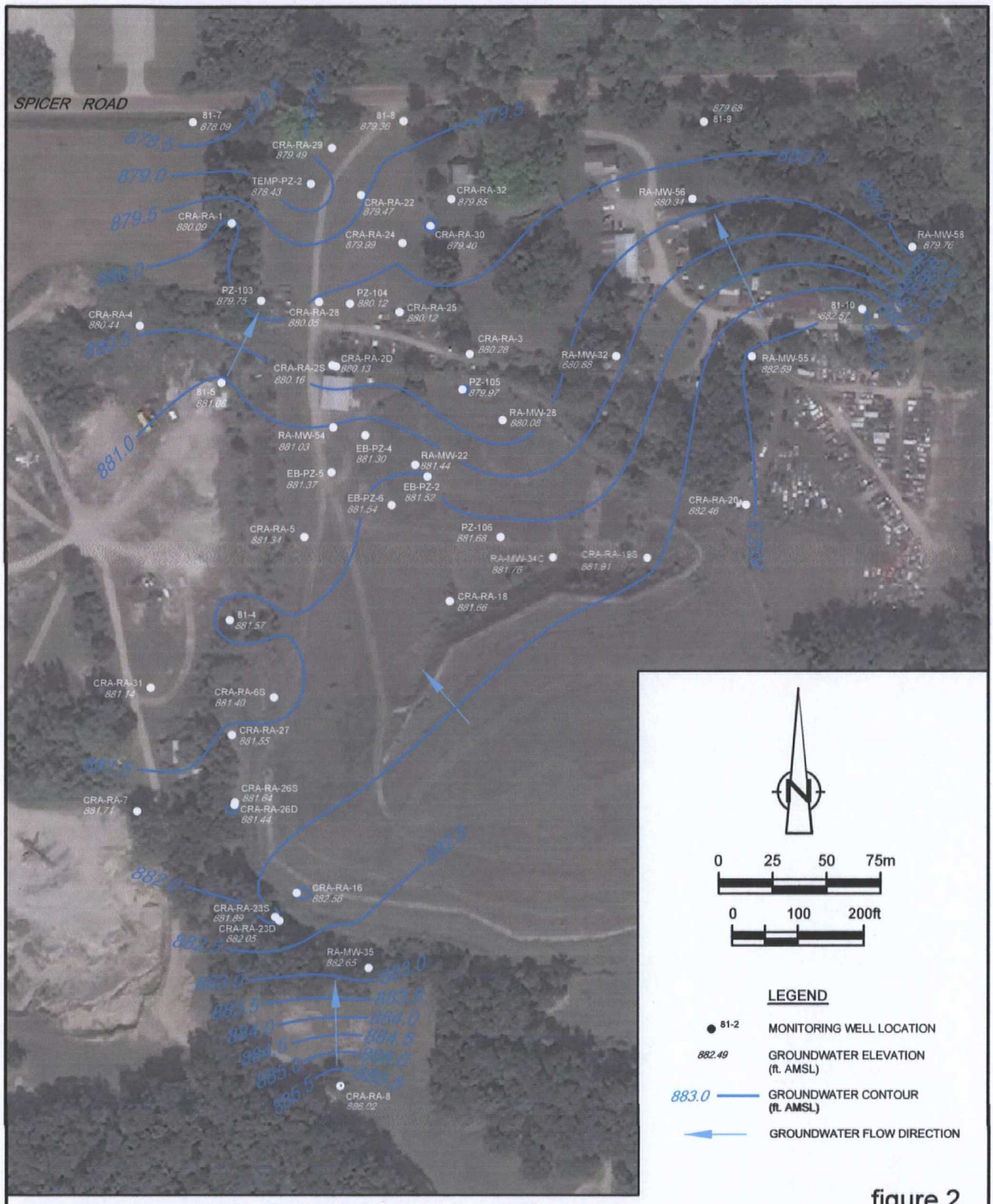



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
APRIL 2014
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN035)GN-WA002 MAY 2/2014

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 1/9/2014 | 1/17/2014 | 1/21/2014 | 1/28/2014 | 2/3/2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L. Rapai | L. Rapai | L. Rapai | L. Rapai | L. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 88027 | 88219 | | | 88623 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 60 | 60 | 60 | 60 | 64 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | 88027 | 88219.1 | | | 88623.4 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 7 | 8 | 8 |
| % O3 capacity | 45 | 46 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | ~~25~~ 40 | 40 | 40 | 38 |
| Regulator #2 psi | 22 | 25 | 22 | 27 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 2 | 1 | 1 | 1 |
| Zone Time hours | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** REPLACED CONTACT BLOCK FOR SWITCH ON $O^3$ GENERATOR ON 1/9/14.

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | 2/14/2014 | 2/21/2014 | 3/1/2014 | 3/7/2014 | 3/14/14 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A Rapai | A Rapai | A Rapai | A Rapai | A Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 88889 | 89058 | 89248 | 89394.2 | 89558 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 60 | 60 | 62 | 60 | 56 |
| Feed Air Pressure psi | 100 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 65 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | 88889.9 | 89058.1 | 89248.8 | 89394.2 | 89557.9 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 8 | 7 | 7 |
| % O3 capacity | 45 | 45 | ~~38~~ 45 | 45 | 45 |
| Regulator #1 psi | 37 | 40 | 38 | 36 | 32 |
| Regulator #2 psi | 22 | 25 | 23 | 22 | 21 |
| Alarm Reading ppm, O3 | - | - | - | - | - |
| Zone On | 1 | 3 | 3 | 3 | 1 |
| Zone Time hours | 1/2 | 2 | 2 | 2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** SOLENOID VALVE FOR ZONE 3 NOT WORKING ON VISIT (3-1-2014). TOOK APART, CLEANED & REASSEMBLED - NOW FUNCTIONING PROPERLY

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | 3/21/14 | 3/26/14 | | | |
| **OPERATOR SIGNATURE** | L Rapa | L Rapa | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Compressor** | | | | | |
| | | | | | |
| Output Pressure psi | 110 | 110 | | | |
| Temperature F | | | | | |
| Run Time hours | 89727 | 89851 | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Sep** | | | | | |
| | | | | | |
| Receiver Pressure psi | 55 | 56 | | | |
| Feed Air Pressure psi | 105 | 110 | | | |
| Cycle Pressure psi | 70 | 70 | | | |
| Holding Tank Pressure psi | 42 | 42 | | | |
| Run Time hours | 89727.2 | 89851 | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Air Dryer** | | | | | |
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Ozone Generator** | | | | | |
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | | | |
| % O3 capacity | 45 | 45 | | | |
| Regulator #1 psi | 37 | 35 | | | |
| Regulator #2 psi | 23 | 22 | | | |
| Alarm Reading ppm, O3 | – | – | | | |
| Zone On | 3 | 1 | | | |
| Zone Time hours | 2 | 1/2 | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Distribution Panel** | | | | | |
| | | | | | |
| CFM | 0.8 | 0.8 | | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | JAN 8, 9, 17 & 21, 2014 | | DATE: | FEB 14 & 21 | | DATE: | MARCH 12, 13, & 14 | |
|---|---|---|---|---|---|---|---|---|
| | EXTREME SNOW @ SITE | | | EXTREME SNOW @ SITE | | | EXTREME SNOW @ SITE | |
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 7 | SW-1 | 0.7 | 9 | SW-1 | 0.8 | 8 |
| SW-2 | 0.8 | 7 | SW-2 | 0.7 | 7 | SW-2 | 0.8 | 7 |
| SW-3 | 0.8 | 13 | SW-3 | 0.8 | 14 | SW-3 | 0.8 | 13 |
| SW-4 | 0.8 | 13 | SW-4 | 0.7 | 15 | SW-4 | 0.8 | 14 |
| SW-5 | 0.8 | 15 | SW-5 | 0.8 | 15 | SW-5 | 0.8 | 15 |
| SW-6 | 0.7 | 14 | SW-6 | 0.8 | 16 | SW-6 | 0.8 | 15 |
| SW-7 | 0.8 | 15 | SW-7 | 0.8 | 16 | SW-7 | 0.8 | 15 |
| SW-8 | - | - | SW-8 | - | - | SW-8 | - | - |
| SW-9 | - | - | SW-9 | - | - | SW-9 | - | - |
| SW-10 | - | - | SW-10 | - | - | SW-10 | - | - |
| SW-11 | - | - | SW-11 | - | - | SW-11 | - | - |
| SW-12 | 0.7 | 14 | SW-12 | 0.6 | 14 | SW-12 | 0.7 | 14 |
| SW-13 | 0.6 | 2 | SW-13 | 0.6 | 3 | SW-13 | 0.7 | 3 |
| SW-14 | - | - | SW-14 | - | - | SW-14 | - | - |
| SW-15 | - | - | SW-15 | - | - | SW-15 | - | - |
| SW-16 | - | - | SW-16 | - | - | SW-16 | - | - |
| SW-17 | 0.8 | 18 | SW-17 | 0.7 | 18 | SW-17 | 0.7 | 18 |
| SW-18 | 0.8 | 17 | SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 |
| SW-19 | 0.8 | 18 | SW-19 | 0.8 | 17 | SW-19 | 0.8 | 17 |
| SW-20 | 0.8 | 17 | SW-20 | 0.7 | 17 | SW-20 | 0.8 | 18 |
| SW-21 | - | - | SW-21 | - | - | SW-21 | - | - |
| SW-22 | 0.8 | 12 | SW-22 | 0.7 | 13 | SW-22 | 0.8 | 13 |
| SW-23 | 0.8 | 14 | SW-23 | 0.7 | 15 | SW-23 | 0.7 | 15 |
| SW-24 | 0.6 | 17 | SW-24 | 0.7 | 13 | SW-24 | 0.8 | 15 |
| SW-25 | 0.7 | 15 | SW-25 | 0.8 | 15 | SW-25 | 0.8 | 15 |
| SW-26 | 0.8 | 3 | SW-26 | 0.8 | 4 | SW-26 | 0.8 | 3 |
| SW-27 | 0.8 | 5 | SW-27 | 0.7 | 6 | SW-27 | 0.7 | 6 |
| SW-28 | 0.7 | 6 | SW-28 | 0.8 | 7 | SW-28 | 0.8 | 6 |
| SW-29 | 0.7 | 6 | SW-29 | 0.8 | 8 | SW-29 | 0.8 | 8 |
| SW-30 | - | - | SW-30 | - | - | SW-30 | - | - |

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** JAN 8, 2014
**Time:** 10:30 AM

**Weather Conditions:** PARTLY CLOUDY 8°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:**

**Vegetation:**

**Signs, Gates, & Fences:** OK

**Actions Taken:**
SITE HAS BEEN PLOWED

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** S Rapai

**Date:** 1/17/2014
**Time:** 2:00PM

**Weather Conditions:** 23° CLOUDY, 3" OF SNOW LAST NIGHT

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:** FRESHLY PLOWED

**Vegetation:**

**Signs, Gates, & Fences:** OK

**Actions Taken:**
SITE ROADS PLOWED

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 2/3/14
**Time:** 10:00 AM

**Weather Conditions:** CLEAR 18°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:**

**Vegetation:**

**Signs, Gates, & Fences:** OK

**Actions Taken:**
SITE ROADS PLOWED

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 2/21/2014
**Time:** 3:00 PM

**Weather Conditions:** CLOUDY, WINDY, 25°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:**

**Vegetation:**

**Signs, Gates, & Fences:** OK

**Actions Taken:**
SITE ROADS HAVE BEEN PLOWED

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 3/1/2014
**Time:** 2:30 PM

**Weather Conditions:** SNOW FLURRIES 32°

**Observations**

**Erosion-North Face:** SNOW COVERED

**Erosion-South Face:**

**Erosion-East Face:**

**Erosion-West Face:**

**Erosion-Misc.:**

**Storm Water Ponds:**

**Drainage Spillways & Outfalls:**

**Roadways:**

**Vegetation:**

**Signs, Gates, & Fences:** OK

**Actions Taken:**
SITE ROADS HAVE BEEN PLOWED

**Recommendations:**
NONE

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** 3/21/2014
**Time:** 2:00 PM

**Weather Conditions:** CLOUDY 40°

**Observations**

**Erosion-North Face:** OK PARTIALLY SNOW COVERED

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** OK

**Drainage Spillways & Outfalls:** OK

**Roadways:** OK MUDDY

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE

CONTENTS

| PAGE NO. | REFERENCE | DATE |
|---|---|---|
| | | |



32504-25 3/12/14

TASK: BEGIN 1/4LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: HEAVY SNOW +6", 40 MPH WIND GUSTS, 26°F FALLING TEMPS.

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA NF 24Z93 9.55

pH=4.00, COND.=4.49, TURB=0.0, D.O.=~~18.17~~,

TEMP=18.17

SAMPLE OF CRA-RA-2D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1455 | 6.03 | 1.65 | 16.6 | 0.95 | 13.83 |
| 1505 | 6.58 | 2.35 | 14.6 | 8.59 | 9.75 |
| 1515 | 6.72 | 2.54 | 9.5 | 0.25 | 7.83 |
| 1525 | 6.81 | 2.49 | 6.1 | 0.17 | 6.88 |
| 1530 | 6.82 | 2.47 | 5.3 | 0.15 | 6.80 |
| 1535 | 6.83 | 2.47 | 4.8 | 0.16 | 6.79 |
| 1540 | 6.84 | 2.46 | 4.4 | 0.15 | 6.79 |
| 1545 | 6.84 | 2.47 | 4.3 | 0.16 | 6.79 |

SAMPLED @ 1546 ID: GW-32504-031214-SR-1764

3/13/14 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: 4° CLEAR, HIGH 26°

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA NEON293

pH=4.00, COND=4.48, TURB 0.0, D.O.=8.90, TEMP=22.21°C

SAMPLE OF TEMP-PZ-2

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1225 | 6.00 | 2.10 | 24.1 | 1.86 | 12.30 |
| 1235 | 6.53 | 2.68 | 3.5 | 0.58 | 10.49 |
| 1250 | 6.71 | 3.23 | 2.7 | 0.30 | 10.20 |
| 1300 | 6.81 | 3.02 | 2.6 | 0.15 | 10.42 |
| 1310 | 6.84 | 2.86 | 2.8 | 0.14 | 10.32 |
| 1315 | 6.84 | 2.85 | 2.6 | 0.14 | 10.31 |
| 1320 | 6.84 | 2.85 | 2.7 | 0.13 | 10.31 |

SAMPLED @ 1321 ID: GW-32504-031314-SR-1765

SAMPLE OF CRA-RA-22

| | | | | | |
|---|---|---|---|---|---|
| 1335 | 6.90 | 1.30 | 24.8 | 0.76 | 9.40 |
| 1345 | 6.82 | 1.25 | 4.0 | 0.12 | 9.94 |
| 1355 | 6.82 | 1.23 | 1.0 | 0.13 | 10.38 |
| 1400 | 6.83 | 1.23 | 1.5 | 0.13 | 10.36 |

CONTINUED ON NEXT PAGE



32504-25 3/13/14

SAMPLE OF CRA-RA-22 (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1405 | 6.84 | 1.23 | 1.3 | 0.14 | 10.36 |
| 1410 | 6.83 | 1.23 | 1.5 | 0.13 | 10.37 |

SAMPLED @ 1411 ID: GW-32504-031314-SR-1766

SAMPLES PACKED IN COOLER WITH ICE FOR FEDEX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.

4/8/14 32504-25

TASK: RESUME 1/4LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: MOSTLY CLOUDY, HIGH 58°

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA NF04293

pH=3.99, COND=4.50, TURB=0.0, D.O.=10.51

TEMP=15.90

SAMPLE OF CRA-RA-28

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0945 | 5.96 | 0.989 | 12.9 | 1.27 | 13.13 |
| 0955 | 6.35 | 1.05 | 4.4 | 0.27 | 13.03 |
| 1005 | 6.66 | 1.24 | 4.0 | 0.19 | 12.22 |
| 1010 | 6.70 | 1.28 | 2.8 | 0.15 | 12.18 |
| 1015 | 6.77 | 1.33 | 1.8 | 0.13 | 12.02 |
| 1020 | 6.81 | 1.35 | 1.4 | 0.12 | 11.92 |
| 1025 | 6.74 | 1.37 | 1.7 | 0.13 | 11.92 |
| 1030 | 6.75 | 1.37 | 1.2 | 0.13 | 11.92 |
| 1035 | 6.75 | 1.37 | 1.4 | 0.13 | 11.92 |

SAMPLED @ 1036 ID: GW-32504-040814-SR-1767

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1045 | 6.97 | 1.25 | 3.3 | 1.38 | 13.58 |
| 1055 | 6.96 | 1.63 | 7.5 | 0.21 | 13.42 |

CONTINUED ON NEXT PAGE



32504-25 4/8/14

SAMPLE OF PZ-104 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1105 | 6.94 | 1.66 | 6.7 | 0.18 | 13.35 |
| 1115 | 6.94 | 1.60 | 5.2 | 0.15 | 13.22 |
| 1120 | 6.99 | 1.59 | 2.8 | 0.14 | 13.22 |
| 1125 | 7.00 | 1.60 | 2.7 | 0.15 | 13.23 |
| 1130 | 6.99 | 1.60 | 2.6 | 0.14 | 13.22 |

SAMPLED @ 1131 ID: GW-32504-040814-SR-1768

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1210 | 7.01 | 0.94 | 31.9 | 0.99 | 17.17 |
| 1225 | 6.93 | 1.20 | 16.1 | 0.12 | 12.19 |
| 1235 | 6.91 | 1.41 | 6.0 | 0.14 | 11.43 |
| 1240 | 6.92 | 1.36 | 4.7 | 0.13 | 11.36 |
| 1250 | 9.93 | 1.35 | 3.9 | 0.15 | 11.36 |
| 1255 | 6.93 | 1.35 | 4.1 | 0.13 | 11.36 |

SAMPLED @ 1256 ID: GW-32504-040814-SR-1769

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1310 | 7.02 | 0.98 | 15.5 | 4.23 | 12.33 |
| 1320 | 7.06 | 1.15 | 6.9 | 0.15 | 12.58 |
| 1330 | 7.10 | 1.27 | 3.1 | 0.13 | 13.04 |
| 1335 | 7.02 | 1.29 | 2.7 | 0.12 | 13.46 |
| 1340 | 7.02 | 1.27 | 3.0 | 0.14 | 13.48 |

CONTINUED ON NEXT PAGE

4/8/14 32504-25

SAMPLE OF CRA-RA-30 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1345 | 7.04 | 1.28 | 3.1 | 0.12 | 13.36 |
| 1350 | 7.04 | 1.27 | 2.6 | 0.14 | 13.37 |
| 1355 | 7.03 | 1.27 | 2.9 | 0.13 | 13.36 |

SAMPLE OF 1356 ID: GW-32504-040814-SR-1770

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 7.11 | 0.690 | 14.4 | 0.57 | 15.39 |
| 1425 | 7.03 | 0.745 | 6.6 | 0.25 | 13.57 |
| 1435 | 7.04 | 0.929 | 4.8 | 0.18 | 12.87 |
| 1440 | 7.04 | 0.98 | 4.6 | 0.13 | 12.74 |
| 1445 | 7.04 | 1.16 | 4.2 | 0.11 | 12.67 |
| 1450 | 7.04 | 1.19 | 3.5 | 0.12 | 12.76 |
| 1455 | 7.04 | 1.16 | 3.9 | 0.14 | 12.75 |
| 1500 | 7.04 | 1.16 | 3.4 | 0.12 | 12.76 |

SAMPLED @ 1501 ID: GW-32504-040814-SR-1771

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1520 | 7.19 | 0.489 | 17.8 | 10.25 | 15.77 |
| 1530 | 7.09 | 0.413 | 5.0 | 3.90 | 15.82 |
| 1540 | 7.11 | 0.428 | 4.5 | 4.76 | 15.60 |
| 1545 | 7.12 | 0.430 | 4.0 | 4.95 | 15.35 |
| 1550 | 7.13 | 0.438 | 4.3 | 5.06 | 15.36 |

CONTINUED ON NEXT PAGE



32504-25 4/8/14

SAMPLE OF CRA-RA-29

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1555 | 7.12 | 0.439 | 4.6 | 5.24 | 15.35 |
| 1600 | 7.12 | 0.439 | 4.5 | 5.22 | 15.36 |
| 1605 | 7.13 | 0.439 | 4.8 | 5.23 | 15.35 |

SAMPLED @ 1606 ID: GW-32504-040814-SR-1772

SAMPLES PACKED IN COOLER WITH ICE.

4/9/14 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: SUN 36°F, HIGH OF 58°

$H_2S$: LEVEL D

CALIBRATION OF RENTAL HORIBA NF04293

pH=4.00, COND.=4.48, TURB.=0.0, D.O.=10.63, TEMP=14.67

SAMPLE OF 81-8

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1020 | 6.01 | .391 | 28.2 | 3.44 | 15.54 |
| 1030 | 6.17 | .483 | 16.2 | 2.84 | 13.36 |
| 1040 | 6.98 | .482 | 6.8 | 4.85 | 11.38 |
| | HAVING ISSUES WITH CONTROL BOX. | | | | |
| 1115 | 7.59 | 0.571 | 2.7 | +19.99 | 11.21 |
| 1120 | 7.64 | 0.581 | 3.6 | +19.99 | 11.05 |
| 1125 | 7.66 | 0.584 | 3.5 | +19.99 | 11.21 |
| 1130 | 7.66 | 0.584 | 3.8 | +19.99 | 11.21 |

SAMPLED @ 1131 ID:GW-32504-040914-SR-1773

SAMPLE OF CRA-RA-31

| | | | | | |
|---|---|---|---|---|---|
| 1315 | 7.50 | 0.497 | 14.3 | 1.04 | 12.27 |
| 1325 | 7.22 | 0.522 | 10.5 | 0.13 | 11.72 |
| 1335 | 7.21 | 0.600 | 5.0 | 0.20 | 11.69 |

CONTINUED ON NEXT PAGE



32504-25 4/9/14

SAMPLE OF CRA-RA-31 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1345 | 7.22 | 0.623 | 4.8 | 0.26 | 11.70 |
| 1350 | 7.22 | 0.640 | 4.7 | 0.26 | 11.68 |
| 1355 | 7.23 | 0.600 | 4.5 | 0.25 | 11.68 |
| 1400 | 7.23 | 0.601 | 4.4 | 0.26 | 11.68 |

SAMPLED @ 1401 ID:GW-32504-040914-SR-1774

SAMPLED @ 1405 ID:GW-32504-040914-SR-1775

SAMPLE OF CRA-RA-7

| | | | | | |
|---|---|---|---|---|---|
| 1420 | 7.50 | 0.275 | 11.8 | 5.17 | 13.84 |
| 1430 | 7.46 | 0.286 | 8.8 | 5.50 | 11.98 |
| 1440 | 7.49 | 0.286 | 6.7 | 5.59 | 11.91 |
| 1450 | 7.56 | 0.286 | 5.2 | 5.38 | 12.01 |
| 1455 | 7.53 | 0.285 | 4.6 | 5.35 | 12.07 |
| 1505 | 7.50 | 0.287 | 4.3 | 5.64 | 11.72 |
| 1510 | 7.51 | 0.288 | 4.5 | 5.66 | 11.68 |
| 1515 | 7.51 | 0.287 | 4.7 | 5.65 | 11.70 |

SAMPLED @ 1516 ID:GW-32504-040914-SR-1776

4/10/14 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPA

WEATHER: 50°F, WINDY, RAIN LATER, HIGH 68°

H&S LEVEL D

CALIBRATION OF RENTAL HORIBA NF04293

pH=4.00, COND.=4.49, TURB.=0.0, D.O.=9.45, TEMP=20.66

SAMPLE OF CRA-RA-18

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1020 | 5.85 | 1.46 | 5.9 | 4.42 | 20.85 |
| 1030 | 6.37 | 1.40 | 3.6 | 2.51 | 16.83 |
| 1040 | 6.58 | 1.48 | 2.5 | 2.72 | 14.22 |
| 1050 | 6.68 | 1.53 | 2.4 | 2.77 | 13.20 |
| 1055 | 6.72 | 1.55 | 2.5 | 2.70 | 12.96 |
| 1100 | 6.73 | 1.55 | 1.9 | 2.71 | 12.95 |
| 1105 | 6.73 | 1.55 | 2.1 | 2.71 | 12.96 |

SAMPLED @ 1106 ID:GW-32504-041014-SR-1777

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1115 | 7.17 | 0.600 | 54.6 | 6.29 | 13.93 |
| 1125 | 7.02 | 0.601 | 17.2 | 5.22 | 13.65 |
| 1135 | 6.96 | 0.598 | 8.4 | 4.15 | 13.37 |
| 1140 | 6.95 | 0.620 | 7.9 | 5.87 | 13.34 |

CONTINUED ON NEXT PAGE



32504-25 4/10/14

SAMPLE OF RA-MW-28 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1145 | 6.94 | 0.595 | 5.5 | 5.89 | 13.35 |
| 1150 | 6.94 | 0.596 | 4.9 | 5.91 | 13.36 |
| 1155 | 6.94 | 0.596 | 4.9 | 5.90 | 13.36 |

SAMPLED @ 1156 ID:GW-32504-041014-SR-1778

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1240 | 7.12 | 1.19 | 23.4 | 1.25 | 18.68 |
| 1250 | 6.91 | 1.20 | 6.9 | 0.61 | 16.10 |
| 1305 | 6.92 | 1.38 | 4.6 | 0.19 | 15.19 |
| 1310 | 6.94 | 1.43 | 5.3 | 0.22 | 15.15 |
| 1315 | 6.90 | 1.45 | 4.8 | 0.22 | 15.12 |
| 1320 | 6.91 | 1.45 | 4.6 | 0.21 | 15.12 |

SAMPLED @ 1321 ID:GW-32504-041014-SR-1779

SAMPLE OF CRA-RA-65

| | | | | | |
|---|---|---|---|---|---|
| 1330 | 7.12 | 1.06 | 4.2 | 3.60 | 16.95 |
| 1340 | 6.75 | 1.08 | 4.4 | 2.02 | 15.95 |
| 1350 | 6.76 | 1.12 | 3.3 | 0.49 | 15.80 |
| 1355 | 6.76 | 1.11 | 4.3 | 0.40 | 15.81 |
| 1400 | 6.76 | 1.11 | 3.9 | 0.40 | 15.80 |
| 1405 | 6.76 | 1.12 | 3.3 | 0.41 | 15.81 |

SAMPLED @ 1406 ID:GW-32504-041014-SR-1780

SAMPLES PACKED IN COOLER FOR FED-EX DELIVERY TO TEST AMERICA

4/11/14 32504.25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: SUN 39°, HIGH 65°

H&S: LEVEL D

CALIBRATION OF HORIBA NF04293

pH=4.00, COND=4.50, TURB=0.0, D.O.=8.35, TEMP.=23.01

SAMPLE OF CRA-RA-27

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1050 | 6.08 | 1.54 | 9.4 | 1.21 | 15.91 |
| 1100 | 6.27 | 1.72 | 2.8 | 0.36 | 13.80 |
| 1110 | 6.51 | 1.91 | 3.6 | 0.12 | 11.94 |
| 1120 | 6.59 | 1.94 | 3.7 | 0.13 | 12.24 |
| 1125 | 6.63 | 1.92 | 3.5 | 0.11 | 12.98 |
| 1130 | 6.64 | 1.90 | 3.8 | 0.11 | 13.16 |
| 1135 | 6.64 | 1.89 | 3.4 | 0.11 | 13.15 |
| 1140 | 6.64 | 1.89 | 3.1 | 0.10 | 13.15 |

SAMPLED @ 1141 ID: GW-32504-041114-SR-1781

MS/MSD

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1240 | 6.79 | 1.05 | 10.8 | 2.62 | 17.14 |
| 1250 | 6.74 | 1.19 | 1.7 | 3.44 | 18.32 |

CONTINUED ON NEXT PAGE



32504.25 4/11/14

SAMPLE OF CRA-RA-26S (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1300 | 6.73 | 1.25 | 3.3 | 3.94 | 16.25 |
| 1310 | 6.74 | 1.29 | 2.4 | 4.78 | 15.59 |
| 1315 | 6.75 | 1.30 | 2.2 | 5.17 | 15.47 |
| 1320 | 6.74 | 1.30 | 2.0 | 5.54 | 15.35 |
| 1330 | 6.74 | 1.32 | 2.2 | 6.00 | 16.36 |
| 1340 | 6.76 | 1.31 | 0.9 | 6.33 | 15.81 |

PURGED WELL FOR OVER ONE HOUR.

D.O. CONTINUED TO SLOWLY INCREASE.

SAMPLED @ 1341 ID: GW-32504-041114-SR-1782

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1350 | 6.78 | 1.49 | 9.4 | 1.15 | 16.10 |
| 1405 | 6.79 | 1.58 | 2.6 | 0.16 | 15.31 |
| 1410 | 6.79 | 1.58 | 1.8 | 0.13 | 15.14 |
| 1415 | 6.79 | 1.74 | 3.6 | 0.11 | 15.12 |
| 1420 | 6.79 | 1.81 | 3.2 | 0.10 | 14.79 |
| 1425 | 6.79 | 1.86 | 3.8 | 0.12 | 13.84 |
| 1430 | 6.79 | 1.87 | 2.7 | 0.13 | 13.83 |
| 1435 | 6.79 | 1.87 | 2.0 | 0.12 | 13.85 |

SAMPLED @ 1436 ID: GW-32504-041114-SR-1783

SAMPLED @ 1445 ID: GW-32504-041114-SR-1784

SAMPLES PACKED IN COOLER WITH ICE.

4/14/14 32504-25

TASK: COMPLETE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: 65°, RAIN, HIGH WIND WARNING,

H&S: LEVEL D

CALIBRATION OF HORIBA NF01293

pH=4.00 COND.=4.49, TURB.=0.0, D.O.=9.68, TEMP=18.35

SAMPLE OF 81-4

| TIME | pH | COND. | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1215 | 6.00 | 1.01 | 9.8 | 2.18 | 19.44 |
| 1230 | 6.49 | 1.15 | 4.0 | 0.24 | 13.87 |
| 1245 | 6.64 | 1.24 | 3.0 | 0.16 | 13.53 |
| 1250 | 6.67 | 1.26 | 3.5 | 0.15 | 13.53 |
| 1255 | 6.67 | 1.25 | 3.1 | 0.15 | 13.53 |
| 1300 | 6.66 | 1.25 | 3.2 | 0.16 | 13.54 |

SAMPLED @ 1301 ID:GW32504-041414SR1785

TROUBLE WITH CONTROL BOX

SAMPLE OF CRA-RA-23D

| | | | | | |
|---|---|---|---|---|---|
| 1430 | 7.12 | 0.506 | 2.1 | 1.33 | 15.78 |
| 1440 | 6.92 | 0.584 | 1.3 | 2.10 | 12.61 |

TROUBLE WITH CONTROL BOX

| | | | | | |
|---|---|---|---|---|---|
| 1520 | 6.96 | 0.555 | 4.9 | 1.87 | 14.88 |

CONTINUED ON NEXT PAGE



32504-25 4/14/14

SAMPLE OF CRA-RA-23D (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1530 | 6.89 | 0.587 | 1.6 | 1.54 | 12.30 |
| 1540 | 6.88 | 0.610 | 2.8 | 1.60 | 11.25 |
| 1545 | 6.87 | 0.612 | 2.8 | 1.61 | 10.94 |
| 1550 | 6.87 | 0.612 | 2.4 | 1.61 | 10.93 |
| 1555 | 6.88 | 0.612 | 2.7 | 1.60 | 10.93 |

SAMPLED @ 1556 ID:GW32504-041414SR1786

SAMPLES PACKED IN COOLER WITH ICE FOR FED EX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.

4/22/14 32504.25

TASK: 1/4 LY WATERLEVELS

CRA: STEVE RAPA

WEATHER: MOSTLY CLOUDY, WINDY 45-54°F

H&S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| 81-4 | 30.25 |
| 81-5 | 34.69 |
| 81-7 | 48.22 |
| 81-8 | 43.83 |
| 81-9 | 16.32 |
| 81-10 | 32.74 |
| RA-1 | 69.42 |
| RA-2D | 56.26 |
| RA-2S | 55.99 |
| RA-3 | 53.07 |
| RA-4 | 24.19 |
| RA-5 | 55.15 |
| RA-6 | 59.63 |
| RA-7 | 32.76 |
| RA-8 | 46.87 |
| RA-16 | 58.58 |
| RA-18 | 41.91 |
| RA-18D | No Access |
| RA-19D | 50.46 |



32504.25 4/22/14

| WELL ID | LEVEL |
|---|---|
| RA-19S | 47.83 |
| RA-20 | 58.83 |
| RA-22 | 54.21 |
| RA-23D | 33.01 |
| RA-23S | 33.30 |
| RA-24 | 57.05 |
| RA-25 | 54.49 |
| RA-26D | 50.25 |
| RA-26S | 50.13 |
| RA-27 | 61.94 |
| RA-28 | 54.76 |
| RA-29 | 46.31 |
| RA-30 | 58.69 |
| RA-31 | 32.54 |
| RA-32 | 35.27 |
| MW-22 | 42.50 |
| MW-28 | 42.84 |
| MW-32 | 57.50 |
| MW-34C | 42.04 |
| MW-35 | 24.27 |
| MW-41 | 47.44 |
| MW-42 | 63.45 |
| MW-47 | 53.69 |
| MW-54 | 56.27 |

4/22/14 32504.25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 37.06 |
| MW-56 | 34.05 |
| MW-58 | 21.62 |
| EB-PZ-2 | 40.59 |
| EB-PZ-4 | 53.70 |
| EB-PZ-5 | 55.42 |
| EB-PZ-6 | 55.15 |
| PZ-103 | 57.52 |
| PZ-104 | 55.28 |
| PZ-105 | 52.07 |
| PZ-106 | 39.40 |
| TEMP-PZ-2 | 54.00 |

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

July 10, 2014

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 127
Groundwater and Landfill RD/RA
Reporting Period: April 1 through June 30, 2014
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 Introduction

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree, Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 Activities Performed During this Reporting Period

### 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on June 9, 2014. The corresponding groundwater contour map is provided on Figure 1.

CRA collected quarterly groundwater samples on June 10 – 12 and 17 - 19, 2014 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

### 2.2 Reports

Quarterly Progress Report No. 126 was submitted to USEPA and Michigan Department of Environmental Quality (MDEQ) on May 10, 2014.

## 3.0 Summary of Findings

The results of the second quarter 2014 sampling are provided in Tables 1 through 5. Figure 2 is a Site location map showing the wells included in quarterly Groundwater Remediation Monitoring Program and the annual Landfill Monitoring Program.

During the second quarter 2014 sampling, seven of the 25 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the seven monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| 81-4 | 2.1 μg/L vinyl chloride |
| CRA-RA-22 | 4.2 μg/L vinyl chloride |
| CRA-RA-23D | 5.1 μg/L trichloroethene |
| CRA-RA-24 | 5.2 μg/L vinyl chloride |
| CRA-RA-26S | 98 μg/L trichloroethene |
| CRA-RA-27 | 12 μg/L vinyl chloride |
| CRA-RA-30 | 3.1 μg/L vinyl chloride |

There were six monitoring wells that had COCs above Part 201 DWC during the first quarter 2014. Vinyl chloride in the groundwater sample from monitoring well 81-4 increased from 2.0 μg/L, which equals the current DWC of 2 μg/L, in April 2014 to 2.1 μg/L in June 2014.

The results of the 2014 round of the annual Landfill Monitoring Programs are provided in Table 5. Bis(2-ethylhhexyl)phthalate was detected in groundwater samples collected from CRA-RA-18 (5.6 J μg/L) and from CRA-RA-19S (5.5 J μg/L), however, at concentrations less that the Part 201 DWC of 6 μg/L, and contamination in lab blanks resulted in the data being qualified as

"J = estimated concentration". No other semi-volatile organic compounds were detected in any of the groundwater samples, however some detection limits were elevated due to blank contamination. Volatile organic compounds were detected but concentrations did not exceed their respective Part 201 DWC. Cadmium and lead were not detected in the samples.

## 4.0 Problems Encountered

On April 7, 2014, the Site compressor failed and CRA called Ingersoll Rand to troubleshoot the issue.

On May 14, 2014, CRA inspected the compressor drive belt which revealed that the belt was beginning to deteriorate and shred. CRA shut the system down to prevent any possible damage that could have occurred if the belt broke while spinning.

## 5.0 Corrective Measures to Rectify Problems

On April 7, 2014, Ingersoll Rand was contacted for a service call to diagnose issues with the site compressor. Ingersoll Rand was able to visit the site the following day and diagnosed the problem as a bad motor starter. A new part was placed on order and the part arrived the following day, April 9, 2014. The new motor starter was installed and the system was restarted on April 9, 2014.

After an inspection of the compressor drive belt on May 14, 2014 a new belt was ordered to replace the older, damaged belt. A new belt arrived and was installed on May 19, 2014. The system was restarted on May 19, 2014.

## 6.0 Contacts and Significant Correspondence with Public Representatives

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | May 10, 2014 | Report No. 126 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDEQ) |

## 7.0 Planned Upcoming Activities/Schedule

Landfill and groundwater component activities planned for the third quarter of 2014:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The third quarter groundwater sampling event is scheduled for the week of August 11, 2014
- The wells to be sampled in the third quarter of 2014 are listed in Table 6
- Obtain property access to install vertical aquifer sampling (VAS) boreholes and monitoring wells

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

For Bart Bartholomy

AJD/cb/36
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Michael Simpson
Steven Nadeau, Honigman Miller

# TABLES AND FIGURES

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUMES
HARBURN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 12,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-22 | GW-SR-1721 | 8/21/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.4 | ND(1.0) |
| CRA-RA-22 | GW-SR-1748 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.5 | ND(1.0) |
| CRA-RA-22 | GW-SR-1749 | 11/11/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.4 | ND(1.0) |
| CRA-RA-22 | GW-SR-1766 | 3/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.8 | ND(1.0) |
| CRA-RA-22 | GW-SR-1795 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | 4.2 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 3.6 µg/L | |
| CRA-RA-24 | GW-SR-1718 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5 | ND(1.0) |
| CRA-RA-24 | GW-SR-1745 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.5 | ND(1.0) |
| CRA-RA-24 | GW-SR-1769 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.2 | ND(1.0) |
| CRA-RA-24 | GW-SR-1790 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.6) | ND(1.0) | ND(1.0) | 5.2 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 1.0 µg/L | |
| CRA-RA-25 | GW-SR-1546 | 8/24/2011 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1547 | 8/24/2011 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1645 | 9/13/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-25 | GW-SR-1716 | 7/25/2013 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1717 | 7/25/2013 | Duplicate | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| | | | Change | | Down 0.2 µg/L | | | | | | | | | | | |
| CRA-RA-28 | GW-SR-1714 | 7/25/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) |
| CRA-RA-28 | GW-SR-1742 | 11/6/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.2 | ND(1.0) |
| CRA-RA-28 | GW-SR-1767 | 4/8/2014 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-28 | GW-SR-1788 | 6/30/2014 | | ND(1.0) | 1.9 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Up 0.1 µg/L | | | | | | | | | | Stable | |
| CRA-RA-29 | GW-SR-1723 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1751 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1772 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1786 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-30 | GW-SR-1719 | 8/16/2013 | | ND(1.0) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| CRA-RA-30 | GW-SR-1746 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1770 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1791 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.1 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 1.4 µg/L | |
| CRA-RA-32 | GW-SR-1720 | 8/16/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1747 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1771 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1792 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| PZ-104 | GW-SR-1715 | 7/25/2013 | | ND(1.0) | 3.5 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1744 | 11/6/2013 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1768 | 4/8/2014 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-104 | GW-SR-1789 | 6/10/2014 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Stable | | | | | | | | | | | |
| TEMP-PZ-2 | GW-SR-1722 | 8/22/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1750 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1765 | 3/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1794 | 6/11/2014 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1795 | 6/11/2014 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1) | ND(1) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| S1-6 | GW-SR-1726 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-6 | GW-SR-1752 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-6 | GW-SR-1773 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| S1-6 | GW-SR-1797 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the lower cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 2

ANALYTICAL RESULTS - POSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-1713 | 7/24/2013 | | ND(1.7) | ND(1.7) | ND(17) | ND(17) | ND(17) | ND(17) | 46 | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) | ND(1.7) |
| CRA-RA-2D | GW-SR-1741 | 11/6/2013 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 55 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1764 | 3/12/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 60 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1787 | 6/10/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 57 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| | | | *Change* | | | | | | | Down 3 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-1730 | 8/27/2013 | | 74 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| CRA-RA-18 | GW-SR-1756 | 11/13/2013 | | 95 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-18 | GW-SR-1777 | 4/9/2014 | | 79 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-18 | GW-SR-1789 | 6/17/2014 | | 76 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| | | | *Change* | Down 3 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1445 | 8/3/2010 | | ND(1) | 1.42 | ND(10) | ND(10) | ND(10) | ND(1) | 29 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 28.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| EB-PZ-4 | GW-SR-1729 | 8/27/2013 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 41 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | 2.2 | ND(1.4) |
| | | | *Change* | | | | | | | Up 2 µg/L | | | | | Down 1.8 µg/L | |
| PZ-106 | GW-SR-1730 | 8/27/2013 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1399 | 08/25/2010 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1731 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1732 | 8/27/2013 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | | | | | | | Stable; all Non-Detect | | | | | | |
| RA-MW-2B | GW-SR-1734 | 8/27/2013 | | 11 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1755 | 11/13/2013 | | 9.6 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1778 | 4/9/2014 | | 8.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1800 | 6/18/2014 | | 7.7 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | *Change* | Down 0.3 µg/L | | | | | | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 8

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC(1) | 200 | 70 (2) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-5 | GW-SR-1728 | 8/26/2013 | | 27 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1743 | 11/6/2013 | | 22 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1779 | 4/10/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1798 | 6/12/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Stable | | | | | | | | | | | | |
| CRA-RA-65 | GW-SR-1727 | 8/26/2013 | | 1.2 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1757 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1780 | 4/10/2014 | | 1.4 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1803 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1804 | 6/20/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Down 0.4 µg/L | | | | | | | | | | | | |
| CRA-RA-7 | GW-SR-1726 | 8/26/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1754 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1776 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1806 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Stable; all Non-Detect | | | | | | | | | | | | |
| CRA-RA-27 | GW-SR-1735 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-27 | GW-SR-1758 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 11 | ND(1.0) |
| CRA-RA-27 | GW-SR-1781 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 10 | ND(1.0) |
| CRA-RA-27 | GW-SR-1802 | 6/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 2 µg/L | |
| CRA-RA-31 | GW-SR-1725 | 8/26/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.6) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1753 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1774 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1775 | 4/9/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1805 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Stable; all Non-Detect | | | | | | | | | | | | |
| B1-4 | GW-SR-1739 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| B1-4 | GW-SR-1762 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.6 | ND(1.0) |
| B1-4 | GW-SR-1763 | 11/14/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| B1-4 | GW-SR-1785 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.0 | ND(1.0) |
| B1-4 | GW-SR-1811 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.1 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 0.1 µg/L | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria.
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethane isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| | | | | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Sample Location | Sample ID | Date Sampled | DWC (1) | 200 | 70 (2) | 18,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-23D | GW-SR-1738 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1761 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1786 | 4/14/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1810 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | | | | | Down 0.8 µg/L | | |
| CRA-RA-26D | GW-SR-1737 | 8/28/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1760 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1783 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1784 | 4/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1809 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1736 | 8/27/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1676 | 11/13/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1782 | 4/11/2014 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 100 | ND(4.0) | ND(4.0) |
| CRA-RA-26S | GW-SR-1808 | 6/19/2014 | | ND(2.9) | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | 98 | ND(2.9) | ND(4.0) |
| | | | Change | | | | | | | | | | | Down 2 µg/L | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 5

ANALYTICAL RESULTS - LANDFILL MONITORING PROGRAM
HAMBURGER LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sample | | Parameter | Volatile Organics | | | | | | | | | | | | | Semi-volatile Organics | | | Metals | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1,1,2-TRICHLOROETHANE | DICHLOROETHENE | 2-BUTANONE | PENTANON | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) | 2-METHYLPHENOL | BIS(2-ETHYLHEXYL)PHTHALATE | ISOPHORONE | CADMIUM, DISSOLVED | CADMIUM, TOTAL | LEAD, DISSOLVE | LEAD, TOTAL |
| | | | | Michigan Part 201 Groundwater Criteria | 200 | 70 (1) | 12,000 | 1,000 | 700 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 200 | 370 | 4 | 500 | 5 | | 4 | |
| | | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| CRA-RA-6S | GW-6S-1192 | 4/2/2009 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.6 | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-6S | GW-6S-1396 | 4/2/2009 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.6 | ND(1) | ND(9) | ND(9) | ND(9) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-6S | GW-6S-1586 | 4/14/2010 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.2 | ND(1) | ND(0.1) | ND(0.1) | ND(0.1) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-6S | GW-6S-1783 | 4/14/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 1.8 | ND(1) | ND(9) | ND(9) | ND(9) | ND(1) | ND(1) | ND(5) | ND(5) |
| CRA-RA-6S | GW-6S-1985 | 4/18/2014 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(5.0) | ND(5.0) |
| CRA-RA-6S | GW-6S-1984 | 4/18/2014 | Duplicate | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(5.0) | ND(5.0) |
| | | | Change | | | | | | | | | | | | | Down 0.8 µg/L | | | | | | | | |
| CRA-RA-5 | GW-6S-1821 | 4/19/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(1.0) | ND(1.0) | ND(0.0) | ND(0.0) |
| CRA-RA-5 | GW-6S-1822 | 4/19/2011 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(1.0) | ND(1.0) | ND(0.0) | ND(0.0) |
| CRA-RA-5 | GW-6S-1976 | 8/20/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(5) | ND(5) |
| CRA-RA-5 | GW-6S-1975 | 8/20/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(5) | ND(5) |
| CRA-RA-5 | GW-6S-1482 | 4/21/2012 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.0) | ND(2.0) | ND(2.0) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-5 | GW-6S-1787 | 4/19/2013 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-5 | GW-6S-1987 | 4/28/2014 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(5.0) | ND(5.0) |
| | | | Change | | | | | | | | | | | | | Stable All Non-Detect | | | | | | | | |
| CRA-RA-10 | GW-6S-1980 | 4/18/2010 | | | 110 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(0.1) | ND(0.1) | ND(0.1) | ND(0.2) | ND(0.2) | ND(0) | ND(0) |
| CRA-RA-10 | GW-6S-1981 | 4/18/2011 | | | 107 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(0.3) | ND(0.3) | ND(0.3) | ND(1.0) | ND(1.0) | 0.1 | ND(0.0) |
| CRA-RA-10 | GW-6S-1982 | 4/18/2011 | Duplicate | | 107 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.5 | ND(1) | ND(1) | ND(0.3) | ND(0.3) | ND(0.3) | ND(1.0) | ND(1.0) | 0.0 | ND(0.0) |
| CRA-RA-10 | GW-6S-1980 | 8/18/2011 | | | 98.8 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | 1.1 | ND(1) | 2.0 | ND(1) | ND(1) | -- | -- | -- | -- | -- | ND(0) | ND(5) |
| CRA-RA-10 | GW-6S-1487 | 4/23/2012 | | | 88.3 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | 2.0 | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(0.0287) | ND(0.0287) | ND(1.7) | ND(1.7) |
| CRA-RA-10 | GW-6S-1682 | 4/17/2013 | | | 68 | ND(0.3) | ND(10) | ND(10) | ND(10) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| CRA-RA-10 | GW-6S-1684 | 4/17/2013 | Duplicate | | 68 | ND(0.3) | ND(10) | ND(10) | ND(10) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(0.3) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(0.0) | ND(0.0) |
| CRA-RA-10 | GW-6S-1790 | 4/17/2014 | | | 76 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | 5.6 † | ND(4.0) | ND(0.2) | ND(0.29) | ND(0.0) | ND(0.0) |
| | | | Change | | Down 14 µg/L | | | | | | | | | | | | | | | | | | | |
| CRA-RA-10B | GW-6S-1988 | 4/18/2010 | Duplicate | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-10B | GW-6S-1987 | 4/18/2011 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(1.0) | ND(1.0) | 4.0 | 5.0 |
| CRA-RA-10B | GW-6S-1881 | 8/20/2011 | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(5) | ND(5) |
| CRA-RA-10B | GW-6S-1882 | 8/20/2011 | Duplicate | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | ND(5) | ND(5) |
| CRA-RA-10B | GW-6S-1489 | 4/23/2012 | | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(2.1) | ND(2.1) | ND(2.1) | ND(0.2) | ND(0.2) | ND(5) | ND(5) |
| CRA-RA-10B | GW-6S-1686 | 4/17/2013 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(0.2) | ND(0.2) | ND(5.0) | ND(5.0) |
| CRA-RA-10B | GW-6S-1792 | 4/18/2014 | | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(4.0) | 5.9 † | ND(4.0) | ND(0.2) | ND(0.2) | ND(5.0) | ND(5.0) |
| | | | Change | | | | | | | | | | | | | Stable all non-detect | | | | | | | | |
| CRA-RA-20 | GW-6S-439 | 11/18/2000 | | | 7 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0.2) | ND(0.2) | ND(0.2) | ND(0.2) | ND(0) | ND(0.2) | ND(0) |
| CRA-RA-20 | GW-6S-497 | 11/19/2001 | | | 11 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0) | ND(0) | ND(0) | ND(0.2) | ND(0) | NA | NA |
| CRA-RA-20 | GW-6S-656 | 12/12/2002 | | | 5 | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(0) | ND(0) | ND(0) | ND(0.0) | ND(0.0) | ND(1) | ND(1) |
| | | | | | | | | | | | | | | | | Insufficient Groundwater to Collect Sample | | | | | | | | |

† = Estimated concentration.

**TABLE 6**

**2014 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | *Q1* | *Q2* | *Q3* | *Q4* |
|---|---|---|---|---|
| 81-4 | | | | |
| 81-8 | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | |
| CRA-RA-2D | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-5 | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-18 (included in quarterly sampling) | New Rasmussen Water Supply Well (VOCs only) | |
| CRA-RA-18 | | CRA-RA-19S | | |
| CRA-RA-22 | | CRA-RA-20 | | |
| CRA-RA-23D | | | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

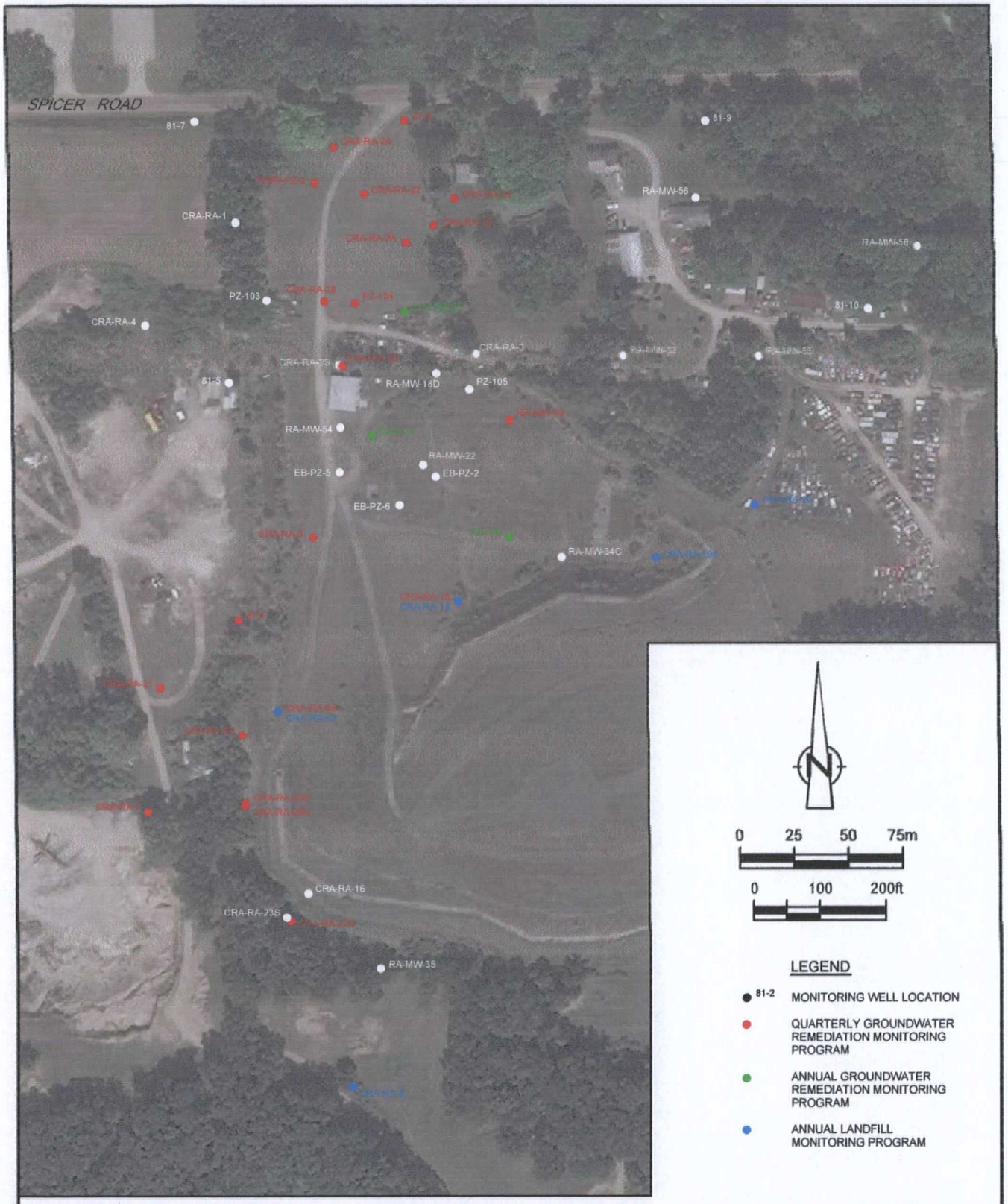



figure 1

# 2014 GROUNDWATER MONITORING PROGRAMS
# RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN036)GN-WA001 JUN 23/2014

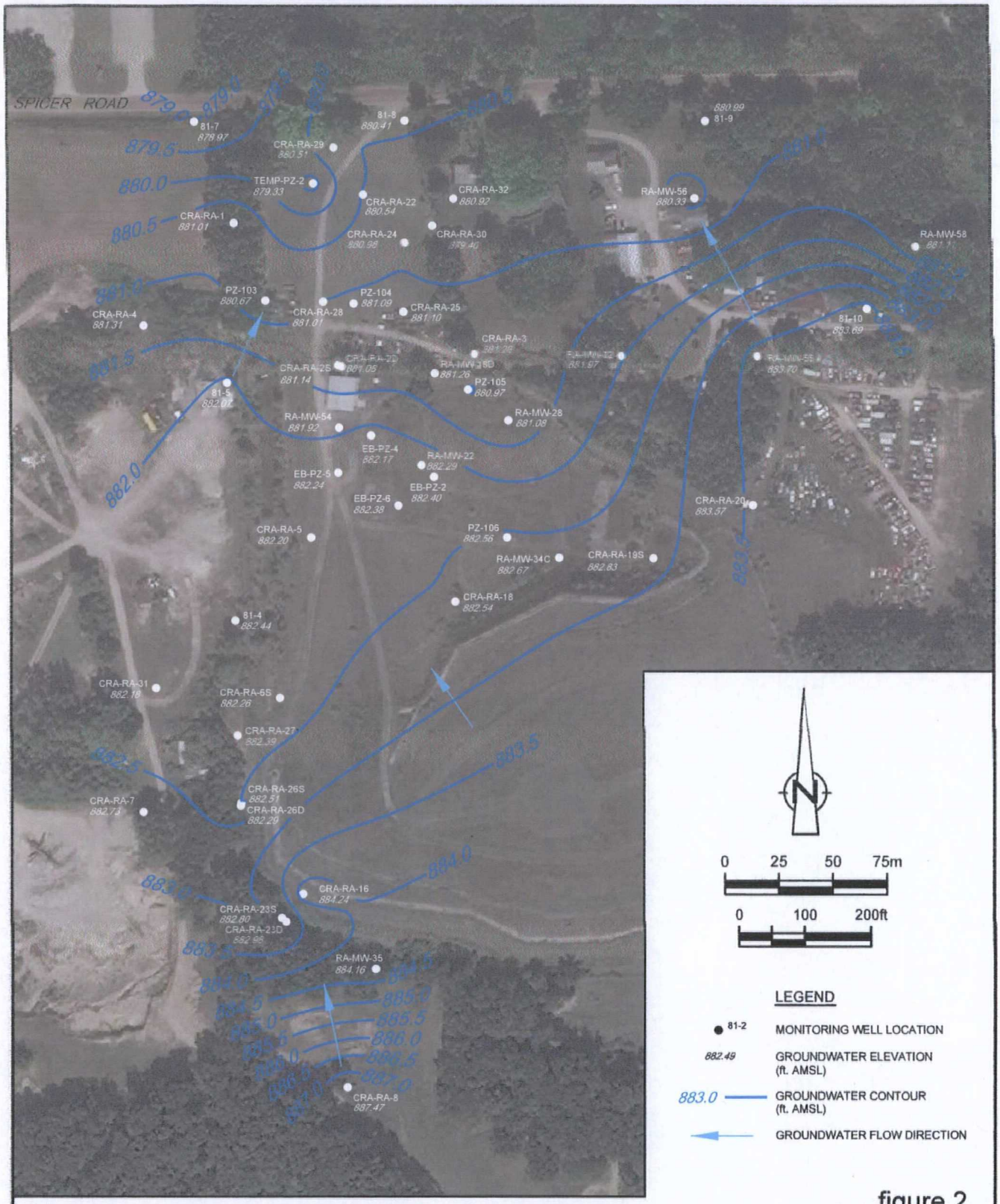



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
JUNE 2014
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN036)GN-WA002 JUN 23/2014

# LOG FORM COPIES

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** MONDAY, APRIL 7, 2014
**Time:** 10:30 AM

**Weather Conditions:** CLOUDY 42° - HEAVY RAIN EXPECTED SOON

**Observations**

**Erosion-North Face:** OK ALL SNOW GONE

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** OK - SOME RUTS FROM WINTER

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE - SOME ROAD WORK NEEDED

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** WEDNESDAY, APRIL 23, 2014
**Time:** 3:00 PM

**Weather Conditions:** SUN 52°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD - HOLES FILLED

**Vegetation:** TURNING GREEN

**Signs, Gates, & Fences:** OK

**Actions Taken:**
ROADS REGRADED

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** THURSDAY, MAY 8, 2014
**Time:** NOON

**Weather Conditions:** SUN 75°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** OK

**Drainage Spillways & Outfalls:** OK

**Roadways:** GOOD

**Vegetation:** GRASS IS GREEN, TREES BLOOMING

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE AT THIS TIME

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** FRIDAY MAY 23, 2014
**Time:** 11:00 AM

**Weather Conditions:** SUN 68°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GRASS GROWING QUICKLY DUE TO VERY WET SPRING

**Signs, Gates, & Fences:** OK

**Actions Taken:**
NONE

**Recommendations:**
NONE AT THIS TIME

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** THURSDAY, JUNE 5, 2014
**Time:** 3:00 PM

**Weather Conditions:** SUN 75°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET

**Drainage Spillways & Outfalls:** WET

**Roadways:** OK

**Vegetation:** GOOD

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** WED. JUNE 25, 2014
**Time:** 9:00 AM

**Weather Conditions:** STORMS LAST NIGHT, CLOUDY, HUMID, 72°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:** OK - NEED GRASS CUT

**Vegetation:** MOWING ON ROADS NEEDED

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | April 3, 2014 | April 11, 2014 | April 15, 2014 | April 23, 2014 | May 2, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L. Rupe | L. Rupe | L. Rupe | L. Rupe | L. Rupe |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | – | – | – | | |
| Run Time hours | 90038 | 90183.7 | | | 90661.0 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 52 | 52 | 52 | 54 | 54 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 65 |
| Holding Tank Pressure psi | 47 | 42 | ~~70~~ 42 | 42 | 42 |
| Run Time hours | 90038.0 | 90183.7 | | | 90661.0 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | 7 | 7 | 8 |
| % O3 capacity | 45 | ~~36~~ 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | ~~22~~ 36 | 36 | 34 | 32 |
| Regulator #2 psi | 22 | 22 | 24 | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 2 | 1 | 2 | 1 |
| Zone Time hours | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** SITE DOWN FOR 2 DAYS IN EARLY APRIL DUE TO BAD MOTOR STARTER ON COMPRESSOR

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | May 9, 2014 | May 14, 2014 | May 19, 2014 | May 27 | June 5, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A. Rapai | A. Rapai | A. Rapai | A. Rapai | A. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | | | | 110 |
| Temperature F | – | | | | |
| Run Time hours | | | | | 91110 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | | | | | 52 |
| Feed Air Pressure psi | | | | | 110 |
| Cycle Pressure psi | | | | | 70 |
| Holding Tank Pressure psi | | | | | 42 |
| Run Time hours | | | | | 91110.8 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | | | | | Green |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | | | | | 7 |
| % O3 capacity | | | | | 45 |
| Regulator #1 psi | | | | | 34 |
| Regulator #2 psi | | | | | 22 |
| Alarm Reading ppm, O3 | | | | | – |
| Zone On | | | | | 1 |
| Zone Time hours | | | | | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | | | | | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | June 12, 2014 | June 19, 2014 | June 26, 2014 | | |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | L. Repai | L. Repai | L. Repai | | |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | | |
| Temperature F | – | – | – | | |
| Run Time hours | 91278 | 91447 | 91593 | | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 54 | 52 | | |
| Feed Air Pressure psi | 110 | 110 | 110 | | |
| Cycle Pressure psi | 70 | 70 | 70 | | |
| Holding Tank Pressure psi | 42 | 42 | 42 | | |
| Run Time hours | 91277.6 | 91447.3 | 91593.4 | | |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | | |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | 7 | | |
| % O3 capacity | 45 | 45 | 45 | | |
| Regulator #1 psi | 38 | 35 | 35 | | |
| Regulator #2 psi | 26 | 22 | 24 | | |
| Alarm Reading ppm, O3 | – | – | – | | |
| Zone On | 3 | 1 | 2 | | |
| Zone Time hours | 2 | 1/2 | 1/2 | | |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | April 22 & 23 | | DATE: | May 23 & 27 | | DATE: | June 17, 18, & 19 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 8 | SW-1 | 0.8 | 7 | SW-1 | 0.7 | 7 |
| SW-2 | 0.7 | 7 | SW-2 | 0.8 | 7 | SW-2 | 0.8 | 8 |
| SW-3 | 0.8 | 13 | SW-3 | 0.8 | 13 | SW-3 | 0.8 | 14 |
| SW-4 | 0.8 | 15 | SW-4 | 0.8 | 15 | SW-4 | 0.7 | 15 |
| SW-5 | 0.8 | 16 | SW-5 | 0.7 | 15 | SW-5 | 0.8 | 16 |
| SW-6 | 0.8 | 15 | SW-6 | 0.7 | 15 | SW-6 | 0.8 | 14 |
| SW-7 | 0.8 | 14 | SW-7 | 0.8 | 15 | SW-7 | 0.8 | 15 |
| SW-8 | - | - | SW-8 | - | - | SW-8 | - | - |
| SW-9 | - | - | SW-9 | - | - | SW-9 | - | - |
| SW-10 | - | - | SW-10 | - | - | SW-10 | - | - |
| SW-11 | - | - | SW-11 | - | - | SW-11 | - | - |
| SW-12 | 0.7 | 14 | SW-12 | 0.8 | 13 | SW-12 | 0.7 | 14 |
| SW-13 | 0.7 | 3 | SW-13 | 0.7 | 0.3 | SW-13 | 0.7 | 3 |
| SW-14 | - | - | SW-14 | - | - | SW-14 | - | - |
| SW-15 | - | - | SW-15 | - | - | SW-15 | - | - |
| SW-16 | - | - | SW-16 | - | - | SW-16 | - | - |
| SW-17 | 0.8 | 17 | SW-17 | 0.8 | 17 | SW-17 | 0.8 | 17 |
| SW-18 | 0.7 | 20 | SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 |
| SW-19 | 0.8 | 17 | SW-19 | 0.7 | 17 | SW-19 | 0.8 | 16 |
| SW-20 | 0.8 | 17 | SW-20 | 0.8 | 17 | SW-20 | 0.8 | 17 |
| SW-21 | - | - | SW-21 | - | - | SW-21 | - | - |
| SW-22 | 0.8 | 14 | SW-22 | 0.8 | 14 | SW-22 | 0.8 | 13 |
| SW-23 | 0.7 | 15 | SW-23 | 0.8 | 14 | SW-23 | 0.8 | 15 |
| SW-24 | 0.7 | 16 | SW-24 | 0.7 | 16 | SW-24 | 0.8 | 15 |
| SW-25 | 0.7 | 15 | SW-25 | 0.7 | 14 | SW-25 | 0.8 | 15 |
| SW-26 | 0.8 | 3 | SW-26 | 0.7 | 3 | SW-26 | 0.8 | 3 |
| SW-27 | 0.8 | 6 | SW-27 | 0.7 | 6 | SW-27 | 0.7 | 6 |
| SW-28 | 0.7 | 6 | SW-28 | 0.8 | 5 | SW-28 | 0.8 | 6 |
| SW-29 | 0.8 | 7 | SW-29 | 0.8 | 6 | SW-29 | 0.8 | 6 |
| SW-30 | - | - | SW-30 | - | - | SW-30 | - | - |

4/22/14 32504-25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 37.06 |
| MW-56 | 34.05 |
| MW-58 | 21.62 |
| EB-PZ-2 | 40.59 |
| EB-PZ-4 | 53.70 |
| EB-PZ-5 | 55.42 |
| EB-PZ-6 | 55.15 |
| PZ-103 | 52.52 |
| PZ-104 | 55.28 |
| PZ-105 | 52.07 |
| PZ-106 | 39.60 |
| TEMP-PZ-2 | 54.00 |



32504-25 6/9/14

TASK: MONTHLY WATERLEVELS
CRA: STEVE RAPAI
WEATHER: MOSTLY SUNNY
H&S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| 81-4 | 29.38 |
| 81-5 | 33.70 |
| 81-7 | 47.34 |
| 81-8 | 42.78 |
| 81-9 | 15.01 |
| 81-10 | 31.62 |
| RA-1 | 68.50 |
| RA-2D | 55.31 |
| RA-2S | 55.01 |
| RA-3 | 52.07 |
| RA-4 | 23.32 |
| RA-5 | 54.29 |
| RA-6 | 58.77 |
| RA-7 | 31.74 |
| RA-8 | 15.42 |
| RA-16 | 56.90 |
| RA-18 | 41.03 |
| RA-18D | 55.56 |
| RA-19D | 49.46 |

6/9/14 32504-25

| WELL ID | LEVEL |
|---|---|
| RA-19S | 46.91 |
| RA-20 | 57.72 |
| RA-22 | 53.14 |
| RA-23D | 32.08 |
| RA-23S | 32.39 |
| RA-24 | 56.06 |
| RA-25 | 53.51 |
| RA-26D | 49.40 |
| RA-26S | 49.26 |
| RA-27 | 61.10 |
| RA-28 | 53.80 |
| RA-29 | 45.29 |
| RA-30 | 57.59 |
| RA-31 | 31.50 |
| RA-32 | 56.43 |
| MW-22 | 41.65 |
| MW-28 | 41.84 |
| MW-32 | 34.18 |
| MW-34R | 41.13 |
| MW-35 | 22.76 |
| MW-41 | 46.83 |
| MW-42 | 62.86 |
| MW-47 | 53.12 |
| MW-54 | 55.38 |



| WELL ID | LEVEL |
|---|---|
| MW-55 | 35.95 |
| MW-56 | 34.06 |
| MW-58 | 20.27 |
| EB-PZ-2 | 39.71 |
| EB-PZ-4 | 52.83 |
| EB-PZ-5 | 54.55 |
| EB-PZ-6 | 54.31 |
| PZ-103 | 56.60 |
| PZ-104 | 54.31 |
| PZ-105 | 51.07 |
| PZ-106 | 38.72 |
| TEMP-PZ-2 | 53.10 |

6/10/14 32504-25

TASK: BEGIN 1ST HLY SAMPLE EVENT

CRA: STEVE RAPH

WEATHER: CLOUDY 72°, CHANCE OF RAIN

H&S: LEVEL D

CALIBRATION OF IE FLOW CELL B165138:

pH=4.00, COND.=4.49, TURB.=0.0, D.O.=339

TEMP.=27.27

SAMPLE OF CRA-RA-20

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1240 | 6.93 | 1.87 | 6.4 | 0.62 | 11.35 |
| 1250 | 6.96 | 1.90 | ~~0.27~~ | 0.20 | 11.29 |
| 1300 | 6.96 | 1.90 | 2.1 | 0.16 | 11.29 |
| 1305 | 6.96 | 1.90 | 1.9 | 0.15 | 11.29 |
| 1310 | 6.96 | 1.90 | 1.8 | 0.15 | 11.29 |

SAMPLED @ 1311 ID: GW-32504-061014-32-1787

SAMPLE OF CRA-RA-28

| | | | | | |
|---|---|---|---|---|---|
| 1325 | 7.51 | 1.15 | 3.2 | 0.97 | 11.24 |
| 1335 | 6.94 | 1.11 | 3.0 | 0.17 | 11.23 |
| 1345 | 6.89 | 1.11 | 2.4 | 0.15 | 11.18 |
| 1350 | 6.89 | 1.11 | 2.0 | 0.15 | 11.18 |
| 1355 | 6.85 | 1.11 | 1.7 | 0.13 | 11.15 |
| 1400 | 6.84 | 1.11 | 1.8 | 0.13 | 11.15 |
| 1405 | 6.84 | 1.11 | 1.6 | 0.13 | 11.14 |

SAMPLED @ 1406 ID: GW-32504-061014-32-1788



32504-25 6/10/14

SAMPLE OF PZ-104

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1420 | 7.60 | 1.36 | 9.9 | 1.70 | 11.64 |
| 1430 | 6.98 | 1.40 | 5.3 | 0.18 | 11.81 |
| 1440 | 6.95 | 1.40 | 4.7 | 0.17 | 11.74 |
| 1445 | 6.93 | 1.40 | 4.1 | 0.16 | 11.82 |
| 1450 | 6.93 | 1.40 | 3.8 | 0.29 | 11.79 |
| 1455 | 6.90 | 1.41 | 3.2 | 0.16 | 11.79 |
| 1500 | 6.90 | 1.41 | 3.5 | 0.16 | 11.78 |
| 1505 | 6.90 | 1.41 | 3.0 | 0.16 | 11.78 |

SAMPLED @ 1506 ID: GW-32504-061014-32-1789

6/11/14 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: 67° CLOUDY, STORMS EXPECTED, HIGH OF 79°F

H&S: LEVEL D

CALIBRATION OF RENTAL FLOW CELL

TE 3116513B

pH=4.00, COND.=4.49, TURB=0.0, D.O.=0.0

SAMPLE OF CRA-RA-24

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 9:40 | 6.31 | 1.03 | 21.7 | 2.61 | 11.01 |
| 9:50 | 6.64 | 1.06 | 8.3 | 1.43 | 11.31 |
| 10:00 | 6.71 | 1.07 | 2.0 | 0.64 | 11.21 |
| 10:05 | 6.72 | 1.07 | 1.4 | 0.49 | 11.22 |
| 10:10 | 6.72 | 1.07 | 1.7 | 0.40 | 11.24 |
| 10:15 | 6.78 | 1.07 | 1.2 | 0.30 | 11.37 |
| 10:20 | 6.79 | 1.07 | 1.3 | 0.27 | 11.37 |
| 10:25 | 6.79 | 1.07 | 1.1 | 0.27 | 11.38 |

SAMPLED @ 1026 ID: GW-32504-061114-SR-1790

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 10:55 | 7.31 | 1.07 | 66.2 | 0.54 | 10.99 |
| 11:05 | 6.91 | 1.07 | 13.5 | 0.15 | 10.92 |

CONTINUED ON NEXT PAGE



32504-25 6/11/14

SAMPLE OF CRA-RA-30 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 11:15 | 6.86 | 1.07 | 5.9 | 0.16 | 10.89 |
| 11:20 | 6.87 | 1.07 | 4.3 | 0.18 | 10.91 |
| 11:25 | 6.86 | 1.07 | 3.8 | 0.16 | 10.92 |
| 11:30 | 6.87 | 1.07 | 3.6 | 0.16 | 10.92 |

SAMPLED @ 1131 ID: GW-32504-061114-SR-1791

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1140 | 7.08 | 0.914 | 1.7 | 0.18 | 10.89 |
| 1150 | 7.05 | 0.916 | 0.9 | 0.19 | 10.83 |
| 1200 | 7.06 | 0.915 | 0.8 | 0.18 | 10.96 |
| 1205 | 6.99 | 0.917 | 0.5 | 0.19 | 10.84 |
| 1210 | 6.97 | 0.917 | 0.7 | 0.15 | 10.84 |
| 1215 | 6.96 | 0.915 | 0.9 | 0.16 | 10.85 |
| 1220 | 6.96 | 0.915 | 0.8 | 0.16 | 10.85 |

SAMPLED @ 1221 ID: GW-32504-061114-SR-1792

SAMPLE OF CRA-RA-22

| | | | | | |
|---|---|---|---|---|---|
| 1315 | 7.06 | 1.09 | 49.1 | 0.51 | 11.60 |
| 1325 | 6.80 | 1.09 | 22.7 | 0.22 | 11.36 |
| 1335 | 6.75 | 1.08 | 6.4 | 0.79 | 11.33 |
| 1340 | 6.74 | 1.07 | 5.5 | 1.73 | 11.41 |
| 1345 | 6.72 | 1.06 | 5.1 | 2.46 | 11.26 |

CONTINUED ON NEXT PAGE

6/11/14 32504.25

SAMPLE OF CRA-RA-22 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1350 | 6.72 | 1.06 | 4.1 | 3.10 | 11.36 |
| 1355 | 6.71 | 1.06 | 3.9 | 3.62 | 11.26 |
| 1400 | 6.71 | 1.05 | 3.9 | 3.75 | 11.24 |
| 1405 | 6.71 | 1.05 | 3.4 | 3.93 | 11.19 |
| 1410 | 6.71 | 1.05 | 3.1 | 4.12 | 11.21 |

PURGED WELL FOR OVER ONE HOUR

SAMPLED @ 1411 ID:GW-32504-061114-SR-1793

SAMPLE OF TEMP-PZ-2

| | | | | | |
|---|---|---|---|---|---|
| 1420 | 7.13 | 2.42 | 1.9 | 1.06 | 11.16 |
| 1430 | 6.73 | 2.17 | 0.6 | 0.54 | 11.10 |
| 1440 | 6.68 | 2.45 | 1.3 | 0.28 | 11.13 |
| 1445 | 6.67 | 2.49 | 0.8 | 0.19 | 11.12 |
| 1450 | 6.67 | 2.48 | 0.6 | 0.16 | 11.12 |
| 1455 | 6.67 | 2.47 | 0.5 | 0.15 | 11.04 |
| 1500 | 6.66 | 2.47 | 0.7 | 0.15 | 11.04 |
| 1505 | 6.66 | 2.47 | 0.8 | 0.16 | 11.04 |

SAMPLED @ 1506 ID:GW-32504-061114-SR-1794

SAMPLED @ 1510 ID:GW-32504-061114-SR-1795

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1520 | 7.34 | 1.20 | 5.3 | 5.64 | 13.67 |

CONTINUED ON NEXT PAGE



32504.25 6/11/14

SAMPLE OF CRA-RA-29

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1530 | 6.89 | 0.998 | 1.3 | 7.30 | 13.14 |
| 1540 | 6.89 | 0.991 | 0.9 | 7.50 | 13.29 |
| 1545 | 6.90 | 0.985 | 2.6 | 7.77 | 13.43 |
| 1550 | 6.87 | 0.980 | 1.4 | 8.22 | 12.92 |
| 1600 | 6.87 | 0.982 | 1.1 | 7.74 | 12.80 |
| 1605 | 6.86 | 0.981 | 1.9 | 7.70 | 12.78 |
| 1610 | 6.86 | 0.978 | 1.0 | 7.63 | 12.86 |
| 1615 | 6.86 | 0.978 | 2.0 | 7.54 | 12.87 |

PURGED FOR OVER ONE HOUR

SAMPLED @ 1616 ID:GW-32504-061114-SR-1796

SAMPLE OF B1-B

| | | | | | |
|---|---|---|---|---|---|
| 1630 | 7.45 | 0.707 | 36.6 | 13.00 | 12.16 |
| 1640 | 7.30 | 0.742 | 12.9 | 11.22 | 11.82 |
| 1650 | 7.38 | 0.877 | 7.3 | 18.90 | 12.00 |
| 1655 | 7.16 | 0.944 | 4.0 | +19.99 | 12.57 |
| 1700 | 7.14 | 0.950 | 3.7 | +19.99 | 12.59 |
| 1705 | 7.13 | 0.952 | 3.5 | +19.99 | 12.58 |
| 1710 | 7.13 | 0.952 | 3.2 | +19.99 | 12.59 |
| 1715 | 7.14 | 0.951 | 3.1 | +19.99 | 12.59 |

SAMPLED @ 1716 ID:GW-32504-061114-SR-1797

SAMPLES PACKED IN COOLER WITH ICE.

6/12/14 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: 72° VERY HEAVY RAIN & STORMS EXPECTED

H&S: LEVEL D

CALIBRATION OF RENTAL TE FLOW CELL

pH=4.00, COND.=4.49, D.O.=ZERO, TURB=0.0

SAMPLE OF CRA-RA-5

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1255 | 6.28 | 1.42 | 0.7 | 1.87 | 11.67 |
| 1305 | 6.36 | 1.33 | 1.8 | 0.53 | 11.35 |
| 1320 | 6.48 | 1.28 | 0.9 | 0.64 | 11.18 |
| 1325 | 6.53 | 1.29 | 0.5 | 0.57 | 11.21 |
| 1330 | 6.52 | 1.29 | 0.6 | 0.57 | 11.22 |
| 1335 | 6.53 | 1.29 | 0.5 | 0.57 | 11.22 |
| 1340 | 6.53 | 1.29 | 0.5 | 0.57 | 11.22 |

SAMPLED @ 1341 ID: GW-32504-061214-SR-1798

SAMPLES PACKED IN COOLER FOR FEDEX DELIVERY TO TEST AMERICA, NORTH CANTON, OH.



32504-25 6/17/14

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY, WINDY, CHANCE OF SEVERE STORMS, HIGH 90°, HUMID!

H&S: LEVEL D

CALIBRATION OF RENTAL TE FLOW CELL

pH=4.00, COND.=4.49, D.O.=ZERO, TURB=0.0

SAMPLE OF CRA-RA-18

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1000 | 6.53 | 1.76 | 2.9 | 7.87 | 11.18 |
| 1010 | 6.70 | 1.76 | 3.4 | 7.82 | 11.07 |
| 1020 | 6.78 | 1.77 | 2.3 | 7.75 | 11.03 |
| 1030 | 6.79 | 1.77 | 1.9 | 7.75 | 10.92 |
| 1035 | 6.79 | 1.77 | 1.4 | 7.76 | 10.93 |
| 1040 | 6.79 | 1.77 | 1.1 | 7.76 | 10.93 |

SAMPLED @ 1041 ID: GW-32504-061714-SR-1799

VOC'S, SVOC'S, TOTAL & DISSOLVED METALS

DISSOLVED METALS HAVE BEEN FIELD FILTERED.

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1115 | 7.35 | 0.843 | 12.7 | 1.89 | 11.31 |
| 1125 | 6.84 | 0.861 | 4.2 | 2.81 | 11.13 |
| 1140 | 6.76 | 0.871 | 2.4 | 3.13 | 11.25 |

CONTINUED ON NEXT PAGE

6/17/14 32504-25

SAMPLE OF CRA-MW-28 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1145 | 6.76 | 0.872 | 1.1 | 3.18 | 11.14 |
| 1150 | 6.76 | 0.873 | 0.9 | 3.19 | 11.13 |
| 1155 | 6.75 | 0.873 | 0.9 | 3.19 | 11.13 |

SAMPLED @ 1156 ID: GW-32504-061711-SR-1800

SAMPLE OF CRA-RA-19S

| | | | | | |
|---|---|---|---|---|---|
| 1215 | 6.94 | 1.112 | 3.0 | 1.14 | 10.85 |
| 1225 | 6.51 | 1.118 | 0.7 | 0.15 | 11.03 |
| 1235 | 6.45 | 1.125 | 1.3 | 0.15 | 10.95 |
| 1240 | 6.44 | 1.249 | 0.9 | 0.14 | 10.95 |
| 1245 | 6.42 | 1.263 | 0.7 | 0.11 | 11.08 |
| 1250 | 6.40 | 1.271 | 1.9 | 0.10 | 10.96 |
| 1255 | 6.38 | 1.278 | 0.8 | 0.16 | 11.00 |
| 1300 | 6.37 | 1.279 | 0.5 | 0.09 | 11.06 |
| 1305 | 6.36 | 1.280 | 0.7 | 0.08 | 11.06 |
| 1310 | 6.36 | 1.280 | 0.9 | 0.09 | 11.06 |

SAMPLED @ 1311 ID: GW-32504-061711-SR-1801

VOC, SVOC, TOTAL & DISSOLVED METALS

DISSOLVED METALS WERE FIELD FILTERED



32504-25 6/17/14

SAMPLE OF CRA-RA-27

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1335 | 6.74 | 2.06 | 39.6 | 0.98 | 11.53 |
| 1345 | 6.50 | 2.08 | 12.1 | 0.18 | 11.42 |
| 1355 | 6.48 | 2.09 | 7.3 | 0.15 | 11.48 |
| 1400 | 6.48 | 2.10 | 5.1 | 0.14 | 11.46 |
| 1405 | 6.48 | 2.09 | 4.6 | 0.14 | 11.46 |
| 1410 | 6.48 | 2.09 | 4.2 | 0.14 | 11.46 |

SAMPLED @ 1411 ID: GW-32504-061714-SR-1802

SAMPLES PACKED IN COOLER WITH ICE FOR DROP OFF AT TEST AMERICA, BRIGHTON, MICHIGAN

6/18/14 32504.25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: HUMID, CLOUDY, 82°, SEVERE STORMS EXPECTED.

$H_2S$: LEVEL D

CALIBRATION OF RENTAL HORIBA

pH=4.00, COND.=4.49, DO=ZERO, TURB=0.0

SAMPLE OF CRA.RA.6S

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1400 | 7.05 | 1.26 | 3.4 | 1.52 | 12.38 |
| 1410 | 7.00 | 1.26 | 2.1 | 0.66 | 12.18 |
| 1420 | 6.88 | 1.27 | 1.9 | 0.37 | 12.17 |
| 1430 | 6.79 | 1.26 | 0.5 | 0.32 | 12.12 |
| 1435 | 6.76 | 1.26 | 0.7 | 0.31 | 12.14 |
| 1440 | 7.71 | 1.26 | 0.4 | 0.30 | 12.12 |
| 1445 | 7.70 | 1.26 | 0.6 | 0.31 | 12.13 |
| 1450 | 7.70 | 1.26 | 0.5 | 0.31 | 12.12 |

SAMPLED @ 1451 ID: GW-32504-061814-SR-1803

SAMPLED @ 1505 ID: GW-32504-061814-SR-1804

VOC, SVOC, TOTAL & DISSOLVED METALS

SAMPLING STOPPED BECAUSE OF APPROACHING THUNDER STORMS



32504.25 6/19/14

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY, HUMID, HIGH 80°

$H_2S$: LEVEL D

CALIBRATION OF RENTAL HORIBA

pH=4.00, COND=4.49, TURB.=0.0, D.O.=ZERO

SAMPLE OF CRA.RA.31

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0900 | 6.76 | 0.670 | 2.1 | 0.88 | 10.63 |
| 0910 | 7.19 | 0.671 | 4.4 | 0.54 | 10.50 |
| 0920 | 7.30 | 0.671 | 4.2 | 0.54 | 10.54 |
| 0925 | 7.32 | 0.671 | 4.5 | 0.54 | 10.50 |
| 0930 | 7.30 | 0.671 | 4.4 | 0.53 | 10.52 |
| 0935 | 7.32 | 0.671 | 4.3 | 0.54 | 10.52 |
| 0940 | 7.32 | 0.671 | 4.4 | 0.53 | 10.51 |

SAMPLED @ 0941 ID: GW-32504-061914-SR-1805

SAMPLE OF CRA.RA.7

| | | | | | |
|---|---|---|---|---|---|
| 0955 | 7.98 | 0.430 | 15.6 | 4.79 | 10.27 |
| 1005 | 7.91 | 0.430 | 12.3 | 4.86 | 10.27 |
| 1015 | 7.82 | 0.429 | 9.2 | 5.00 | 10.26 |
| 1020 | 7.78 | 0.429 | 5.7 | 4.72 | 10.27 |
| 1025 | 7.71 | 0.428 | 4.9 | 4.66 | 10.27 |

CONTINUED ON NEXT PAGE

SAMPLE OF CRA-RA-7 (CONTINUED)

| TIME | pH | COND | TURB | D.O | TEMP |
|---|---|---|---|---|---|
| 1030 | 7.71 | 0.426 | 3.6 | 4.66 | 10.26 |
| 1035 | 7.71 | 0.426 | 4.1 | 4.67 | 10.27 |

SAMPLED @ 1036 ID: GW-32504-061414-SR-1806

SAMPLE OF CRA-RA-8

| | | | | | |
|---|---|---|---|---|---|
| 1050 | 7.91 | 0.543 | 6.6 | 9.28 | 8.29 |
| 1100 | 7.48 | 0.579 | 4.7 | 7.87 | 8.36 |
| 1110 | 7.47 | 0.581 | 4.2 | 7.72 | 8.36 |
| 1115 | 7.45 | 0.580 | 4.0 | 7.74 | 8.36 |
| 1120 | 7.45 | 0.581 | 4.0 | 7.73 | 8.37 |
| 1125 | 7.45 | 0.580 | 3.8 | 7.74 | 8.36 |

SAMPLED @ 1126 ID: GW-32504-061414-SR-1807

VOC, SVOC, TOTAL & DISSOLVED METALS

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1200 | 7.12 | 1.58 | 2.1 | 4.38 | 10.95 |
| 1210 | 6.87 | 1.60 | 1.8 | 4.14 | 10.93 |
| 1220 | 6.85 | 1.61 | 1.3 | 4.33 | 10.95 |
| 1225 | 6.85 | 1.61 | 1.4 | 4.58 | 10.98 |
| 1230 | 6.86 | 1.63 | 1.6 | 5.40 | 10.93 |
| 1235 | 6.87 | 1.64 | 1.2 | 5.42 | 10.92 |
| 1240 | 6.87 | 1.64 | 1.4 | 5.41 | 10.92 |

SAMPLED @ 1241 ID: GW-32504-061414-SR-1808



SAMPLE OF CRA-RA-26D

| TIME | pH | COND | TURB | D.O | TEMP |
|---|---|---|---|---|---|
| 1250 | 7.07 | 1.92 | 3.3 | 4.07 | 11.01 |
| 1300 | 6.81 | 1.94 | 5.2 | 0.17 | 11.03 |
| 1310 | 6.77 | 1.95 | 4.1 | 0.14 | 11.01 |
| 1315 | 6.76 | 1.95 | 3.8 | 0.14 | 10.96 |
| 1320 | 6.75 | 1.95 | 3.6 | 0.14 | 11.02 |
| 1325 | 6.75 | 1.95 | 3.5 | 0.13 | 11.01 |
| 1330 | 6.75 | 1.95 | 3.4 | 0.13 | 11.01 |

SAMPLED @ 1331 ID: GW-32504-061414-SR-1809

SAMPLE OF CRA-RA-23D

| | | | | | |
|---|---|---|---|---|---|
| 1415 | 6.95 | 0.767 | 6.9 | 1.52 | 10.35 |
| 1425 | 6.59 | 0.797 | 3.1 | 0.72 | 10.18 |
| 1435 | 6.48 | 0.836 | 4.1 | 0.89 | 10.19 |
| 1440 | 6.48 | 0.839 | 3.6 | 0.90 | 10.18 |
| 1445 | 6.47 | 0.841 | 3.9 | 0.90 | 10.16 |
| 1450 | 6.47 | 0.841 | 4.0 | 0.90 | 10.15 |
| 1455 | 6.47 | 0.841 | 3.1 | 0.90 | 10.16 |

SAMPLED @ 1456 ID: GW-32504-061414-SR-1810

SAMPLE OF 81-4

| | | | | | |
|---|---|---|---|---|---|
| 1515 | 7.13 | 1.58 | 16.4 | 2.56 | 11.20 |
| 1525 | 6.69 | 1.59 | 7.2 | 1.02 | 11.12 |

CONTINUED ON NEXT PAGE

6/19/14 32504-25

SAMPLE OF 81-4 (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP |
|---|---|---|---|---|---|
| 1535 | 6.48 | 1.59 | 2.6 | 0.18 | 11.13 |
| 1540 | 6.46 | 1.59 | 1.6 | 0.14 | 11.10 |
| 1545 | 6.45 | 1.59 | 0.9 | 0.13 | 11.13 |
| 1550 | 6.45 | 1.59 | 0.7 | 0.13 | 11.13 |

SAMPLED @ 1551 ID: GW-32504-061914-S2-181

SAMPLES PACKED IN COOLER WITH ICE FOR DROPOFF @ TEST AMERICA, BRIGHTON.

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

October 10, 2014

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 128
Groundwater and Landfill RD/RA
Reporting Period: July 1 through September 30, 2014
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 Introduction

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree, Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 Activities Performed During this Reporting Period

### 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on August 18, 2014. The corresponding groundwater contour map is provided on Figure 1.

CRA collected quarterly groundwater samples on August 18 and 19, September 2 and 3, and September 11 and 12, 2014 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

### 2.2 Reports

Quarterly Progress Report No. 127 was submitted to USEPA and Michigan Department of Environmental Quality (MDEQ) on July 10, 2014.

## 3.0 Summary of Findings

The results of the third quarter 2014 sampling are provided in Tables 1 through 5. Figure 2 is a Site location map showing the wells included in quarterly Groundwater Remediation Monitoring Program and the annual Landfill Monitoring Program.

During the third quarter 2014 sampling, five of the 25 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the five monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 5.6 µg/L vinyl chloride |
| CRA-RA-24 | 6.0 µg/L vinyl chloride |
| CRA-RA-26S | 99 µg/L trichloroethene |
| CRA-RA-27 | 8.9/8.9 µg/L vinyl chloride (duplicate sample) |
| CRA-RA-30 | 3.6 µg/L vinyl chloride |

There were seven monitoring wells that had COCs above Part 201 DWC during the second quarter 2014 sampling event. Changes from the previous quarter groundwater samples include:

- Vinyl chloride from monitoring well 81-4 decreased from 2.6 µg/L, which exceeds the current DWC of 2 µg/L, in June 2014 to 1.6 µg/L in September 2014.
- Trichloroethene from monitoring well CRA-RA-23D decreased from 5.1 µg/L, which exceeds the current DWC of 5 µg/L, in June 2014 to 4.0 µg/L in September 2014.

Lower Aquifer monitoring well RA-MW-47 serves as a sentry well for the Lower Aquifer. An annual groundwater sample was collected from RA-MW-47 during the third quarter 2014 sampling. No COCs were detected in the groundwater samples collected from this well.

CRA did not collect the annual Rasmussen residential water well sample in the third quarter 2014 because the plumbing system is disconnected pending a repair. CRA will attempt to collect the annual Rasmussen residential water well sample during Q4 2014, pending repair of the plumbing system.

***COC Contours***

The Rasmussen Site Remediation Group (RSRG) provides contour maps of current COC distribution following completion of the third quarter sampling. CRA prepared an update of COC distribution based on data collected in 2013 in Progress Report No. 124 (CRA, October 2013). The 2013 COC plume map is provided on Figure 3. Figure 4 provides a COC plume map based on the data collected in 2014. There were minor changes in the concentration of COCs in 2014 as compared to 2013, as follows:

***Vinyl Chloride***

| ***Monitoring Well*** | ***Q3 2013 Result (μg/L)*** | ***Q3 2014 Result (μg/L)*** |
|---|---|---|
| CRA-RA-22 | 7.3 | 5.6 |
| CRA-RA-24 | 5.0 | 6.0 |
| CRA-RA-27 | 12 | 8.9/8.9 (1) |
| CRA-RA-28 | 1.1 | ND(1.0) |
| CRA-RA-30 | 3.3 | 3.6 |
| EB-PZ-4 | 2.2 | ND(1.4) |
| 81-4 | 2.5 | 1.6 |
| (1) – duplicate sample | | |

The concentration of vinyl chloride in the groundwater samples collected from EB-PZ-4 decreased from 2.2 μg/L in 2013 to less than the method detection limit (1.0 μg/L) in 2014, eliminating the isolated detection of vinyl chloride near EB-PZ-4. Similarly, the concentration of

vinyl chloride at 81-4 decreased from 2.5 µg/L in 2013 to 1.6 µg/L in 2014, which is less than the Part 201 DWC for vinyl chloride. This reduced the lateral extent of the vinyl chloride plume near 81-4.

***Trichloroethene***

| ***Monitoring Well*** | ***Q3 2013 Result (µg/L)*** | ***Q3 2014 Result (µg/L)*** |
|---|---|---|
| CRA-RA-23D | 5.9 | 4.0 |
| CRA-RA-26S | 95 | 99 |

The COC plumes are relatively stable. The trichloroethene concentration at CRA-RA-23D decreased from 5.9 µg/L 4.0 µg/L, which is less than the DWC of 5 µg/L.

***Trend Analysis***

CRA completed trend analysis for benzene, trichloroethene and vinyl chloride data from monitoring wells included in the Groundwater Remediation Monitoring Program and the Annual Landfill Monitoring Program. Analysis of trends in the last eight monitoring events provides insight into recent changes in COC concentrations. Tables 6 through 8 provide a summary of the trend analyses.

CRA did not identify any increasing or decreasing trends in the benzene and trichloroethene data from the last eight monitoring rounds, primarily because these compounds are detected regularly at only a few locations. CRA identified four locations where vinyl chloride results are decreasing; 81-4, CRA-RA-22, CRA-RA-27, and CRA-RA-28. CRA did not identify any increasing trends in the vinyl chloride data. The lack of trends reflects relatively stable plume conditions over the last two years, except for the vinyl chloride plume, which is degrading.

## 4.0 Problems Encountered

Other than several weather-related power interruptions, no problems were encountered with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2013.

## 5.0 Corrective Measures to Rectify Problems

No corrective measures were implemented with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2013.

## 6.0 Contacts and Significant Correspondence with Public Representatives

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | July 10, 2014 | Report No. 127 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDEQ). |
| Emails | July 29, 2014 to August 8, 2014 | Emails with USEPA and Group to select 5 year Site meeting date. |
| 4th Five Year Site Visit | August 25, 2014 | Site inspection with Mr. H. Caine (USEPA), Mr. K. Krawczyk (MDEQ) and Kim Hiller (Livingston County Road Commission). Mr. S. Nadeau (Honigman), Mr. J. Bartholomy (CRA), and Mr. S. Rapai (CRA) for the Rasmussen Site Remediation Group. |
| email | September 8, 2014 | Recap of Site meeting with Livingston County from Mr. H. Caine (USEPA). |

## 7.0 Planned Upcoming Activities/Schedule

Landfill and groundwater component activities planned for the third quarter of 2014:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The fourth quarter groundwater sampling event is scheduled for the week of December 8, 2014
- The wells to be sampled in the fourth quarter of 2014 are listed in Table 5

- Apply to the Livingston County Road Commission for access to install vertical aquifer sampling (VAS) boreholes and monitoring wells in the Spicer Road right of way

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

For Steven Rapaie

Bart Bartholomy

AJD/cb/37
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Steve Simpson
Michael Simpson
Steven Nadeau, Honigman Miller

# TABLES AND FIGURES

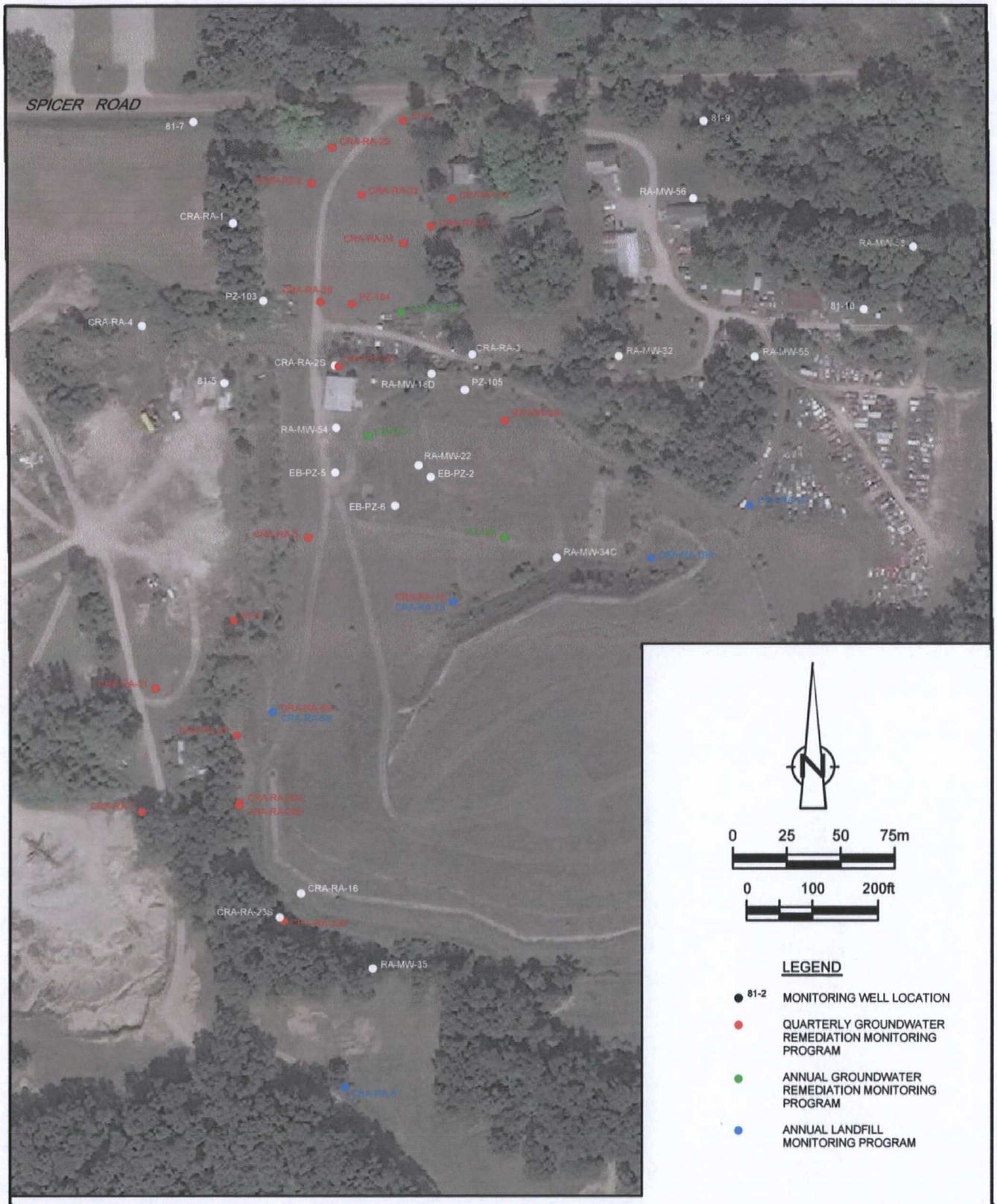



**figure 1**

## 2014 GROUNDWATER MONITORING PROGRAMS
## RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN037)GN-WA001 SEP 22/2014

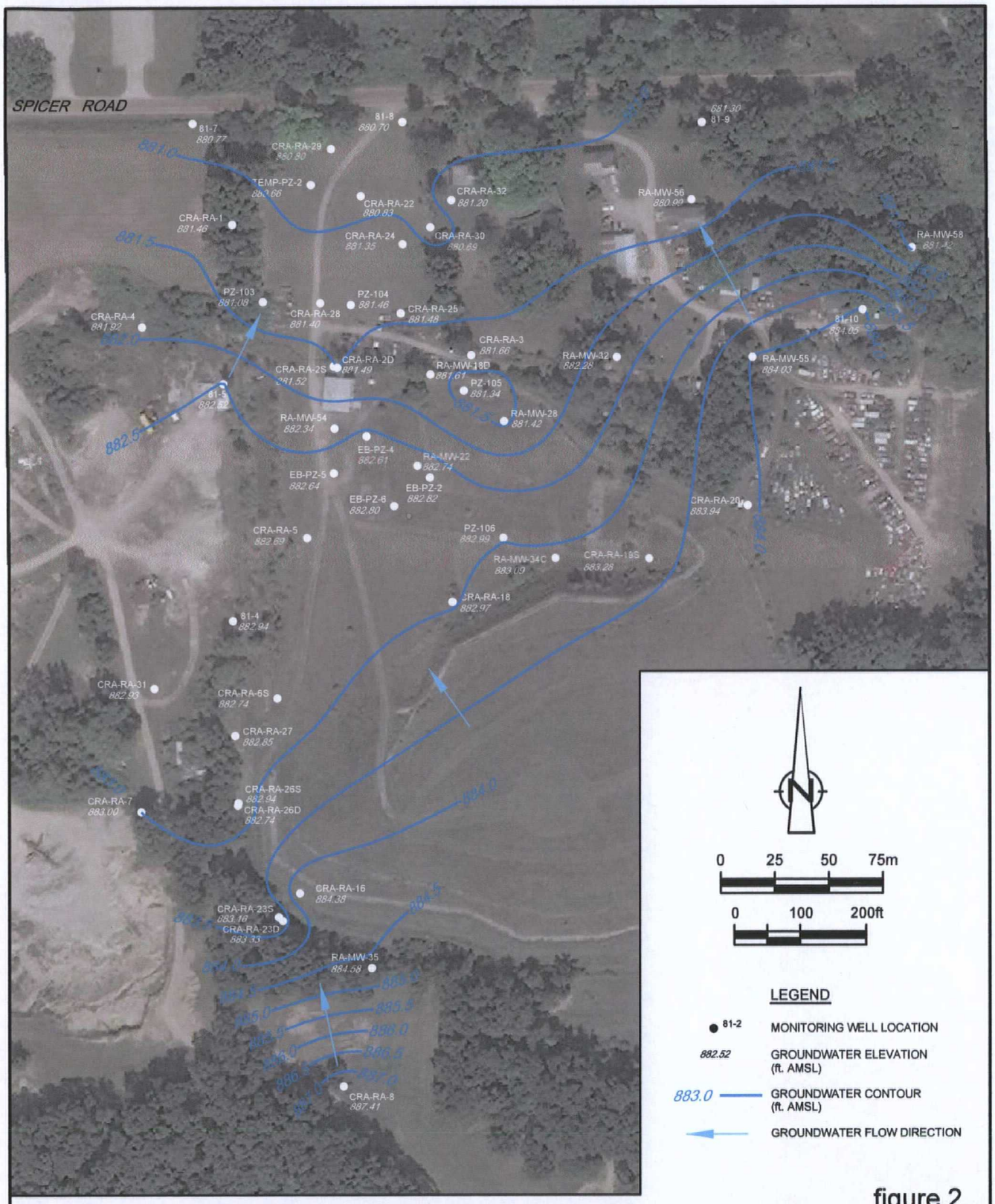
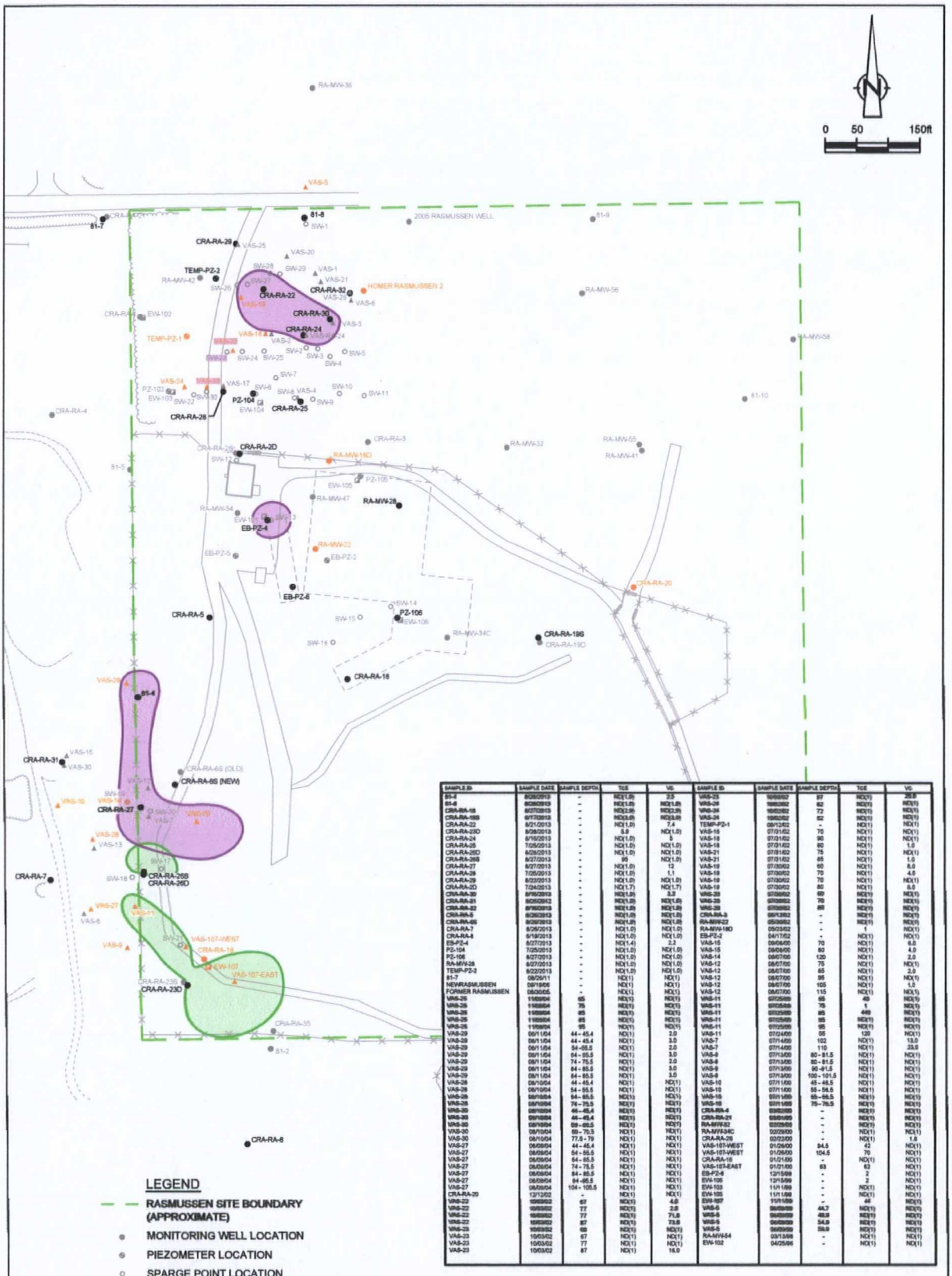



figure 2

# GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
## AUGUST 2014
## RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN037)GN-WA002 SEP 22/2014



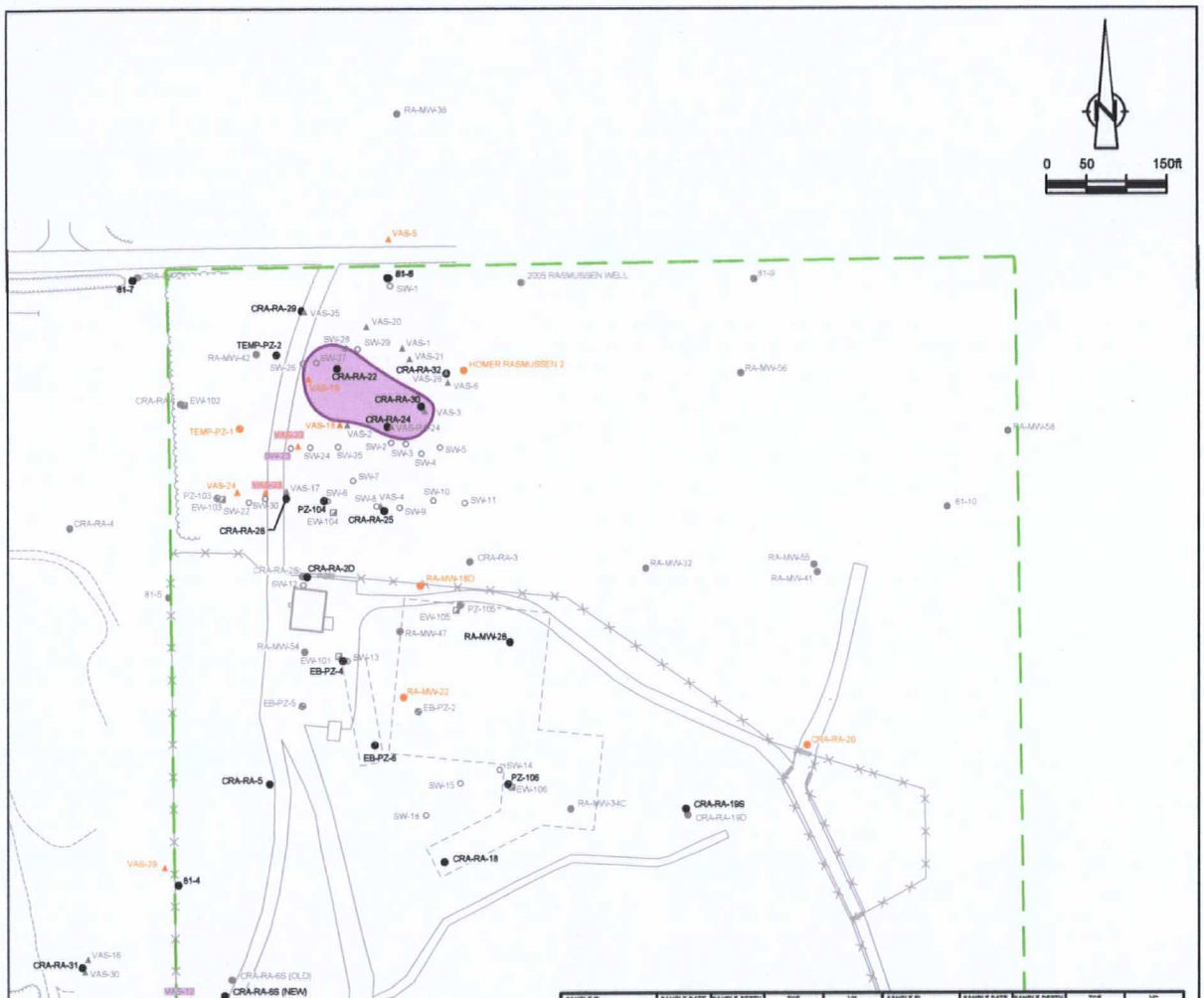

| SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC |
|---|---|---|---|---|
| 81-4 | 8/28/2013 | - | ND(1.0) | 2.5 |
| 81-8 | 8/28/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-18 | 8/27/2013 | - | ND(2.0) | ND(2.0) |
| CRA-RA-19S | 8/27/2013 | - | ND(3.0) | ND(3.0) |
| CRA-RA-22 | 8/21/2013 | - | ND(1.0) | 7.4 |
| CRA-RA-23D | 8/28/2013 | - | 5.0 | ND(1.0) |
| CRA-RA-24 | 8/15/2013 | - | ND(1.0) | 3 |
| CRA-RA-25 | 7/25/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-25D | 8/28/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-26S | 8/27/2013 | - | 95 | ND(1.0) |
| CRA-RA-27 | 8/27/2013 | - | ND(1.0) | 12 |
| CRA-RA-28 | 7/25/2013 | - | ND(1.0) | 1.1 |
| CRA-RA-29 | 8/22/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-2D | 7/24/2013 | - | ND(1.7) | ND(1.7) |
| CRA-RA-30 | 8/15/2013 | - | ND(1.0) | 3.3 |
| CRA-RA-31 | 8/28/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-32 | 8/15/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-5 | 8/28/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-6S | 8/28/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-7 | 8/26/2013 | - | ND(1.0) | ND(1.0) |
| CRA-RA-8 | 8/19/2013 | - | ND(1.0) | ND(1.0) |
| EB-PZ-4 | 8/27/2013 | - | ND(1.4) | 2.2 |
| PZ-104 | 7/25/2013 | - | ND(1.0) | ND(1.0) |
| PZ-106 | 8/27/2013 | - | ND(1.0) | ND(1.0) |
| RA-MW-28 | 8/27/2013 | - | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | 8/22/2013 | - | ND(1.0) | ND(1.0) |
| 81-7 | 08/09/11 | - | ND(1) | ND(1) |
| NEWRASMUSSEN | 09/19/05 | - | ND(1) | ND(1) |
| FORMER RASMUSSEN | 05/30/05 | - | ND(1) | ND(1) |
| VAS-25 | 11/09/04 | 65 | ND(1) | ND(1) |
| VAS-25 | 11/09/04 | 75 | ND(1) | ND(1) |
| VAS-25 | 11/09/04 | 85 | ND(1) | ND(1) |
| VAS-25 | 11/09/04 | 95 | ND(1) | ND(1) |
| VAS-25 | 11/09/04 | 95 | ND(1) | ND(1) |
| VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 54 -55.5 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 54 - 55.5 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 74 - 75.5 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-28 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 74 - 75.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 59 - 60.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 69 - 70.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 77.5 - 79 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 64 - 65.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 74 - 75.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 84 - 85.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 94 -95.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 104 - 105.5 | ND(1) | ND(1) |
| CRA-RA-20 | 12/12/02 | - | ND(1) | ND(1) |
| VAS-22 | 10/03/02 | 67 | ND(1) | 4.0 |
| VAS-22 | 10/03/02 | 77 | ND(1) | 2.0 |
| VAS-22 | 10/03/02 | 77 | ND(1) | 71.0 |
| VAS-22 | 10/03/02 | 87 | ND(1) | 73.0 |
| VAS-23 | 10/03/02 | 69 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 67 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 77 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 87 | ND(1) | 16.0 |

| SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC |
|---|---|---|---|---|
| VAS-23 | 10/03/02 | 97 | ND(1) | 26.0 |
| VAS-24 | 10/03/02 | 62 | ND(1) | ND(1) |
| VAS-24 | 10/03/02 | 72 | ND(1) | ND(1) |
| VAS-24 | 10/03/02 | 82 | ND(1) | ND(1) |
| TEMP-PZ-1 | 09/13/02 | - | ND(1) | ND(1) |
| VAS-15 | 07/31/02 | 70 | ND(1) | ND(1) |
| VAS-18 | 07/31/02 | 90 | ND(1) | ND(1) |
| VAS-18 | 07/31/02 | 60 | ND(1) | 1.0 |
| VAS-21 | 07/31/02 | 75 | ND(1) | ND(1) |
| VAS-21 | 07/31/02 | 65 | ND(1) | 1.0 |
| VAS-19 | 07/30/02 | 60 | ND(1) | 5.0 |
| VAS-19 | 07/30/02 | 70 | ND(1) | 4.0 |
| VAS-19 | 07/30/02 | 70 | ND(1) | ND(1) |
| VAS-19 | 07/30/02 | 80 | ND(1) | 8.0 |
| VAS-20 | 07/30/02 | 60 | ND(1) | ND(1) |
| VAS-20 | 07/30/02 | 70 | ND(1) | ND(1) |
| VAS-20 | 07/30/02 | 80 | ND(1) | ND(1) |
| RA-MW-3 | 06/12/02 | - | ND(1) | ND(1) |
| RA-MW-22 | 05/30/02 | - | ND(1) | ND(1) |
| RA-MW-18D | 05/23/02 | - | 1 | ND(1) |
| EB-PZ-2 | 04/17/02 | - | ND(1) | ND(1) |
| VAS-15 | 09/06/00 | 70 | ND(1) | 6.0 |
| VAS-15 | 09/06/00 | 80 | ND(1) | 4.0 |
| VAS-14 | 08/07/00 | 120 | ND(1) | 2.0 |
| VAS-12 | 08/07/00 | 75 | ND(1) | ND(1) |
| VAS-12 | 08/07/00 | 85 | ND(1) | 2.0 |
| VAS-12 | 08/07/00 | 95 | ND(1) | ND(1) |
| VAS-12 | 08/07/00 | 105 | ND(1) | 1.0 |
| VAS-12 | 08/07/00 | 115 | ND(1) | ND(1) |
| VAS-11 | 07/25/99 | 65 | 49 | ND(1) |
| VAS-11 | 07/25/99 | 75 | 1 | ND(1) |
| VAS-11 | 07/25/99 | 85 | 440 | ND(1) |
| VAS-11 | 07/25/99 | 95 | ND(1) | ND(1) |
| VAS-11 | 07/25/99 | 95 | ND(1) | ND(1) |
| VAS-11 | 07/24/00 | 55 | 120 | ND(1) |
| VAS-7 | 07/14/00 | 102 | ND(1) | 13.0 |
| VAS-7 | 07/14/00 | 110 | ND(1) | 23.0 |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 90 -91.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 100 - 101.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 45 - 46.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 55 - 56.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 65 - 66.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 75 - 76.5 | ND(1) | ND(1) |
| CRA-RA-4 | 03/02/00 | - | ND(1) | ND(1) |
| CRA-RA-21 | 03/02/00 | - | ND(1) | ND(1) |
| RA-MW-32 | 03/29/00 | - | ND(1) | ND(1) |
| RA-MW34C | 02/23/00 | - | ND(1) | ND(1) |
| CRA-RA-26 | 02/22/00 | - | ND(1) | 1.6 |
| VAS-107-WEST | 01/26/00 | 84.5 | 42 | ND(1) |
| VAS-107-WEST | 01/26/00 | 104.5 | 70 | ND(1) |
| CRA-RA-19 | 01/21/00 | - | ND(1) | ND(1) |
| VAS-107-EAST | 01/21/00 | 63 | 62 | ND(1) |
| EB-PZ-4 | 12/15/99 | - | 2 | ND(1) |
| EW-106 | 12/15/99 | - | 2 | ND(1) |
| EW-103 | 11/11/99 | - | ND(1) | ND(1) |
| EW-105 | 11/11/99 | - | ND(1) | ND(1) |
| EW-107 | 11/11/99 | - | 44 | ND(1) |
| VAS-5 | 06/08/99 | 44.7 | ND(1) | ND(1) |
| VAS-5 | 06/08/99 | 48.8 | ND(1) | ND(1) |
| VAS-5 | 06/08/99 | 54.9 | ND(1) | ND(1) |
| VAS-5 | 06/08/99 | 59.8 | ND(1) | ND(1) |
| RA-MW-54 | 03/13/96 | - | ND(1) | ND(1) |
| EW-102 | 04/25/96 | - | ND(1) | ND(1) |

**figure 3**

2013 COC CONTOURS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN037)GN-WA003 OCT 6/2014




| SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC |
|---|---|---|---|---|
| 81-4 | 8/12/2014 | - | ND(1.0) | 1.6 |
| 81-6 | 8/19/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-16 | 8/8/2014 | - | ND(3.9) | ND(3.9) |
| CRA-RA-19S | 8/18/2014 | - | ND(3.9) | ND(3.9) |
| CRA-RA-22 | 8/18/2014 | - | ND(1.0) | 5.6 |
| CRA-RA-23D | 8/12/2014 | - | 4.8 | ND(1.0) |
| CRA-RA-24 | 8/18/2014 | - | ND(1.0) | 5.9 |
| CRA-RA-25 | 9/2/2014 | - | ND(1.0) | 1.1 |
| CRA-RA-26D | 9/11/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-26S | 9/11/2014 | - | 99 | ND(3.3) |
| CRA-RA-27 | 9/11/2014 | - | ND(1.0) | 8.8 |
| CRA-RA-28 | 8/18/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-29 | 8/19/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-2D | 8/18/2014 | - | ND(2.0) | ND(2.0) |
| CRA-RA-30 | 8/18/2014 | - | ND(1.0) | 3.6 |
| CRA-RA-31 | 9/2/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-32 | 8/18/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-5 | 8/19/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-6S | 9/11/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-7 | 9/2/2014 | - | ND(1.0) | ND(1.0) |
| CRA-RA-8 | 8/20/2014 | - | ND(1.0) | ND(1.0) |
| EB-PZ-4 | 9/2/2014 | - | ND(1.4) | ND(1.4) |
| PZ-104 | 8/18/2014 | - | ND(1.0) | ND(1.0) |
| PZ-106 | 9/2/2014 | - | ND(1.0) | ND(1.0) |
| RA-MW-28 | 9/3/2014 | - | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | 8/19/2014 | - | ND(1.0) | ND(1.0) |
| 81-7 | 08/09/11 | - | ND(1) | ND(1) |
| NEWRASMUSSEN | 09/18/06 | - | ND(1) | ND(1) |
| FORMER RASMUSSEN | 06/00/05 | - | ND(1) | ND(1) |
| VAS-26 | 11/09/04 | 65 | ND(1) | ND(1) |
| VAS-26 | 11/09/04 | 75 | ND(1) | ND(1) |
| VAS-26 | 11/09/04 | 85 | ND(1) | ND(1) |
| VAS-26 | 11/09/04 | 95 | ND(1) | ND(1) |
| VAS-26 | 11/09/04 | 95 | ND(1) | ND(1) |
| VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 44 - 45.4 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 54 - 55.5 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 54 - 55.5 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 74 - 75.5 | ND(1) | 2.0 |
| VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-29 | 08/11/04 | 84 - 85.5 | ND(1) | 3.0 |
| VAS-28 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 64 - 65.5 | ND(1) | ND(1) |
| VAS-28 | 08/10/04 | 74 - 75.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 59 - 60.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 69 - 70.5 | ND(1) | ND(1) |
| VAS-30 | 08/10/04 | 77.5 - 79 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 44 - 45.4 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 54 - 55.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 64 - 65.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 74 - 75.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 84 - 85.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 94 -95.5 | ND(1) | ND(1) |
| VAS-27 | 08/09/04 | 104 - 105.5 | ND(1) | ND(1) |
| CRA-RA-20 | 12/13/02 | - | ND(1) | ND(1) |
| VAS-22 | 10/03/02 | 67 | ND(1) | 4.0 |
| VAS-22 | 10/03/02 | 77 | ND(1) | 2.0 |
| VAS-22 | 10/03/02 | 77 | ND(1) | 71.0 |
| VAS-23 | 10/03/02 | 67 | ND(1) | 73.0 |
| VAS-23 | 10/03/02 | 69 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 67 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 77 | ND(1) | ND(1) |
| VAS-23 | 10/03/02 | 87 | ND(1) | 16.0 |

| SAMPLE ID | SAMPLE DATE | SAMPLE DEPTH | TCE | VC |
|---|---|---|---|---|
| VAS-23 | 10/03/02 | 97 | ND(1) | 20.0 |
| VAS-24 | 10/02/02 | 62 | ND(1) | ND(1) |
| VAS-24 | 10/02/02 | 72 | ND(1) | ND(1) |
| VAS-24 | 10/02/02 | 82 | ND(1) | ND(1) |
| TEMP-PZ-1 | 09/12/02 | - | ND(1) | ND(1) |
| VAS-18 | 07/31/02 | 78 | ND(1) | ND(1) |
| VAS-18 | 07/31/02 | 88 | ND(1) | ND(1) |
| VAS-18 | 07/31/02 | 98 | ND(1) | 1.0 |
| VAS-21 | 07/31/02 | 75 | ND(1) | ND(1) |
| VAS-21 | 07/31/02 | 85 | ND(1) | 1.0 |
| VAS-19 | 07/30/02 | 60 | ND(1) | 8.0 |
| VAS-19 | 07/30/02 | 70 | ND(1) | 4.0 |
| VAS-19 | 07/30/02 | 70 | ND(1) | ND(1) |
| VAS-19 | 07/30/02 | 80 | ND(1) | 8.0 |
| VAS-20 | 07/30/02 | 60 | ND(1) | ND(1) |
| VAS-20 | 07/30/02 | 70 | ND(1) | ND(1) |
| VAS-20 | 07/30/02 | 80 | ND(1) | ND(1) |
| CRA-RA-3 | 06/12/02 | - | ND(1) | ND(1) |
| RA-MW-22 | 05/30/02 | - | ND(1) | ND(1) |
| RA-MW-18D | 05/23/02 | - | 1 | ND(1) |
| EB-PZ-2 | 04/17/02 | - | ND(1) | ND(1) |
| VAS-15 | 09/06/00 | 70 | ND(1) | 6.0 |
| VAS-15 | 09/06/00 | 80 | ND(1) | 4.0 |
| VAS-14 | 09/07/00 | 120 | ND(1) | 2.0 |
| VAS-12 | 08/07/00 | 75 | ND(1) | ND(1) |
| VAS-12 | 08/07/00 | 85 | ND(1) | 2.0 |
| VAS-12 | 08/07/00 | 95 | ND(1) | ND(1) |
| VAS-12 | 08/07/00 | 105 | ND(1) | 1.0 |
| VAS-12 | 08/07/00 | 115 | ND(1) | ND(1) |
| VAS-11 | 07/25/00 | 65 | 40 | ND(1) |
| VAS-11 | 07/25/00 | 75 | 1 | ND(1) |
| VAS-11 | 07/25/00 | 85 | 440 | ND(1) |
| VAS-11 | 07/25/00 | 95 | ND(1) | ND(1) |
| VAS-11 | 07/25/00 | 95 | ND(1) | ND(1) |
| VAS-11 | 07/24/00 | 55 | 120 | ND(1) |
| VAS-7 | 07/14/00 | 102 | ND(1) | 13.0 |
| VAS-7 | 07/14/00 | 110 | ND(1) | 23.0 |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 80 - 81.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 90 -91.5 | ND(1) | ND(1) |
| VAS-9 | 07/13/00 | 100 - 101.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 45 - 46.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 55 - 56.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 65 - 66.5 | ND(1) | ND(1) |
| VAS-10 | 07/11/00 | 75 - 76.5 | ND(1) | ND(1) |
| CRA-RA-4 | 03/02/00 | - | ND(1) | ND(1) |
| CRA-RA-21 | 03/01/00 | - | ND(1) | ND(1) |
| RA-MW-32 | 02/29/00 | - | ND(1) | ND(1) |
| RA-MW-34C | 02/29/00 | - | ND(1) | ND(1) |
| CRA-RA-2S | 02/22/00 | - | ND(1) | 1.6 |
| VAS-107-WEST | 01/26/00 | 94.5 | 42 | ND(1) |
| VAS-107-WEST | 01/26/00 | 104.5 | 70 | ND(1) |
| CRA-RA-16 | 01/21/00 | - | ND(1) | ND(1) |
| VAS-107-EAST | 01/21/00 | 93 | 52 | ND(1) |
| EB-PZ-4 | 12/15/99 | - | 2 | ND(1) |
| EW-106 | 12/15/99 | - | 2 | ND(1) |
| EW-103 | 11/11/99 | - | ND(1) | ND(1) |
| EW-105 | 11/11/99 | - | ND(1) | ND(1) |
| EW-107 | 11/11/99 | - | 44 | ND(1) |
| VAS-5 | 06/09/99 | 44.7 | ND(1) | ND(1) |
| VAS-5 | 06/09/99 | 49.9 | ND(1) | ND(1) |
| VAS-5 | 06/09/99 | 54.9 | ND(1) | ND(1) |
| VAS-5 | 06/09/99 | 59.9 | ND(1) | ND(1) |
| RA-MW-54 | 03/12/99 | - | ND(1) | ND(1) |
| EW-102 | 04/02/98 | - | ND(1) | ND(1) |

## LEGEND

- RASMUSSEN SITE BOUNDARY (APPROXIMATE)
- **MONITORING WELL LOCATION**
- **PIEZOMETER LOCATION**
- SPARGE POINT LOCATION
- COMPLETED VAS LOCATION
- EXTRACTION WELL LOCATION
- **LIMIT OF 2014 VINYL CHLORIDE PLUME (2 ug/L)**
- **LIMIT OF 2014 TCE PLUME (5 ug/L)**
- 2014 DATA USED FOR CONTOURING
- 1999-2005 DATA USED FOR CONTOURING

**figure 4**

**2014 COC CONTOURS**
**RASMUSSEN LANDFILL SITE**
*Livingston County, Michigan*

32504-15(CAIN037)GN-WA004 OCT 6/2014

TABLE 1

ANALYTICAL RESULTS - NORTHERN PLUMES
RAMBURSKI LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-22 | GW-SR-1748 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.5 | ND(1.0) |
| CRA-RA-22 | GW-SR-1749 | 11/11/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.4 | ND(1.0) |
| CRA-RA-22 | GW-SR-1786 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.8 | ND(1.0) |
| CRA-RA-22 | GW-SR-1793 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | 4.2 | ND(1.0) |
| CRA-RA-22 | GW-SR-1818 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.6 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 1.4 µg/L | |
| CRA-RA-34 | GW-SR-1745 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.5 | ND(1.0) |
| CRA-RA-34 | GW-SR-1769 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.2 | ND(1.0) |
| CRA-RA-34 | GW-SR-1790 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.6) | ND(1.0) | ND(1.0) | 5.2 | ND(1.0) |
| CRA-RA-34 | GW-SR-1815 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.0 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 0.8 µg/L | |
| CRA-RA-25 | GW-SR-1646 | 9/12/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-25 | GW-SR-1716 | 7/25/2013 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1717 | 7/25/2013 | Duplicate | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| CRA-RA-25 | GW-SR-1828 | 9/2/2014 | | ND(1.0) | 1.1 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) |
| | | | Change | | Up 0.1 µg/L | | | | | | | | | | Up 0.1 µg/L | |
| CRA-RA-28 | GW-SR-1742 | 11/8/2013 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.2 | ND(1.0) |
| CRA-RA-28 | GW-SR-1767 | 4/8/2014 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-28 | GW-SR-1788 | 6/10/2014 | | ND(1.0) | 1.9 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-28 | GW-SR-1813 | 8/18/2014 | | ND(1.0) | 2.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Up 0.7 µg/L | | | | | | | | | | | |
| CRA-RA-29 | GW-SR-1751 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1772 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1796 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-29 | GW-SR-1820 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-30 | GW-SR-1746 | 11/7/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1770 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.5 | ND(1.0) |
| CRA-RA-30 | GW-SR-1791 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.1 | ND(1.0) |
| CRA-RA-30 | GW-SR-1815 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 0.5 µg/L | |
| CRA-RA-32 | GW-SR-1747 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1771 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1792 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-32 | GW-SR-1817 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| FZ-104 | GW-SR-1744 | 11/8/2013 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| FZ-104 | GW-SR-1768 | 4/8/2014 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| FZ-104 | GW-SR-1789 | 6/10/2014 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| FZ-104 | GW-SR-1814 | 8/18/2014 | | ND(1.0) | 1.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Stable | | | | | | | | | | | |
| TEMP-PZ-2 | GW-SR-1750 | 11/11/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1765 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1794 | 6/11/2014 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1795 | 6/11/2014 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1819 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| B1-8 | GW-SR-1752 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SR-1773 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SR-1797 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SR-1821 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| B1-8 | GW-SR-1822 | 8/19/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria

(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 2

ANALYTICAL RESULTS - FOBLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,3-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 13,000 | 1,000 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-1741 | 11/6/2013 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 55 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1764 | 3/12/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 60 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1787 | 6/10/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 57 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1812 | 8/18/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 67 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| | | | Change | | | | | | | Up 10 µg/L | | | | | | |
| CRA-RA-1B | GW-SR-1756 | 11/13/2013 | | 95 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-1B | GW-SR-1777 | 4/9/2014 | | 79 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-1B | GW-SR-1799 | 6/17/2014 | | 76 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-1B | GW-SR-1831 | 9/3/2014 | | 80 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| | | | Change | Up 4 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 38.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| EB-PZ-4 | GW-SR-1729 | 8/27/2013 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 41 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | 2.2 | ND(1.4) |
| EB-PZ-4 | GW-SR-1827 | 9/2/2014 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 43 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) |
| | | | Change | | | | | | | Up 2 µg/L | | | | | Down 0.8 µg/L | |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1731 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1732 | 8/27/2013 | *Duplicate* | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1828 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| RA-MW-2B | GW-SR-1755 | 11/13/2013 | | 9.6 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1778 | 4/9/2014 | | 8.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1800 | 6/18/2014 | | 7.7 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-2B | GW-SR-1830 | 9/3/2014 | | 11 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Up 3.3 µg/L | | | | | | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC(1) | 200 | 70 (2) | 13,000 | 1,000 | 700 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 200 |
| CRA-RA-5 | GW-SR-1743 | 11/6/2013 | | 22 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1779 | 4/10/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1798 | 6/12/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1823 | 8/19/2014 | | 15 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Down 6 µg/L | | | | | | | | | | | | |
| CRA-RA-65 | GW-SR-1757 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1780 | 4/10/2014 | | 1.4 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1803 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1804 | 6/20/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-65 | GW-SR-1832 | 9/11/2014 | | 1.5 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Up 0.5 µg/L | | | | | | | | | | | | |
| CRA-RA-7 | GW-SR-1754 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1776 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1806 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1825 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-27 | GW-SR-1758 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 11 | ND(1.0) |
| CRA-RA-27 | GW-SR-1781 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 10 | ND(1.0) |
| CRA-RA-27 | GW-SR-1802 | 6/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-27 | GW-SR-1833 | 9/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| CRA-RA-27 | GW-SR-1834 | 9/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 3.1 µg/L | |
| CRA-RA-31 | GW-SR-1753 | 11/12/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1774 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1775 | 4/9/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1805 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1824 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| 81-4 | GW-SR-1762 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.6 | ND(1.0) |
| 81-4 | GW-SR-1763 | 11/14/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.5 | ND(1.0) |
| 81-4 | GW-SR-1785 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.0 | ND(1.0) |
| 81-4 | GW-SR-1811 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.1 | ND(1.0) |
| 81-4 | GW-SR-1837 | 9/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.6 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.5 µg/L | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria.
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| | | | | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Sample Location | Sample ID | Date Sampled | DWC (1) | 200 | 70 (2) | 18,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-23D | GW-SR-1761 | 11/14/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1786 | 4/14/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1810 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1838 | 9/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.0 | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | | | | | Down 1.1 µg/L | | |
| CRA-RA-26D | GW-SR-1760 | 11/13/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1783 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1784 | 4/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1809 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1836 | 9/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1676 | 11/13/2013 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 95 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1782 | 4/11/2014 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 100 | ND(4.0) | ND(4.0) |
| CRA-RA-26S | GW-SR-1808 | 6/19/2014 | | ND(2.9) | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | 98 | ND(2.9) | ND(4.0) |
| CRA-RA-26S | GW-SR-1835 | 9/11/2014 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 99 | ND(3.3) | ND(3.3) |
| | | | Change | | | | | | | | | | | Up 1 µg/L | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 5**

**2014 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | *Q1* | *Q2* | *Q3* | *Q4* |
|---|---|---|---|---|
| 81-4 | | | | |
| 81-8 | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) | New Rasmussen Water Supply Well (VOCs only) |
| CRA-RA-2D | | | EB-PZ-4 (VOCs only) | |
| CRA-RA-5 | | CRA-RA-6S (included in quarterly sampling) | PZ-106 (VOCs only) | |
| CRA-RA-6S | | CRA-RA-8 | RA-MW-47 (VOCs only) | |
| CRA-RA-7 | | CRA-RA-18 (included in quarterly sampling) | | |
| CRA-RA-18 | | CRA-RA-19S | | |
| CRA-RA-22 | | CRA-RA-20 | | |
| CRA-RA-23D | | | | |
| CRA-RA-24 | | | | |
| CRA-RA-26D | | | | |
| CRA-RA-26S | | | | |
| CRA-RA-27 | | | | |
| CRA-RA-28 | | | | |
| CRA-RA-29 | | | | |
| CRA-RA-30 | | | | |
| CRA-RA-31 | | | | |
| CRA-RA-32 | | | | |
| PZ-104 | | | | |
| RA-MW-28 | | | | |
| TEMP-PZ-2 | | | | |

# TABLE 6

## CONCENTRATION vs. TIME TREND TESTS RESULTS FOR CURRENT GROUNDWATER MONITORING DATA RASMUSSEN LANDFILL SITE LIVINGSTON COUNTY, MICHIGAN

| | Benzene | | | | |
|---|---|---|---|---|---|
| | | | Mann-Kendall Trend test | | |
| *Well* | *Number of Samples* | *Percent Non-Detect* | *Statistic* | *Probability* | *Conclusion* |
| 81-4 | 8 | 100% | – | – | No detected results |
| 81-8 | 8 | 100% | – | – | No detected results |
| CRA-RA-2D | 8 | 100% | – | – | No detected results |
| CRA-RA-5 | 8 | 100% | – | – | No detected results |
| CRA-RA-6S | 8 | 100% | – | – | No detected results |
| CRA-RA-7 | 8 | 100% | – | – | No detected results |
| CRA-RA-8 | 8 | 100% | – | – | No detected results |
| CRA-RA-18 | 8 | 100% | – | – | No detected results |
| CRA-RA-19S | 8 | 100% | – | – | No detected results |
| CRA-RA-20 | 8 | 100% | – | – | No detected results |
| CRA-RA-22 | 8 | 100% | – | – | No detected results |
| CRA-RA-23D | 8 | 100% | – | – | No detected results |
| CRA-RA-24 | 8 | 100% | – | – | No detected results |
| CRA-RA-25 | 8 | 75% | – | – | Over 50% non-detects |
| CRA-RA-26D | 8 | 100% | – | – | No detected results |
| CRA-RA-26S | 8 | 100% | – | – | No detected results |
| CRA-RA-27 | 8 | 100% | – | – | No detected results |
| CRA-RA-28 | 8 | 100% | – | – | No detected results |
| CRA-RA-29 | 8 | 100% | – | – | No detected results |
| CRA-RA-30 | 8 | 100% | – | – | No detected results |
| CRA-RA-31 | 8 | 100% | – | – | No detected results |
| CRA-RA-32 | 8 | 100% | – | – | No detected results |
| EB-PZ-4 | 8 | 100% | – | – | No detected results |
| PZ-104 | 8 | 100% | – | – | No detected results |
| PZ-106 | 8 | 100% | – | – | No detected results |
| RA-MW-28 | 8 | 100% | – | – | No detected results |
| RA-MW-47 | 8 | 100% | – | – | No detected results |
| Stanley Rasmussen | 8 | 100% | – | – | No detected results |
| TEMP-PZ-2 | 8 | 100% | – | – | No detected results |

# TABLE 7

## CONCENTRATION vs. TIME TREND TESTS RESULTS FOR GROUNDWATER MONITORING DATA RASMUSSEN LANDFILL SITE LIVINGSTON COUNTY, MICHIGAN

| | | | *Trichloroethene* | | |
|---|---|---|---|---|---|
| | | | *Mann-Kendall Trend test* | | |
| *Well* | *Number of Samples* | *Percent Non-Detect* | *Statistic* | *Probability* | *Conclusion* |
| 81-4 | 8 | 100% | – | – | No detected results |
| 81-8 | 8 | 100% | – | – | No detected results |
| CRA-RA-2D | 8 | 100% | – | – | No detected results |
| CRA-RA-5 | 8 | 100% | – | – | No detected results |
| CRA-RA-6S | 8 | 100% | – | – | No detected results |
| CRA-RA-7 | 8 | 100% | – | – | No detected results |
| CRA-RA-8 | 8 | 100% | – | – | No detected results |
| CRA-RA-18 | 8 | 100% | – | – | No detected results |
| CRA-RA-19S | 8 | 100% | – | – | No detected results |
| CRA-RA-20 | 8 | 100% | – | – | No detected results |
| CRA-RA-22 | 8 | 100% | – | – | No detected results |
| CRA-RA-23D | 8 | 13% | -6 | 0.530 | No trend identified |
| CRA-RA-24 | 8 | 100% | – | – | No detected results |
| CRA-RA-25 | 8 | 100% | – | – | No detected results |
| CRA-RA-26D | 8 | 100% | – | – | No detected results |
| CRA-RA-26S | 8 | 0% | 6 | 0.530 | No trend identified |
| CRA-RA-27 | 8 | 100% | – | – | No detected results |
| CRA-RA-28 | 8 | 100% | – | – | No detected results |
| CRA-RA-29 | 8 | 100% | – | – | No detected results |
| CRA-RA-30 | 8 | 100% | – | – | No detected results |
| CRA-RA-31 | 8 | 100% | – | – | No detected results |
| CRA-RA-32 | 8 | 100% | – | – | No detected results |
| EB-PZ-4 | 8 | 88% | – | – | Over 50% non-detects |
| PZ-104 | 8 | 100% | – | – | No detected results |
| PZ-106 | 8 | 100% | – | – | No detected results |
| RA-MW-28 | 8 | 100% | – | – | No detected results |
| RA-MW-47 | 8 | 100% | – | – | No detected results |
| Stanley Rasmussen | 8 | 100% | – | – | No detected results |
| TEMP-PZ-2 | 8 | 100% | – | – | No detected results |

# TABLE 8

## CONCENTRATION vs. TIME TREND TESTS RESULTS FOR CURRENT GROUNDWATER MONITORING DATA (LAST 8 DATA POINTS) RASMUSSEN LANDFILL SITE LIVINGSTON COUNTY, MICHIGAN

| | *Vinyl Chloride* | | | | |
|---|---|---|---|---|---|
| | | | *Mann-Kendall Trend test* | | |
| *Well* | *Number of Samples* | *Percent Non-Detect* | *Statistic* | *Probability* | *Conclusion* |
| 81-4 | 8 | 13% | -22 | 0.009 | **Decreasing Trend** |
| 81-8 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-2D | 8 | 100% | -- | -- | No detected results |
| CRA-RA-5 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-6S | 8 | 63% | -- | -- | Over 50% non-detects |
| CRA-RA-7 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-8 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-18 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-19S | 8 | 100% | -- | -- | No detected results |
| CRA-RA-20 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-22 | 8 | 13% | -18 | 0.035 | **Decreasing Trend** |
| CRA-RA-23D | 8 | 100% | -- | -- | No detected results |
| CRA-RA-24 | 8 | 0% | -6 | 0.536 | No trend identified |
| CRA-RA-25 | 8 | 75% | -- | -- | Over 50% non-detects |
| CRA-RA-26D | 8 | 100% | -- | -- | No detected results |
| CRA-RA-26S | 8 | 100% | -- | -- | No detected results |
| CRA-RA-27 | 8 | 0% | -20 | 0.017 | **Decreasing Trend** |
| CRA-RA-28 | 8 | 38% | -20 | 0.015 | **Decreasing Trend** |
| CRA-RA-29 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-30 | 8 | 0% | -9 | 0.308 | No trend identified |
| CRA-RA-31 | 8 | 100% | -- | -- | No detected results |
| CRA-RA-32 | 8 | 100% | -- | -- | No detected results |
| EB-PZ-4 | 8 | 50% | 5 | 0.610 | No trend identified |
| PZ-104 | 8 | 88% | -- | -- | Over 50% non-detects |
| PZ-106 | 8 | 100% | -- | -- | No detected results |
| RA-MW-28 | 8 | 100% | -- | -- | No detected results |
| RA-MW-47 | 8 | 100% | -- | -- | No detected results |
| Stanley Rasmussen | 8 | 100% | -- | -- | No detected results |
| TEMP-PZ-2 | 8 | 100% | -- | -- | No detected results |

# LOG FORM COPIES

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | July 2, 2014 | July 7, 2014 | July 16, 2014 | July 25, 2014 | July 31, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A. Rapai | A. Rapai | A. Rapai | A. Rapai | A. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 91730 | 91855 | | 92284 | 92425.8 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 56 | 56 | 52 | 54 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 40 | 42 | 42 | 42 |
| Run Time hours | 91729.7 | 91855.4 | | 92284.2 | 92425.8 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | 7 | 7 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 34 | 32 | 34 | 35 | 35 |
| Regulator #2 psi | 22 | 22 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 2 | 3 | 1 | 3 |
| Zone Time hours | 1/2 | 1/2 | 2 | 1/2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** THERE WERE SEVERAL, BRIEF WEATHER RELATED SHUT DOWNS IN JULY - MANY STRONG STORMS.

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | Aug. 15, 2014 | Aug. 22, 2014 | Aug. 28, 2014 | Sept. 5, 2014 | Sept. 12, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A. Rapai | A. Rapai | A. Rapai | A. Rapai | A. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 92786 | 92954 | 93096 | 93284 | 93454.8 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 54 | 54 | 52 | 56 | 54 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | 92786.2 | 92954.4 | 93096.0 | 93284.4 | 93454.8 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | 7 | 7 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 33 | 34 | 35 | 33 | 36 |
| Regulator #2 psi | 22 | 22 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 3 | 3 | 1 | 3 | 3 |
| Zone Time hours | 2 | 2 | 1/2 | 2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | SEPT, 17, 2014 | SEPT, 26, 2014 | | | |
| **OPERATOR SIGNATURE** | A Thapa | A Thapa | | | |

| **Air Compressor** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | | | |
| Temperature F | | | | | |
| Run Time hours | | | | | |

| **Air Sep** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 54 | 56 | | | |
| Feed Air Pressure psi | 110 | 110 | | | |
| Cycle Pressure psi | 70 | 70 | | | |
| Holding Tank Pressure psi | 42 | 42 | | | |
| Run Time hours | | | | | |

| **Air Dryer** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | | | |

| **Ozone Generator** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 7 | | | |
| % O3 capacity | 45 | 45 | | | |
| Regulator #1 psi | 34 | 32 | | | |
| Regulator #2 psi | 22 | 22 | | | |
| Alarm Reading ppm, O3 | – | – | | | |
| Zone On | 1 | 2 | | | |
| Zone Time hours | 1/2 | 1/2 | | | |

| **Distribution Panel** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | | | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | WEDNESDAY, JULY 16, 2014 | | DATE: | WED. AUG. 20 & THURS. AUG 21, 2014 | | DATE: | SEPT. 16 & 17, 2014 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 7 | SW-1 | 0.8 | 7 | SW-1 | 0.8 | 8 |
| SW-2 | 0.8 | 7 | SW-2 | 0.7 | 8 | SW-2 | 0.8 | 7 |
| SW-3 | 0.8 | 13 | SW-3 | 0.8 | 14 | SW-3 | 0.7 | 14 |
| SW-4 | 0.8 | 15 | SW-4 | 0.7 | 16 | SW-4 | 0.8 | 15 |
| SW-5 | 0.8 | 16 | SW-5 | 0.8 | 16 | SW-5 | 0.8 | 15 |
| SW-6 | 0.8 | 15 | SW-6 | 0.8 | 15 | SW-6 | 0.8 | 15 |
| SW-7 | 0.8 | 14 | SW-7 | 0.7 | 15 | SW-7 | 0.6 | 15 |
| SW-8 | - | - | SW-8 | - | - | SW-8 | - | - |
| SW-9 | - | - | SW-9 | - | - | SW-9 | - | - |
| SW-10 | - | - | SW-10 | - | - | SW-10 | - | - |
| SW-11 | - | - | SW-11 | - | - | SW-11 | - | - |
| SW-12 | 0.8 | 15 | SW-12 | 0.8 | 14 | SW-12 | 0.8 | 14 |
| SW-13 | 0.7 | 2 | SW-13 | 0.7 | 3 | SW-13 | 0.7 | 3 |
| SW-14 | - | - | SW-14 | - | - | SW-14 | - | - |
| SW-15 | - | - | SW-15 | - | - | SW-15 | - | - |
| SW-16 | - | - | SW-16 | - | - | SW-16 | - | - |
| SW-17 | 0.8 | 17 | SW-17 | 0.7 | 17 | SW-17 | 0.8 | 16 |
| SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 |
| SW-19 | 0.8 | 17 | SW-19 | 0.8 | 17 | SW-19 | 0.7 | 17 |
| SW-20 | 0.8 | 17 | SW-20 | 0.7 | 17 | SW-20 | 0.8 | 17 |
| SW-21 | - | - | SW-21 | - | - | SW-21 | - | - |
| SW-22 | 0.8 | 13 | SW-22 | 0.8 | 14 | SW-22 | 0.8 | 14 |
| SW-23 | 0.7 | 15 | SW-23 | 0.8 | 15 | SW-23 | 0.7 | 15 |
| SW-24 | 0.7 | 15 | SW-24 | 0.8 | 15 | SW-24 | 0.7 | 15 |
| SW-25 | 0.7 | 16 | SW-25 | 0.7 | 15 | SW-25 | 0.8 | 15 |
| SW-26 | 0.8 | 3 | SW-26 | 0.7 | 3 | SW-26 | 0.8 | 3 |
| SW-27 | 0.7 | 6 | SW-27 | 0.8 | 6 | SW-27 | 0.8 | 7 |
| SW-28 | 0.8 | 6 | SW-28 | 0.8 | 6 | SW-28 | 0.8 | 6 |
| SW-29 | 0.8 | 6 | SW-29 | 0.8 | 7 | SW-29 | 0.8 | 6 |
| SW-30 | - | - | SW-30 | - | - | SW-30 | - | - |

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** MONDAY JULY 7, 2014
**Time:** 3:30 PM

**Weather Conditions:** CLOUDY, HUMID, 86°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET - NO STANDING WATER

**Drainage Spillways & Outfalls:** WET

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** THURSDAY JULY 31, 2014
**Time:** 9:00 AM

**Weather Conditions:** SUN 70°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** FRIDAY, AUGUST 15, 2014
**Time:** 3:00 PM

**Weather Conditions:** SUN 75°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**

**Recommendations:**

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** THURSDAY, AUG. 28, 2014
**Time:** 3:00 PM

**Weather Conditions:** SUN 75°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**
CLEANED UP BRUSH ALONG FENCE & BUILDING

**Recommendations:**
—

**RASMUSSEN LANDFILL SITE**
**Livingston County, Michigan**

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steven Rapai

**Date:** FRIDAY, SEPT. 5
**Time:** 10:00 AM

**Weather Conditions:** SUN 79°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GOOD

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**

—

**Recommendations:**

—

6/19/14 32504-25

SAMPLE OF 81-4 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1535 | 6.48 | 1.59 | 2.6 | 0.18 | 11.13 |
| 1540 | 6.46 | 1.59 | 1.6 | 0.14 | 11.10 |
| 1545 | 6.45 | 1.59 | 0.9 | 0.13 | 11.13 |
| 1550 | 6.45 | 1.59 | 0.7 | 0.13 | 11.13 |

SAMPLED @ 1551 ID: GW-32504-061914-SR-181

SAMPLES PACKED IN COOLER WITH ICE FOR DROP OFF @ TEST AMERICA, BRIGHTON.



8/18/14 32504.25

TASK: 1/4 LY WATERLEVELS (3RD 1/4)

CRA: STEVE RAPAI

WEATHER: MOSTLY CLOUDY, HIGH 77°

H2S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| 81-4 | 28.88 |
| 81-5 | 33.25 |
| 81-7 | 45.54 |
| 81-8 | 42.49 |
| 81-9 | 14.70 |
| 81-10 | 31.26 |
| RA-1 | 68.05 |
| RA-2D | 54.90 |
| RA-2S | 54.63 |
| RA-3 | 51.69 |
| RA-4 | 22.71 |
| RA-5 | 53.80 |
| RA-6 | 58.29 |
| RA-7 | 31.47 |
| RA-8 | 15.48 |
| RA-16 | 56.76 |
| RA-18 | 40.60 |
| RA-18D | 55.21 |
| RA-19D | 49.09 |

8/18/14 32504-25

| WELL ID | LEVEL |
|---|---|
| RA-19S | 46.46 |
| RA-20 | 57.35 |
| RA-22 | 52.85 |
| RA-23D | 31.73 |
| RA-23S | 32.03 |
| RA-24 | 55.69 |
| RA-25 | 53.13 |
| RA-26D | 48.95 |
| RA-26S | 48.83 |
| RA-27 | 60.64 |
| RA-28 | 53.41 |
| RA-29 | 45.00 |
| RA-30 | 57.40 |
| RA-31 | 30.75 |
| RA-32 | 56.15 |
| MW-27 | 41.20 |
| MW-28 | 41.50 |
| MW-32 | 33.87 |
| MW-34C | 40.71 |
| MW-35 | 22.34 |
| MW-41 | 46.81 |
| MW-42 | 62.83 |
| MW-47 | 63.08 |
| MW-54 | 54.90 |



8/18/14 32504-25

| WELL ID | LEVEL |
|---|---|
| MW-55 | 35.62 |
| MW-56 | 34.40 |
| MW-58 | 19.96 |
| EB-PZ-2 | 39.29 |
| EB-PZ-4 | 51.89 |
| EB-PZ-5 | 54.15 |
| EB-PZ-6 | 52.89 |
| PZ-103 | 56.19 |
| PZ-104 | 53.94 |
| PZ-105 | 50.70 |
| PZ-106 | 38.29 |
| TEMP-PZ-2 | 53.77 |

8/18/14 32504.25

TASK: BEGIN 4TH QTR SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: MOSTLY SUNNY, HIGH 77°F

H&S: LEVEL D

CALIBRATION OF HORIBA NF07402

pH=4.00, COND.=4.48, TURB.=0.0,

D.O.=8.06, TEMP=27.1

SAMPLE OF CRA-RA-2D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1040 | 5.94 | 2.16 | 2.7 | 7.10 | 12.2 |
| 1115 | 6.81 | 1.96 | 1.4 | 0.18 | 11.7 |
| 1120 | 6.85 | 1.94 | 0.0 | 0.20 | 11.8 |
| 1125 | 6.85 | 1.95 | 0.0 | 0.19 | 11.8 |
| 1130 | 6.85 | 1.95 | 0.0 | 0.19 | 11.8 |

SAMPLED @ 1131 ID: GW-32504-081814-SR-1812

SAMPLE OF CRA-RA-2B

| | | | | | |
|---|---|---|---|---|---|
| 1155 | 6.98 | 1.17 | 17.2 | 1.21 | 11.5 |
| 1205 | 6.95 | 1.13 | 0.0 | 0.23 | 11.4 |
| 1215 | 6.93 | 1.13 | 0.0 | 0.18 | 11.4 |
| 1220 | 6.85 | 1.13 | 0.0 | 0.16 | 11.5 |
| 1225 | 6.83 | 1.14 | 0.0 | 0.17 | 11.5 |

CONTINUED ON NEXT PAGE



32504.25 8/18/14

SAMPLE OF CRA-RA-2B (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1230 | 6.84 | 1.13 | 0.0 | 0.15 | 11.5 |
| 1235 | 6.84 | 1.13 | 0.0 | 0.15 | 11.5 |

SAMPLED @ 1236 ID: GW-32504-081814-SR-1813

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1250 | 6.98 | 1.42 | 158.0 | 2.05 | 11.7 |
| 1300 | 6.90 | 1.39 | 0.0 | 0.23 | 11.6 |
| 1310 | 6.90 | 1.39 | 0.0 | 1.32 | 11.9 |
| 1315 | 6.90 | 1.40 | 0.0 | 3.56 | 11.8 |
| 1320 | 6.91 | 1.40 | 0.0 | 0.17 | 11.8 |
| 1325 | 6.91 | 1.40 | 0.0 | 0.16 | 11.8 |
| 1330 | 6.91 | 1.40 | 0.0 | 0.16 | 11.8 |

SAMPLED @ 1331 ID: GW-32504-081814-SR-1814

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1440 | 7.19 | 1.13 | 108.0 | 4.02 | 12.8 |
| 1450 | 7.21 | 1.12 | 115.0 | 4.22 | 12.0 |
| 1500 | 7.00 | 1.11 | 49.7 | 1.30 | 11.6 |
| 1505 | 6.98 | 1.11 | 21.2 | 0.43 | 11.5 |
| 1510 | 6.97 | 1.11 | 0.0 | 0.33 | 11.5 |
| 1515 | 6.97 | 1.11 | 0.0 | 0.31 | 11.4 |
| 1520 | 6.97 | 1.11 | 0.0 | 0.31 | 11.4 |

SAMPLED @ 1521 ID: GW-32504-081814-SR-1815

8/18/14 32504-25

SAMPLE OF CRA-RA-30

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1545 | 6.94 | 1.11 | 0.0 | 0.89 | 11.4 |
| 1555 | 6.96 | 1.11 | 0.0 | 0.18 | 11.3 |
| 1605 | 6.96 | 1.11 | 0.0 | 0.15 | 11.3 |
| 1610 | 6.99 | 1.11 | 0.0 | 0.18 | 11.3 |
| 1615 | 7.00 | 1.11 | 0.0 | 0.22 | 11.4 |
| 1620 | 6.99 | 1.11 | 0.0 | 0.26 | 11.4 |
| 1625 | 6.99 | 1.11 | 0.0 | 0.26 | 11.4 |
| 1630 | 6.99 | 1.11 | 0.0 | 0.25 | 11.4 |

SAMPLED @ 1631 ID: GW-32504-081814-SR-1816

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1645 | 6.97 | 0.97 | 195.0 | 0.16 | 11.3 |
| 1655 | 7.01 | 0.97 | 0.0 | 0.16 | 11.2 |
| 1705 | 7.01 | 0.96 | 0.0 | 0.16 | 11.2 |
| 1710 | 7.01 | 0.96 | 0.0 | 0.22 | 11.3 |
| 1715 | 7.01 | 0.96 | 0.0 | 0.23 | 11.3 |
| 1720 | 7.01 | 0.96 | 0.0 | 0.22 | 11.2 |

SAMPLED @ 1721; ID: GW-32504-081814-SR-1817

SAMPLES PACKED IN COOLER WITH ICE



32504-25 8/19/14

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: PARTLY CLOUDY, HIGH 82°F

STORMS EXPECTED THROUGH DAY

H&S: LEVEL D

CALIBRATION OF HORIBA NF07402

pH=4.00, COND.=4.49, TURB.=0.0, D.O.=8.04, TEMP=27.8°C

SAMPLE OF CRA-RA-22

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 9:40 | 6.18 | 1.16 | 0.0 | 4.38 | 11.7 |
| 9:50 | 6.64 | 1.14 | 203.0 | 5.39 | 11.6 |
| 10:00 | 6.78 | 1.12 | 229.0 | 3.32 | 11.6 |
| 10:10 | 6.84 | 1.11 | 0.0 | 2.34 | 11.6 |
| 10:15 | 6.82 | 1.11 | 0.0 | 2.05 | 11.5 |
| 1020 | 6.83 | 1.10 | 0.0 | 1.86 | 11.5 |
| 1025 | 6.82 | 1.10 | 0.0 | 1.76 | 11.5 |
| 1030 | 6.83 | 1.10 | 0.0 | 1.73 | 11.5 |
| 1035 | 6.84 | 1.10 | 0.0 | 1.71 | 11.6 |
| 1040 | 6.83 | 1.10 | 0.0 | 1.70 | 11.6 |

SAMPLED @ 1041 ID: GW-32504-081914-SR-1818

8/19/14 32504.25

SAMPLE OF TEMP PZ-2 (RAINING)

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1100 | 6.87 | 2.38 | 0.0 | 9.88 | 11.8 |
| 1110 | 6.80 | 2.29 | 0.0 | 5.40 | 11.6 |
| 1120 | 6.81 | 2.38 | 0.0 | 3.42 | 11.6 |
| 1130 | 6.81 | 2.39 | 0.0 | 2.88 | 11.6 |
| 1135 | 6.82 | 2.39 | 0.0 | 2.31 | 11.7 |
| 1140 | 6.83 | 2.40 | 0.0 | 1.62 | 11.7 |
| 1145 | 6.83 | 2.39 | 0.0 | 1.57 | 11.7 |
| 1150 | 6.83 | 2.40 | 0.0 | 1.51 | 11.7 |
| 1155 | 6.83 | 2.40 | 0.0 | 1.51 | 11.7 |
| 1200 | 6.83 | 2.40 | 0.0 | 1.51 | 11.7 |

SAMPLED @ 1201 ID: GW-32504-081914-SR-1819

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1215 | 6.96 | 1.27 | 0.0 | 5.59 | 15.5 |
| 1225 | 6.89 | 1.07 | 0.0 | 6.71 | 15.0 |
| 1235 | 6.92 | 1.12 | 0.0 | 7.12 | 15.5 |
| 1245 | 6.94 | 1.13 | 0.0 | 7.20 | 15.6 |
| 1250 | 6.94 | 1.13 | 0.0 | 7.21 | 15.6 |
| 1255 | 6.94 | 1.14 | 0.0 | 7.21 | 15.6 |

SAMPLED @ 1256 ID: GW-32504-081914-SR-1820



32504.25 8/19/14

SAMPLE OF 81-8

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1325 | 7.08 | 1.12 | 176 | 7.12 | 13.2 |
| 1335 | 7.24 | 1.09 | 0.0 | 9.27 | 15.5 |
| 1345 | 7.31 | 1.03 | 0.0 | +19.99 | 15.3 |
| 1350 | 7.36 | 1.01 | 0.0 | +19.99 | 15.0 |
| 1355 | 7.35 | 1.00 | 0.0 | +19.99 | 14.6 |
| 1400 | 7.35 | 0.99 | 0.0 | +19.99 | 14.6 |
| 1405 | 7.35 | 0.99 | 0.0 | +19.99 | 14.7 |

SAMPLED @ 1406 ID: GW-32504-081914-SR-1821

SAMPLED @ 1410 ID: GW-32504-081914-SR-1822

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1420 | 7.11 | 1.45 | 0.0 | 2.11 | 12.2 |
| 1430 | 6.99 | 1.38 | 0.0 | 1.66 | 11.8 |
| 1440 | 6.91 | 1.33 | 0.0 | 1.65 | 11.8 |
| 1445 | 6.89 | 1.32 | 0.0 | 1.75 | 11.8 |
| 1450 | 6.89 | 1.35 | 0.0 | 1.88 | 12.0 |
| 1455 | 6.88 | 1.34 | 0.0 | 1.89 | 11.9 |
| 1500 | 6.86 | 1.34 | 0.0 | 1.86 | 11.8 |
| 1505 | 6.86 | 1.34 | 0.0 | 1.85 | 11.8 |
| 1510 | 6.86 | 1.34 | 0.0 | 1.85 | 11.8 |

SAMPLED @ 1511 ID: GW-32504-081914-SR-1823

SAMPLES PACKED IN COOLER WITH ICE FOR DROP OFF AT TEST AMERICA, BRIGHTON.

9/2/14 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: MOSTLY CLOUDY, HUMID, HIGH 85°

$H_2S$: LEVEL D

CALIBRATION OF HORIBA NF0740Z

pH: 4.00, COND. = 4.49, TURB = 0.0, D.O. = 8.10, TEMP = 28.5

SAMPLE OF CRA-RA-31

| TIME | pH | COND | TURB. | D.O. | TEMP °C |
|---|---|---|---|---|---|
| 0835 | 5.90 | 0.99 | 0.0 | 4.95 | 17.5 |
| 0845 | 6.63 | 0.99 | 4.7 | 0.62 | 11.2 |
| 0855 | 6.90 | 0.643 | 0.0 | 0.39 | 11.2 |
| 0900 | 7.01 | 0.647 | 0.0 | 0.36 | 11.2 |
| 0905 | 7.00 | 0.647 | 0.0 | 0.32 | 11.2 |
| 0910 | 7.01 | 0.646 | 0.0 | 0.31 | 11.2 |
| 0915 | 7.00 | 0.647 | 0.0 | 0.31 | 11.2 |

SAMPLED @ 0916 ID: GW-32504-090214-SR-1824

SAMPLE OF CRA-RA-7

| | | | | | |
|---|---|---|---|---|---|
| 0930 | 7.16 | 0.832 | 3.9 | 3.97 | 10.6 |
| 0940 | 7.21 | 0.724 | 1.5 | 4.74 | 10.5 |
| 0950 | 7.25 | 0.876 | 0.0 | 4.88 | 10.5 |
| 0955 | 7.26 | 0.876 | 0.0 | 4.91 | 10.5 |
| 1000 | 7.27 | 0.877 | 0.0 | 4.90 | 10.5 |

CONTINUED ON NEXT PAGE



32504-25 9/2/14

SAMPLE OF CRA-RA-7 (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1005 | 7.27 | 0.877 | 0.0 | 4.91 | 10.5 |

SAMPLED @ 1006 ID: GW-32504-090214-SR-1825

SAMPLE OF CRA-RA-25 (WELL/PUMP PROBLEMS)

| | | | | | |
|---|---|---|---|---|---|
| 1100 | 6.83 | 1.07 | 27.2 | 2.94 | 12.7 |
| 1110 | 6.84 | 0.93 | 3.6 | 0.26 | 12.2 |
| 1120 | 6.85 | 0.96 | 0.0 | 0.21 | 12.3 |
| 1125 | 6.85 | 0.96 | 0.0 | 0.19 | 12.2 |
| 1130 | 6.86 | 0.96 | 0.0 | 0.20 | 12.2 |
| 1135 | 6.85 | 0.96 | 0.0 | 0.20 | 12.2 |

SAMPLE OF 1136 ID: GW-32504-090214-SR-1826

SAMPLE OF EB-PZ-4

| | | | | | |
|---|---|---|---|---|---|
| 1200 | 6.97 | 0.90 | 0.0 | 4.11 | 12.2 |
| 1210 | 7.06 | 0.90 | 8.6 | 3.32 | 11.9 |
| 1220 | 7.07 | 0.873 | 0.0 | 3.01 | 11.9 |
| 1225 | 7.09 | 0.833 | 0.0 | 2.77 | 11.9 |

1230 FLOW CELL FAILURE

HAD TO PURCHASE NEW BATTERY

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 7.40 | 0.831 | 0.0 | 4.42 | 11.9 |
| 1410 | 7.07 | 0.832 | 0.0 | 4.35 | 11.8 |
| 1415 | 7.07 | 0.832 | 0.0 | 4.35 | 11.8 |
| 1420 | 7.07 | 0.832 | 0.0 | 4.35 | 11.8 |

SAMPLED @ 1421 ID: GW-32504-090214-SR-1827

9/2/14 759 32504-25

SAMPLE OF PZ-106

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1435 | 6.75 | 1.48 | 17.6 | 1.24 | 12.2 |
| 1450 | 6.76 | 1.47 | 7.3 | 1.02 | 12.2 |
| 1455 | 6.73 | 1.47 | 1.4 | 0.97 | 12.7 |
| 1500 | 6.73 | 1.48 | 0.0 | 0.90 | 13.2 |
| 1505 | 6.72 | 1.49 | 0.0 | 0.89 | 13.2 |
| 1510 | 6.72 | 1.49 | 0.0 | 0.88 | 13.2 |

SAMPLED @ 1511 ID: GW-32504-090214-SR-1828

SAMPLE OF RA-MW-47

| | | | | | |
|---|---|---|---|---|---|
| 1530 | 7.02 | 1.72 | 7.4 | 1.19 | 11.6 |
| 1540 | 7.14 | 1.86 | 0.0 | 0.84 | 11.5 |
| 1550 | 7.28 | 1.76 | 0.0 | 0.81 | 11.4 |
| 1555 | 7.32 | 1.79 | 0.0 | 0.80 | 11.4 |
| 1600 | 7.34 | 1.80 | 0.0 | 0.76 | 11.4 |
| 1605 | 7.39 | 1.82 | 0.0 | 0.71 | 11.4 |
| 1610 | 7.38 | 1.81 | 0.0 | 0.70 | 11.4 |
| 1615 | 7.38 | 1.81 | 0.0 | 0.70 | 11.4 |

SAMPLED @ 1616 ID: GW-32504-090214-SR-1829

SAMPLES PACKED IN COOLER WITH ICE.

760 32504-25 9/3/14

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: SUN, HIGH 82°F

H&S: LEVEL D

CALIBRATION OF HORIBA NF07402

pH=4.00, COND=4.48, TURB=0.0, D.O.=8.41, TEMP=25.9°C

SAMPLE OF ~~CRA~~-RA-MW-28

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1000 | 6.17 | 0.921 | 11.4 | 3.92 | 11.6 |
| 1010 | 6.54 | 0.805 | 0.0 | 3.75 | 11.4 |
| 1020 | 6.60 | 0.795 | 0.0 | 3.69 | 11.3 |
| 1025 | 6.61 | 0.799 | 0.0 | 3.70 | 11.3 |
| 1030 | 6.61 | 0.799 | 0.0 | 3.70 | 11.3 |
| 1035 | 6.60 | 0.798 | 0.0 | 3.71 | 11.3 |

SAMPLED @ 1036 ID: GW-32504-090314-SR-1830

SAMPLE OF CRA-RA-18

| | | | | | |
|---|---|---|---|---|---|
| 1045 | 6.59 | 1.70 | 0.0 | 8.01 | 10.8 |
| 1055 | 6.60 | 1.70 | 0.0 | 8.01 | 10.8 |
| 1105 | 6.62 | 1.71 | 0.0 | 7.99 | 10.8 |
| 1110 | 6.64 | 1.71 | 0.0 | 7.99 | 10.8 |
| 1115 | 6.65 | 1.71 | 0.0 | 7.97 | 10.7 |

CONTINUED ON NEXT PAGE

9/3/14 32504-25

SAMPLE OF CRA-RA-18 (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1120 | 6.65 | 1.71 | 0.0 | 7.98 | 10.7 |
| 1125 | 6.65 | 1.71 | 0.0 | 7.98 | 10.7 |

SAMPLED @ 1126 ID: GW-32504-090314-SB-1831

SAMPLE OF CRA-RA-65

| | | | | | |
|---|---|---|---|---|---|
| 1215 | 6.60 | 1.21 | 3.1 | 3.67 | 13.8 |
| 1225 | 6.56 | 1.20 | 0.0 | 1.95 | 13.1 |
| 1235 | 6.53 | 1.19 | 0.0 | 1.79 | 13.3 |
| 1240 | 6.52 | 1.19 | 0.0 | 1.81 | 13.3 |

COMPRESSOR FAILURE!

SAMPLE EVENT SUSPENDED.

SAMPLES PACKED IN COOLER WITH ICE FOR DROP OFF AT TEST AMERICA, BRIGHTON, ME.



9/11/14 32504-25

TASK: CONTINUE VALLEY SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY 54°

HES LEVEL D

CALIBRATION OF RENTAL HORIBA

NF 07402: pH=4.00, COND=4.48, TURB=0.0, D.O.=8.41, TEMP=24.8°C

SAMPLE OF CRA-RA-65

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1050 | 5.96 | 1.20 | 0.0 | 5.47 | 13.1 |
| 1100 | 6.52 | 1.20 | 0.0 | 2.15 | 12.1 |
| 1110 | 6.55 | 1.20 | 0.0 | 2.10 | 12.2 |
| 1115 | 6.57 | 1.19 | 0.0 | 2.01 | 12.1 |
| 1120 | 6.57 | 1.19 | 0.0 | 1.88 | 12.1 |
| 1125 | 6.57 | 1.19 | 0.0 | 1.85 | 12.1 |
| 1130 | 6.56 | 1.19 | 0.0 | 1.84 | 12.1 |
| 1135 | 6.57 | 1.19 | 0.0 | 1.83 | 12.1 |
| 1140 | 6.57 | 1.19 | 0.0 | 1.83 | 12.1 |

SAMPLED @ 1141 ID: GW-32504-091114-SB-1832

SAMPLE OF CRA-RA-27

| | | | | | |
|---|---|---|---|---|---|
| 1230 | 6.77 | 1.89 | 0.0 | 3.03 | 11.6 |
| 1240 | 6.68 | 1.91 | 0.0 | 1.30 | 11.5 |

CONTINUED ON NEXT PAGE

9/11/14 32504-25

SAMPLE OF CRA-RA-27 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1250 | 6.65 | 1.78 | 0.0 | 1.17 | 11.6 |
| 1255 | 6.65 | 1.78 | 0.0 | 1.14 | 11.6 |
| 1300 | 6.65 | 1.77 | 0.0 | 1.12 | 11.6 |
| 1305 | 6.65 | 1.77 | 0.0 | 1.11 | 11.6 |
| 1310 | 6.65 | 1.77 | 0.0 | 1.12 | 11.6 |

SAMPLED @ 1310 ID:GW-32504-091114-SR-1833

SAMPLED @ 1315 ID:GW-32504-091114-SR-1834

SAMPLE OF CRA-RA-26S

| | | | | | |
|---|---|---|---|---|---|
| 1325 | 6.83 | 1.46 | 4.1 | 6.21 | 11.0 |
| 1335 | 6.66 | 1.47 | 0.0 | 5.64 | 10.9 |
| 1345 | 6.65 | 1.48 | 0.0 | 5.60 | 10.9 |
| 1355 | 6.65 | 1.50 | 0.0 | 5.65 | 10.9 |
| 1400 | 6.65 | 1.50 | 0.0 | 5.70 | 10.9 |
| 1410 | 6.65 | 1.51 | 0.0 | 5.79 | 10.9 |
| 1420 | 6.65 | 1.50 | 0.0 | 5.92 | 10.9 |

PURGED WELL FOR OVER 1 HOUR. D.O. SLOWLY INCREASING.

SAMPLED @ 1426 ID:GW-32504-091114-SR-1835

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1435 | 6.87 | 1.75 | 0.0 | 7.01 | 11.1 |

CONTINUED ON NEXT PAGE



32504-25

SAMPLE OF CRA-RA-26D (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1445 | 6.68 | 1.75 | 0.0 | 3.75 | 11.1 |
| 1455 | 6.69 | 1.76 | 0.0 | 2.80 | 11.0 |
| 1500 | 6.70 | 1.76 | 0.0 | 2.43 | 11.0 |
| 1505 | 6.70 | 1.76 | 0.0 | 2.19 | 11.0 |
| 1510 | 6.70 | 1.76 | 0.0 | 1.88 | 11.0 |
| 1515 | 6.70 | 1.76 | 0.0 | 1.85 | 11.0 |
| 1520 | 6.70 | 1.76 | 0.0 | 1.86 | 11.0 |
| 1525 | 6.70 | 1.76 | 0.0 | 1.85 | 11.0 |

SAMPLED @ 1526 ID:GW-32504-091114-SR-1836

SAMPLES PACKED IN COOLER WITH ICE.

9/12/14 32504-25

TASK: CONTINUE 1/4 LY SAMPLE EVENT

CREW: STEVE, RAFAEL

WEATHER: CLOUDY, 55°F

H&S: LEVEL D

CALIBRATION OF HORIBA NF07402

pH=4.00 COND.=4.49, TURB.=0.0, D.O.=9.00, TEMP=22.6

SAMPLE OF ~~GB~~ 81-4

BEGAN PURGE @ 1115

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1140 | 5.84 | 1.46 | 0.0 | 4.04 | 11.5 |
| 1150 | 6.46 | 1.44 | 0.0 | 1.44 | 11.3 |
| 1155 | 6.54 | 1.44 | 0.0 | 1.34 | 11.3 |
| 1200 | 6.56 | 1.44 | 0.0 | 1.28 | 11.3 |
| 1205 | 6.57 | 1.44 | 0.0 | 1.26 | 11.3 |
| 1210 | 6.57 | 1.44 | 0.0 | 1.27 | 11.3 |

SAMPLED @ 1211 ID: GW-32504-091214-SR-1837

SAMPLE OF CRA-RA-23D

| | | | | | |
|---|---|---|---|---|---|
| 1325 | 7.14 | 0.818 | 0.0 | 3.31 | 10.4 |
| 1335 | 6.94 | 0.90 | 0.0 | 2.20 | 10.2 |
| 1345 | 6.92 | 0.90 | 0.0 | 2.04 | 10.2 |
| 1350 | 6.91 | 0.90 | 0.0 | 2.02 | 10.2 |

CONTINUED ON NEXT PAGE



9/12/14 32504-25

SAMPLE OF CRA-RA-23D (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1355 | 6.91 | 0.90 | 0.0 | 1.92 | 10.2 |
| 1400 | 6.90 | 0.90 | 0.0 | 1.93 | 10.2 |
| 1405 | 6.90 | 0.90 | 0.0 | 1.92 | 10.2 |

SAMPLED @ 1406 ID: GW-32504-091214-SR-1838

SAMPLES PACKED IN COOLER WITH ICE FOR DROP OFF AT TEST AMERICA, BRIGHTON, NY

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

January 8, 2015

Reference No. 032504-15

Mr. Howard Caine
United States Environmental Protection Agency
Region V (SR-6J)
77 W. Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. Caine:

Re: Progress Report No. 129
Groundwater and Landfill RD/RA
Reporting Period: October 1 through December 31, 2014
Rasmussen Landfill (Site), Livingston Co., Michigan

## 1.0 Introduction

This Progress Report is submitted in accordance with Paragraph 26 of the Consent Decree, Civil Action No. 92 40071. This report summarizes the activities performed during the reporting period and describes the activities to continue or which are scheduled to start during the next reporting period.

## 2.0 Activities Performed During this Reporting Period

### 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on December 4, 2014. The corresponding groundwater contour map is provided on Figure 1.

CRA collected quarterly groundwater samples on December 9 through 12, December 15 and 16, 2014 consistent with the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

### 2.2 Reports

Quarterly Progress Report No. 128 was submitted to USEPA and Michigan Department of Environmental Quality (MDEQ) on October 10, 2014.

## 3.0 Summary of Findings

The results of the fourth quarter 2014 sampling are provided in Tables 1 through 5. Figure 2 is a Site location map showing the wells included in the quarterly Groundwater Remediation Monitoring Program and the annual Landfill Monitoring Program.

During the fourth quarter 2014 sampling, five of the 21 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above generic Part 201 Drinking Water Criteria (DWC).

Specifically, the five monitoring wells with COCs exceeding DWC are:

| | |
|---|---|
| CRA-RA-22 | 4.0 µg/L vinyl chloride |
| CRA-RA-24 | 5.3 µg/L vinyl chloride |
| CRA-RA-26S | 86/85 µg/L trichloroethene (duplicate sample) |
| CRA-RA-27 | 11 µg/L vinyl chloride |
| CRA-RA-30 | 3.3 µg/L vinyl chloride |

These were the same five monitoring wells that had COCs above Part 201 DWC during the third quarter 2014 sampling event. COC concentrations detected in these wells during fourth quarter 2014 sampling were similar to COC concentrations detected in these wells during third quarter 2014 sampling.

CRA did not collect the annual Rasmussen residential water well sample in the fourth quarter 2014 because the plumbing system is disconnected pending a repair. CRA will attempt to collect the annual Rasmussen residential water well sample during Q1 2015, pending repair of the plumbing system.

## 4.0 Problems Encountered

Other than several weather-related power interruptions, no problems were encountered with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2014.

## 5.0 Corrective Measures to Rectify Problems

CRA visited the Site and re-started the treatment system after each power outage. No corrective measures were implemented with respect to the operation and maintenance of the ozone treatment system during the fourth quarter 2014.

## 6.0 Contacts and Significant Correspondence with Public Representatives

| *Communication* | *Date* | *Subject of Correspondence/Discussion* |
|---|---|---|
| Quarterly Report | October 10, 2014 | Report No. 128 submitted to Mr. H. Caine (USEPA) and Mr. K. Krawczyk (MDEQ). |
| email | November 17, 2014 | Inquiry from Mr. Howard Caine regarding the application for permit for to work in the right of way |
| email | December 8, 2014 | Inquiry from Mr. Howard Caine regarding the application for permit for to work in the right of way |

## 7.0 Planned Upcoming Activities/Schedule

Landfill and groundwater component activities planned for the first quarter of 2015:

- Continue the operation of ozone sparging system
- Continue to monitor for the presence of ozone at each sparge vault
- The first quarter groundwater sampling event is scheduled for the week of March 2, 2015

- The wells to be sampled in the first quarter of 2015 are listed in Table 5
- Apply to the Livingston County Road Commission for access to install vertical aquifer sampling (VAS) boreholes and monitoring wells in the Spicer Road right of way

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Bart Bartholomy

AJD/ac/38
Encl.

cc: Mike Stoelton, JCI
Chuck Pinter, Ford
Nan Bernado, BASF
Michael Simpson
Steven Nadeau, Honigman Miller

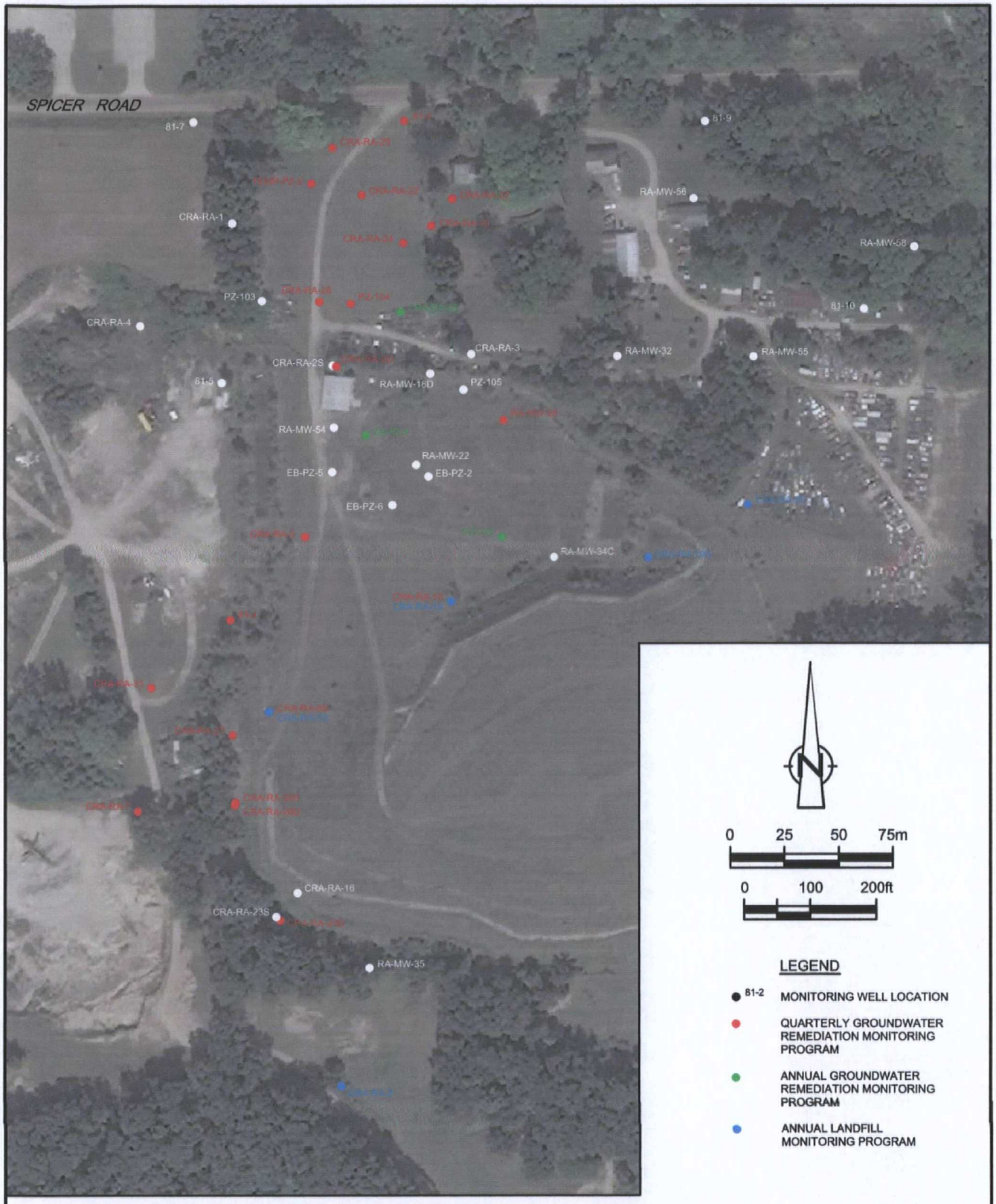



figure 1

2014 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN038)GN-WA001 DEC 23/2014

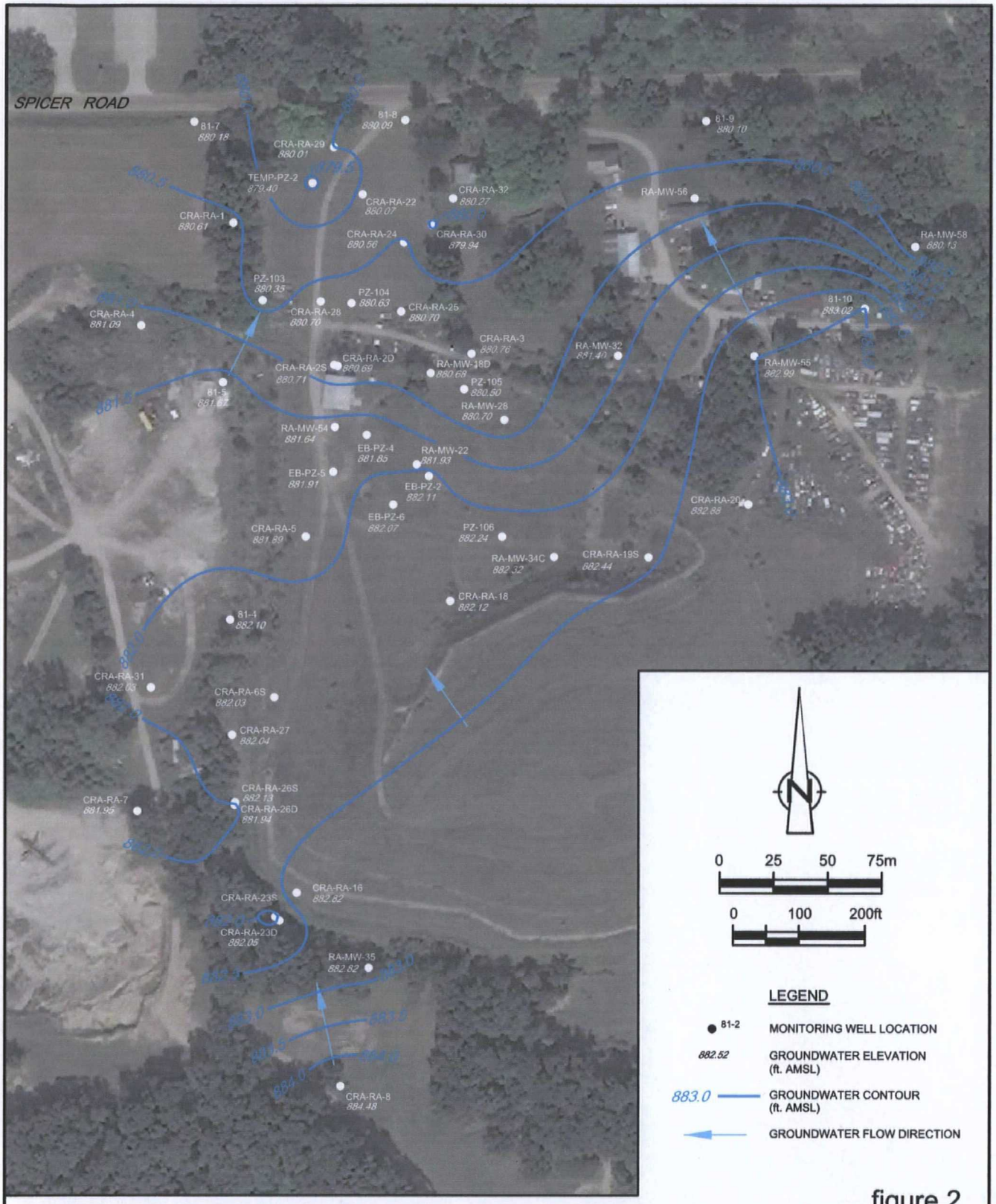



figure 2

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
DECEMBER 2014
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN038)GN-WA002 DEC 23/2014

TABLE 5

ANALYTICAL RESULTS - NORTHERN PLUMES
RAMBLEWEED LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 16,000 | 1,000 | 700 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 300 |
| ERA-RA-22 | GW-SR-1766 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 7.0 | ND(1.0) |
| ERA-RA-22 | GW-SR-1788 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | 4.2 | ND(1.0) |
| ERA-RA-22 | GW-SR-1818 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.6 | ND(1.0) |
| ERA-RA-22 | GW-SR-1845 | 12/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 1.6 µg/L | |
| ERA-RA-24 | GW-SR-1769 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.2 | ND(1.0) |
| ERA-RA-24 | GW-SR-1790 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.4) | ND(1.0) | ND(1.0) | 5.2 | ND(1.0) |
| ERA-RA-24 | GW-SR-1815 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 6.0 | ND(1.0) |
| ERA-RA-24 | GW-SR-1848 | 12/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.3 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.7 µg/L | |
| ERA-RA-25 | GW-SR-1645 | 9/13/2012 | | ND(1.0) | 1.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-25 | GW-SR-1716 | 7/25/2013 | | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| ERA-RA-25 | GW-SR-1717 | 7/25/2013 | Duplicate | ND(1) | 1.0 | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| ERA-RA-25 | GW-SR-1836 | 9/2/2014 | | ND(1.0) | 1.1 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.1 | ND(1.0) |
| | | | Change | | Up 0.1 µg/L | | | | | | | | | | Up 0.1 µg/L | |
| ERA-RA-28 | GW-SR-1767 | 4/8/2014 | | ND(1.0) | 1.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-28 | GW-SR-1789 | 6/10/2014 | | ND(1.0) | 1.9 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-28 | GW-SR-1813 | 8/18/2014 | | ND(1.0) | 2.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-28 | GW-SR-1841 | 11/8/2014 | | ND(1.0) | 2.3 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Down 0.3 µg/L | | | | | | | | | | | |
| ERA-RA-29 | GW-SR-1772 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-29 | GW-SR-1789 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-29 | GW-SR-1820 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-29 | GW-SR-1849 | 12/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| ERA-RA-30 | GW-SR-1770 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.9 | ND(1.0) |
| ERA-RA-30 | GW-SR-1791 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.1 | ND(1.0) |
| ERA-RA-30 | GW-SR-1815 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.6 | ND(1.0) |
| ERA-RA-30 | GW-SR-1844 | 12/10/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Down 0.3 µg/L | |
| ERA-RA-32 | GW-SR-1771 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-32 | GW-SR-1792 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-32 | GW-SR-1817 | 8/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| ERA-RA-32 | GW-SR-1846 | 12/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| PE-104 | GW-SR-1768 | 4/8/2014 | | ND(1.0) | 3.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PE-104 | GW-SR-1789 | 6/10/2014 | | ND(1.0) | 3.6 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PE-104 | GW-SR-1814 | 8/18/2014 | | ND(1.0) | 3.8 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PE-104 | GW-SR-1842 | 12/10/2014 | | ND(1.0) | 3.2 | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | Down 0.6 | | | | | | | | | | | |
| TEMP-PZ-2 | GW-SR-1765 | 3/13/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1794 | 6/11/2014 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1795 | 6/11/2014 | Duplicate | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1) | ND(1) |
| TEMP-PZ-2 | GW-SR-1819 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| TEMP-PZ-2 | GW-SR-1847 | 12/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| EI-6 | GW-SR-1773 | 4/8/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| EI-6 | GW-SR-1797 | 6/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| EI-6 | GW-SR-1821 | 8/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| EI-6 | GW-SR-1822 | 8/19/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(2.1) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| EI-6 | GW-SR-1848 | 12/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria

(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 2

ANALYTICAL RESULTS - FOSLD AREA PLUMES
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| | | | DWC (1) | 200 | 70 (2) | 19,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 700 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-1764 | 3/12/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 60 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1787 | 6/10/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 57 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1812 | 8/18/2014 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 67 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) |
| CRA-RA-2D | GW-SR-1839 | 12/9/2014 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | 58 | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| | | | Change | | | | | | | Down 9 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-1777 | 4/9/2014 | | 79 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-18 | GW-SR-1799 | 6/17/2014 | | 76 | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) |
| CRA-RA-18 | GW-SR-1831 | 9/3/2014 | | 80 | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) |
| CRA-RA-18 | GW-SR-1853 | 12/15/2014 | | 66 | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) |
| | | | Change | Down 14 µg/L | | | | | | | | | | | | |
| EB-PZ-4 | GW-SR-1548 | 8/24/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | 38.7 | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| EB-PZ-4 | GW-SR-1630 | 9/10/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1) | 39 | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.3 | ND(1.0) |
| EB-PZ-4 | GW-SR-1657 | 12/4/2012 | | ND(2.0) | ND(2.0) | ND(20) | ND(20) | ND(20) | ND(2.0) | 39 | ND(2.0) | ND(2.0) | ND(2.0) | ND(2.0) | 4.0 | ND(2.0) |
| EB-PZ-4 | GW-SR-1729 | 8/27/2013 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 41 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | 2.2 | ND(1.4) |
| EB-PZ-4 | GW-SR-1827 | 9/2/2014 | | ND(1.4) | ND(1.4) | ND(14) | ND(14) | ND(14) | ND(1.4) | 43 | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) | ND(1.4) |
| | | | Change | | | | | | | Up 2 µg/L | | | | | Down 0.8 µg/L | |
| PZ-106 | GW-SR-1549 | 8/25/2011 | | ND(1) | ND(1) | ND(10) | ND(10) | ND(10) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) | ND(1) |
| PZ-106 | GW-SR-1640 | 9/12/2012 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1731 | 8/27/2013 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1732 | 8/27/2013 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| PZ-106 | GW-SR-1828 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | Stable; all Non-Detect | | | | | | |
| RA-MW-28 | GW-SR-1778 | 4/9/2014 | | 8.0 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1800 | 6/18/2014 | | 7.7 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1830 | 9/3/2014 | | 11 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| RA-MW-28 | GW-SR-1854 | 12/15/2014 | | 8.7 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Down 2.3 µg/L | | | | | | | | | | | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 3

ANALYTICAL RESULTS - SOUTHERN VINYL CHLORIDE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| Sample Location | Sample ID | Date Sampled | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Units DWC(1) | µg/L 200 | µg/L 70 (2) | µg/L 13,000 | µg/L 1,860 | µg/L 730 | µg/L 5 | µg/L 100 | µg/L 74 | µg/L 5 | µg/L 790 | µg/L 5 | µg/L 2 | µg/L 280 |
| CRA-RA-5 | GW-SR-1779 | 4/10/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1798 | 6/12/2014 | | 21 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1823 | 8/19/2014 | | 15 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-5 | GW-SR-1840 | 12/9/2014 | | 19 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Up 4 µg/L | | | | | | | | | | | | |
| CRA-RA-6S | GW-SR-1780 | 4/10/2014 | | 1.4 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1803 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1804 | 6/20/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1832 | 9/11/2014 | | 1.5 | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-6S | GW-SR-1855 | 12/15/2014 | | 1.7 | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | Up 0.2 µg/L | | | | | | | | | | | | |
| CRA-RA-7 | GW-SR-1776 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1806 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1825 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1851 | 12/15/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-7 | GW-SR-1852 | 12/15/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-27 | GW-SR-1781 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 10 | ND(1.0) |
| CRA-RA-27 | GW-SR-1802 | 6/18/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 12 | ND(1.0) |
| CRA-RA-27 | GW-SR-1833 | 9/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| CRA-RA-27 | GW-SR-1834 | 9/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 8.9 | ND(1.0) |
| CRA-RA-27 | GW-SR-1856 | 12/16/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 11 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 2.1 µg/L | |
| CRA-RA-31 | GW-SR-1774 | 4/9/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1775 | 4/9/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1805 | 6/20/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1824 | 9/2/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.6) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-31 | GW-SR-1850 | 12/15/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| 81-4 | GW-SR-1785 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.0 | ND(1.0) |
| 81-4 | GW-SR-1811 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2.1 | ND(1.0) |
| 81-4 | GW-SR-1837 | 9/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 1.6 | ND(1.0) |
| 81-4 | GW-SR-1860 | 12/16/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 2 | ND(1.0) |
| | | | Change | | | | | | | | | | | | Up 0.4 µg/L | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria.
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethene isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

TABLE 4

ANALYTICAL RESULTS - SOUTHERN TCE PLUME
RASMUSSEN LANDFILL SITE
LIVINGSTON COUNTY, MICHIGAN

| | | | | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Parameter | 1,1,1-TRICHLOROETHANE | 1,2-DICHLOROETHENE (TOTAL) | 2-BUTANONE | 4-METHYL-2-PENTANONE | ACETONE | BENZENE | CHLOROBENZENE | ETHYLBENZENE | METHYLENE CHLORIDE | TOLUENE | TRICHLOROETHENE | VINYL CHLORIDE | XYLENES (TOTAL) |
| | | | Units | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Sample Location | Sample ID | Date Sampled | DWC (1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-23D | GW-SR-1786 | 4/14/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.9 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1810 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 5.1 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1838 | 9/12/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 4.0 | ND(1.0) | ND(1.0) |
| CRA-RA-23D | GW-SR-1861 | 12/16/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | 3.4 | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | | | | | | Down 0.6 µg/L | | |
| CRA-RA-26D | GW-SR-1783 | 4/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1784 | 4/11/2014 | Duplicate | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1809 | 6/19/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1836 | 9/11/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| CRA-RA-26D | GW-SR-1859 | 12/16/2014 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) | ND(1.0) |
| | | | Change | | | | | | Stable; all Non-Detect | | | | | | | |
| CRA-RA-26S | GW-SR-1782 | 4/11/2014 | | ND(4.0) | ND(4.0) | ND(40) | ND(40) | ND(40) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | ND(4.0) | 100 | ND(4.0) | ND(4.0) |
| CRA-RA-26S | GW-SR-1808 | 6/19/2014 | | ND(2.9) | ND(2.9) | ND(29) | ND(29) | ND(29) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | ND(2.9) | 98 | ND(2.9) | ND(4.0) |
| CRA-RA-26S | GW-SR-1835 | 9/11/2014 | | ND(3.3) | ND(3.3) | ND(33) | ND(33) | ND(33) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | ND(3.3) | 99 | ND(3.3) | ND(3.3) |
| CRA-RA-26S | GW-SR-1857 | 12/16/2014 | | ND(2.5) | ND(2.5) | ND(25) | ND(25) | ND(25) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | ND(2.5) | 86 | ND(2.5) | ND(2.5) |
| CRA-RA-26S | GW-SR-1858 | 12/16/2014 | Duplicate | ND(5) | ND(5) | ND(50) | ND(50) | ND(50) | ND(5) | ND(5) | ND(5) | ND(5) | ND(5) | 85 | ND(5) | ND(5) |
| | | | Change | | | | | | | | | | | Down 1 µg/L | | |

Notes:

(1) Michigan Part 201 Drinking Water Criteria
(2) The criterion provided is for the isomer cis-1,2-dichloroethene, the lower of the two criteria for 1,2-dichloroethane isomers. The criterion for trans 1,2-dichloroethene is 100 µg/L.

**TABLE 5**

**2015 GROUNDWATER SAMPLING PROGRAM**
**RASMUSSEN LANDFILL SITE**
**LIVINGSTON COUNTY, MICHIGAN**

| *Quarterly Sampling - VOCs* | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|
| 81-4 SP-VC | | | | |
| 81-8 NP | | | | |
| CRA-RA-2D PDSLD | | | | |
| CRA-RA-5 SP-VC | | | | |
| CRA-RA-6S SP-VC | | | | |
| CRA-RA-7 SP-VC | | | | |
| CRA-RA-18 PDSLD/SP-VC | | | | |
| CRA-RA-22 NP | | | | |
| CRA-RA-23D SP-TCE | | | | |
| CRA-RA-24 NP | | | | |
| CRA-RA-26D SP-TCE | | | | |
| CRA-RA-26S SP-TCE | | | | |
| CRA-RA-27 SP-VC | | | | |
| CRA-RA-28 NP | | | | |
| CRA-RA-29 NP | | | | |
| CRA-RA-30 NP | | | | |
| CRA-RA-31 SP-VC | | | | |
| CRA-RA-32 NP | | | | |
| PZ-104 NP | | | | |
| RA-MW-28 PDSLD | | | | |
| TEMP-PZ-2 NP | | | | |
| | | *Annual Landfill Monitoring Program - VOCs, SVOCs & Metals* | CRA-RA-25 (VOCs only) NP | New Rasmussen Water Supply Well (VOCs only) |
| | | CRA-RA-6S (included in quarterly sampling) LF | EB-PZ-4 (VOCs only) PDSLD | |
| | | CRA-RA-8 LF | PZ-106 (VOCs only) PDSLD | |
| | | CRA-RA-18 (included in quarterly sampling) LF | RA-MW-47 (VOCs only) Lost 4/01/08 | |
| | | CRA-RA-19S LF | | |
| | | CRA-RA-20 LF | | |

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | Oct. 3, 2014 | Oct. 8, 2014 | Oct. 17, 2014 | Oct. 22, 2014 | Oct. 28, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | S. Rapai | S. Rapai | S. Rapai | S. Rapai | S. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | 93958.4 | 94078 | 94294 | 94415 | 94560 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 57 | 55 | 56 | 56 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | 93958 | ~~GREEN~~ 94078.2 | 94293.8 | 94414.8 | 94560.2 |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 8 | 7 | 7 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 32 | 22 | 33 | 37 | 35 |
| Regulator #2 psi | 32 | 35 | 22 | 24 | 23 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 3 | 2 | 1 | 3 | 3 |
| Zone Time hours | 2 | 1/2 | 1/2 | 2 | 2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | WED. NOV. 5, 2014 | NOV. 13, 2014 | NOV. 21, 2014 | NOV. 25, 2014 | DEC. 4, 2014 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A. Rapai | A. Rapai | A. Rapai | A. Rapai | A. Rapai |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Temperature F | | | | | |
| Run Time hours | | 94943 | 95136 | 95206 | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 52 | 54 | 54 | 54 |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | | 94942.8 | 95135.6 | 95206.2 | |

| Air Dryer | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | GREEN |

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 7 | 8 | 8 | 8 | 8 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | 36 | 32 | 35 | 34 |
| Regulator #2 psi | 22 | 22 | 22 | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 2 | 3 | 1 | 1 |
| Zone Time hours | 1/2 | 1/2 | 2 | 1/2 | 1/2 |

| Distribution Panel | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:** BREIF POWER OUTAGE ON NOV. 24 DUE TO VERY STRONG WINDS

# Rasmussen 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | Dec. 12, 2014 | Dec 16, 2014 | Dec 22, 2014 | Dec 31, 2014 | |
| **OPERATOR SIGNATURE** | A Rapai | A Rapai | A Rapai | A Rapai | |

| **Air Compressor** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 110 | 110 | |
| Temperature F | | | | | |
| Run Time hours | 95619 | | | 96071 | |

| **Air Sep** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 56 | 54 | 56 | 54 | |
| Feed Air Pressure psi | 110 | 110 | 110 | 110 | |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | |
| Run Time hours | 95619.0 | | | 96070.6 | |

| **Air Dryer** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Temp. Indicator - color | GREEN | GREEN | GREEN | GREEN | |

| **Ozone Generator** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | 8 | 8 | 8 | |
| % O3 capacity | 45 | 45 | 45 | 45 | |
| Regulator #1 psi | 36 | 35 | 34 | 35 | |
| Regulator #2 psi | 23 | 22 | 22 | 22 | |
| Alarm Reading ppm, O3 | – | – | – | – | |
| Zone On | 3 | 2 | 1 | 1 | |
| Zone Time hours | 2 | 1/2 | 1/2 | 1/2 | |

| **Distribution Panel** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| CFM | 0.8 | 0.8 | 0.8 | 0.8 | |
| O3 Feed Conc. Ppm O3 | | | | | |

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

| DATE: | Oct. 17 & 22 | | DATE: | Nov. 13 & 21 | | DATE: | Dec. 11, 12, 15 & 16 | |
|---|---|---|---|---|---|---|---|---|
| WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL | WELL ID | CFM @ DIST. PANEL | PSI @ WELL |
| SW-1 | 0.8 | 8 | SW-1 | 0.8 | 8 | SW-1 | 0.8 | 8 |
| SW-2 | 0.8 | 8 | SW-2 | 0.8 | 7 | SW-2 | 0.8 | 8 |
| SW-3 | 0.8 | 14 | SW-3 | 0.7 | 14 | SW-3 | 0.7 | 14 |
| SW-4 | 0.8 | 14 | SW-4 | 0.8 | 15 | SW-4 | 0.8 | 13 |
| SW-5 | 0.8 | 14 | SW-5 | 0.8 | 15 | SW-5 | 0.7 | 13 |
| SW-6 | 0.8 | 15 | SW-6 | 0.7 | 15 | SW-6 | 0.8 | 14 |
| SW-7 | 0.8 | 14 | SW-7 | 0.7 | 14 | SW-7 | 0.8 | 15 |
| SW-8 | — | — | SW-8 | — | — | SW-8 | — | — |
| SW-9 | — | — | SW-9 | — | — | SW-9 | — | — |
| SW-10 | — | — | SW-10 | — | — | SW-10 | — | — |
| SW-11 | — | — | SW-11 | — | — | SW-11 | — | — |
| SW-12 | 0.8 | 14 | SW-12 | 0.8 | 14 | SW-12 | 0.8 | 14 |
| SW-13 | 0.7 | 2 | SW-13 | 0.7 | 2 | SW-13 | 0.8 | 2 |
| SW-14 | — | — | SW-14 | — | — | SW-14 | — | — |
| SW-15 | — | — | SW-15 | — | — | SW-15 | — | — |
| SW-16 | — | — | SW-16 | — | — | SW-16 | — | — |
| SW-17 | 0.7 | 16 | SW-17 | 0.8 | 17 | SW-17 | 0.8 | 16 |
| SW-18 | 0.8 | 20 | SW-18 | 0.8 | 20 | SW-18 | 0.7 | 20 |
| SW-19 | 0.7 | 17 | SW-19 | 0.8 | 17 | SW-19 | 0.7 | 16 |
| SW-20 | 0.8 | 16 | SW-20 | 0.8 | 17 | SW-20 | 0.8 | 16 |
| SW-21 | — | — | SW-21 | — | — | SW-21 | — | — |
| SW-22 | 0.8 | 13 | SW-22 | 0.8 | 14 | SW-22 | 0.8 | 13 |
| SW-23 | 0.8 | 15 | SW-23 | 0.8 | 14 | SW-23 | 0.8 | 14 |
| SW-24 | 0.7 | 14 | SW-24 | 0.7 | 14 | SW-24 | 0.8 | 14 |
| SW-25 | 0.7 | 16 | SW-25 | 0.8 | 15 | SW-25 | 0.7 | 15 |
| SW-26 | 0.8 | 3 | SW-26 | 0.8 | 2 | SW-26 | 0.8 | 2 |
| SW-27 | 0.8 | 6 | SW-27 | 0.7 | 7 | SW-27 | 0.8 | 6 |
| SW-28 | 0.8 | 5 | SW-28 | 0.7 | 6 | SW-28 | 0.8 | 6 |
| SW-29 | 0.8 | 6 | SW-29 | 0.7 | 7 | SW-29 | 0.8 | 6 |
| SW-30 | — | — | SW-30 | — | — | SW-30 | — | — |

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** WEDNESDAY, OCT. 8, 2014
**Time:** 2:00 PM

**Weather Conditions:** WINDY, CLEAR, 55°F

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** GRASS IS STILL GREEN, TREES TURNING COLORS

**Signs, Gates, & Fences:** GOOD

**Actions Taken:**

—

**Recommendations:**

—

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** TUESDAY OCT. 28, 2014
**Time:** 3:30 PM

**Weather Conditions:** RAIN 65°F

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:** GOOD

**Vegetation:** GOING DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** THURSDAY, NOVEMBER 13, 2014
**Time:** _____

**Weather Conditions:** MOSTLY CLOUDY, 35°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** EMPTY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

***Landfill Inspection Form***

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** TUESDAY, NOVEMBER 25, 2014
**Time:** 10:00 AM

**Weather Conditions:** WIND, SNOW, 35°

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** TUESDAY, DECEMBER 16, 2014
**Time:** 3:00 PM

**Weather Conditions:** RAIN 48°F

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** WET BUT EMPTY

**Drainage Spillways & Outfalls:** FLOWING

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

**Recommendations:**

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** Steve Rapai

**Date:** DEC. 31, 2014
**Time:** 12:30 PM

**Weather Conditions:** MOSTLY CLOUDY 22°F

**Observations**

**Erosion-North Face:** OK

**Erosion-South Face:** OK

**Erosion-East Face:** OK

**Erosion-West Face:** OK

**Erosion-Misc.:** OK

**Storm Water Ponds:** OK - DRY

**Drainage Spillways & Outfalls:** DRY

**Roadways:** GOOD

**Vegetation:** DORMANT

**Signs, Gates, & Fences:** OK

**Actions Taken:**

—

**Recommendations:**

—

12/4/14 32504-25

TASK: Daily WATERLEVELS
CRA: STEVE RAPAI
WEATHER: Mostly Cloudy, 35°F
H&S: LEVEL D

| WELL ID | LEVEL |
|---|---|
| B1-4 | 29.72 |
| B1-5 | 34.10 |
| B1-7 | 46.13 |
| B1-8 | 43.10 |
| B1-9 | 15.90 |
| B1-10 | 32.29 |
| RA-1 | 68.90 |
| RA-2D | 55.70 |
| RA-2S | 55.44 |
| RA-3 | 52.59 |
| RA-4 | 23.54 |
| RA-5 | 54.60 |
| RA-6 | 59.00 |
| RA-7 | 32.52 |
| RA-8 | 18.41 |
| RA-16 | 58.32 |
| RA-18 | 41.45 |
| RA-18D | 56.14 |
| RA-19D | 50.00 |



32504-25 12/4/14

| WELL ID | LEVEL |
|---|---|
| RA19-S | 47.30 |
| RA-20 | 58.41 |
| RA-22 | 53.01 |
| RA-23D | 33.01 |
| RA-23S | 35.28 |
| RA-24 | 56.48 |
| RA-25 | 53.91 |
| RA-26D | 49.75 |
| RA-26S | 49.64 |
| RA-27 | 61.15 |
| RA-28 | 54.11 |
| RA-29 | 45.79 |
| RA-30 | 58.15 |
| RA-31 | 31.65 |
| RA-32 | 57.08 |
| MW-22 | 42.01 |
| MW-28 | 42.22 |
| MW-32 | 34.75 |
| MW-34C | 41.48 |
| MW-35 | 24.10 |
| MW-41 | 47.32 |
| MW-42 | 63.36 |
| MW-47 | 53.49 |
| MW-54 | 55.66 |

12/4/14 32504-25

| Well ID. | Level |
|---|---|
| MW-55 | 36.66 |
| MW-56 | 35.69 |
| MW-58 | 21.25 |
| EB-PZ-2 | 40.00 |
| EB-PZ-4 | 53.15 |
| EB-PZ-5 | 54.88 |
| EB-PZ-6 | 54.62 |
| PZ-103 | 56.92 |
| PZ-104 | 54.97 |
| PZ-105 | 51.54 |
| PZ-106 | 39.04 |
| TEMP-PZ-2 | 53.03 |



32504-25 12/04/14

TAIR: BEGIN MONTHLY SAMPLE EVENT

CRA: STEVE RAPP

WEATHER: CLOUDY 38°F

H2S: LEVEL D

CALIBRATION OF RENTAL HORIBA U52-

TB: B212933

pH=4.00, COND.=4.49, TURB=0.0, D.O.=7.77

SAMPLE OF CRA-RA-20

| Time | pH | Cond. | Turb. | D.O. | Temp. |
|---|---|---|---|---|---|
| 1310 | 6.48 | 1.38 | 4.9 | 0.12 | 11.67 |
| 1320 | 6.63 | 1.30 | 5.9 | 0.21 | 11.45 |
| 1330 | 6.72 | 1.31 | 2.9 | 0.10 | 11.25 |
| 1335 | 6.75 | 1.65 | 2.6 | 0.10 | 11.25 |
| 1340 | 6.79 | 1.65 | 4.1 | 0.11 | 11.16 |
| 1345 | 6.79 | 1.66 | 4.0 | 0.10 | 11.15 |
| 1350 | 6.78 | 1.66 | 4.7 | 0.11 | 11.15 |

SAMPLED AT 1355 BEGIN 32504-20 12-04-14 1359

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 6.73 | 1.23 | 3.3 | 0.18 | 10.79 |
| 1410 | 6.69 | 1.20 | 3.8 | 0.09 | 10.78 |
| 1420 | 6.67 | 1.17 | 4.2 | 0.07 | 10.73 |
| 1425 | 6.67 | 1.17 | 4.2 | 0.08 | 10.72 |

CONTINUED ON NEXT PAGE

12/9/14 32504.25

SAMPLE OF CRA-RA-5 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1430 | 6.67 | 1.17 | 4.2 | 0.12 | 10.71 |
| 1435 | 6.68 | 1.17 | 4.1 | 0.09 | 10.72 |
| 1440 | 6.67 | 1.17 | 4.3 | 0.08 | 10.71 |

SAMPLED @ 1441 ID: GW-32504-120914-SR-1840

SAMPLE OF CRA-RA-2B

| | | | | | |
|---|---|---|---|---|---|
| 1455 | 6.78 | 0.951 | 30.3 | 1.61 | 10.96 |
| 1505 | 6.72 | 0.952 | 11.5 | 0.21 | 10.96 |
| 1515 | 6.72 | 0.950 | 6.1 | 0.15 | 10.98 |
| 1520 | 6.71 | 0.952 | 5.8 | 0.13 | 10.97 |
| CONTROL BOX NOT WORKING | | | | | |
| 1530 | 6.71 | 0.950 | 4.7 | 0.10 | 10.95 |
| 1535 | 6.72 | 0.952 | 4.7 | 0.09 | 10.95 |
| 1540 | 6.72 | 0.952 | 4.7 | 0.09 | 10.95 |

SAMPLED @ 1541 ID: GW-32504-120914-SR-1841

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1555 | 6.96 | 1.13 | 108 | 1.72 | 10.84 |
| 1605 | 6.75 | 1.16 | 122 | 0.34 | 10.83 |
| 1610 | 6.77 | 1.17 | 10.7 | 0.26 | 10.88 |
| 1615 | 6.77 | 1.17 | 6.4 | 0.18 | 10.88 |

CONTINUED ON NEXT PAGE



32504.25 12/9/14

SAMPLE OF PZ-104 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1620 | 6.75 | 1.17 | 5.2 | 0.11 | 10.84 |
| 1625 | 6.76 | 1.17 | 4.8 | 0.09 | 10.84 |
| 1630 | 6.74 | 1.17 | 4.6 | 0.09 | 10.84 |
| 1635 | 6.74 | 1.17 | 4.7 | 0.09 | 10.84 |
| 1640 | 6.74 | 1.17 | 4.6 | 0.10 | 10.85 |

SAMPLED @ 1641 ID: GW-32504-120914-SR-1842

SAMPLES PACKED IN COOLER WITH ICE

12/10/14 32504-25

TASK: CONTINUE 1/4-Y SAMPLE EVENT

CRA: STEVE RAPAI

WEATHER: CLOUDY, WINDY 30°F

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA U-52

I.E. B212938

pH=4.00, COND=4.49, TURB=0.0, DO=8.83

SAMPLE OF CRA-RA-24

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1330 | 6.72 | 0.931 | 6.4 | 2.14 | 10.97 |
| 1350 | 6.77 | 0.925 | 1.3 | 0.51 | 11.11 |
| 1355 | 6.82 | 0.926 | 0.3 | 0.31 | 11.08 |
| 1400 | 6.84 | 0.925 | 0.5 | 0.21 | 11.04 |
| 1405 | 6.85 | 0.925 | 2.4 | 0.17 | 11.00 |
| 1410 | 6.84 | 0.925 | 2.1 | 0.15 | 11.01 |
| 1420 | 6.85 | 0.925 | 2.0 | 0.15 | 11.01 |

SAMPLED @ 1421 ID: GW-32504-121014-SR-1843

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1430 | 6.74 | 0.849 | 7.4 | 1.26 | 10.80 |
| 1440 | 6.88 | 0.858 | 5.1 | 0.64 | 10.85 |
| 1450 | 6.87 | 0.860 | 4.7 | 0.29 | 10.78 |
| 1455 | 6.88 | 0.860 | 4.4 | 0.26 | 10.77 |

CONTINUED ON NEXT PAGE



32504-25 12/10/14

SAMPLE OF CRA-RA-30 (CONTINUED)

| TIME | pH | COND. | TURB. | DO | TEMP. |
|---|---|---|---|---|---|
| 1500 | 6.88 | 0.861 | 4.3 | 0.25 | 10.78 |
| 1505 | 6.88 | 0.861 | 4.4 | 0.25 | 10.78 |

SAMPLED @ 1506 ID: GW-32504-121014-SR-1844

SAMPLE OF CRA-RA-32

| | | | | | |
|---|---|---|---|---|---|
| 1515 | 6.90 | 0.778 | 4.7 | 2.72 | 10.53 |
| 1525 | 6.90 | 0.779 | 4.5 | 0.53 | 10.56 |
| 1535 | 6.90 | 0.779 | 4.7 | 0.26 | 10.54 |
| 1540 | 6.90 | 0.779 | 4.6 | 0.25 | 10.54 |
| 1545 | 6.90 | 0.779 | 4.6 | 0.25 | 10.54 |

SAMPLED @ 1546 ID: GW-32504-121014-SR-1845

SAMPLES PACKED IN COOLER WITH ICE

12/11/14 32504-25

TASK: CONTINUE 1/4 QT. SAMPLING

CRA: STEVE RAPA

WEATHER: MOSTLY CLOUDY, WIND, HIGH 38°

H&S: LEVEL D

CALIBRATION OF RENTAL USED HORIBA

IE B21293B

pH: 4.00, COND = 4.49, TURB = 0.0, D.O. = 7.93

SAMPLE OF CRA-RA-22

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 10:00 | 6.91 | 0.981 | 4.9 | 4.91 | 11.34 |
| 10:20 | 6.86 | 0.981 | 3.7 | 1.27 | 11.16 |
| 10:25 | 6.84 | 0.981 | 3.1 | 0.62 | 11.10 |
| 10:30 | 6.82 | 0.984 | 3.4 | 0.31 | 11.01 |
| 10:35 | 6.82 | 0.978 | 3.0 | 0.49 | 10.99 |
| 10:40 | 6.82 | 0.973 | 3.1 | 0.51 | 10.94 |
| 10:45 | 6.81 | 0.969 | 2.0 | 0.52 | 10.93 |
| 10:50 | 6.82 | 0.966 | 1.4 | 0.55 | 10.91 |
| 10:55 | 6.83 | 0.963 | 2.5 | 0.54 | 10.88 |

PURGED FOR OVER ONE HOUR

SAMPLED @ 1106 ID: GW-32504-121114-SR-1846

SAMPLE OF TEMP-PZ-2

| | | | | | |
|---|---|---|---|---|---|
| 1115 | 6.88 | 1.68 | 6.4 | 2.56 | 10.70 |

CONTINUED ON NEXT PAGE



32504-25 12/11/14

SAMPLE OF TEMP-PZ-2 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1125 | 6.81 | 1.78 | 6.8 | 1.47 | 10.67 |
| 1135 | 6.81 | 1.82 | 4.1 | 1.20 | 10.60 |
| 1140 | 6.81 | 1.85 | 3.9 | 1.18 | 10.58 |
| 1145 | 6.80 | 1.86 | 2.7 | 1.21 | 10.58 |
| 1150 | 6.80 | 1.86 | 3.2 | 1.19 | 10.59 |

SAMPLED @ 1151 ID: GW-32504-121114-SR-1847

CRA-RA-29

SET UP AT WELL AND CONTROL BOX WILL NOT WORK - WILL NOT CYCLE FROM DISCHARGE TO REFILL & BACK. PUT IN CALL TO QED AND ALSO CALLED N.F. OFFICE TO SEE IF I CAN RENT ANOTHER CONTROL BOX.

ALL SAMPLES PACKED IN COOLER WITH ICE FOR DELIVERY TO TEST AMERICA IN BRIGHTON.

12/12/14 32504.25

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAFAI

WEATHER: CLOUDY 38°F

H&S: LEVEL D

CALIBRATION OF RENTAL U-52 HORIBA

TE B21293B

pH=4.00, COND.=4.49, TURB=0.0, D.O.=8.01

NEW CONTROL BOX FROM NE OFFICE

SAMPLE OF CRA-RA-29

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| BEGAN PURGING @ 1300 | | | | | |
| 1345 | 7.04 | 0.708 | 3.8 | 6.82 | 9.62 |
| 1350 | 7.03 | 0.708 | 3.7 | 6.51 | 9.46 |
| 1355 | 7.02 | 0.711 | 4.5 | 6.80 | 9.66 |
| 1400 | 6.98 | 0.709 | 4.4 | 6.35 | 10.06 |
| 1405 | 6.98 | 0.709 | 4.2 | 6.27 | 10.08 |
| 1410 | 6.97 | 0.708 | 4.0 | 6.35 | 10.07 |
| 1415 | 6.97 | 0.709 | 3.8 | 6.36 | 10.07 |

SAMPLED @ 1416 ID: GW-32504-121214-SR-1848

SAMPLE OF 81-B:

| | | | | | |
|---|---|---|---|---|---|
| 1440 | 7.05 | 0.811 | 35.0 | 4.16 | 10.13 |
| 1450 | 7.23 | 0.806 | 28.3 | 6.47 | 8.59 |

WELL HAS GONE DRY AFTER ABOUT 15 MINUTES OF PURGING. CAME BACK 2 HRS LATER TO SAMPLE.

SAMPLED @ 1700 ID: GW-32504-121214-SR-1849

SAMPLES PACKED IN COOLER WITH ICE



32504.25 12/15/14

TASK: CONTINUE 1/4LY SAMPLE EVENT

CRA: STEVE RAFAI

WEATHER: CLOUDY 50°F

H&S: LEVEL D

CALIBRATION OF RENTAL U-52 HORIBA

TE B21293B

pH=4.00, COND. 4.49, TURB=0.0, D.O.=9.32

SAMPLE OF CRA-RA-31

| TIME | pH | COND. | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1245 | 7.41 | 0.543 | 6.1 | 5.62 | 11.21 |
| 1255 | 7.30 | 0.549 | 4.0 | 2.22 | 14.14 |
| 1305 | 7.29 | 0.487 | 3.9 | 0.43 | 15.87 |
| 1310 | 7.27 | 0.451 | 3.3 | 0.39 | 16.14 |
| 1315 | 7.22 | 0.463 | 2.8 | 0.35 | 15.19 |
| 1320 | 7.20 | 0.467 | 2.2 | 0.32 | 14.93 |
| 1325 | 7.19 | 0.473 | 1.0 | 0.29 | 14.42 |
| 1330 | 7.19 | 0.478 | 0.9 | 0.31 | 14.02 |
| 1335 | 7.18 | 0.482 | 0.8 | 0.30 | 13.69 |
| 1340 | 7.18 | 0.483 | 0.9 | 0.29 | 13.67 |
| 1345 | 7.18 | 0.483 | 0.9 | 0.29 | 13.66 |

SAMPLED @ 1346 ID: GW-32504-121514-SR-1850

12/15/14 32504.25

SAMPLE OF CRA-RA-7

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1355 | 7.59 | 0.300 | 5.1 | 6.32 | 10.73 |
| 1405 | 7.56 | 0.301 | 4.4 | 6.01 | 10.68 |
| 1415 | 7.53 | 0.302 | 4.6 | 5.86 | 10.66 |
| 1420 | 7.54 | 0.302 | 4.5 | 5.87 | 10.65 |
| 1425 | 7.54 | 0.303 | 4.2 | 5.87 | 10.65 |
| 1430 | 7.54 | 0.303 | 4.2 | 5.86 | 10.64 |

SAMPLED @ 1431 ID: GW-32504-121514-SR-1851

SAMPLED @ 1440 ID: GW-32504-121514-SR-1852

SAMPLE OF CRA-RA-18

| | | | | | |
|---|---|---|---|---|---|
| 1450 | 6.92 | 1.52 | 5.8 | 9.42 | 10.43 |
| 1500 | 6.78 | 1.51 | 4.3 | 4.43 | 10.33 |
| 1510 | 6.77 | 1.50 | 4.1 | 4.29 | 10.32 |
| 1515 | 6.77 | 1.50 | 4.2 | 4.26 | 10.31 |
| 1520 | 6.77 | 1.50 | 4.2 | 4.25 | 10.31 |
| 1525 | 6.76 | 1.50 | 4.2 | 4.25 | 10.31 |

SAMPLED @ 1526 ID: GW-32504-121514-SR-1853

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1540 | 7.08 | 0.632 | 19.2 | 1.67 | 10.53 |
| 1550 | 7.00 | 0.633 | 10.5 | 1.19 | 10.51 |
| 1600 | 6.97 | 0.632 | 8.4 | 1.32 | 10.51 |

CONTINUED ON NEXT PAGE



32504.25 12/15/14

SAMPLE OF RA-MW-28 (CONTINUED)

| TIME | pH | COND | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1605 | 6.99 | 0.632 | 6.3 | 1.34 | 10.49 |
| 1610 | 6.98 | 0.632 | 4.7 | 1.37 | 10.45 |
| 1615 | 6.97 | 0.633 | 4.5 | 1.40 | 10.45 |
| 1620 | 6.97 | 0.633 | 4.1 | 1.41 | 10.44 |
| 1625 | 6.98 | 0.633 | 3.9 | 1.41 | 10.44 |

SAMPLED @ 1626 ID: GW-32504-121514-SR-1854

SAMPLE OF CRA-RA-63

| | | | | | |
|---|---|---|---|---|---|
| 1640 | 6.81 | 0.993 | 5.0 | 2.96 | 11.21 |
| 1650 | 6.69 | 0.990 | 4.3 | 0.18 | 11.31 |
| 1700 | 6.68 | 0.987 | 4.6 | 0.13 | 11.34 |
| 1705 | 6.69 | 0.987 | 4.6 | 0.11 | 11.29 |
| 1710 | 6.69 | 0.987 | 4.4 | 0.11 | 11.30 |
| 1715 | 6.69 | 0.987 | 4.5 | 0.10 | 11.30 |

SAMPLED @ 1716 ID: GW-32504-121514-SR-1855

SAMPLES PACKED IN COOLER WITH ICE

12/16/14 32504.25

TASK: CONTINUE 1/MIX SAMPLE EVENT

CRA: STEVE RABAI

WEATHER: RAIN 43°

H&S: LEVEL D

CALIBRATION OF RENTAL HORIBA U52

IE B2293B

pH=4.00, COND=4.49, TURB=0.0; D.O.=8.41

SAMPLE OF CRA-RA-27

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0915 | 6.96 | 1.49 | 3.4 | 2.31 | 11.86 |
| 0930 | 6.85 | 1.56 | 3.1 | 1.01 | 11.82 |
| 0940 | 6.81 | 1.56 | 2.6 | 0.16 | 11.71 |
| 0945 | 6.79 | 1.57 | 2.4 | 0.11 | 11.51 |
| 0950 | 6.76 | 1.59 | 0.9 | 0.13 | 11.37 |
| 0955 | 6.76 | 1.59 | 1.7 | 0.11 | 11.37 |
| 1000 | 6.76 | 1.59 | 1.8 | 0.10 | 11.38 |

SAMPLED @ 1001 ID: GW-32504-121614-SR-1856

SAMPLE OF CRA-RA-26S

BEGAN PURGING @ 1015

| | | | | | |
|---|---|---|---|---|---|
| 1035 | 6.71 | 1.24 | 3.9 | 10.38 | 10.60 |
| 1045 | 6.76 | 1.26 | 3.6 | 5.48 | 10.61 |
| 1050 | 6.76 | 1.26 | 3.4 | 5.50 | 10.60 |
| 1055 | 6.76 | 1.26 | 3.5 | 5.51 | 10.61 |

SAMPLED @ 1056 ID: GW-32504-121614-SR-1857



32504.25 12/16/14

SAMPLE OF CRA-RA-26D

BEGAN PURGING WELL @ 1105

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1125 | 6.77 | 1.46 | 7.6 | 1.70 | 10.74 |
| 1130 | 6.76 | 1.45 | 4.7 | 0.26 | 10.76 |
| 1135 | 6.76 | 1.45 | 4.6 | 0.24 | 10.75 |
| 1140 | 6.77 | 1.45 | 4.6 | 0.25 | 10.75 |

SAMPLED @ 1141 ID: GW-32504-121614-SR-1859

MS/MSD

SAMPLE OF B1-4

| | | | | | |
|---|---|---|---|---|---|
| 1215 | 6.32 | 1.47 | 3.6 | 5.64 | 10.74 |
| 1225 | 6.59 | 1.46 | 2.1 | 1.09 | 10.61 |
| 1235 | 6.71 | 1.48 | 1.7 | 0.37 | 10.62 |
| 1240 | 6.74 | 1.48 | 1.9 | 0.52 | 10.63 |
| 1245 | 6.75 | 1.47 | 2.1 | 0.53 | 10.62 |
| 1250 | 6.75 | 1.48 | 1.6 | 0.52 | 10.62 |

SAMPLED @ 1251 ID: GW-32504-121614-SR-1860

SAMPLE OF CRA-RA-23D

| | | | | | |
|---|---|---|---|---|---|
| 1330 | 6.92 | 0.797 | 2.4 | 4.39 | 10.63 |
| 1340 | 6.84 | 0.802 | 1.9 | 0.86 | 10.61 |
| 1350 | 6.79 | 0.804 | 2.6 | 1.00 | 10.54 |
| 1355 | 6.77 | 0.805 | 1.7 | 0.95 | 10.52 |

CONTINUED ON NEXT PAGE

12/16/14 32504-25

SAMPLE OF CRA-ZA-23D (CONTINUED)

| TIME | pH | COND | TURB | D.O. | TEMP |
|---|---|---|---|---|---|
| 1400 | 6.75 | 0.806 | 1.2 | 0.93 | 10.52 |
| 1405 | 6.75 | 0.806 | 1.4 | 0.91 | 10.52 |
| 1410 | 6.76 | 0.806 | 0.9 | 0.92 | 10.52 |

SAMPLED @ 1411 ID: GW-32504-121614-SR-1861

SAMPLES PACKED IN COOLER WITH ICE FOR DROPOFF AT TEST AMERICA, BRIGHTON, NY.