



# RACER TRUST LANSING PLANTS 2, 3, & 6

#### **2021 Fourth Quarter Progress Report | January 15, 2022**

More detailed reports are available on RACER's Webpage for this Site: https://www.racertrust.org/properties/lansing-plant-2-industrial-land

# **Site Introduction**

- Remediation at the RACER Lansing Site is being performed through the Resource Conservation and Recovery Act (RCRA) Corrective Action program under the oversight of the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Current activities include focused site characterization, interim remedial actions, and evaluation of remedial alternatives.
- There is currently no known exposure pathways for area residents associated with the site contaminants.
- Characterization of the 1,4-dioxane plume in weathered bedrock at a depth of approximately 60 to 75 feet below the ground surface is complete. Remediation of 1,4-dioxane in the weathered bedrock includes operation of the Plant 2 and Plant 3 biosparge systems (Plant 2 system started operations during the third quarter of 2020). It is anticipated that portions of the Plant 2 biosparge system may need to operate for 10 to 15 years. See the appendix at the end of this report for more information on biosparging.
- Characterization of per and polyfluoroalkyl substances (PFAS) is ongoing to the north, east, and south of Plant 6. Interim actions for PFAS include storm sewer modifications on Plants 2, 3, and 6 to eliminate groundwater containing PFAS from infiltrating into and then discharging off-site through the storm sewers.
- Monitoring of potential soil vapor intrusion (VI) to indoor air is ongoing and will continue in the northeast portion of Plant 6 and the adjacent off-site area.
- Routine groundwater monitoring on Plants 2, 3, & 6 in the shallow (perched) zone, weathered bedrock, shallow bedrock, and deep bedrock is ongoing and is anticipated to continue for 25 to 30 years.



Activities completed during this period move the Site forward in the RCRA Corrective Action process



# **Remediation of 1,4-Dioxane in Weathered Bedrock**

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Plants 2 and 3 greater than 94% uptime since August 2020
  - Downtime related to equipment upgrades/replacement or regular system maintenance
  - Re-developing 8-10 wells based on system data observations for preventative system maintenance
- Results from the Third Quarter 2021 performance monitoring show that concentrations of 1,4-Dioxane at Plant 2 and Plant 3 continue to decrease:
  - 1,4-dioxane concentrations upstream of biosparge treatment transect on Plant 3 is decreasing, indicating that the former source of contamination is depleted and attenuating
  - 1,4-dioxane concentrations in groundwater have reduced to low or non-detectable levels within the biosparge treatment transects
  - 1,4-dioxane concentrations in groundwater downstream of the biosparge treatment transects have started to

© Arcadis 2021 decrease as treated groundwater flows downstream



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## **Remediation of 1,4-Dioxane in Weathered Bedrock**

- Results show that the biosparge systems are achieving the short-term objective of reducing 1,4dioxane concentrations and mass along the core of the weathered bedrock plume
- 2021 Fourth Quarter performance monitoring was conducted in December 2021 and the results will be summarized in the 2022 First Quarter Progress Report and in a Lower 1,4-Dioxane Biosparge Update Report, submitted annually to EGLE (targeted submittal of March 2022)
- Performance sampling will be moving to a semiannual schedule in 2022



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## Investigation of 1,4-Dioxane in Weathered Bedrock

#### Southeastern Plant 2 Area 1,4-Dioxane Investigation

Investigation into 1,4-dioxane detected in weathered bedrock (WB) well MW-20-130

- One shallow monitoring well installed within the southeastern portion of Plant 2 (MW-21-139)
  - Sampled for 1,4-dioxane and PFAS during the Fourth Quarter groundwater monitoring event.
  - 1,4-Dioxane: 4 μg/L, PFAS results pending
- Completed three deep vertical aquifer profile (VAP) borings and collection of groundwater samples to delineate 1,4-dioxane in WB
  - 1,4-dioxane was not detected in the VAP samples
- Converted two VAP borings into WB monitoring wells to act as a sentinel monitoring locations (MW-21-140, MW-21-141)
  - Sampled during Fourth Quarter groundwater monitoring event
  - 1,4-dioxane was not detected in the samples



### Investigation of 1,4-Dioxane in Weathered Bedrock

#### **Northwestern Plant 2 Investigation**

Investigation to (re)characterize the lower 1,4dioxane plume in the northwestern portion of Plant 2 and install a performance monitoring well for biosparge system

- Completed a total of 6 VAP borings into the weathered bedrock
- Collected 1 to 2 groundwater samples from the weathered bedrock at each location
  - Five locations to the east to MW-14-63 contained low concentrations of 1,4-dioxane (non-detect - 12 µg/L)
- 1 VAP boring and groundwater samples collected (SB-P2-JO68) replicated historical VAP intervals and results
  - Converted VAP-P2-JO68 to a performance monitoring well for biosparge (MW-21-142)
- Also abandoned 10 test wells not included in the current groundwater monitoring program or used for biosparge performance monitoring





### **Remediation of PFAS Impacts**

#### **Sewer Modifications and Performance Sampling**

- Osborn Street catch basin was replaced in November 2021 as part of sewer modifications completed during fourth quarter 2021 to prevent infiltration of groundwater containing Perfluorooctanesulfonic acid (PFOS) into the sewer system
- Old brick catch basin wall had numerous leaking cracks that would be difficult to repair
- Replaced entire catch basin structure to mitigate leaks
- Structure replacement preserves stormwater drainage in Osborn Street with no connections to the RACER site



New catch basin structure



Catch Basin ▲ Plugged Pipe Filled Structure



### **Remediation of PFAS Impacts**

#### **Sewer Modifications and Performance Sampling**

- A total of four post construction/modification storm sewer inspections have now been completed after precipitation event of 0.5 inches or more within the first year of modifications - the purpose of these inspections is to evaluate the Plants for ponding and the potential for storm water runoff onto neighboring properties, discharges at property boundary, bulkheaded or filled manholes.
  - Final inspection in late September 2021
  - No discharges were observed at bulkheaded or filled outfall manholes
  - No discharges along the property boundary were observed
  - Areas of ponding were observed on both Plants 2 and 3, which are consistent with prior inspections of these areas
  - Inspections are completed per the workplans that have been submitted to EGLE

### **Remediation of PFAS Impacts**

#### **Sewer Modifications and Performance Sampling**

- Third Quarter site wide performance monitoring of storm sewers was conducted in August and additional sampling was completed in October for P2-MH-29. Results for Perfluorooctanesulfonic acid (PFOS), the specific PFAS of concern, are depicted on figures to the right.
- Fourth Quarter site wide performance monitoring of storm sewers was conducted in December 2021. Results will be summarized in the First Quarter Progress Report.



PLANT 6



Catch basin structure replaced

in Nov 2021

13.0

11 0

10.0

5.0

# **PFAS Investigation**

### **Plant 6 Off-site Investigation**

Off-site PFAS GW investigation was completed in September 2021:

- One groundwater sample collected from 11-15 ft below the ground surface (bgs) at the northernmost boring (SB-OS-KG312) contained Perfluorooctanoic acid (PFOA), the specific PFAS of concern in off-site groundwater, at a concentration of 11 ng/L exceeding Drinking Water criteria
- PFOA detected at low concentrations in four other shallow samples but not detected in any samples collected from deeper intervals
- There are no known complete exposure pathways to PFOA in the groundwater for residents and therefore PFOA present in shallow groundwater is not expected to pose a risk to residents

Based on the results it is anticipated monitoring wells will be installed in Spring of 2022 to establish a monitoring network for PFOA impacts. A draft summary report including proposed monitoring well locations will be submitted to EGLE in January 2022.



## **Plant 2 Vault Closure**

- Vault closure completed on October 12<sup>th</sup>, 2021
- Vault structure was larger than anticipated
  - 36 X 6 X 4 ft
- Approximately 12,800 gallons of water was pumped into a frac tank on-site
- A portion of the interior of the vault was pressure washed and the vault was filled with flowable fill as the cleaning water was pumped into the frac tank
- Contents of the frac tank were picked up and transported off-site for disposal on November 15, 2021
- A summary memo will be submitted to EGLE in January 2022





# Plants 2 & 3 Soil Corrective Measures Update



Plants 2 & 3 corrective measures evaluation is complete. As a result of the evaluation the following corrective measures are proposed:

- Specific locations within the following areas will require a notification in the Amended Declaration of Restrictive Covenant (DRC) due to exceedances of EGLE Criteria:
  - Plant 2 Areas 2 (criteria exceedance of manganese), 5-1 (criteria exceedance of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(a,h)anthracene), 5-2 (criteria exceedance of manganese and benzo(a)pyrene), and 5-3 (criteria exceedance of manganese and benzo(a)pyrene)
  - Plant 3 Areas 14 (criteria exceedance of arsenic and nickel), 16 (criteria exceedance of lead), 20 (criteria exceedance of manganese) and 21 (criteria exceedance of arsenic)
- Portions of the following areas will require an exposure barrier:
  - Plant 2 Area 2 (excavation and existing barrier) (criteria exceedance of arsenic)
  - Plant 3 Area 14 (existing barrier) (criteria exceedance of cyanide)
  - Plant 3 Area 18 (barrier placement) (criteria exceedance of benzo(a)pyrene)
  - Plant 3 Area 19 (existing barrier) (criteria exceedance of arsenic)
- A Draft Plants 2 & 3 Soil Corrective Measures Summary Report was submitted to EGLE on December 21, 2021.

# Plants 2 & 3 Soil Corrective Measures Update

# Plant 2 – Locations that require an exposure barrier or notification in the Amended DRC



Plant 3 – Locations that require an exposure barrier or notification in the Amended DRC

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#### Work in Progress and Near-Term Milestones Anticipated During the First Quarter of 2022



| Activity   | Schedule            |
|--|---------------------|
| Remediation of 1,4-Dioxane in the Weathered Bedrock                              |                     |
| Plants 2 and 3 Biosparge System Operation  | Ongoing             |
| Biosparge Update Report  | March 2022          |
| Plant 2 1,4 Dioxane Investigation and Pilot Test Well Abandonment Summary Report | January 2022        |
| Remediation and Investigation of PFAS  |                     |
| Plant 6 Osborn Catch Basin Replacement Memo                                      | January 2022        |
| Quarterly Storm Sewer Sampling   | February/March 2022 |
| Plant 6 Off-Site PFAS Summary Report   | January 2022        |
| Plant 6 Off-Site Monitoring Well Installation                                    | March 2022          |
| Other investigations and Sampling  |                     |
| Perched Well Abandonment Memo  | January 2022        |
| Plant 2 TSCA (PCB) Soils IM Work Plan Submittal                                  | January 2022        |
| Plant 2 Vault Closure Memorandum   | January 2022        |
| Updated RFI and CMS Draft Report Submittals                                      | January 2022        |
| 2021 Annual Groundwater Monitoring Report Submittal                              | March 2022          |
| First Quarter 2022 Groundwater Monitoring and Biosparge Performance Monitoring   | February 2022       |



# Appendix

### **BIOSPARGING TREATMENT OF 1,4-DIOXANE**

Lansing Industrial Land, Lansing and Lansing Township, Michigan

Atmospheric

Sparge Well

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#### WHAT IS BIOSPARGING?

- Air and small amounts of propane are injected into the ground through wells Promotes biodegradation of chemicals in groundwater, much faster than it would occur naturally
- 1,4-dioxane is treated in the ground, so minimal waste is generated
- Nearby wells are sampled to make sure treatment is occurring

#### O TREATMENT OBJECTIVES

- Reduce onsite concentrations of 1,4-dioxane in the top/weathered zone of the bedrock aquifer
- Prevent off-site migration of 1,4-dioxane

#### CO-METABOLIC BIODEGRADATION OF 1,4-DIOXANE:







Biosparge Transect With Hoses in Grave

- 2016 Pilot Test Biosparge Points 2018 Pre-Design Study Biosparge Points With Sand
- Enhancements Weathered Bedrock Monitoring Well

#### Plant 2 Biosparge Transect Layout



#### CONCLUSIONS

- Biosparging is a low cost, effective, safe and sustainable method for treating 1,4-dioxane
- Installation of sand enhancements improves treatment
- Continual monitoring of the treatment system improves results
- Technology can be scaled up to treat the rest of the site

#### **FULL-SCALE DESIGN**

- 5 transects with 48 air sparge wells across Plants 2 and 4
- Nearly 5 miles of air hose and an air/propane injection network
- Groundwater flows from northwest to southeast and is cleaned by each transect
- Tubing installed above grade to save on costs and to accommodate future development
- Network of monitoring wells to track treatment progress



Plant 2 Biosparge Unit and Nutrient Injection Tanks