US EPA RECORDS CENTER REGION 5
550692

April 10, 2018

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. 142**
**Groundwater and Landfill RD/RA**
**Reporting Period: January 1 through March 31, 2018**
**Rasmussen Landfill (Site), Livingston Co., Michigan**

# 1. 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. Activities Performed During this Reporting Period

## 2.1 Operation and Maintenance

The quarterly round of groundwater elevations were measured on March 28, 2018. The corresponding groundwater contour map is provided on Figure 1

GHD collected quarterly groundwater samples on March 8, 11, 12, 13, and 14, 2018, for the Groundwater Remediation Monitoring Program. The results from these samples are discussed below.

## 2.2 Reports

Quarterly Progress Report No. 141 was submitted to USEPA and Michigan Department of Environmental Quality (MDEQ) on January 11, 2018.

# 3. Summary of Findings

*First Quarter 2018 Groundwater Quality Monitoring*

The results of the first quarter 2018 sampling are provided in Tables 1 through 4. Figure 2 is a Site location map showing the wells included in the quarterly Groundwater Remediation Monitoring Program.

**GHD**
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REGISTERED COMPANY FOR ISO 9001 ENGINEERING DESIGN

When GHD attempted to collect a sample from monitoring well 81-8, located immediately south of Spicer road, there was insufficient recharge to collect a groundwater sample using the dedicated pump. On March 13, 2018, GHD pumped the well dry. The next day there was sufficient water in the well for GHD to collect a sample. The RSRG is evaluating options to address the situation.

During the first quarter 2018 sampling event, six of the 25 monitoring wells sampled had Compounds of Concern (COCs) at concentrations above Part 201 December 2013 Generic Residential Drinking Water Cleanup Criteria (RDWCC).

Specifically, the six monitoring wells with COCs exceeding RDWCC are:

- CRA-RA-22 3.1 µg/L vinyl chloride
- CRA-RA-24 4.6 µg/L vinyl chloride
- CRA-RA-26S 84 µg/L trichloroethene
- CRA-RA-27 9.4 µg/L vinyl chloride
- CRA-RA-30 4.9/5.1 µg/L vinyl chloride (duplicate sample)
- 81-4 2.2/2.1 µg/L vinyl chloride (duplicate sample)

The concentration of vinyl chloride in groundwater samples collected from CRA-RA-33 decreased from 2 5 µg/L in the fourth quarter 2017 to 1.1 µg/L in the first quarter 2018 sample. The concentration of vinyl chloride in groundwater samples collected from 81-4 increased from 1.4 µg/L in the fourth quarter 2017 to 2.2/2.1 µg/L (duplicate sample) The other five monitoring wells also had COCs above RDWCC during the fourth quarter 2017 sampling event.

## 4. Problems Encountered

As stated in the previous quarterly report, the manufacturer of the system ozone generator, Plasma Technics, requested that it be shipped to them for refurbishment. This maintenance was needed because the air flow through the ozone generator was reduced. Refurbishment included cleaning the unit and performing any needed upgrades.

The system was shut down on Thursday, February 22, 2018. The ozone generator was removed from its mounting inside the cabinet and shipped to Plasma Technics for refurbishment. Plasma Technics was in possession of the unit for just over 2 weeks.

## 5. Corrective Measures to Rectify Problems

Plasma Technics returned the ozone generator on Wednesday, March 14, 2018. GHD reinstalled and restarted the ozone generator that same day and airflow has been restored to original specifications.

## 6. Contacts and Significant Correspondence with Public Representatives

| Communication | Date | Subject of Correspondence/Discussion |
|---|---|---|
| Quarterly Report | January 11, 2018 | Report No. 141 submitted to H. Caine (USEPA) and K. Krawczyk (MDEQ) |

## 7. Planned Upcoming Activities/Schedule

Activities planned for the second quarter of 2018 include:

- Continuing the operation of ozone sparging system
- Continuing to monitor for the presence of ozone at each sparge vault
- The second quarter 2018 groundwater sampling event, which is scheduled for the week of June 4, 2018
- The wells to be sampled in the second quarter of 2018 are listed in Table 5

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

Yours truly,

GHD

For Alan Rapain

Bart Bartholomy

AJD/cb/54

Encl.

cc: Mike Stoelton, JCI
Colleen Liddell, Ford
Karyllan Dodson Mack, BASF
Michael Simpson (e-copy only)
Steven Nadeau, Honigman

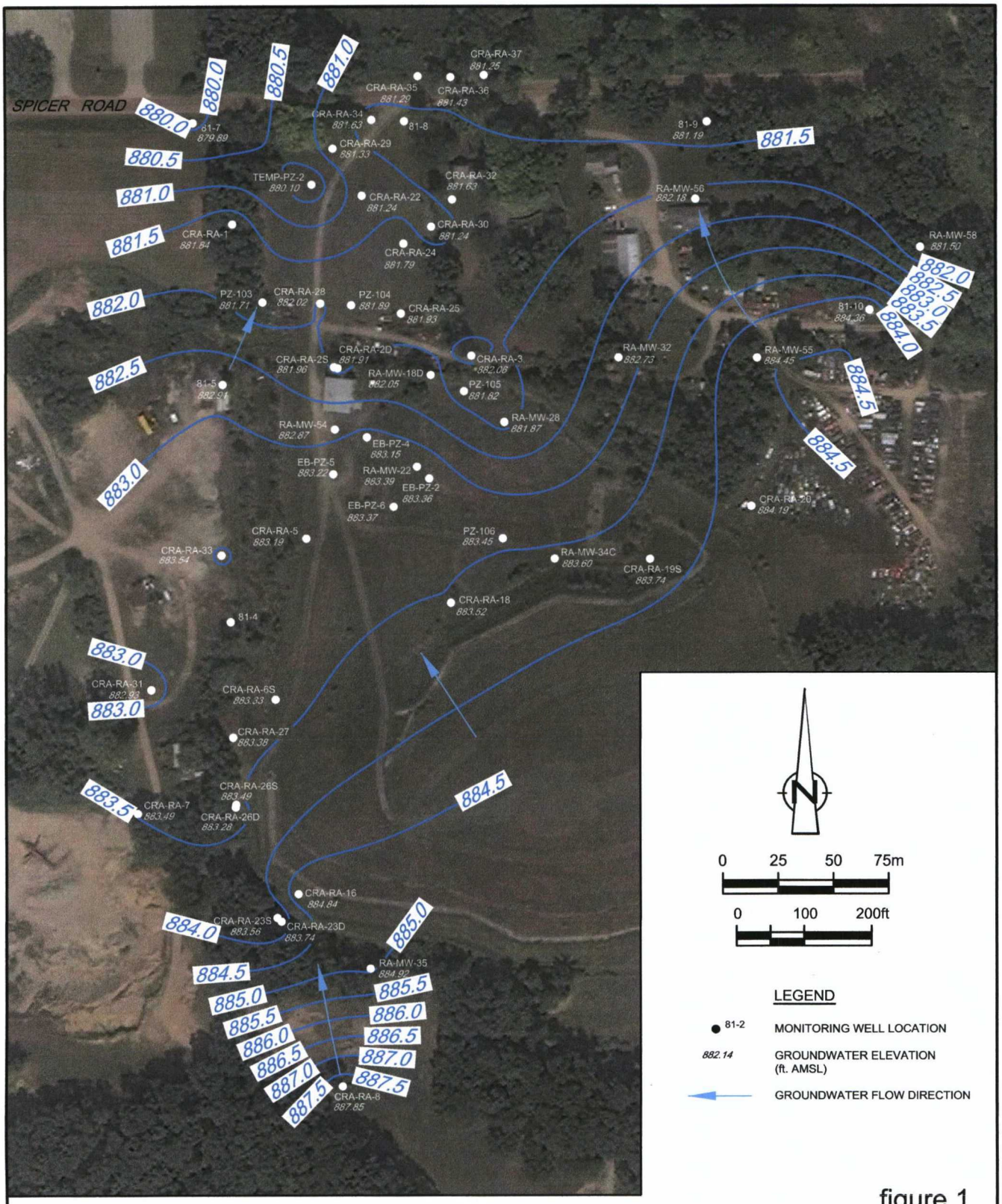


figure 1

GROUNDWATER ELEVATION CONTOURS (UPPER AQUIFER)
MARCH 28, 2018
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN054)GN-WA001 APR 4, 2018

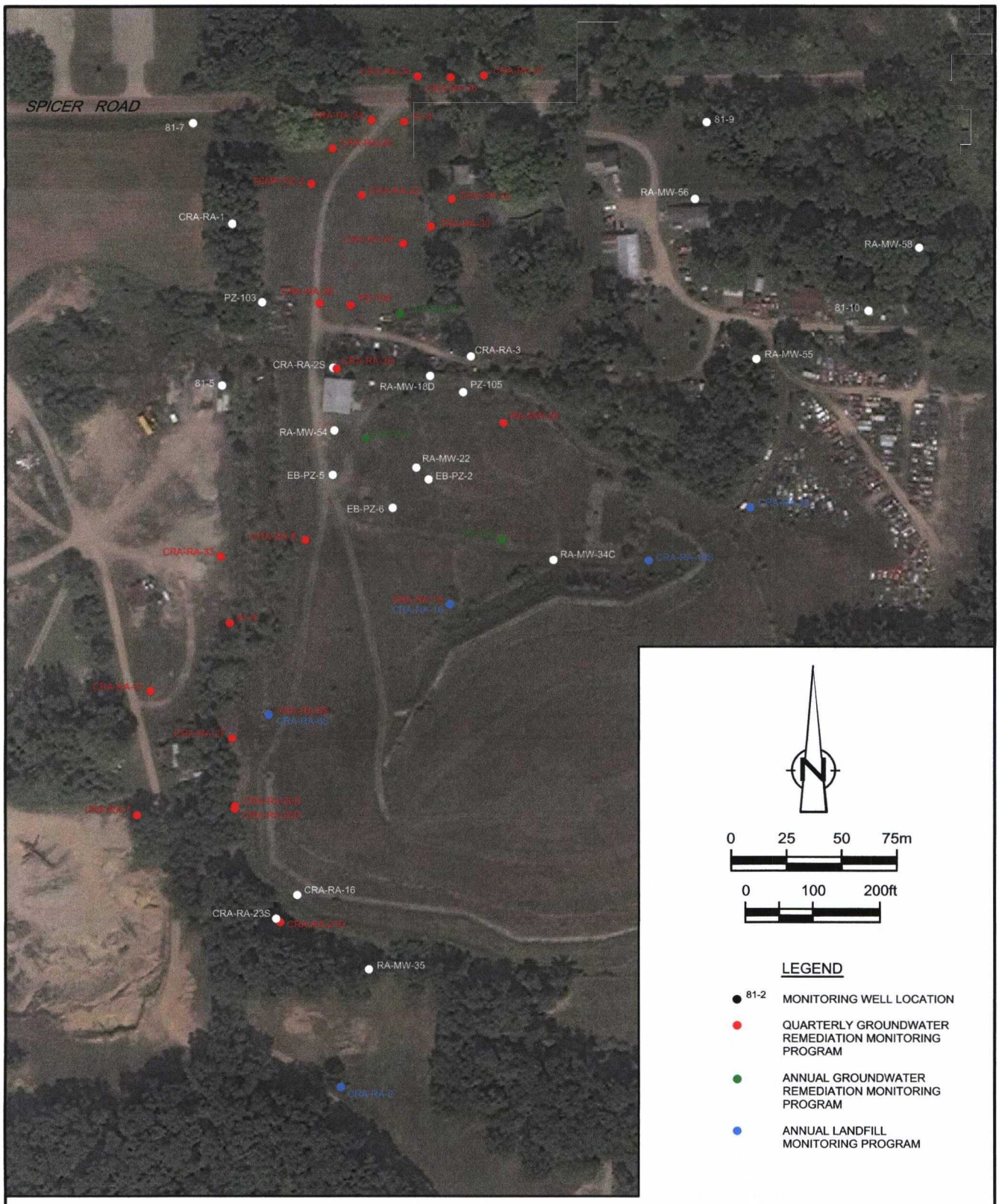


figure 2

2018 GROUNDWATER MONITORING PROGRAMS
RASMUSSEN LANDFILL SITE
*Livingston County, Michigan*

32504-15(CAIN054)GN-WA002 APR 4, 2018

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 |
| | | | RDWCC (1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-22 | GW-SR-2088 | 6/8/2017 | | 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) | 2 6 | ND(1 0) |
| CRA-RA-22 | GW-SR-2113 | 9/7/2017 | | 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 0 | ND(1 0) |
| CRA-RA-22 | GW-SR-2141 | 12/14/2017 | | 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) | 2 5 | ND(1 0) |
| CRA-RA-22 | GW-SR-2168 | 3/13/2018 | | 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) | 3 1 | ND(1 0) |
| | | | *Change* | | | | | | | | | | | | Up 0 6 µg/L | |
| CRA-RA-24 | GW-SR-2085 | 6/7/2017 | | ND(1 0) | ND(1 0) | 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 4 | ND(1 0) |
| CRA-RA-24 | GW-SR-2111 | 9/7/2017 | | 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 5 | ND(1 0) |
| CRA-RA-24 | GW-SR-2138 | 12/12/2017 | | 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 1 | ND(1 0) |
| CRA-RA-24 | GW-SR-2164 | 3/12/2018 | | ND(1 0) | ND(1 0) | 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* | | | | | | | | | | | | Up 0 5 µg/L | |
| CRA-RA-25 | GW-SR-1826 | 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) |
| CRA-RA-25 | GW-SR-1921 | 9/2/2015 | | 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) | ND(1 0) | ND(1 0) |
| CRA-RA-25 | GW-SR-2011 | 9/1/2016 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2110 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-28 | GW-SR-2083 | 6/7/2017 | | ND(1 0) | 2 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-2108 | 9/6/2017 | | 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) |
| CRA-RA-28 | GW-SR-2136 | 12/12/2017 | | 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) |
| CRA-RA-28 | GW-SR-2162 | 3/12/2018 | | ND(1 0) | 2 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* | | Down 0 6 µg/L | | | | | | | | | | | |
| CRA-RA-29 | GW-SR-2090 | 6/8/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2115 | 9/7/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2143 | 12/14/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2170 | 3/13/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2087 | 6/7/2017 | | ND(1 0) | ND(1 0) | 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-2113 | 9/13/2017 | | ND(1 0) | ND(1 0) | 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 4 | ND(1 0) |
| CRA-RA-30 | GW-SR-2139 | 12/12/2017 | | ND(1 0) | ND(1 0) | 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-2165 | 3/12/2018 | | ND(1 0) | ND(1 0) | 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) |
| CRA-RA-30 | GW-SR-2166 | 3/12/2018 | *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 1 | ND(1 0) |
| | | | *Change* | | | | | | | | | | | | Up 1 4 µg/L | |
| CRA-RA-32 | GW-SR-2086 | 6/7/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2112 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2140 | 12/12/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2167 | 3/12/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-34 | GW-BW-001 | 6/9/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-34 | GW-BW-002 | 6/9/2017 | *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-34 | GW-BW-001 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-34 | GW-BW-001 | 12/16/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-34 | GW-BW-01 | 3/8/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-34 | GW-BW-02 | 3/8/2018 | *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-35 | GW-BW-05 | 6/10/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-35 | GW-BW-004 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-35 | GW-BW-005 | 9/6/2017 | *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-35 | GW-BW-005 | 12/16/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-35 | GW-BW-005 | 3/8/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-36 | GW-BW-004 | 6/9/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-36 | GW-BW-003 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-36 | GW-BW-003 | 12/16/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-36 | GW-BW-004 | 12/16/2017 | *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-36 | GW-BW-004 | 3/8/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-37 | GW-BW-003 | 6/9/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-37 | GW-BW-002 | 9/6/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-37 | GW-BW-002 | 12/16/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-37 | GW-BW-003 | 3/8/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2084 | 6/7/2017 | | 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) | 1 0 | ND(1 0) |
| PZ-104 | GW-SR-2109 | 9/6/2017 | | ND(1 0) | 2 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) |
| PZ-104 | GW-SR-2137 | 12/12/2017 | | 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) | 1 1 | ND(1 0) |
| PZ-104 | GW-SR-2163 | 3/12/2018 | | ND(1 0) | 2 0 | 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) |
| | | | *Change* | | Down 0 3 µg/L | | | | | | | | | | Down 0 1 µg/L | |
| TEMP-PZ-2 | GW-SR-2089 | 6/8/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2049 | 11/18/2016 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2142 | 12/14/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2169 | 3/13/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2091 | 6/8/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2116 | 9/7/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2117 | 9/7/2017 | *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) |
| 81-8 | GW-SR-2179 | 3/14/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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) Part 201 December 2013 Generic Residential Drinking Water Cleanup 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 - 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 |
| | | | RDWCC(1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-2D | GW-SR-2082 | 6/7/2017 | | ND(2 5) | ND(2 5) | ND(25) | ND(25) | ND(25) | ND(2 5) | 72 | ND(2 5) | ND(2 5) | ND(2 5) | ND(2 5) | ND(2 5) | ND(2 5) |
| CRA-RA-2D | GW-SR-2107 | 9/6/2017 | | ND(3 3) | ND(3 3) | ND(33) | ND(33) | ND(33) | ND(3 3) | 78 | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) |
| CRA-RA-2D | GW-SR-2135 | 12/12/2017 | | ND(3 3) | ND(3 3) | ND(33) | ND(33) | ND(33) | ND(3 3) | 72 | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) | ND(3 3) |
| CRA-RA-2D | GW-SR-2157 | 3/11/2018 | | ND(2 9) | ND(2 9) | ND(29) | ND(29) | ND(29) | ND(2 9) | 82 | ND(2 9) | ND(2 9) | ND(2 9) | ND(2 9) | ND(2 9) | ND(2 9) |
| | | | *Change* | | | | | | | Up 10 µg/L | | | | | | |
| CRA-RA-18 | GW-SR-2104 | 6/13/2017 | | 61 | 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-2118 | 9/11/2017 | | 49 | ND(2 0) | ND(20) | ND(20) | ND(20) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) |
| CRA-RA-18 | GW-SR-2149 | 12/19/2017 | | 75 | 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-2161 | 3/11/2018 | | 67 | ND(2 0) | ND(20) | ND(20) | ND(20) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) | ND(2 0) |
| | | | *Change* | Down 8 µg/L | | | | | | | | | | | | |
| 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) |
| EB-PZ-4 | GW-SR-1911 | 9/1/2015 | | ND(1 8) | ND(1 8) | ND(10) | ND(10) | ND(10) | ND(1 8) | 46 | ND(1 8) | ND(1 8) | ND(1 8) | ND(1 8) | ND(1 8) | ND(1 8) |
| EB-PZ-4 | GW-SR-2026 | 9/5/2016 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | ND(1 0) | 46 | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) |
| EB-PZ-4 | GW-SR-2122 | 9/12/2017 | | ND(1 7) | ND(1 7) | ND(20) | ND(20) | ND(20) | ND(1 7) | 37 | ND(1 7) | ND(1 7) | ND(1 7) | ND(1 7) | ND(1 7) | ND(1 7) |
| | | | *Change* | | | | | | | Down 9 µg/L | | | | | | |
| 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) |
| PZ-106 | GW-SR-1912 | 9/1/2015 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2023 | 9/4/2016 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2119 | 9/11/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2101 | 6/13/2017 | | 7 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) |
| RA-MW-28 | GW-SR-2121 | 9/12/2017 | | 5 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-2148 | 12/19/2017 | | 8 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) |
| RA-MW-28 | GW-SR-2160 | 3/11/2018 | | 9 8 | ND(1 0) | ND(10) | ND(10) | ND(10) | 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 1 4 µg/L | | | | | | | | | | | | |

Notes

(1) Part 201 December 2013 Generic Residential Drinking Water Cleanup 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 |
| | | | RDWCC(1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-5 | GW-SR-2096 | 6/12/2017 | | 29 | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2123 | 9/12/2017 | | 14 | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2147 | 12/19/2017 | | 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-2158 | 3/11/2018 | | 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*** | Up 1 µg/L | | | | | | | | | | | | |
| CRA-RA-6S | GW-SR-2097 | 6/12/2017 | | 2 1 | ND(1 0) | 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-6S | GW-SR-2126 | 9/12/2017 | | 1 9 | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2150 | 12/19/2017 | | 2 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) |
| CRA-RA-6S | GW-SR-2159 | 3/11/2018 | | 2 9 | ND(1 0) | ND(10) | ND(10) | ND(10) | 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 0.2 µg/L | |
| CRA-RA-7 | GW-SR-2093 | 6/11/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2125 | 9/12/2017 | | ND(1 0) | ND(1.0) | ND(10) | ND(10) | ND(10) | 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-2053 | 12/15/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2172 | 3/13/2018 | | ND(1.0) | ND(1.0) | ND(10) | ND(10) | ND(10) | 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-2098 | 6/12/2017 | | ND(1 0) | 2 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) | 12 | ND(1 0) |
| CRA-RA-27 | GW-SR-2127 | 9/12/2017 | | ND(1 0) | 2 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) | 9 9 | ND(1 0) |
| CRA-RA-27 | GW-SR-2151 | 12/19/2017 | | ND(1.0) | 3 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) | 10 | ND(1 0) |
| CRA-RA-27 | GW-SR-2152 | 12/19/2017 | *Duplicate* | 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) | 9 5 | ND(1 0) |
| CRA-RA-27 | GW-SR-2173 | 3/13/2018 | | ND(1 0) | 3.9 | ND(10) | ND(10) | ND(10) | ND(1 0) | ND(1 0) | ND(1.0) | ND(1 0) | ND(1.0) | ND(1 0) | 9 4 | ND(1 0) |
| | | | ***Change*** | | Up 0 3 µg/L | | | | | | | | | | Down 0.1 µg/L | |
| CRA-RA-31 | GW-SR-2092 | 6/11/2017 | | ND(1.0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2124 | 9/12/2017 | | ND(1.0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2144 | 12/15/2017 | | ND(1 0) | ND(1.0) | ND(10) | ND(10) | ND(10) | 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-2145 | 12/15/2017 | *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-2171 | 3/13/2018 | | ND(1.0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-33 | GW-BW-006 | 6/10/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 1 5 | ND(1.0) | ND(1.0) | ND(1 0) | ND(1 0) | ND(1 0) | 1 3 | ND(1.0) |
| CRA-RA-33 | GW-BW-006 | 9/6/2017 | | ND(1 0) | ND(1.0) | ND(10) | ND(10) | ND(10) | 1 6 | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1.0) | 3.2 | ND(1 0) |
| CRA-RA-33 | GW-BW-006 | 12/16/2017 | | ND(1.0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 1 6 | ND(1 0) | ND(1 0) | ND(1 0) | ND(1.0) | ND(1.0) | 2 5 | ND(1 0) |
| CRA-RA-33 | GW-BW-006 | 3/8/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 1 4 | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | 1.1 | ND(1 0) |
| | | | | | | | | | Down 0.2 µg/L | | | | | | Down 1 4 µg/L | |
| 81-4 | GW-SR-2105 | 6/13/2017 | | ND(1 0) | ND(1 0) | 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 9 | ND(1.0) |
| 81-4 | GW-SR-2132 | 9/13/2017 | | ND(1 0) | ND(1.0) | 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-2156 | 12/20/2017 | | ND(1.0) | ND(1 0) | 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) |
| 81-4 | GW-SR-2176 | 3/14/2018 | | ND(1 0) | ND(1 0) | 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 2 | ND(1.0) |
| 81-4 | GW-SR-2177 | 3/14/2018 | *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 1 | ND(1 0) |
| | | | ***Change*** | | | | | | | | | | | | Down 0.75 µg/L | |

Notes

(1) Part 201 December 2013 Generic Residential Drinking Water Cleanup 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

| Sample Location | Sample ID | Date Sampled | Parameter | Volatile Organics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 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 |
| | | | RDWCC(1) | 200 | 70 (2) | 13,000 | 1,800 | 730 | 5 | 100 | 74 | 5 | 790 | 5 | 2 | 280 |
| CRA-RA-23D | GW-SR-2106 | 6/13/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | 2 1 | ND(1 0) | ND(1 0) |
| CRA-RA-23D | GW-SR-2130 | 9/13/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | 1 5 | ND(1 0) | ND(1 0) |
| CRA-RA-23D | GW-SR-2131 | 9/13/2017 | *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) | 1 6 | ND(1 0) | ND(1 0) |
| CRA-RA-23D | GW-SR-2155 | 12/20/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | 2 | ND(1 0) | ND(1 0) |
| CRA-RA-23D | GW-SR-2178 | 3/14/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | ND(1 0) | 2 7 | ND(1 0) | ND(1 0) |
| | | | ***Change*** | | | | | | | | | | | Up 0 7 µg/L | | |
| CRA-RA-26D | GW-SR-2100 | 6/12/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2129 | 9/12/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2154 | 12/20/2017 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2175 | 3/13/2018 | | ND(1 0) | ND(1 0) | ND(10) | ND(10) | ND(10) | 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-2099 | 6/12/2017 | | ND(5 0) | ND(5 0) | ND(50) | ND(50) | ND(50) | ND(5 0) | ND(5 0) | ND(5 0) | ND(5 0) | ND(5 0) | 98 | ND(5 0) | ND(5 0) |
| CRA-RA-26S | GW-SR-2128 | 9/12/2017 | | 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) | 69 J | ND(3 3) | ND(3 3) |
| CRA-RA-26S | GW-SR-2153 | 12/20/2017 | | 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) | 78 | ND(2 5) | ND(2 5) |
| CRA-RA-26S | GW-SR-2174 | 3/13/2018 | | 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) | 84 | ND(4 0) | ND(4 0) |
| | | | ***Change*** | | | | | | | | | | | Up 6 µg/L | | |

Notes

(1) Part 201 December 2013 Generic Residential Drinking Water Cleanup 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**

**2018 Groundwater Sampling Program**
**Rasmussen Landfill Site**
**Livingston County, Michigan**

| Quarterly Sampling - VOCs | Annual Landfill Monitoring Program - VOCs, SVOCs & Metals | Additional Annual Samples - VOCs |
|---|---|---|
| | *(2nd Quarter)* | *(3rd Quarter)* |
| 81-4 | CRA-RA-6S (included in quarterly sampling) | CRA-RA-25 |
| 81-8 | CRA-RA-8 | EB-PZ-4 |
| CRA-RA-2D | CRA-RA-18 (included in quarterly sampling) | PZ-106 |
| CRA-RA-5 | CRA-RA-19S | RA-MW-47 |
| CRA-RA-6S | CRA-RA-20 | Rasmussen Water Supply Well |
| CRA-RA-7 | | |
| CRA-RA-18 | | |
| CRA-RA-22 | | |
| 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 | | |
| CRA-RA-33 | | |
| CRA-RA-34 | | |
| CRA-RA-35 | | |
| CRA-RA-36 | | |
| CRA-RA-37 | | |
| PZ-104 | | |
| RA-MW-28 | | |
| TEMP-PZ-2 | | |

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | JAN 4, 2018 | JAN 12, 2018 | JAN 17, 2018 | JAN 25, 2018 | JAN 30, 2018 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A Rapai | A Rapai | A Rapai | A Rapai | |

| Air Compressor | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 110 | 110 | 115 | 110 | 110 |
| Temperature F | 180 | 7290 ↑ | 177 | 182 | 181 |
| Run Time hours | | 181 ↓ | 7411 | 7598 | |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 52 | 52 | 52 | 54 | 54 |
| Feed Air Pressure psi | 115 | 115 | 110 | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | 70 | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | 42 | 42 | 42 |
| Run Time hours | | 122398.1 | 122520.1 | 122708.1 | |

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

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 6 | 6 | 7 | 7 | 7 |
| % O3 capacity | 45 | 45 | 45 | 45 | 45 |
| Regulator #1 psi | 35 | 36 | 38 | 35 | 36 |
| Regulator #2 psi | 22 | 20 | 20 | 20 | 22 |
| Alarm Reading ppm, O3 | – | – | – | – | – |
| Zone On | 1 | 2 | 2 | 3 | 1 |
| 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 | | | | | |

**Comments:**

# Rasmussen 32504

## Ozone Sparge System Inspection

| DATE | FEB. 8, 2018 | FEB 16, 2018 | FEB. 22, 2018 | MARCH 14, 2018 | MAR. 23, 2018 |
|---|---|---|---|---|---|
| OPERATOR SIGNATURE | A Rapai | A Rapai | A Rapai | A Rapai | A Rapai |

| Air Compressor | | | SYSTEM SHUT DOWN FOR O3 GENERATOR REFURBISHMENT | | |
|---|---|---|---|---|---|
| Output Pressure psi | 110 | 115 | | 115 | 121 |
| Temperature F | 178 | 183 | | 180 | 183 |
| Run Time hours | 7933 | 8124 | | | 8480 |

| Air Sep | | | | | |
|---|---|---|---|---|---|
| Receiver Pressure psi | 54 | 54 | | 56 | 52 |
| Feed Air Pressure psi | 115 | 110 | | 110 | 110 |
| Cycle Pressure psi | 70 | 70 | | 70 | 70 |
| Holding Tank Pressure psi | 42 | 42 | | 42 | 42 |
| Run Time hours | 123045.0 | 123237.0 | | | 123595.0 |

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

| Ozone Generator | | | | | |
|---|---|---|---|---|---|
| Oxygen Supply, LPM | 6 | 6 | | 8 | 8 |
| % O3 capacity | 70 | 70 | | 40 | 40 |
| Regulator #1 psi | 37 | 35 | | 38 | 35 |
| Regulator #2 psi | 20 | 22 | | 22 | 22 |
| Alarm Reading ppm, O3 | – | – | | – | – |
| Zone On | 2 | 1 | | 2 | 1 |
| 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 32504

## Ozone Sparge System Inspection

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | MAR. 31, 2018 | | | | |
| **OPERATOR SIGNATURE** | A Rapa | | | | |

| **Air Compressor** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Output Pressure psi | 125 | | | | |
| Temperature F | 177 | | | | |
| Run Time hours | 86666 | | | | |

| **Air Sep** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Receiver Pressure psi | 53 | | | | |
| Feed Air Pressure psi | 110 | | | | |
| Cycle Pressure psi | 70 | | | | |
| Holding Tank Pressure psi | 42 | | | | |
| Run Time hours | 123782.2 | | | | |

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

| **Ozone Generator** | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Oxygen Supply, LPM | 8 | | | | |
| % O3 capacity | 40 | | | | |
| Regulator #1 psi | 38 | | | | |
| Regulator #2 psi | 22 | | | | |
| Alarm Reading ppm, O3 | — | | | | |
| Zone On | 3 | | | | |
| Zone Time hours | 2 | | | | |

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

**Comments:**

SPARGE WELL PRESSURE READINGS
RASMUSSEN SITE
CRA PROJECT #32504

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

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** [signature]

**Date:** FRIDAY, JANUARY 12, 2018
**Time:** 4:00 PM

**Weather Conditions:** SNOW, 26°F WITH FALLING TEMPS

**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 - WILL FREEZE SOON

**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:** THURSDAY, JANUARY 25, 2018
**Time:** 10:00AM

**Weather Conditions:** 27° CLOUDY

**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:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** [signature]

**Date:** THURSDAY, FEBRUARY 8, 2018
**Time:** 0930

**Weather Conditions:** 14° CLOUDY, 5"-9" OF SNOW PREDICTED

**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:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

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

**Date:** FEBRUARY 28, 2018
**Time:** 4:00 PM

**Weather Conditions:** RAIN/SNOW MIX 38°

**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

**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:** FRIDAY, MARCH 9, 2018
**Time:** 4:30 PM

**Weather Conditions:** FLURRIES 32°

**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:**
NONE

**Recommendations:**
NONE

# RASMUSSEN LANDFILL SITE
## Livingston County, Michigan

*Landfill Inspection Form*

**Inspector:** STEVE RAPAI **Signature:** [signature]

**Date:** SATURDAY, MARCH 31, 2018
**Time:** 1000 AM

**Weather Conditions:** CLOUDY 42°, WIND ADVISORY

**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:**
NONE

**Recommendations:**
NONE

12/26/2017 32504.25

| | |
|---|---|
| MW-34C | 40.93 |
| MW-35 | 23.27 |
| MW-41 | 46.38 |
| MW-42 | 62.72 |
| MW-47 | 52.95 |
| MW-54 | 55.13 |
| MW-55 | 36.05 |
| MW-56 | 33.08 |
| MW-58 | 20.60 |
| EB-PZ-2 | 39.47 |
| EB-PZ-4 | 52.58 |
| EB-PZ-5 | 54.30 |
| EB-PZ-6 | 54.06 |
| PZ-103 | 56.28 |
| PZ-104 | 54.26 |
| PZ-105 | 50.99 |
| PZ-106 | 38.47 |
| TEMP-PZ-2 | 53.06 |



3/11/18 32504-25

TASK: BEGIN 1/4LY SAMPLE EVENT
GHD: STEVE RAPAI
WEATHER: 33° CLEAR, WIND
H&S: LEVEL D
TAILGATE: WORKING IN SNOW, PRESERVED SAMPLE BOTTLES, LIFTING, MP50 BATTERY CONNECTION.
CALIBRATION OF FLOWCELL NF IN SITU.

SAMPLE OF CRA-RA-2D

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1230 | 7.08 | 1.37 | 2.1 | 0.14 | 11.03 |
| 1250 | 7.09 | 1.42 | 0.0 | 0.10 | 10.92 |
| 1255 | 7.09 | 1.42 | 0.0 | 0.10 | 10.92 |
| 1300 | 7.09 | 1.42 | 0.0 | 0.10 | 10.92 |
| 1305 | 7.09 | 1.41 | 0.0 | 0.10 | 10.93 |

SAMPLED @ 1306 ID: GW-32504-031118-SR-2157

SAMPLE OF CRA-RA-5

| | | | | | |
|---|---|---|---|---|---|
| 1320 | 6.96 | 1.17 | 0.7 | 0.22 | 10.78 |
| 1335 | 6.95 | 1.11 | 0.0 | 0.40 | 10.87 |
| 1340 | 6.95 | 1.11 | 0.0 | 0.45 | 10.91 |
| 1345 | 6.95 | 1.11 | 0.0 | 0.46 | 10.92 |

CONTINUED ON NEXT PAGE

3/11/18 32504-25

SAMPLE OF CRA-RA-5 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1350 | 6.95 | 1.11 | 0.0 | 0.46 | 10.92 |

SAMPLED @ 1351 ID: GW-32504-031118-SR-2158

SAMPLE OF CRA-RA-6S

| | | | | | |
|---|---|---|---|---|---|
| 1405 | 6.81 | 1.00 | 0.0 | 0.48 | 11.57 |
| 1420 | 6.81 | 1.00 | 0.0 | 0.52 | 11.85 |
| 1425 | 6.81 | 1.00 | 0.0 | 0.52 | 11.81 |
| 1430 | 6.82 | 1.00 | 0.0 | 0.52 | 11.78 |
| 1435 | 6.81 | 1.00 | 0.0 | 0.52 | 11.75 |
| 1440 | 6.81 | 1.00 | 0.0 | 0.52 | 11.76 |

SAMPLED @ 1441 ID: GW-32504-031118-SR-2159

SAMPLE OF RA-MW-28

| | | | | | |
|---|---|---|---|---|---|
| 1455 | 7.08 | 0.84 | 10.4 | 2.26 | 11.11 |
| 1515 | 6.98 | 0.83 | 0.0 | 4.10 | 10.70 |
| 1520 | 6.98 | 0.83 | 0.0 | 4.16 | 10.69 |
| 1525 | 6.97 | 0.83 | 0.0 | 4.18 | 10.66 |
| 1530 | 6.97 | 0.82 | 0.0 | 4.19 | 10.65 |
| 1535 | 6.98 | 0.83 | 0.0 | 4.19 | 10.65 |

SAMPLED @ 1536 ID: GW-32504-031118-SR-2160



32504-25 3/11/18

SAMPLE OF CRA-RA-18

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1545 | 6.91 | 1.29 | 0.0 | 6.53 | 10.85 |
| 1600 | 6.91 | 1.30 | 0.0 | 6.62 | 10.92 |
| 1605 | 6.92 | 1.30 | 0.0 | 6.61 | 10.93 |
| 1610 | 6.92 | 1.29 | 0.0 | 6.63 | 10.92 |
| 1615 | 6.91 | 1.30 | 0.0 | 6.61 | 10.92 |
| 1620 | 6.91 | 1.30 | 0.0 | 6.61 | 10.92 |

SAMPLED @ 1621 ID: GW-32504-031118-SR-2161

SAMPLES PACKED IN COOLER WITH ICE.

3/12/18 32504-25

TASK: CONTINUE 1/4LY SAMPLE EVENT

GHD: STEVE RAPAI

WEATHER: SNOW 32°, WIND WSW 4MPH

H&S: LEVEL D

TAILGATE: PRESERVED/GLASS SAMPLE BOTTLES, WORKING IN SNOW, MP 50 WELL CONTROLLER.

CALIBRATION OF FLOW CELL NF

IN SITU

SAMPLE OF CRA-RA-28

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1300 | 7.05 | 0.80 | 47.3 | 0.12 | 11.04 |
| 1315 | 7.04 | 0.82 | 11.1 | 0.09 | 10.97 |
| 1325 | 7.04 | 0.82 | 3.9 | 0.08 | 10.96 |
| 1330 | 7.04 | 0.83 | 2.4 | 0.08 | 10.92 |
| 1335 | 7.04 | 0.83 | 2.1 | 0.08 | 10.94 |
| 1340 | 7.04 | 0.83 | 2.1 | 0.08 | 10.93 |

SAMPLED @ 1341 ID: GW-32504-031218-SR-2162

SAMPLE OF PZ-104

| | | | | | |
|---|---|---|---|---|---|
| 1400 | 7.08 | 1.16 | 7.9 | 0.94 | 10.73 |
| 1415 | 7.09 | 0.66 | 1.9 | 0.83 | 9.95 |
| 1425 | 7.10 | 0.63 | 0.8 | 1.51 | 9.92 |
| 1430 | 7.14 | 0.67 | 0.7 | 2.29 | 9.89 |

CONTINUED ON NEXT PAGE



32504-25 3/12/18

SAMPLE OF PZ-104 (CONTINUED)

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1440 | 7.03 | 1.19 | 0.0 | 1.19 | 10.37 |
| 1445 | 7.04 | 1.20 | 0.0 | 1.25 | 10.29 |
| 1450 | 7.04 | 1.20 | 0.0 | 1.23 | 10.28 |
| 1455 | 7.04 | 1.20 | 0.0 | 1.24 | 10.29 |

SAMPLED @ 1456 ID: GW-32504-031218-SR-2163

SAMPLE OF CRA-RA-24

| | | | | | |
|---|---|---|---|---|---|
| 1505 | 7.01 | 1.04 | 12.1 | 0.37 | 10.86 |
| 1520 | 6.97 | 1.05 | 0.0 | 0.12 | 11.00 |
| 1525 | 6.97 | 1.04 | 0.0 | 0.11 | 11.01 |
| 1530 | 6.97 | 1.04 | 0.0 | 0.11 | 11.03 |
| 1535 | 6.96 | 1.05 | 0.0 | 0.10 | 11.01 |
| 1540 | 6.96 | 1.05 | 0.0 | 0.10 | 11.01 |

SAMPLED @ 1541 ID: GW-32504-031218-SR-2164

SAMPLE OF CRA-RA-30

| | | | | | |
|---|---|---|---|---|---|
| 1550 | 7.04 | 0.98 | 32.4 | 0.78 | 10.75 |
| 1605 | 7.07 | 0.98 | 5.5 | 0.10 | 10.92 |
| 1610 | 7.07 | 0.98 | 3.7 | 0.10 | 10.88 |
| 1615 | 7.07 | 0.98 | 2.6 | 0.10 | 10.91 |
| 1620 | 7.07 | 0.98 | 1.9 | 0.10 | 10.92 |
| 1625 | 7.07 | 0.98 | 1.4 | 0.10 | 10.92 |

SAMPLED @ 1626 ID: GW-32504-031218-SR-2165

SAMPLED @ 1629 ID: GW-32504-031218-SR-2166

3/12/18 32504-25

SAMPLE OF CRA-RA-32

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1635 | 7.11 | 0.91 | 0.0 | 0.74 | 10.54 |
| 1650 | 7.09 | 0.93 | 0.0 | 0.08 | 10.73 |
| 1655 | 7.09 | 0.93 | 0.0 | 0.08 | 10.73 |
| 1700 | 7.10 | 0.93 | 0.0 | 0.09 | 10.73 |
| 1705 | 7.09 | 0.93 | 0.0 | 0.08 | 10.73 |

SAMPLED @ 1706 ID:GW-32504-031218-SR-2167



32504-25 3/13/18

TASK: CONTINUE 1/4 LY SAMPLE EVENT

GHD: STEVE RAPAI

WEATHER: SNOW SQUALS, 25°, WIND WNW 12 MPH

H&S: LEVEL D

TAILGATE: COLD STRESS, WIND & SNOW, PRESERVED SAMPLE BOTTLES.

CALIBRATION OF FLOW CELL NF IN SITU

SAMPLE OF CRA-RA-22

| TIME | pH | COND. | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 0945 | 6.97 | 1.04 | 7.4 | 0.33 | 10.83 |
| 1000 | 6.97 | 1.00 | 0.3 | 0.35 | 10.77 |
| 1005 | 6.99 | 0.95 | 0.0 | 0.70 | 10.69 |
| 1010 | 7.00 | 0.93 | 0.0 | 0.91 | 10.67 |
| 1015 | 7.01 | 0.93 | 0.0 | 1.02 | 10.68 |
| 1020 | 7.01 | 0.94 | 0.0 | 1.11 | 10.73 |
| 1025 | 7.01 | 0.95 | 0.0 | 1.13 | 10.75 |
| 1030 | 7.03 | 0.95 | 0.0 | 1.13 | 10.73 |
| 1035 | 7.01 | 0.95 | 0.0 | 1.15 | 10.74 |
| 1040 | 7.01 | 0.95 | 0.0 | 1.15 | 10.74 |

SAMPLED @ 1041 ID:GW-32504-031315-SR-2168

3/13/18 32504-25

SAMPLE OF TEMP-PZ-2

| TIME | pH | COND. | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1050 | 7.00 | 1.85 | 9.8 | 0.85 | 10.69 |
| 1105 | 6.98 | 1.96 | 0.0 | 0.34 | 10.69 |
| 1110 | 6.98 | 1.98 | 0.0 | 0.26 | 10.72 |
| 1115 | 6.98 | 1.98 | 0.0 | 0.19 | 10.73 |
| 1120 | 6.98 | 1.98 | 0.0 | 0.19 | 10.74 |
| 1125 | 6.98 | 1.98 | 0.0 | 0.19 | 10.73 |

SAMPLED @ 1126 ID:GW-32504-031318-SR-2169

SAMPLE OF CRA-RA-29

| | | | | | |
|---|---|---|---|---|---|
| 1140 | 7.11 | 0.90 | 13.0 | 10.97 | 10.92 |
| 1200 | 7.10 | 0.90 | 2.1 | 11.46 | 11.01 |
| 1210 | 7.10 | 0.91 | 2.0 | 11.54 | 11.01 |
| 1215 | 7.10 | 0.90 | 2.0 | 11.59 | 10.95 |
| 1220 | 7.10 | 0.91 | 2.1 | 11.61 | 10.92 |
| 1225 | 7.10 | 0.91 | 2.0 | 11.60 | 10.92 |

SAMPLED @ 1226 ID:GW-32504-031318-SR-2170

SAMPLE OF CRA-RA-31

| | | | | | |
|---|---|---|---|---|---|
| 1250 | 7.47 | 0.62 | 0.0 | 0.64 | 10.26 |
| 1310 | 7.35 | 0.60 | 0.0 | 0.19 | 10.55 |
| 1315 | 7.35 | 0.60 | 0.0 | 0.18 | 10.55 |
| 1320 | 7.34 | 0.60 | 0.0 | 0.18 | 10.54 |
| 1325 | 7.34 | 0.60 | 0.0 | 0.18 | 10.54 |

SAMPLED @ 1326 ID:GW-32504-031318SR-2171



32504-25 3/13/18

SAMPLE OF CRA-RA-7

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1335 | 7.32 | 0.49 | 3.1 | 0.94 | 10.97 |
| 1350 | 7.38 | 0.43 | 0.0 | 0.72 | 11.11 |
| 1355 | 7.40 | 0.42 | 0.0 | 0.83 | 10.97 |
| 1400 | 7.41 | 0.41 | 0.0 | 0.99 | 10.97 |
| 1405 | 7.42 | 0.40 | 0.0 | 1.13 | 10.96 |
| 1410 | 7.42 | 0.40 | 0.0 | 1.30 | 11.00 |
| 1415 | 7.43 | 0.40 | 0.0 | 1.48 | 10.97 |
| 1420 | 7.43 | 0.40 | 0.0 | 1.51 | 10.97 |
| 1425 | 7.43 | 0.40 | 0.0 | 1.53 | 10.97 |
| 1430 | 7.43 | 0.40 | 0.0 | 1.54 | 10.97 |

SAMPLED @ 1431 ID:GW-32504-031318-SR-2172
MS/MSD

SAMPLE DELIVERY TO TEST AMERICA IN BRIGHTON.

SAMPLE OF CRA-RA-27

| | | | | | |
|---|---|---|---|---|---|
| 1530 | 6.85 | 1.71 | 2.7 | 0.26 | 10.88 |
| 1550 | 6.83 | 1.72 | 0.0 | 0.14 | 11.12 |
| 1600 | 6.83 | 1.73 | 0.0 | 0.14 | 11.10 |
| 1605 | 6.83 | 1.73 | 0.0 | 0.14 | 11.10 |
| 1610 | 6.83 | 1.73 | 0.0 | 0.14 | 11.10 |

SAMPLED @ 1611 ID:GW-32504-031318-SR-2173

3/13/18 32504-25

CRA-RA-26S SAMPLE

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1620 | 6.94 | 1.21 | 13.6 | 9.25 | 9.99 |
| 1635 | 6.87 | 1.22 | 0.0 | 7.66 | 10.27 |
| 1640 | 6.91 | 1.22 | 0.0 | 8.15 | 10.03 |
| 1645 | 6.86 | 1.22 | 0.0 | 6.24 | 10.27 |
| 1650 | 6.86 | 1.22 | 0.0 | 6.16 | 10.27 |
| 1655 | 6.87 | 1.22 | 0.0 | 6.17 | 10.27 |
| 1700 | 6.86 | 1.22 | 0.0 | 6.17 | 10.27 |

SAMPLED @ 1701 ID: GW-32504-031318-SR-2174

SAMPLE OF CRA-RA-26D

| | | | | | |
|---|---|---|---|---|---|
| 1710 | 6.96 | 1.44 | 47.9 | 4.81 | 9.37 |
| 1725 | 6.89 | 1.46 | 3.5 | 0.44 | 9.84 |
| 1730 | 6.89 | 1.46 | 2.7 | 0.37 | 10.09 |
| 1735 | 6.89 | 1.46 | 2.3 | 0.34 | 10.09 |
| 1740 | 6.89 | 1.44 | 2.1 | 0.32 | 10.09 |
| 1745 | 6.89 | 1.46 | 2.0 | 0.31 | 10.07 |
| 1750 | 6.89 | 1.44 | 2.1 | 0.31 | 10.07 |
| 1755 | 6.89 | 1.46 | 2.0 | 0.30 | 10.07 |

SAMPLED @ 1756 ID: GW-32504-031318-SR-2175

SAMPLES PACKED IN COOLER WITH ICE



32504-25 3/14/18

TASK: FINISH 1/4LY SAMPLE EVENT
GHD: STEVE RAPAI
WEATHER: MOSTLY CLOUDY 21°, WIND WNW 15 MPH, WIND CHILL = 9°
H&S: LEVEL D
TAILGATE: STEEP SNOW COVERED HILLS, PRESERVED GLASS SAMPLE BOTTLES, COLD STRESS.
CALIBRATION OF FLOW CELL NF INSITU

SAMPLE OF 81-4
TUBING FROZEN & WELL IS IN REMOTE LOCATION. TOOK QUITE A WHILE TO THAW TUBING. BEGAN TO FLOW @ 1045

| TIME | pH | COND. | TURB. | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1100 | 7.44 | 1.12 | 5.9 | 8.49 | 10.59 |
| 1105 | 7.31 | 1.12 | 4.4 | 8.45 | 10.65 |
| 1110 | 7.20 | 1.12 | 2.7 | 8.49 | 10.69 |
| 1115 | 7.00 | 1.12 | 3.0 | 8.47 | 10.69 |
| 1120 | 7.99 | 1.12 | 2.5 | 8.49 | 10.71 |
| 1125 | 7.98 | 1.12 | 2.1 | 8.50 | 10.72 |
| 1130 | 6.98 | 1.12 | 2.1 | 8.49 | 10.72 |

SAMPLED @ 1131 ID: GW-32504-031418-SR-2176
SAMPLED @ 1135 ID: GW-32504-031418-SR-2177

3/14/18 32504-25

SAMPLE OF CRA-RA-23D

| TIME | pH | COND | TURB | D.O. | TEMP. |
|---|---|---|---|---|---|
| 1215 | 7.12 | 0.17 | 0.0 | 3.84 | 9.92 |
| 1235 | 7.16 | 0.70 | 0.0 | 9.29 | 9.82 |
| 1240 | 7.15 | 0.71 | 0.0 | 10.01 | 10.39 |
| 1245 | 7.15 | 0.71 | 0.0 | 10.21 | 10.40 |
| 1250 | 7.15 | 0.71 | 0.0 | 10.29 | 10.41 |
| 1255 | 7.15 | 0.71 | 0.0 | 10.30 | 10.41 |
| 1300 | 7.15 | 0.71 | 0.0 | 10.30 | 10.41 |

SAMPLED @ 1301 ID:GW-32504-031418-SR-2178

SAMPLE OF 81-8
WELL WAS PURGED DRY YESTERDAY.
SAMPLE COLLECTED @ 1330
ID:GW-32504-031418-SR-2179

SAMPLES PACKED IN COOLER WITH ICE FOR GHD DROP OFF @ TEST AMERICA, BRIGHTON, MICHIGAN.



32504-25 3/28/2018

TASK: QUARTERLY WATER LEVELS
GHD: STEVE RAPAI
WEATHER: MOSTLY CLOUDY 42°F
H&S: LEVEL D
TAILGATE: PINCH POINTS & TRIP HAZARDS

| WELL ID | LEVEL |
|---|---|
| 81-4 | 20.39 |
| 81-5 | 32.86 |
| 81-7 | 46.42 |
| 81-8 | 45.58 |
| 81-9 | 14.81 |
| 81-10 | 30.95 |
| RA-1 | 67.67 |
| RA-2D | 54.48 |
| RA-2S | 54.19 |
| RA-3 | 51.29 |
| RA5 | 53.30 |
| RA-6S | 57.70 |
| RA-7 | 30.98 |
| RA-8 | 15.04 |
| RA-16 | 56.30 |
| RA-18 | 40.05 |
| RA-18D | 54.77 |
| RA-19D | 48.61 |

3/28/2018 32504-25

| Well ID | Level |
|---|---|
| RA-19S | 46.00 |
| RA-20 | 57.10 |
| ~~RA-21~~ | |
| RA-22 | 52.44 |
| RA-23D | 31.32 |
| RA-23S | 31.63 |
| RA-24 | 55.25 |
| RA-25 | 52.68 |
| RA-26D | 48.41 |
| RA-26S | 48.28 |
| RA-27 | 60.11 |
| RA-28 | 52.79 |
| RA-29 | 44.47 |
| RA-30 | 56.85 |
| RA-31 | 30.75 |
| RA-32 | 33.42 |
| RA-33 | 30.81 |
| RA-34 | 40.34 |
| RA-35 | 30.49 ~~22.00~~ |
| RA-36 | 34.84 |
| RA-37 | 34.60 |
| MW-22 | 40.55 |
| MW-28 | 41.05 |
| MW-32 | 55.72 |



32504-25 3/28/2018

| Well ID | Level |
|---|---|
| MW-34C | 40.20 |
| MW-35 | 22.00 |
| MW-41 | 45.65 |
| MW-42 | 62.16 |
| MW-47 | 52.38 |
| MW-54 | 54.43 |
| MW-55 | 36.20 |
| MW-56 | 32.21 |
| MW-58 | 19.88 |
| EB-PZ-2 | 38.75 |
| EB-PZ-4 | 51.85 |
| EB-PZ-5 | 53.57 |
| EB-PZ-6 | 53.32 |
| PZ-103 | 55.56 |
| PZ-104 | 53.51 |
| PZ-105 | 50.22 |
| PZ-106 | 37.83 |
| TEMP-PZ-2 | 52.33 |