Revitalizing Auto Communities Environmental Response (RACER) Trust

Lower 1,4-Dioxane Biosparge 2024 Progress Report

Lansing Industrial Land
Lansing, Michigan

April 2025

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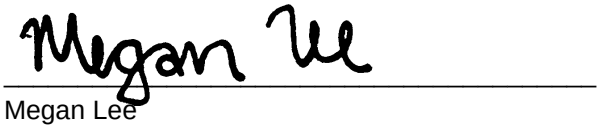

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Acronyms and Abbreviations

µg/L	micrograms per liter
%	percent
Arcadis	Arcadis of Michigan, LLC
EGLE	Michigan Department of Environment, Great Lakes, and Energy
IGMP	Interim Groundwater Monitoring Plan
O&M	operation and maintenance
RACER Trust	Revitalizing Auto Communities Environmental Response Trust
ROI	radius of influence
RRV	reference reduction value
Site	Revitalizing Auto Communities Environmental Response Trust Lansing Industrial Land Site, Lansing, Michigan

1 Introduction

On behalf of Revitalizing Auto Communities Environmental Response Trust (RACER Trust), Arcadis of Michigan, LLC (Arcadis) installed a propane biosparge remediation system at the RACER Trust Lansing Industrial Land Site in Lansing, Michigan (Site) to address 1,4-dioxane impacts in the weathered bedrock. Two treatment systems, encompassing 41 biosparge wells in four transects (Transects B, E, F, and G) on Plant 2 with an equipment enclosure (**Figure 1**) and seven wells in one transect (Transect A) on Plant 3 with an equipment enclosure (**Figure 2**), comprise the overall biosparge system. The biosparge system was designed to inject air and propane into the subsurface to facilitate co-metabolic biodegradation of 1,4-dioxane. The Plant 3 system was started up in July 2019 and the Plant 2 system was started up in August 2020. This progress report provides a summary of system operations and performance in 2024 and presents recommendations for system optimization in 2025.

The long-term objectives of the biosparge system are to:

- Provide for continued protection of the municipal drinking water supply wells by preventing site-related 1,4-dioxane-impacted groundwater from migrating offsite laterally in the weathered bedrock zone at concentrations greater than 7.2 micrograms per liter (µg/L); and
- Reduce the potential for substantial migration of 1,4-dioxane downward toward less-weathered bedrock.

The short-term objective of the biosparge system is to reduce site-related 1,4-dioxane concentrations along the core of the lower 1,4-dioxane weathered bedrock plume.

As presented in the Interim Measures Work Plan (Arcadis 2018), the biosparge system will be operated until:

- Concentrations of site-related 1,4-dioxane in weathered bedrock and bedrock monitoring wells along the core of the plume and in monitoring wells along the western Plant 2 property boundary exhibit stable to decreasing trends based on statistical evaluation (e.g., Mann-Kendall or other method acceptable to the Michigan Department of Environment, Great Lakes, and Energy [EGLE]).
- Further reduction in groundwater concentrations reaches the point of diminishing returns. Evaluation of the point of diminishing returns is detailed in Section 3.2 of this progress report. The diminishing returns evaluation process has been updated, based on feedback from and in collaboration with EGLE, over the course of operation of the biosparge system as the information gained during operation and monitoring activities has allowed for better operation and evaluation over time; or
- The short- and long-term objectives have been met.

2 Biosparge System Operation and Maintenance

The Plant 2 and Plant 3 biosparge systems operated throughout 2024 to continue treating 1,4-dioxane in the weathered bedrock. A summary of operations and maintenance (O&M) is outlined in the following sections.

2.1 Summary of Operations

The operational uptime of the Plant 3 system was 73 percent (%) during 2024. The Plant 3 system was down approximately 2% of the time for routine maintenance activities and approximately 25% of the time for non-routine maintenance activities. The Plant 2 system was operational 88% of the time during 2024. The Plant 2 system was down approximately 2% of the time for routine maintenance activities and approximately 10% of the time for non-routine maintenance activities. These activities are detailed further in Sections 2.2 and 2.3.

The biosparge system operated as follows in 2024:

- Air flow rates of between 2 to 5 actual cubic feet per minute (CFM, as measured inline at the system temperature and pressure and not converted to standard conditions) per biosparge well are targeted using the system variable frequency drive and the gate valves installed on the manifolds in the equipment enclosures. It was observed that flow in select wells on Plant 2 had reduced below 2 CFM and were rehabilitated by jetting the well screens in order to get closer to the desired flow range.
- Wells from different transects are grouped into three sparge groups at Plant 2 and two sparge groups at Plant 3 that alternate through sparge cycles, with time on for each group, followed by a rest cycle. Any given biosparge well receives 45 minutes of continuous air sparging followed by 3 hours and 15 minutes of continuous rest – a total of 4.5 hours of sparging and 19.5 hours of rest per day.
- Air dosed with propane at 15% to 20% of its lower explosive limit was injected into each of the sparging wells at Plant 2 and Plant 3 in 15 to 30-minute increments during four of the six sparging cycles per day, for a total of up to 2 hours per day per well.
- The Plant 3 system continued to sparge into wells AS-19-A01 through AS-19-A05. Wells AS-19-A06 and AS-19-A07 remain idle as previously communicated.

Detailed O&M data are provided in the completed O&M forms included in **Appendix A**.

2.2 Routine Operation and Maintenance

O&M visits were conducted monthly in 2024 and included data collection, equipment maintenance, and system checks to verify normal system operation. Onsite data collection included flow rates and pressures for individual wells while the overall system flow and pressure data were logged remotely through the programmable logic controller (PLC). At the Plant 3 system, propane tank changeouts occurred once per month. At the Plant 2 system, propane was delivered on an as-needed basis, approximately three times per year.

Other routine O&M activities included compressor maintenance, equipment calibration, and nutrient injections. Both compressors were serviced quarterly in 2024 in accordance with the manufacturer's recommendations. With the over pressurization issues observed in late 2023 and early 2024 (discussed later in this report), nutrient injections were reduced to once per year in March 2024 to minimize the potential for the nutrient injection fluids to temporarily block air pathways or limit gas injection pathways that could exacerbate over pressurization of the subsurface during normal operation. Nutrient data collected in fourth quarter 2024 suggested nutrients were still present over eight months following the previous injection. This result and the continued treatment of 1,4-dioxane

in 2024 suggest that one nutrient injection is adequate to maintain optimal conditions for biodegradation. Routine O&M downtime in 2024 was associated with the nutrient injection, equipment calibration, equipment replacement, and compressor maintenance. The 2024 O&M logs are included in **Appendix A**.

2.3 Non-Routine Operation and Maintenance

2.3.1 Plant 3

The following non-routine maintenance was completed at the Plant 3 biosparge system in 2024:

- Performance Monitoring Well TW-14-06 was abandoned in February 2024 following EGLE approval. The well was abandoned due to injected air leaking from outside of the casing. This leakage prevented adequate distribution of gases in the subsurface and impacted performance of the Plant 3 biosparge system.
- On March 26, 2024, the Plant 3 biosparge system was temporarily shut down due to leaks detected in the air/propane distribution manifold. After the procurement of materials and a qualified contractor, the manifold was rebuilt on May 17, 2024, and the system was re-started at that time.
- During sampling events, it was noted that several monitoring well caps of radius of influence (ROI) and near downgradient performance monitoring wells had become displaced from the well casings as a result of a buildup of subsurface pressure. Injected gases were preferentially short circuiting through the open monitoring well casings, preventing adequate distribution of gases in the subsurface, impacting the performance of the Plant 3 biosparge system. On June 6, 2024, the well caps on ROI and near downgradient performance monitoring wells, PW-14-03 and TW-15-11, were retrofitted with a threaded well cap to prevent the well caps from dislodging. The threaded well caps were fitted with pressure relief valves to allow gases to escape and avoid over pressurization that might damage or compromise the well seals.
- During the year, 4 power outages caused the system to shut down. The system could not be restarted without the assistance of onsite personnel to get the compressor running. The system was off for 1-2 weeks each time this occurred.

2.3.2 Plant 2

The following non-routine maintenance was completed at the Plant 2 biosparge system in 2024:

- On May 3, 2024, the following wells were turned off due to elevated pressure and no air flow to the subsurface: B06, E02, E09, E11, F02, F08, G01, G02, G03, G04. On June 10 through 12, 2024 well redevelopment was performed at these 10 biosparge wells. On June 12, the biosparge wells were turned back on following the redevelopment with the exception of E11 and G03, which required further repairs (discussed below).
- Following redevelopment, the well seal gasket on biosparge well E11 was observed to be leaking. The well remained off until July 18, 2024, when the well seal was replaced and the well was put back in service.
- Following redevelopment, the threaded connection on wellhead at G03 was observed to be leaking. The well remained off until July 18, 2024, when the threaded connection was fixed and the well was put back into service.

- During sampling events, it was noted that several monitoring well caps of ROI and near downgradient performance monitoring wells had become displaced from the well casings as a result of a buildup of subsurface pressure. Injected gases were preferentially short circuiting through the open monitoring well casings preventing adequate distribution of gases in the subsurface, which impacted the performance of certain areas of the Plant 2 biosparge system. On June 6, 2024, the well caps on ROI and near downgradient performance monitoring wells, MW-13-43, TW-14-02, MW-20-128, MW-14-61, and MW-19-121, were retrofitted with a threaded well cap to prevent the well caps from dislodging. The threaded well caps were fitted with pressure relief valves to allow gases to escape and avoid over pressurization that might damage or compromise the well seals.
- The compressor shut down for high pressure alarms in February and November, due to a buildup of material in the air/oil separator. Routine maintenance of the air/oil separator is normally an annual or greater maintenance activity, but cleaning/parts replacement was required on a semi-annual basis in 2024.
- During the year, 3 power outages caused the system to shut down. The system could not be restarted without the assistance of onsite personnel to get the compressor running. The system was off for 1-2 weeks each time this would occur.

3 Performance Monitoring Results

System performance is monitored using the established performance monitoring well network across the Site. The Plant 2 and Plant 3 performance monitoring networks, including sampling frequency, are presented on **Figures 1** and **2**, respectively. Performance monitoring wells are distributed within the biosparge well radius of influence (ROI), and the upgradient and downgradient zones. Wells are positioned approximately every 300 feet along the transects. Groundwater sampling, including analytical data and field parameters, was performed at the performance monitoring wells quarterly for the first 2 years of biosparge operation, and semi-annually thereafter. Select biosparge performance wells are sampled more frequently for specific purposes (e.g., in anticipation of shut down testing, to support the diminishing returns evaluation, etc.). **Figures 3** through **6** show the 1,4-dioxane and dissolved oxygen concentrations for performance monitoring wells at Plant 2 and Plant 3. Performance monitoring data, including 1,4-dioxane, dissolved oxygen, and nutrient concentrations, are summarized in **Table 1**.

Full results for groundwater sampling events, including laboratory reports and data tables for constituents other than 1,4-dioxane, dissolved oxygen, and nutrients, will be provided in the 2025 Annual Groundwater Monitoring Report.

3.1 Performance Evaluation

The biosparge system has met the established short-term objective of reducing 1,4-dioxane concentrations along the core of the weathered bedrock plume. Based on biosparge performance monitoring and the Interim Monitoring Plan (IMP, Arcadis 2024) bedrock monitoring well results, the long-term objectives of continued protection of the municipal drinking water supply wells by preventing lateral migration and reducing the potential for vertical migration of site-related 1,4-dioxane continue to be achieved. Trend graphs for bedrock wells are included in **Appendix B**. Overall, the 1,4-dioxane concentration in a majority of the bedrock wells in the vicinity of the lower 1,4-dioxane plume continue to be below 1 µg/L. The remainder of the bedrock wells are consistently between 1 and approximately 5 µg/L and have never exceeded 7.2 µg/L.

IMP and biosparge performance monitoring indicates that the extent of 1,4-dioxane exceedances of the drinking water criteria has decreased since system startup in 2019. **Figure 7** is a comparison of the lateral extent of the 1,4-dioxane plume from before system startup in 2019 and the end of 2024. The biosparge treatment transects were installed to treat 1,4-dioxane above 72 µg/L in the weathered bedrock. The extent of the 72 µg/L contour has decreased to a fraction of its previous size. In addition, annual Mann-Kendall analysis of plume stability demonstrates stable to decreasing concentrations in all key deep overburden and weathered bedrock wells surrounding the Plant 2 and 3 biosparge systems (Arcadis 2022, 2023b, 2024b).

Plant 3 results since system startup are summarized here and presented on **Figure 3,** in **Table 2,** and in **Appendix B**:

- Upgradient wells: The upgradient weathered bedrock well, MW-13-22, has fluctuated since system start up and as was expected does not appear to be directly impacted by the biosparge system. The upgradient deep overburden well, MW-12-21, appears to be gradually decreasing since its installation in 2012. Mann Kendall trends for both upgradient wells show a decreasing trend (**Appendix B**).

- Radius of influence wells: TW-14-06 was abandoned in February 2024, due to air leakage around the well casing that prevented adequate distribution of gases in the subsurface, ultimately impacting treatment efficiency in the localized area. Air sparge well AS-19-A05 was sampled in place of TW-14-06 in May and November 2024 and showed low concentrations. While this well is turned off temporarily to collect groundwater samples, sparge well AS-19-05 is an active sparge well and therefore will only be sampled in the future as part of shut down / rebound testing when the system is shut down for a longer period of time. Previously deactivated air sparge well AS-19-A06 continued to show low concentrations throughout 2024, indicating that leaving air sparge wells AS-19-06 and AS-19-07 idle is still appropriate.
- Downgradient wells:
  - Weathered bedrock monitoring wells 50 to 60 feet beyond Transect A (PW-14-03 and TW-15-11) are exhibiting the following results:
    - Concentrations in PW-14-03 has shown consistently low concentrations since 2021. It is important to note that the biosparge system had been off for over 7 weeks prior to the second quarter 2024 sampling event that showed a negligible change to 1,4-dioxane concentrations.
    - Concentrations in TW-15-11 had been on a decreasing trend until 2023, when the maintenance and short-circuiting issues caused decreased treatment and concentrations rose. Upon abandonment of TW-14-06, installation of threaded monitoring well caps, and rebuilding the leaking manifold in the first half of 2024, concentrations in TW-15-11 in the third and fourth quarters of 2024 reduced back to the range observed in 2022 and 2023.
  - The two deep overburden wells, MW-13-29 and MW-13-48, located 250 and 460 feet downgradient of the treatment transect, are exhibiting the following results:
    - Concentrations at MW-13-29 have continued to decrease overtime and do not appear to be impacted by the operational disruptions in late 2023 and early 2024.
    - Concentrations in MW-13-48 did increase from 2023 to 2024. This could potentially indicate the operations disruptions from 2023 and 2024 have affected downgradient flushing from the treatment transect. After start up, decreasing trends lagged at this location due to the distance from the treatment transect. Therefore, it may take additional time to regain the downward trends since the operational issues were rectified.
  - The next downgradient weathered bedrock well, MW-13-34, located approximately 460 feet from Transect A, remains stable.

Plant 2 results since system startup are summarized here and presented on **Figures 4** through **6,** in **Table 3**, and in **Appendix B**:

- Upgradient wells: Concentrations at MW-21-142, located approximately 650 feet upgradient of Plant 2 Transect B and 600 feet downgradient of Plant 3 Transect A, has yet to show a decreasing trend. Concentrations at MW-20-126, located approximately 65 feet upgradient of Transect B, continue to decrease overall. Wells located upgradient of Transects E, F, and G are all stable to decreasing and below pre-startup concentrations.

- Radius of influence wells: Results continue to demonstrate treatment within the ROI of all transects. Concentrations of 1,4-dioxane in Transect G ROI well TW-14-02 has fluctuated in the last two years due to short term system shut downs for maintenance but quickly returns to low concentrations upon system restart. The highest rebound seen was approximately half of the pre-startup concentration. A more-prolonged shut down evaluation would be required to verify if the concentration in TW-14-02 remains stable or continues to increase without continuous system operation. Concentrations consistently remain low in all other Plant 2 ROI performance monitoring wells, TW-15-12, MW-20-128, MW-14-61, and MW-19-121.
- Downgradient wells: Downgradient wells, including those that exhibited non-detect/low concentrations when installed before the system was started, continue to exhibit low concentrations. Weathered bedrock wells 50 to 120 feet downgradient of the Plant 2 treatment transects exhibit decreased concentration trends, except for MW-20-127, located approximately 110 feet from Transect B, which continues to be stable. Concentrations in monitoring well MW-19-123 (downgradient from Transect G), had temporarily increased due to system shutdowns and gas distribution challenges in 2023, but have now decreased in 2024 and returned to the range seen in 2022.

3.2 Point of Diminishing Return Evaluation

Assessment of the point of diminishing returns is important to evaluating the effectiveness of ongoing biosparge treatment. The diminishing returns evaluation process has been updated, based on feedback from and in collaboration with EGLE, over the course of operation of the biosparge system. The current framework for evaluating the point of diminishing returns involves four main lines of evidence:

1. Assessment of upgradient well trends to evaluate the stability and magnitude of concentrations of 1,4-dioxane entering the biosparge system and requiring treatment;
2. Assessment of average plume concentrations to evaluate the trend of overall reductions year over year (i.e., 12-month reductions) to determine if ongoing treatment is meaningful;
3. Comparison of the 12-month average reduction of 1,4-dioxane to 20% of a reference reduction value (RRV) and;
4. Financial assessment of the cost per unit of treatment to understand the cost benefit of ongoing treatment.

To evaluate these lines of evidence in terms of localized system effectiveness, biosparge performance monitoring wells have been grouped based on transect and proximity: one group for Plant 3 and three groups for Plant 2. An average concentration for each group of wells is calculated after each comprehensive sampling event. A 12-month reduction in the 1,4-dioxane concentration is calculated by subtracting the current average plume concentration from the average plume concentration 12 months prior. **Tables 2** and **3** present the average 1,4-dioxane plume concentrations and 12-month reduction values for the one group for Plant 3 and the three groups for Plant 2, respectively. For the third line of evidence listed, the maximum 12-month reduction in 1,4-dioxane observed during the first 3 years of operation serves as the RRV. While RACER proposed that 20% of the RRV be considered the point of diminishing returns, the diminishing returns evaluation now also includes an evaluation of the overall trends for average plume concentration and 12-month reduction values, as shown on Figures 8, 9, 10 and 11. Looking at these trends provides a visual representation of the asymptotic conditions that occur when there is no longer changes in the average plume concentration and the 12-month reduction values, which is a strong line of evidence that the point of diminishing returns has been achieved.

Prior to 2023, the Plant 3 diminishing returns evaluation included upgradient wells but excluded deep overburden wells. Decreases observed in 1,4-dioxane concentrations since system startup in the deep overburden indicate that the deep overburden is influenced by the biosparge system and that contribution to the weathered bedrock from the deep overburden continues to decrease. Therefore, downgradient deep overburden wells MW-13-29 and MW-13-48 are included in the Plant 3 diminishing returns evaluation to account for this reduction in mass flux contribution from the deep overburden to weathered bedrock downgradient of Plant 3. While Plant 3 upgradient wells MW-13-22 and MW-12-21 have shown a decreasing concentration trend over the last 10 years, as expected they do not appear to be under the direct influence of the biosparge system. Because the upgradient wells are considered in a separate portion of the diminishing returns evaluation (#1 in the list of lines of evidence), MW-13-22 was removed from the treatment portion of the diminishing returns evaluation to reduce potential bias in the calculation of the reference concentration reduction (#2 and #3 in the list of lines of evidence) and financial cost per unit of treatment (#4 in the list of lines of evidence) evaluations that are specifically evaluating the biosparge system performance.

Upgradient wells at Plant 2 will continue to be included in the reference reduction and treatment unit cost evaluations because they are either directly influenced by the system or are affected by flushing of treated water from upgradient.

3.2.1 Plant 3

3.2.1.1 Upgradient Well Trends

The upgradient weathered bedrock well, MW-13-22, was generally stable in 2024. The upgradient deep overburden well, MW-12-21, exhibits a slight decreasing concentration trend, indicating that the contribution to the weathered bedrock transport zone from mass stored in the deep overburden continues to decrease.

3.2.1.2 Average Plume Concentrations

The assessment of the average plume concentration at Plant 3 was completed to evaluate if ongoing treatment is meaningful. Data are provided in **Table 2** and on **Figure 8a**, and key points are summarized below:

- The baseline average plume concentration before startup of the biosparge system was 232 µg/L.
- In 2024, the average plume concentration ranged from 48 µg/L to 84 µg/L, a 64% to 79% reduction over baseline.
- In the fourth quarter of 2024, the average plume concentration was 4 µg/L higher than the average plume concentration in the fourth quarter of 2023.

The increased average plume concentration in fourth quarter 2024 compared to fourth quarter 2023 can be attributed to the known interruptions in treatment from late 2023 and the first half of 2024, that resulted in system down time due to the leaking manifold and short-circuiting of air. The average plume concentration decreased in fourth quarter 2024 after the manifold was rebuilt, and the short-circuiting issues were rectified. Moving forward, with the abandonment of TW-14-06 (which had been very low in concentration since 2020), data from this well will no longer be used in the average plume concentrations calculation. Therefore, the average plume concentration will be higher than the average plume concentration when TW-14-06 was being sampled as part of performance monitoring. This is not indicative of a change in performance of the biosparge system, but rather the fact that a low concentration well is no longer available and is excluded from the average plume concentration calculation.

3.2.1.3 Reference Reduction Value Comparison

As stated in Section 3.2, the 12-month reduction in the 1,4-dioxane concentration is calculated by subtracting the current average plume concentration from the average plume concentration 12 months prior. **Table 2** presents the average 1,4-dioxane plume concentrations and 12-month reduction values for Plant 3 Transect A. The maximum 12-month reduction in 1,4-dioxane observed during the first 3 years of operation serves as the Reference Reduction Value (RRV), and 20% of the RRV was identified as the point of diminishing returns. For Plant 3, the RRV is 142 µg/L, with 20% being 28.4 µg/L, representing the point of diminishing returns. As shown in **Table 2 and Figure 8b**, the 12-month reduction was less than 28.4 µg/L for all of 2022 and became negative in 2023 and 2024. A negative 12-month reduction value indicates that the average plume concentration increased year over year. The 12-month reduction in Q2 of 2024 indicated that the average plume concentration increased by 44 ug/L from the previous year. This is likely due to maintenance shut downs and short-circuiting of air observed in late 2023 and early 2024. In Q4, the average 12-month reduction value indicates the average plume concentration was approximately the same as the previous year.

3.2.1.4 Financial Assessment

A financial assessment of the cost per unit of treatment was completed to evaluate the cost benefit of ongoing treatment. The cost of treatment was calculated using the annual O&M cost and the annual average reduction of 1,4-dioxane. **Exhibit 1** summarizes the approximate cost per 1 µg/L of 1,4-dioxane successfully treated. Backup calculation details are included in **Appendix C.** The calculation of the cost per unit treated cannot be calculated for 2023 or 2024 because the average plume concentration did not decrease.

Exhibit 1. Plant 3 Operations Cost per µg/L Treated (Excludes Upgradient Wells and Includes Deep Overburden Wells)

Year	Annual Average Reduction in Plume Concentration (µg/L)	Unit Treatment Cost ($ per µg/L reduction)
2019*	108	$216
2020	51	$784
2021	29	$1,995
2022	19	$2,165
2023	-17	--
2024	-4	--

Note:

*The Plant 3 system began operation in June 2019, Concentrations and costs are based on 7 months of operation (June to December 2019).

As of the end of 2024, the Plant 3 system has been operating for 5.5 years and based on the well trends, average plume concentration reductions, reference reduction value trends, and financial assessment, Plant 3 has reached the point of diminishing returns. Although gas distribution challenges led to a localized area of reduced treatment in late 2023 and early 2024, all 1,4-dioxane levels remained below the pre-start up concentrations. A shut down test is still recommended and would provide valuable information to help determine if the system (or portions of the system) could be idled and still meet the stated objectives for the biosparge system. The Revised Biosparge Shut Down Test Proposal Memo was submitted to EGLE in January 2025 (Arcadis 2025) outlining the details of the proposed shut down test.

3.2.2 Plant 2

3.2.2.1 Upgradient Well Trends

Trends in wells upgradient of the Plant 2 treatment transects are a consideration for evaluating the point of diminishing returns. Concentrations at MW-21-142, approximately 620 feet upgradient of the Plant 2 Transect B and 600 feet downgradient of Plant 3 Transect A, has yet to show a decreasing trend. Concentrations at MW-20-126, approximately 65 feet upgradient of Transect B, continues to show a decreasing trend (**Figure 4**). Dissolved oxygen concentrations measured in this well suggest that the well may be influenced by the biosparge system.

Monitoring wells upgradient of Transects E, F, and G are all stable to decreasing and below pre-startup concentrations. These decreasing trends could be the result of direct treatment from the biosparge transect, clean water flushing from upgradient transects, decreased mass flux from the shallower subsurface, or a combination of these factors.

3.2.2.2 Average Plume Concentrations

The assessment of the average plume concentration at Plant 2 was completed to evaluate the trend of overall reductions year over year (i.e., 12-month reductions) to evaluate ongoing treatment. Data are provided in **Tables 3a, 3b,** and **3c** and on **Figures 9a, 10a,** and **11a**, and a summary of key points follows:

- The average plume concentration in northern Plant 2 (Transect B) prior to startup of the biosparge system in June 2020 was 206 µg/L. In 2024, the average plume concentration ranged from 52 µg/L to 66 µg/L, a 68% to 75% reduction over baseline. In the fourth quarter of 2024, the average plume concentration was approximately the same as the average plume concentration in the fourth quarter of 2023. The average plume concentrations for Plant 2 Transect B has been relatively consistent since 2022 as shown on **Figure 9a**.
- The average plume concentration in southern Plant 2 (Transect G and Transect E wells AS-19-E01 through AS-19-E04) prior to startup of the biosparge system was 484 µg/L. In 2024, the average plume concentration ranged from 23 µg/L to 37 µg/L, a 92% to 95% reduction over baseline. In the fourth quarter of 2024, the average plume concentration was 5 µg/L lower than the average plume concentration in the fourth quarter of 2023. The average plume concentrations for Plant 2 Transects G&E has been relatively consistent since 2022 as shown on **Figure 10a**.
- In eastern Plant 2 (Transect F and Transect E wells AS-19-E06 through AS-19-E12), the average plume concentration before startup of the biosparge system was 159 µg/L. The average plume concentration ranged from 38 µg/L to 42 µg/L in 2024, a 74% to 76% reduction over baseline. The average plume concentration in the fourth quarter of 2024 was approximately the same as the average plume concentration in the fourth quarter of 2023. The average plume concentrations for Plant 2 Transects E&F has been relatively consistent since 2022 as shown on **Figure 11a**.

3.2.2.3 Reference Reduction Value Comparison

As stated in Section 3.2, the 12-month reduction in the 1,4-dioxane concentration is calculated by subtracting the current average plume concentration from the average plume concentration 12 months prior. **Table 3a, b, and c** presents the average 1,4-dioxane plume concentrations and 12-month reduction values for Plant 2. The maximum 12-month reduction in 1,4-dioxane observed during the first 3 years of operation serves as the Reference Reduction Value (RRV), and 20% of the RRV was suggested as the point of diminishing returns. **Figures 9b, 10b,** and **11b** show the 12-month reduction values over time for the different regions of Plant 2. A negative 12-month reduction value indicates that the average plume concentration increased year over year.

Stabilization at or near zero indicates that the average plume concentration is no longer changing, which is a strong line of evidence that the point of diminishing returns has been achieved.

The RRV for the Plant 2 northern transect (Transect B) is 125 µg/L, with the point of diminishing returns identified as 25 µg/L. As shown in **Table 3a and Figure 9b**, the 12-month reduction has been less than 20% of the RRV for all of 2023. Also since 2023, the 12-month reduction value has stabilized near or below zero indicating the average plume concentration is no longer significantly changing.

The RRV for southern Plant 2 (Transects G and portions of E) is 398 µg/L, with the point of diminishing returns identified as 79.6 µg/L. As shown in **Table 3b and Figure 10b**, the 12-month reduction has been less than 79.6 µg/L since Q2 2022, and since 2023 has plateaued near zero indicating the average plume concentration is no longer significantly changing.

The RRV for eastern Plant 2 (Transect F and portions of E) is 106 µg/L, with the point of diminishing returns identified as 21.2 µg/L. As shown in **Table 3c and Figure 11c**, the average 12-month reduction has been below 20% of the RRV since Q2 2023, and since then has plateaued near zero indicating the average plume concentration is no longer significantly changing

The smaller and negative average 12-month reductions in plume concentration are due to the system reaching the point of diminishing returns. As such, RACER has proposed a shut down test of Transect G, as outlined in the Revised Biosparge Shut Down Test Proposal Memo (Arcadis 2025), that would provide beneficial information for optimizing system operation in the coming years.

3.2.2.4 Financial Assessment

A financial assessment of the cost per unit of treatment was completed for Plant 2 to evaluate the cost benefit of ongoing treatment. The cost of treatment was calculated using the annual O&M cost and the annual average reduction of 1,4-dioxane. **Exhibit 2** summarizes the approximate cost per 1 µg/L of 1,4-dioxane treated. The cost per unit treated for some of the transects cannot be calculated in 2023 or 2024 because the average plume concentration did not decrease.

Exhibit 2. Plant 2 Operations Cost per µg/L Treated

Year	P2 North – Transect B		P2 South – Transects G & E		P2 East – Transects E & F	
	Annual Reduction in Average Plume Concentration (µg/L)	Unit Treatment Cost ($ per µg/L reduction)	Annual Average Reduction in Plume Concentration (µg/L)	Unit Treatment Cost ($ per µg/L reduction)	Annual Average Reduction in Plume Concentration (µg/L)	Unit Treatment Cost ($ per µg/L reduction)
2020*	54*	$211	215*	$121	47*	$623
2021	38	$1,036	215	$420	44	$2,308
2022	59	$476	34	$1,888	31	$2,330
2023	5	$7,354	-7	--	0	--
2024	-1	--	5	$17,441	-1	--

Note:

*The Plant 2 system began operation in August 2020. Concentrations and costs are based on five months of operation (August to December 2020).

As of the end of 2024, the Plant 2 system had been operating for more than 4 years. Since 2022, the average plume concentration plateaued in all areas of the Plant 2 biosparge system. This is another line of evidence that the point of diminishing returns has been met because there has been little to no further reduction in plume average concentration for the operation and maintenance dollars spent over the past 2 years. A shut down test is recommended for Transect G, as outlined in the Revised Biosparge Shut Down Test Proposal Memo provided in January 2025 (Arcadis 2025).

4 Recommendations

The evaluation of biosparge performance monitoring, operations, and treatment cost data presented in Sections 2 and 3 leads to the following recommendations for optimization of the biosparge system.

4.1 Shut Down Evaluation

The biosparge transect performance metrics described in Section 3 were evaluated relative to the diminishing returns criteria and the short- and long-term objectives. Arcadis presented an initial shut down evaluation plan to EGLE in the 2022 Annual Biosparge Report (Arcadis 2023a). EGLE reviewed this plan and requested a Remediation Advisory Team (RAT) meeting, which was held in April 2024. RACER received comments from the RAT team and responded on July 3, 2024. RACER received comments from EGLE in November 2024 and responded on December 9, 2024. RACER submitted an updated shut down test plan on January 17, 2025. Any information about sampling frequencies, restart thresholds, and other details of the shut down test can be found in the Revised Biosparge Shut Down Test Proposal Memo (Arcadis 2025). No changes to that memo are proposed at this time.

Information gathered during rebound testing will be used to optimize the system and lower the unit cost per treatment while still maintaining the short- and long-term objectives of the biosparge treatment system. Further, the proposed test will provide information to assess if the apparent asymptotic concentration reductions are providing any benefit or are helping achieve the short- or long-term objectives. As stated in the memo, the shut down test is not intended to automatically lead to permanent shut down of the biosparge system or any portion of the system. Rather, at the end of the test, recommendations will be made based on the data collected. These recommendations may include restarting the portions of the system that were shut down for testing, continued shut down of portions of the system, shut down testing for additional portions of the system, and/or additional monitoring. The system re-start triggers were selected to allow adequate time and data to be collected while remaining protective of the municipal water supply Information obtained during and at the end of the shut down testing, will be reviewed with EGLE and any recommendations made would be discussed with EGLE.

4.2 Optimization Recommendations

In order to continue meeting the goals of the biosparge system while minimizing O&M costs and wear and tear on equipment, Arcadis proposes routine sparge well redevelopment, annual nutrient injection frequency, and consideration for additional reduction in sparge frequency in 2025.

4.2.1 Sparge Well Redevelopment

In 2024, well redevelopment was performed on sparge wells that had high pressures and low flowrates. Per the basis of design, the system is operated to keep pressures below 30 psi and flowrates between 2 and 5 scfm at all sparge wells. Due to differences in subsurface conditions and fouling of the well screens over time, some biosparge wells fall outside of these parameters. Arcadis intends to perform well redevelopment as needed based on pressures and flowrates observed during routine O&M activities.

4.2.2 Nutrient Injection Frequency

Nutrient data collected in fourth quarter 2024 suggested nutrients were still present over eight months following the previous injection. This result and the continued treatment of 1,4-dioxane in 2024 indicate that two injections per year are not necessary to maintain optimal conditions for biodegradation. Arcadis proposes to continue nutrient injections on an annual frequency moving forward to be performed in Q2 of each year.

4.2.3 Reduction in Sparge Cycles

In 2023, air sparge duration was reduced by 25% at both plants to mitigate over pressurization of the formation and to assist in preventing sparged gases from short-circuiting. No changes to the propane sparge time were made, but air sparge time was reduced, and rest-cycle time was increased.

Given that no decrease in treatment efficiency was seen with the reduction in air sparge frequency, further reduction of sparge frequency will be considered in 2025. An additional reduction would help manage the potential for over pressurization of the subsurface and short circuiting reduce cycling and wear and tear on sparge equipment, and minimize yearly operations and maintenance costs. If RACER decides to reduce the air sparge frequency, the plan will be communicated with EGLE and the change will be made 4 to 8 weeks prior to a performance sampling event so that the impact on treatment, if any, can be assessed.

4.3 Transect C

Continued monitoring of wells in the central portion of Plant 2 (MW-19-115, MW-19-116, MW-19-117, MW-16-82, MW-15-72), where an additional biosparge transect was originally planned, indicates that installation of this transect is not needed. Concentrations in the area are stable to decreasing, and the short- and long-term objectives of the remedy continue to be met through operation of the existing transects. The six blank casings that were installed at Transect C are currently sealed off with well caps. This area will continue to be monitored, and, if it is determined that the additional transect is not warranted, abandonment of the currently installed blank casings will be recommended.

4.4 Ongoing Evaluation

As performance monitoring data are collected and evaluated, minor operational adjustments will be made and additional, more significant actions will be recommended to EGLE as appropriate. Significant operational adjustments or other actions will be proposed in annual progress reports if future performance monitoring results justify such adjustments or actions. It is proposed that a 5-year review be completed during the first quarter of 2026 for the biosparge system to document recommendations, proposals, and concurrences with EGLE over its 5 years of operation. Site redevelopment potential and opportunities, as they relate to the biosparge system, will be a factor to be considered in that review.

5 References

Arcadis. 2018. Interim Measures Work Plan: Lower 1,4-Dioxane Biosparge. RACER Trust Lansing Industrial Land, Lansing, Michigan. October 19.

Arcadis. 2020. 2019 Annual Groundwater Report. RACER Trust Lansing Industrial Land, Lansing, Michigan. May 4.

Arcadis. 2021. 2020 Annual Groundwater Monitoring Report. RACER Trust Lansing Industrial Land, Lansing, Michigan. May 6.

Arcadis. 2022. 2021 Annual Groundwater Monitoring Report. RACER Trust Lansing Industrial Land, Lansing, Michigan. May 12.

Arcadis. 2023a. 2022 Lower 1,4-Dioxane Biosparge Progress Report and Shutdown Evaluation. March 15.

Arcadis. 2023b. 2022 Annual Groundwater Monitoring Report. RACER Trust Lansing Industrial Land, Lansing, Michigan. March 15.

Arcadis. 2023c. Revised Interim Groundwater Monitoring Plan. May 23.

Arcadis. 2024a. 2023 Lower 1,4-Dioxane Biosparge Progress Report. April 12.

Arcadis 2024b. 2023 Annual Groundwater Monitoring Report. RACER Trust Lansing Industrial Land, Lansing, Michigan.

Arcadis 2024c. Revised Interim Monitoring Plan. December 20.

Arcadis. 2025. Revised Biosparge Shut Down Test Proposal Memo. January 17.

Tables

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-13-43	**2**	06/06/19	0.23	--	--	--	266
		12/04/19	0.36	--	--	--	320
		06/09/20	0.28	--	--	--	230
		12/04/20	4.26	--	--	--	15
		06/03/21	7.36	--	--	--	<1
		12/06/21	9.20	--	--	--	31
		06/07/22	14.84	--	--	--	3
		11/01/22	10.24	--	--	--	2
		05/16/23	10.51	--	--	--	2
		10/28/23	10.20	--	--	--	<1
		05/14/24	6.11	--	--	--	3
		11/12/24	8.05	--	--	--	4
MW-13-45	**2**	06/05/19	0.14	--	--	--	40
		12/03/19	-	--	--	--	41
		06/09/20	0.18	--	--	--	38
		12/04/20	0.09	--	--	--	58
		06/03/21	0.32	--	--	--	42
		12/06/21	0.29	--	--	--	37
		06/07/22	0.39	--	--	--	32
		11/01/22	0.85	--	--	--	26
		05/16/23	5.61	--	--	--	28
		10/28/23	0.19	--	--	--	25
		05/14/24	1.04	--	--	--	28
		11/12/24	0.91	--	--	--	27
MW-14-61	**2**	06/13/19	0.75	--	--	--	151
		12/06/19	0.25	--	--	--	140
		03/03/20	1.60	<0.50	0.60	0.07	148
		06/02/20	0.36	<0.50	0.80	0.05	152
		08/31/20	2.55	<0.50	0.50	0.03	98
		12/02/20	1.27	<0.50	0.30	0.15	18
		03/02/21	1.85	<0.50	1.00	0.76	21
		06/02/21	1.40	<0.50	0.20	0.23	9
		09/02/21	1.31 [1.31]	<0.50 [<0.50]	0.10 [0.10]	0.09 [0.08]	9 [8]
		11/30/21	1.10 [1.10]	--	0.20 [0.20]	0.14 [0.12]	5 [7]
		06/01/22	2.10	<0.50	0.30	0.11	16
		11/02/22	0.48	<0.50	0.30	0.13	21
		05/17/23	2.11	<0.50	0.17	0.07	13
		10/26/23	8.66	0.02	0.10	0.11	13
		05/15/24	0.53 [0.53]	--	--	--	8 [8]
		11/12/24	4.33	--	--	--	7
MW-15-72	**2**	05/16/16	0.11	--	--	--	190
		09/09/16	--	--	--	--	--
		11/11/16	4.31	--	--	--	--
		12/07/16	3.30	--	--	--	--
		12/29/16	4.85	--	--	--	--
		01/31/17	1.95	--	--	--	--
		04/26/17	0.23	--	--	--	320
		12/07/17	1.67	--	--	--	290
		01/10/18	0.27	--	--	--	--
		02/14/18	0.21	--	--	--	230
		03/08/18	0.40	--	--	--	324
		04/09/18	0.19	--	--	--	220
		05/08/18	0.25	--	--	--	260
		09/05/18	0.06	--	--	--	240
		12/05/18	0.30	--	--	--	290
		02/27/19	0.68	--	--	--	28
		06/13/19	0.54	--	--	--	128
		09/26/19	--	--	--	--	17
MW-15-72	**2**	10/04/19	--	--	--	--	16

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-15-72 (Cont.)	**2**	12/05/19	0.24	--	--	--	310
		03/02/20	0.63	--	--	--	150
		06/02/20	0.18	--	--	--	270
		09/01/20	0.29	--	--	--	90
		12/03/20	0.09	--	--	--	270
		03/02/21	0.19	--	--	--	240
		06/02/21	4.94	--	--	--	15
		08/31/21	0.12	--	--	--	112
		12/01/21	0.34	--	--	--	133
		06/01/22	0.11	--	--	--	144
		11/03/22	0.46	--	--	--	11
		05/17/23	3.31	--	--	--	199
		10/27/23	0.28	--	--	--	67
		05/15/24	6.38	--	--	--	165
		11/13/24	0.52	--	--	--	108
MW-16-74	**2**	03/02/20	0.44	--	--	--	2
		06/05/20	0.49	--	--	--	2
		09/01/20	0.15	--	--	--	3
		12/01/20	0.62	--	--	--	<1
		03/03/21	0.43	--	--	--	<2
		06/02/21	0.37	--	--	--	<3
		08/31/21	0.12	--	--	--	2
		12/02/21	0.26	--	--	--	3
		06/01/22	0.17	--	--	--	2
		11/01/22	0.71	--	--	--	2
		05/17/23	0.27	--	--	--	2
		10/27/23	0.61	--	--	--	3
		05/14/24	0.04	--	--	--	3
		11/13/24	1.97	--	--	--	3
MW-16-75	**2**	06/05/19	0.11	--	--	--	<1
		12/05/19	0.57	--	--	--	2
		06/08/20	0.32	--	--	--	2
		12/04/20	0.06	--	--	--	<1
		06/03/21	0.34	--	--	--	<1
		12/06/21	0.70	--	--	--	3
		06/08/22	0.11	--	--	--	2
		11/01/22	0.47	--	--	--	2
		05/16/23	0.26	--	--	--	1
		10/28/23	0.35	--	--	--	2
		05/14/24	0.42				1
MW-16-77	**2**	06/06/19	0.33	--	--	--	<1
		12/05/19	6.54	--	--	--	<1
		06/08/20	0.74	--	--	--	<1
		12/04/20	0.26	--	--	--	<1
		06/04/21	0.46	--	--	--	<1
		12/06/21	0.78	--	--	--	<1
		06/08/22	0.61	--	--	--	1
		11/02/22	0.50	--	--	--	<1
		05/17/23	1.47	--	--	--	2
		10/28/23	1.09	--	--	--	1
		05/14/24	1.29				<1
MW-16-78	**2**	06/05/19	0.16	--	--	--	<1
		12/04/19	0.20	--	--	--	<1
		06/09/20	0.26	--	--	--	<1
		12/07/20	0.14 [0.14]	--	--	--	<1 [<1]
		03/03/21	0.23	--	--	--	<1
		06/02/21	0.67	--	--	--	<1
		08/31/21	0.36	--	--	--	<1
		12/02/21	0.30	--	--	--	<1

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-16-78 (Cont.)	**2**	06/02/22	0.12	--	--	--	<1
		11/02/22	0.51	--	--	--	<1
		02/16/23	1.22 [1.22]	--	--	--	1 [1]
		05/17/23	0.15	--	--	--	1
		08/29/23	0.42	--	--	--	<1
		10/28/23	0.68	--	--	--	1
		02/12/24	0.00	--	--	--	<1
		05/14/24	0.00	--	--	--	<1
		11/13/24	0.22	--	--	--	<1
MW-16-79	**2**	06/04/19	0.86	--	--	--	<1
		12/04/19	1.10	--	--	--	2
		06/09/20	0.79	--	--	--	<1
		12/07/20	0.34	--	--	--	<1
		03/03/21	0.20	--	--	--	<1
		06/03/21	0.75	--	--	--	<1
		08/31/21	0.64	--	--	--	<1
		12/02/21	0.42	--	--	--	<1
		06/02/22	0.71	--	--	--	<1
		11/02/22	--	--	--	--	<1
MW-16-81	**2**	06/13/19	0.27	--	--	--	3200
		12/06/19	0.16	--	--	--	2500
		03/02/20	0.40 [0.40]	--	--	--	2600 [2700]
		06/05/20	0.26 [0.26]	--	--	--	3100 [2700]
		09/02/20	0.16 [0.16]	--	--	--	500 [590]
		12/03/20	0.23 [0.23]	--	--	--	1930 [1070]
		03/03/21	0.20 [0.20]	--	--	--	560 [570]
		06/03/21	0.52 [0.52]	--	--	--	490 [500]
		08/31/21	0.29	--	--	--	230
		12/01/21	0.80	--	--	--	310
		06/02/22	6.55	--	--	--	143
		11/03/22	1.00	--	--	--	70
		05/17/23	0.79	--	--	--	168
		10/27/23	1.83	--	--	--	99
		05/15/24	8.33	--	--	--	38
		11/13/24	1.17	--	--	--	58
MW-16-82	**2**	06/07/19	0.27	--	--	--	<1
		12/04/19	0.32	--	--	--	<1
		06/10/20	0.36	--	--	--	<1
		12/04/20	0.27	--	--	--	<1
		03/03/21	0.29	--	--	--	<1
		06/04/21	0.34	--	--	--	<1
		09/01/21	0.30	--	--	--	<2
		12/02/21	0.31	--	--	--	<1
		06/02/22	0.09	--	--	--	1
		11/03/22	0.30	--	--	--	1
		05/17/23	0.21	--	--	--	1
		10/27/23	3.65	--	--	--	3
		05/14/24	0.54	--	--	--	6
		11/13/24	0.49	--	--	--	9
MW-16-84	**2**	06/04/19	7.89	--	--	--	47
		12/03/19	--	--	--	--	67
		03/04/20	0.21	--	--	--	66
		06/04/20	0.63 [0.63]	--	--	--	58 [58]
		09/01/20	0.39	--	--	--	57
		12/01/20	0.10	--	--	--	81
		03/02/21	1.69	<0.50	0.50	0.06	66
		06/03/21	0.51	<0.50	0.40	0.09	15
		09/01/21	0.21	--	--	--	43
		12/02/21	0.27	--	--	--	60

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-16-84 (Cont.)	2	06/02/22	0.14 [0.14]	--	--	--	44 [44]
		11/03/22	0.59 [0.59]	--	--	--	29 [30]
		05/17/23	0.23	--	--	--	44
		10/28/23	4.44	--	--	--	39
		05/14/24	2.88	--	--	--	32
		11/13/24	5.23	--	--	--	20
MW-16-85	2	06/04/19	4.49	--	--	--	16
		12/03/19	--	--	--	--	17
		06/08/20	0.48	--	--	--	8
		12/04/20	0.40	--	--	--	8
		06/04/21	0.27	--	--	--	4
		12/03/21	1.99	--	--	--	10
		06/06/22	0.03	--	--	--	8
		11/04/22	1.47	--	--	--	6
		05/18/23	0.58	--	--	--	6
		10/28/23	4.99	--	--	--	28
		05/16/24	0.73	--	--	--	18
		11/12/24	0.43	--	--	--	8
MW-17-86	2	06/04/19	0.23	--	--	--	75
		12/03/19	0.18	--	--	--	90
		03/04/20	0.15	--	--	--	99
		06/03/20	2.12	--	--	--	94
		09/01/20	0.53	--	--	--	88
		12/01/20	0.11	--	--	--	106
		03/03/21	0.20	--	--	--	79
		06/03/21	0.28 [0.28]	--	--	--	69 [70]
		09/01/21	0.28	--	--	--	48
		12/03/21	0.32	--	--	--	43
		06/02/22	0.42	--	--	--	27
		11/03/22	0.34	--	--	--	19
		05/17/23	0.86	--	--	--	20
		10/27/23	0.00	--	--	--	16
		05/14/24	0.67	--	--	--	16
		11/14/24	0.89	--	--	--	16
MW-19-115	2	12/20/19	0.68	--	--	--	11
		03/04/20	0.22	--	--	--	9
		06/03/20	0.24	--	--	--	13
		09/01/20	1.99	--	--	--	8
		12/01/20	0.17	--	--	--	12
		03/03/21	0.60	--	--	--	2
		06/04/21	1.08	--	--	--	2
		09/01/21	0.23	--	--	--	7
		12/03/21	0.24	--	--	--	8
		06/03/22	1.63	--	--	--	7
		11/02/22	0.39	--	--	--	7
		05/17/23	5.57	--	--	--	8
		10/27/23	5.08	--	--	--	6
		05/15/24	0.5	--	--	--	8
		11/14/24	1.41	--	--	--	7
MW-19-116	2	12/20/19	0.19	--	--	--	51
		03/04/20	0.17	--	--	--	60
		06/03/20	0.18	--	--	--	61
		09/02/20	0.24 [0.24]	--	--	--	54 [55]
		12/02/20	0.30 [0.30]	--	--	--	82 [83]
		03/03/21	0.22 [0.22]	--	--	--	72 [71]
		06/04/21	0.30	--	--	--	69
		09/01/21	0.20 [0.20]	--	--	--	54 [58]
		12/03/21	0.34 [0.34]	--	--	--	68 [73]
		06/03/22	7.01	--	--	--	69

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-19-116 (Cont.)	2	11/02/22	0.20	--	--	--	65
		05/17/23	1.91	--	--	--	81
		10/27/23	5.64	--	--	--	61
		05/15/24	0.11	--	--	--	148
		11/14/24	1.46	--	--	--	111
MW-19-117	2	06/03/20	0.30	--	--	--	2
		09/02/20	0.23	--	--	--	2
		12/02/20	0.23	--	--	--	<1
		03/03/21	1.22	--	--	--	<1
		06/04/21	0.16	--	--	--	<1
		09/02/21	0.13	--	--	--	<2
		12/03/21	0.29	--	--	--	1
		06/02/22	0.48	--	--	--	1
		11/03/22	0.16	--	--	--	<1
		05/18/23	0.36	--	--	--	<1
		10/27/23	0.94	--	--	--	<1
		05/15/24	0.11	--	--	--	<1
		11/15/24	0.37	--	--	--	<1
MW-19-120	2	12/04/19	0.63	--	--	--	165
		03/04/20	0.23	--	--	--	198
		06/04/20	0.35	--	--	--	184
		09/02/20	0.11	--	--	--	137
		12/02/20	2.68	--	--	--	28
		03/02/21	0.16	<0.50	0.50	0.02	73
		06/04/21	0.29	<0.50	0.40	0.02	49
		09/02/21	4.14	--	--	--	7
		12/03/21	2.75	--	--	--	15
		06/02/22	1.08	--	--	--	12
		11/03/22	1.14	--	--	--	13
		05/18/23	0.50	--	--	--	15
		10/28/23	2.96	--	--	--	11
		05/14/24	4.23	--	--	--	7
		11/15/24	4.07	--	--	--	8
MW-19-121	2	12/04/19	0.75	--	--	--	99
		03/03/20	0.14	<0.50	0.70	0.10	119
		06/04/20	1.16	<0.50	0.80	0.14	115
		08/31/20	6.06	<0.50	0.90	0.06	17
		12/02/20	2.53	8.20	0.50	1.74	4
		03/02/21	2.13	2.20	0.40	0.87	<1
		06/04/21	4.36	8.80	0.30	1.66	<1
		09/02/21	1.20	7.60	0.20	0.89	<2
		11/30/21	0.33	--	0.10	11.30	<1
		03/01/22	1.89	--	--	--	<1
		06/01/22	5.79	18.60	0.40	4.10	<1
		11/02/22	4.55	15.00	0.80	15.30	<1
		02/16/23	10.50	--	--	--	<1
		05/17/23	4.29 [4.29]	5.60 [5.40]	0.32 [0.45]	5.10 [4.80]	<1 [<1]
		08/29/23	7.76	--	--	--	<1
		10/26/23	10.44 [10.44]	0.02 [0.02]	1.30 [1.30]	10.30 [10.30]	<1 [<1]
		02/12/24	8.08	--	--	--	<1
		05/14/24	2.03	--	--	--	<1
		11/14/24	4.18	<0.5	0.3	1.06	<1
MW-19-122	2	12/03/19	0.97	--	--	--	43
		03/04/20	0.31 [0.31]	--	--	--	41 [41]
		06/05/20	0.21	--	--	--	42
		09/02/20	1.87	--	--	--	33
		12/03/20	0.11	--	--	--	34
		03/02/21	0.38	--	--	--	25
		06/03/21	1.20	--	--	--	37

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-19-122 (Cont.)	2	09/03/21	1.63	--	--	--	9
		12/03/21	6.25	--	--	--	4
		06/02/22	6.05	--	--	--	3
		11/01/22	5.12	--	--	--	6
		02/16/23	9.46	--	--	--	3
		05/18/23	6.57	--	--	--	2
		08/07/23	--	--	--	--	5
		08/29/23	1.02	--	--	--	8
		10/30/23	3.05	--	--	--	4
		02/12/24	2.88	--	--	--	6
		05/14/24	3.40	--	--	--	3
		11/15/24	3.23	--	--	--	2
MW-19-123	2	12/03/19	3.14	--	--	--	52
		03/04/20	0.21	--	--	--	76
		06/04/20	0.22	--	--	--	75
		09/01/20	1.46	--	--	--	51
		12/03/20	5.35	--	--	--	39
		03/02/21	5.49	<0.50	0.30	0.03	58
		06/07/21	6.03	<0.50	0.30	0.03	50
		09/02/21	5.35	<0.50	0.20	0.01	43
		11/30/21	6.43	--	0.10	0.02	20
		06/01/22	4.25	<0.50	0.30	0.01	25
		11/02/22	5.10	<0.50	0.30	0.01	21
		02/16/23	6.54	--	--	--	26
		05/17/23	10.19	<0.50	0.23	0.07	44
		08/07/23	--	--	--	--	53
		08/29/23	0.53	--	--	--	72
		10/26/23	4.10	0.02	0.10	0.02	39
		02/12/24	6.44	--	--	--	48
		05/14/24	6.03	--	--	--	24
		11/14/24	6.36	--	--	--	19
MW-19-124	2	12/04/19	0.67	--	--	--	220
		06/05/20	0.18	--	--	--	197
		09/02/20	0.12	--	--	--	230
		12/03/20	0.11	--	--	--	420
		03/02/21	0.17	--	--	--	182
		06/03/21	0.12	--	--	--	173
		09/03/21	0.72	--	--	--	222
		12/02/21	0.33	--	--	--	280
		06/02/22	0.48	--	--	--	90
		11/01/22	0.26	--	--	--	137
		05/18/23	0.24	--	--	--	172
		10/30/23	0.62	--	--	--	143
		05/14/24	0.37	--	--	--	186
		11/15/24	0.37	--	--	--	171
MW-20-126	2	07/23/20	0.26	--	--	--	370
		09/02/20	4.26	--	--	--	360
		12/03/20	0.94	--	--	--	320
		03/03/21	1.04	--	--	--	220
		06/03/21	6.70	--	--	--	156
		09/03/21	1.11	--	--	--	143
		12/02/21	5.39	--	--	--	170
		03/01/22	10.04	--	--	--	130
		06/03/22	4.65	--	--	--	120
		11/01/22	2.87	--	--	--	85
		02/16/23	10.89	--	--	--	82
		05/18/23	4.06	--	--	--	81
		08/30/23	9.61 [9.61]	--	--	--	91 [88]
		10/30/23	2.36	--	--	--	63

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-20-126 (Cont.)	2	02/12/24	2.40	--	--	--	58
		04/10/24	7.78	--	--	--	7
		11/13/24	1.71	--	--	--	27
MW-20-127	2	07/23/20	0.71	--	--	--	85
		08/31/20	7.15	<0.50	0.80	0.04	115
		12/02/20	0.06	<0.50	0.70	0.16	157
		03/02/21	4.00	<0.50	0.70	0.08	138
		06/03/21	0.23	<0.50	0.80	0.06	140
		09/02/21	2.01	<0.50	0.50	0.09	126
		11/30/21	0.56	--	0.50	0.09	158
		03/01/22	0.78	--	--	--	130
		06/01/22	0.60 [0.60]	<0.50 [<0.50]	0.70 [0.80]	0.06 [0.07]	142 [143]
		11/02/22	0.43 [0.43]	<0.50 [<0.50]	0.80 [0.70]	0.04 [0.04]	126 [122]
		02/16/23	0.40	--	--	--	146
		05/17/23	0.72	<0.50	0.75	0.06	155
		08/30/23	0.32	--	--	--	180
		10/26/23	0.00	0.54	0.70	0.05	132
		02/12/24	0.00	--	--	--	156
		05/15/24	0.35	--	--	--	171
		11/14/24	0.26 [0.26]	<0.5 [<0.5]	0.7 [0.7]	0.05 [0.05]	174 [172]
MW-20-128	2	07/23/20	0.15	<0.50	0.60	0.09	270
		09/01/20	9.82	--	--	--	112
		12/03/20	7.13	--	--	--	20
		03/02/21	9.69	<0.50	1.40	0.43	9
		06/02/21	7.95	0.70	6.10	1.00	4
		09/02/21	3.92	<0.50	0.20	0.04	11
		11/30/21	9.39	--	2.10	0.70	5
		06/01/22	7.13	<0.50	2.20	0.39	6
		11/02/22	7.59	<0.50	1.60	0.60	<1
		05/17/23	7.58	<0.50	0.81	0.33	4
		10/26/23	11.62	0.03	6.70	3.30	1
		05/15/24	0.72 [0.72]	--	--	--	2 [2]
		11/15/24	1.31	--	--	--	3
MW-20-129	2	07/23/20	0.41	--	--	--	126
		09/01/20	0.35	--	--	--	126
		12/03/20	0.09	--	--	--	140
		03/02/21	0.48	--	--	--	108
		06/02/21	0.20	--	--	--	108
		09/02/21	0.18	--	--	--	82
		12/02/21	0.43	--	--	--	83
		06/03/22	0.17	--	--	--	80
		11/01/22	0.31	--	--	--	60
		02/16/23	0.79	--	--	--	71
		05/18/23	0.21	--	--	--	103
		08/07/23	--	--	--	--	75
		08/29/23	0.71	--	--	--	74
		10/30/23	0.38	--	--	--	71
		02/12/24	1.09	--	--	--	64
		05/15/24	2.91	--	--	--	67
		11/14/24	0.28	--	--	--	77
MW-21-142	2	12/03/21	0.30	--	--	--	91
		06/07/22	0.04	--	--	--	81
		11/02/22	0.51	--	--	--	64
		05/18/23	0.48	--	--	--	82
		10/30/23	0.21	--	--	--	70
		05/15/24	0.00	--	--	--	112
		11/13/24	0.00	--	--	--	95
PW-14-02	2	06/06/19	0.12	--	--	--	260
		12/04/19	0.24	--	--	--	260

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
PW-14-02 (Cont.)	**2**	06/03/20	0.39 [0.39]	--	--	--	160 [160]
		09/02/20	7.57	--	--	--	43
		12/03/20	1.15	--	--	--	97
		03/03/21	9.04	--	--	--	37
		06/02/21	8.56	--	--	--	23
		09/03/21	1.39	--	--	--	50
		12/02/21	0.70	--	--	--	95
		03/01/22	10.81 [10.81]	--	--	--	11 [12]
		06/01/22	5.46	<0.50	0.40	0.03	26
		11/03/22	8.20	--	--	--	9
		02/16/23	9.42	--	--	--	18
		05/18/23	7.50	--	--	--	14
		08/30/23	9.11	--	--	--	5
		10/26/23	8.97	--	--	--	7
		02/13/24	0.87 [0.87]	--	--	--	55 [51]
		05/15/24	1.41	--	--	--	84
		08/19/24	8.83 [8.83]	--	--	--	8 [8]
		11/13/24	11.29	--	--	--	6
TW-14-02	**2**	03/04/20	0.34	--	--	--	470
		06/04/20	0.37	--	--	--	410
		09/01/20	10.72	--	--	--	3
		12/02/20	9.81	--	--	--	<1
		03/03/21	12.61	--	--	--	<1
		06/02/21	8.39	--	--	--	<1
		09/03/21	5.08	--	--	--	29
		12/02/21	9.61	--	--	--	8
		03/02/22	9.44	--	--	--	<1
		06/01/22	8.07	<0.50	0.50	0.11	<1
		11/03/22	13.03	--	--	--	<1
		02/16/23	12.10	--	--	--	3
		05/18/23	8.16 [8.16]	--	--	--	9 [8]
		08/07/23	--	--	--	--	152
		08/29/23	0.32	--	--	--	220
		10/26/23	10.48	--	--	--	1
		02/12/24	10.44	--	--	--	4
		05/15/24	0.92	--	--	--	161
		08/20/24	8.24	--	--	--	16
		11/13/24	7.63	--	--	--	21
TW-15-12	**2**	03/03/20	0.33	<0.50	0.40	0.03	220
		06/02/20	1.33	<0.50	0.90	0.31	210
		08/31/20	7.42	<0.50	1.00	0.45	100
		12/02/20	9.19	<0.50	2.00	0.76	34
		03/02/21	10.91	<0.50	0.40	0.15	5
		06/02/21	8.58	<0.50	0.40	0.14	7
		09/02/21	6.15	<0.50	0.20	0.03	10
		11/30/21	8.86	--	0.10	0.02	34
		03/02/22	11.92	--	--	--	4
		06/01/22	7.33	0.50	5.10	2.50	9
		11/02/22	10.14	0.50	4.60	3.00	2
		02/16/23	10.73	--	--	--	1
		05/17/23	7.35	<0.50	0.30	0.12	3
		08/30/23	8.86	--	--	--	<1
		10/26/23	10.49	0.02	0.30	0.12	<1
		02/13/24	11.02	--	--	--	<1
		05/16/24	6.75	--	--	--	<1
		11/14/24	10.47	<0.5	0.2	0.03	<1
AS-19-A05	**3**	05/17/24	0.43	--	--	--	5
		11/18/24	0.74	--	--	--	2
AS-19-A06	**3**	07/06/22		--	--	--	<1

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
AS-19-A06 (Cont.)	3	08/30/22	3.24	--	--	--	<1
		11/07/22	0.50	--	--	--	<1
		02/17/23	1.27	--	--	--	<1
		05/19/23	0.49	--	--	--	<1
		08/30/23	1.16	--	--	--	<1
		11/02/23	0.79	--	--	--	<1
		02/13/24	3.83	--	--	--	<1
		05/17/24	1.79	--	--	--	<1
		11/18/24	1.77	--	--	--	2
AS-19-A07	3	2/17/2023	4.50	--	--	--	1
		5/19/2023	5.72	--	--	--	<1
		8/30/2023	1.98	--	--	--	3
		11/2/2023	4.09	--	--	--	3
MW-12-21	3	05/08/18	1.21	--	--	--	200
		12/11/18	4.54	--	--	--	251
		06/05/19	6.79	--	--	--	255
		12/06/19	0.57	--	--	--	250
		06/11/20	0.62	--	--	--	230
		12/08/20	0.20	--	--	--	310
		06/07/21	1.02 [1.02]	--	--	--	167 [171]
		12/09/21	0.46	--	--	--	177
		06/10/22	4.55	--	--	--	179
		11/04/22	1.10	--	--	--	150
		02/17/23	1.60	--	--	--	141
		05/19/23	0.77 [0.77]	--	--	--	162 [167]
		08/30/23	7.22	--	--	--	199
		11/01/23	0.45	--	--	--	118
		02/13/24	0.71	--	--	--	145
		05/16/24	0.87	--	--	--	157
		11/18/24	5.08	--	--	--	160
MW-13-22	3	12/12/18	1.11	--	--	--	160
		06/06/19	0.62	--	--	--	159
		08/27/19	6.58	<0.5	1.00	0.39	173
		12/05/19	1.91	--	--	--	162
		03/03/20	0.23	--	--	--	203
		06/11/20	0.47	--	--	--	157
		08/27/20	1.52	--	--	--	141
		12/01/20	3.55	--	--	--	162
		03/03/21	0.16	--	--	--	86
		06/07/21	0.34	--	--	--	45
		09/01/21	0.52	--	--	--	132
		12/07/21	0.45	--	--	--	152
		03/02/22	0.35	--	--	--	100
		06/06/22	0.37	--	--	--	109
		08/30/22	6.69	--	--	--	137
		11/05/22	0.22	--	--	--	84
		02/17/23	0.98	--	--	--	171
		05/19/23	1.39	--	--	--	179
		08/30/23	2.61	--	--	--	138
		11/01/23	0.23	--	--	--	135
		02/13/24	0 [0]	--	--	--	79 [77]
		05/16/24	0.18	--	--	--	124
		11/18/24	0.04	--	--	--	173
MW-13-29	3	12/10/18	1.00	--	--	--	16
		06/05/19	0.19	--	--	--	21
		06/10/20	0.26	--	--	--	35
		06/08/21	--	<0.50	0.70	0.06	26
		09/02/21	0.64	<0.50	0.40	0.01	18
		11/30/21	1.59	--	0.40	0.06	12

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Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
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Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-13-29 (Cont.)	3	06/06/22	3.46	--	--	--	8
		11/07/22	1.05	<0.50	0.80	0.02	12
		05/23/23	3.51	<0.50	0.47	0.08	9
		10/26/23	2.34 [2.34]	0.13 [0.12]	0.40 [0.20]	0.02 [0.02]	7 [7]
		05/16/24	0.23	--	--	--	9
		11/18/24	0.57	<0.5	0.4	0.01	6
MW-13-34	3	05/14/18	3.53	--	--	--	75
		12/11/18	1.79	--	--	--	70
		06/07/19	0.15	--	--	--	74
		08/29/19	0.39	--	--	--	94
		12/05/19	1.42	--	--	--	105
		06/10/20	0.01	--	--	--	81
		08/27/20	0.35	--	--	--	75
		12/01/20	0.12	--	--	--	106
		03/03/21	6.61	--	--	--	127
		06/07/21	0.12	--	--	--	86
		09/02/21	0.31	--	--	--	77
		12/07/21	0.49	--	--	--	83
		03/02/22	0.86	--	--	--	75
		06/06/22	0.33	--	--	--	80
		11/08/22	0.47	--	--	--	81
		02/17/23	0.16 [0.16]	--	--	--	87 [85]
		05/19/23	0.99	--	--	--	109
		08/30/23	0.26	--	--	--	106
		11/02/23	0.21	--	--	--	82
		02/13/24	0.00	--	--	--	97
		05/16/24	0.01	--	--	--	114
		11/18/24	0.04 [0.04]	--	--	--	101 [115]
MW-13-48	3	05/14/18	0.24	--	--	--	141
		12/11/18	1.83	--	--	--	117
		06/07/19	0.10	--	--	--	128
		12/06/19	2.02	--	--	--	162
		06/10/20	0.01	--	--	--	128
		12/07/20	0.04 [0.04]	--	--	--	137 [137]
		06/07/21	1.03	--	--	--	114
		12/09/21	0.27	--	--	--	84
		06/10/22	0.65	--	--	--	37
		11/08/22	0.37	--	--	--	24
		05/19/23	0.63	--	--	--	62
		11/02/23	0.39	--	--	--	61
		05/16/24	0 [0]	--	--	--	86 [91]
		11/18/24	0.06	--	--	--	94
MW-19-109	3	06/20/19	3.99	--	--	--	34
		08/27/19	8.08	<0.50	0.40	0.40	29
		12/05/19	6.95	--	--	--	4
PW-14-03	3	05/09/18	0.29	--	--	--	500
		12/11/18	1.22	--	--	--	378
		06/04/19	0.33	<0.09	1.30	0.08	223
		08/27/19	0.64 [0.64]	<0.50 [<0.50]	1.20 [1.10]	0.14 [0.11]	250 [245]
		12/05/19	1.04	--	--	--	43
		03/03/20	5.90	--	--	--	75
		06/10/20	0.02	--	--	--	65
		08/27/20	4.51	--	--	--	69
		12/01/20	8.30	--	--	--	71
		03/03/21	9.12	--	--	--	27
		06/08/21	8.63	--	--	--	22
		09/01/21	7.59	--	--	--	19
		12/07/21	1.07	--	--	--	25
		03/02/22	10.37 [10.37]	--	--	--	3 [2]

Table 1
Biosparge Performance Results
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
PW-14-03 (Cont.)	**3**	06/06/22	12.18 [12.18]	--	--	--	3 [3]
		11/05/22	5.53 [5.53]	--	--	--	8 [8]
		02/17/23	6.22	--	--	--	6
		05/20/23	7.69	--	--	--	5
		08/30/23	7.30	--	--	--	3
		11/02/23	7.59	--	--	--	2
		02/13/24	2.92	--	--	--	6
		05/17/24	0.38	--	--	--	13
		11/19/24	2.08	--	--	--	11
TW-14-06	**3**	06/04/19	2.12	<0.09	2.40	1.00	700
		08/27/19	9.16	<0.50	9.10	14.00	430
		12/06/19	8.92 [8.92]	<0.50 [--]	1.50 [--]	1.00 [--]	59 [61]
		03/03/20	12.46	<0.50	22.40	29.00	23
		06/23/20	0.91	<0.50	2.70	1.60	13
		08/31/20	6.69 [6.69]	<0.50 [<0.50]	2.40 [2.20]	1.60 [1.14]	4 [4]
		12/02/20	12.49 [12.49]	<0.50 [<0.50]	18.00 [19.10]	22.00 [24.00]	<1 [<1]
		03/02/21	10.44 [10.44]	<0.50 [<0.50]	8.60 [8.40]	10.80 [8.30]	<1 [<1]
		06/07/21	12.87 [12.87]	<0.50 [<0.50]	8.20 [7.00]	14.00 [9.30]	<1 [<1]
		09/02/21	11.29 [11.29]	<0.50 [<0.50]	4.70 [4.70]	2.90 [1.90]	9 [8]
		11/30/21	11.24 [11.24]	--	7.50 [7.70]	4.00 [6.00]	34 [36]
		03/02/22	12.34	--	--	--	7
		06/06/22	15.09	<0.50	4.30	1.50	2
		11/07/22	9.53	2.50	2.60	0.60	10
		05/23/23	11.94	<0.50	9.70	10.00	4
		08/30/23	10.31 [10.31]	--	--	--	4 [5]
		10/26/23	11.92	0.02	0.80	0.46	<1
TW-15-11	**3**	06/04/19	0.20	<0.09	0.90	0.07	246
		08/28/19	4.22	<0.50	0.40	0.07	218
		12/05/19	2.78	--	--	--	250
		03/03/20	5.91	--	--	--	130
		06/23/20	0.63	--	--	--	220
		08/27/20	4.11	--	--	--	120
		12/01/20	10.66	--	--	--	51
		03/03/21	9.45	--	--	--	48
		06/07/21	11.85	--	--	--	41
		09/01/21	7.77	--	--	--	7
		12/08/21	0.32	--	--	--	30
		03/02/22	0.02	--	--	--	5
		06/06/22	13.66	--	--	--	5
		11/05/22	9.82	--	--	--	22
		02/17/23	0.29	--	--	--	17
		05/20/23	8.66 [8.66]	--	--	--	46 [47]
		08/30/23	10.15	--	--	--	120
		11/02/23	12.88	--	--	--	108
		02/13/24	9.78	--	--	--	115
		05/17/24	0.03	--	--	--	197 Y
		08/19/24	7.76	--	--	--	24
		11/18/24	2.12	--	--	--	26

Notes:
mg/L = milligrams per liter
µg/L = micrograms per liter
< = less than lab reporting limit
-- = Not Analyzed
[ ] = Duplicate Sample

Table 2
Biosparge Performance Tracking Plant 3
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

ARCADIS

Plant 3 (Transect A) - Includes Deep Overburden Wells but Excludes Upgradient Wells

		Well 1,4-Dioxane (µg/L)							
Descriptor:		TW-14-06 ROI	TW-15-11 DG	PW-14-03 DG	MW-13-34 DG	MW-13-29 DG	MW-13-48 DG	Average (µg/L)	Average 12-month Reduction (µg/L)*
Distance (ft):		14	48	56	460	250	460		
Year	Quarter								
1	6/1/2019	700	246	223	74	21	128	232	--
	9/1/2019	430	218	250	94	--	--	--	--
	12/1/2019	59	250	43	105	--	162	124	--
	3/1/2020	23	130	75	--	--	--	--	--
2	6/1/2020	13	220	65	81	34	128	90	142
	9/1/2020	4	120	69	75	--	--	--	--
	12/1/2020	< 1	51	71	106	--	137	73	51
	3/1/2021	< 1	48	27	127	--	--	--	--
3	6/1/2021	< 1	41	22	86	26	114	48	42
	9/1/2021	9	7	19	77	18	--	--	--
	12/1/2021	34	30	25	83	12	84	45	29
	3/1/2022	7	5	3	75	--	--	--	--
4	6/1/2022	2	5	3	80	8	37	23	***26***
	9/1/2022	--	--	--	--	--	--	--	--
	12/1/2022	10	22	8	81	12	24	26	***19***
	3/1/2023	--	17	6	85	--	--	--	--
5	6/1/2023	4	47	5	109	9	62	39	-17
	9/1/2023	5	120	3	106	--	--	--	--
	12/1/2023	< 1	108	2	82	7	61	44	-17
	3/1/2024	--	115	6	97	--	--	--	--
6	6/1/2024	--	197	13	114	9	86	84	-44
	9/1/2024	--	24	--	--	--	--	--	--
	12/1/2024	--	26	11	101	6	94	48	-4

Notes:
All concentrations are in micrograms per liter.
Actual sample date varies, sample date displayed represents first day of the third month of the quarter
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
< = less than lab reporting limit
-- = Not Analyzed
TW-14-06 was not sampled due to abandonment
*Reference Reduction Value (RRV) is 142 µg/L, the point of diminishing returns is achieved after 3 years of operation when the 12-month reduction is less than 20% of the RRV, or 28.4 µg/L
Bold and Italic = below 20% of the RRV

Table 3a
Biosparge Performance Tracking Plant 2
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

ARCADIS

Plant 2 North (Transect B)

		Well 1,4-Dioxane (µg/L)					
Descriptor:		TW-15-12 ROI	PW-14-02 DG	MW-20-127 DG	MW-20-126 UG	Average (µg/L)	Average 12-month Reduction (µg/L)*
Distance (ft):		8	54	102	66		
Year	Date						
1	6/1/2020	210	160	85	370	206	--
	9/1/2020	100	43	115	360	155	--
	12/1/2020	34	97	157	320	152	--
	3/1/2021	5	37	138	220	100	--
2	6/1/2021	7	23	140	156	82	125
	9/1/2021	10	50	126	143	82	72
	12/1/2021	34	95	158	170	114	38
	3/1/2022	4	11	130	130	69	31
3	6/1/2022	9	26	142	120	74	***7***
	9/1/2022	--	--	--	--	--	--
	12/1/2022	2	9	126	85	56	59
	3/1/2023	1	18	146	82	62	***7***
4	6/1/2023	3	14	155	81	63	***11***
	9/1/2023	< 1	5	180	88	69	--
	12/1/2023	< 1	7	132	63	51	***5***
	3/1/2024	< 1	55	156	58	68	-6
5	6/1/2024	< 1	84	171	7	66	-3
	9/1/2024	--	8	--	--	--	--
	12/1/2024	< 1	6	174	27	52	-1

Notes:
All concentrations are in micrograms per liter.
Actual sample date varies, sample date displayed represents first day of the third month of the quarter
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
< = less than lab reporting limit
-- = Not Analyzed
*Reference Reduction Value (RRV) is 125 µg/L, RACER proposes the point of diminishing returns is achieved after 3 years of operation when the 12-month reduction is less than 20% of the RRV, or 25 µg/L
Bold and Italic = below 20% of the RRV

Table 3b
Biosparge Performance Tracking Plant 2
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

ARCADIS

Plant 2 South (Transect G & E)

Descriptor:		Well 1,4-Dioxane (µg/L)								Average	Average 12-month Reduction (µg/L)*
		TW-14-02 ROI 2	MW-19-123 DG 70	MW-16-74 DG 75	MW-19-121 ROI 2	MW-20-129 UG 121	MW-19-122 UG 92	MW-16-78 DG 174	MW-16-81 UG 120		
Year	Date										
1	3/1/2020	470	76	2	119	--	41	--	2600	--	--
	6/1/2020	410	75	2	115	126	42	< 1	3100	484	--
	9/1/2020	3	51	3	17	126	33	--	500	--	--
	12/1/2020	< 1	39	< 1	4	140	34	< 1	1930	269	--
2	3/1/2021	< 1	58	< 1	< 1	108	25	< 1	560	94	--
	6/1/2021	< 1	50	< 1	< 1	108	37	< 1	490	86	398
	9/1/2021	29	43	2	< 2	82	9	< 1	230	50	--
	12/1/2021	8	20	3	< 1	83	4	< 1	310	54	215
3	3/1/2022	< 1	--	--	< 1	--	--	--	--	--	--
	6/1/2022	< 1	25	2	< 1	80	3	< 1	143	32	***54***
	9/1/2022	--	--	--	--	--	--	--	--	--	--
	12/1/2022	< 1	21	2	< 1	60	6	< 1	70	20	***34***
4	3/1/2023	3	26	--	< 1	71	3	1	--	--	--
	6/1/2023	9	44	2	< 1	103	2	1	168	41	-9
	9/1/2023	220	72	--	< 1	74	8	< 1	--	--	--
	12/1/2023	1	39	3	< 1	71	4	1	99	27	-7
5	3/1/2024	4	48	--	< 1	64	6	< 1	--	--	--
	6/1/2024	161	24	3	< 1	67	3	< 1	38	37	***4***
	9/1/2024	16	--	--	--	--	--	--	--	--	--
	12/1/2024	21	19	3	< 1	77	2	< 1	58	23	***5***

Notes:
All concentrations are in micrograms per liter.
Actual sample date varies, sample date displayed represents first day of the third month of the quarter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
< = less than lab reporting limit
-- = Not Analyzed
*Reference Reduction Value (RRV) is 398 µg/L, RACER proposes the point of diminishing returns is achieved after 3 years of operation when the 12-month reduction is less than 20% of the RRV, or 79.6 µg/L
Bold and Italic = below 20% of the RRV

Table 3c
Biosparge Performance Tracking Plant 2
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

ARCADIS

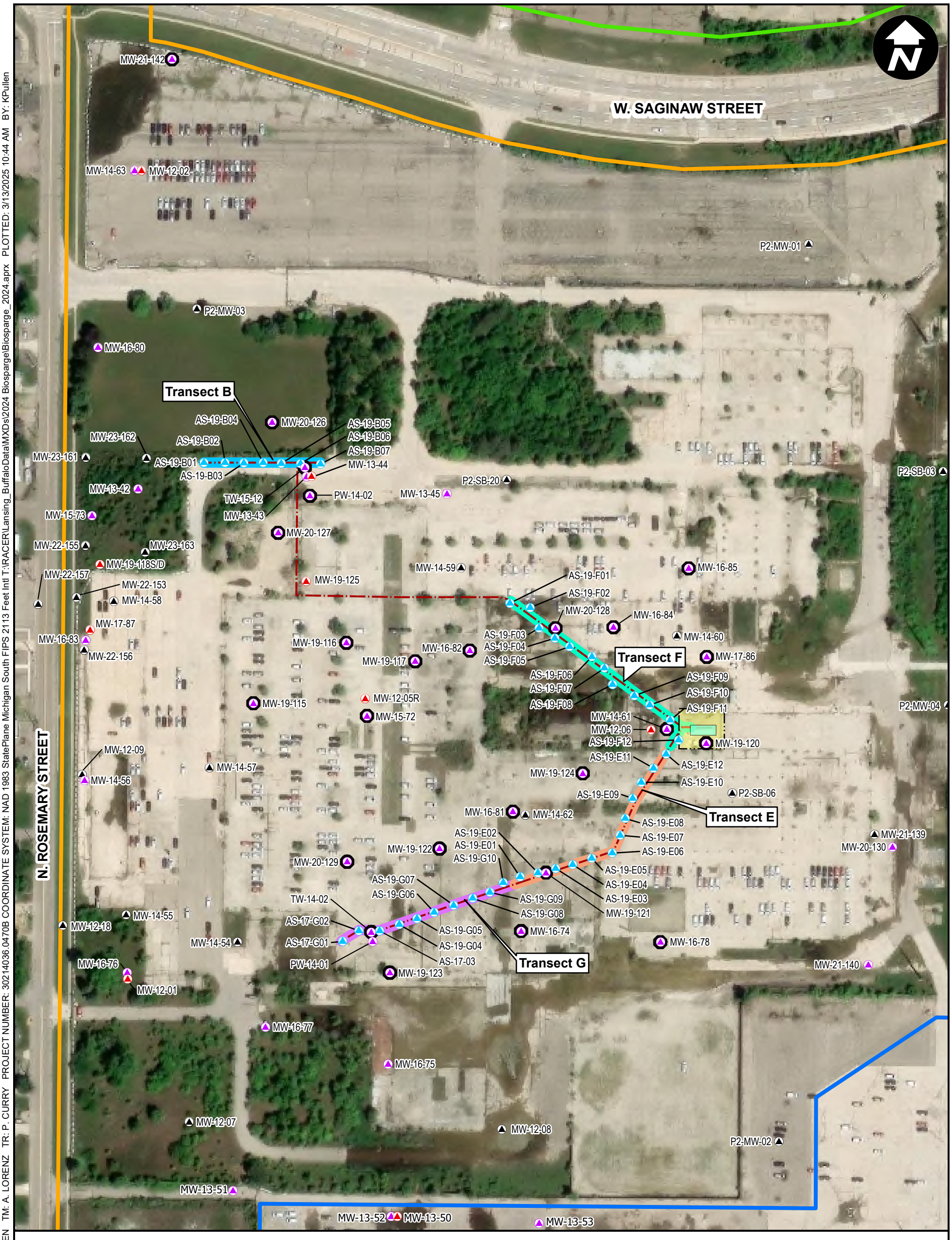
Plant 2 East (Transect E & F)

Descriptor: Distance (ft):		Well 1,4-Dioxane (µg/L)						Average (µg/L)	Average 12-month Reduction (µg/L)*
		MW-14-61 ROI 13	MW-19-120 ROI 44	MW-20-128 ROI 17	MW-16-84 DG 69	MW-17-86 DG 115	MW-19-124 UG 99		
Year	Date								
1	3/1/2020	148	198	--	66	99	--		--
	6/1/2020	152	184	270	58	94	197	159	--
	9/1/2020	98	137	112	57	88	230	120	--
	12/1/2020	18	28	20	81	106	420	112	--
2	3/1/2021	21	73	9	66	79	182	72	--
	6/1/2021	9	49	4	15	69	173	53	106
	9/1/2021	9	7	11	43	48	222	57	64
	12/1/2021	5	15	5	60	43	280	68	44
3	3/1/2022	--	--	--	--	--	--	--	--
	6/1/2022	16	12	6	44	27	90	33	**21**
	9/1/2022	--	--	--	--	--	--	--	--
	12/1/2022	21	13	< 1	29	19	137	37	31
4	3/1/2023	--	--	--	--	--	--	--	--
	6/1/2023	13	15	4	44	20	172	45	-12
	9/1/2023	--	--	--	--	--	--	--	--
	12/1/2023	13	11	1	39	16	143	37	***0***
5	3/1/2024	--	--	--	--	--	--	--	--
	6/1/2024	8	7	2	32	16	186	42	***3***
	9/1/2024	--	--	--	--	--	--	--	--
	12/1/2024	7	8	3	20	16	171	38	-1

Notes:
All concentrations are in micrograms per liter.
Actual sample date varies, sample date displayed represents first day of quarter for graphing purposes.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
< = less than lab reporting limit
-- = Not Analyzed
MW-16-79 was removed from calculation due to well damage.

*Reference Reduction Value (RRV) is 106 µg/L, RACER proposes the point of diminishing returns is achieved after 3 years of operation when the 12-month reduction is less than 20% of the RRV, or 21.2 µg/L
Bold and Italic = below 20% of the RRV

Figures



WELLS

- BIOSPARGE
- PERCHED MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE/IGMP SEMI-ANNUAL PERFORMANCE MONITORING WELL

- FENCE
- SYSTEM BUILDING
- FENCED AREA
- 1-INCH CONVEYANCE HOSE
- TRANSECT B
- TRANSECT E
- TRANSECT F
- TRANSECT G

PLANT BOUNDARIES

- PLANT 2
- PLANT 3
- PLANT 6

0 150 300
SCALE IN FEET

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

RACER TRUST
LANSING INDUSTRIAL LAND
LANSING, MICHIGAN

PLANT 2 BIOSPARGE SYSTEM AND PERFORMANCE MONITORING WELLS

ARCADIS

FIGURE
1

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 10:44 AM BY: KPullen

LEGEND:

- BIOSPARGE
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE/IGMP SEMI-ANNUAL PERFORMANCE MONITORING WELL
- 1-INCH CONVEYANCE HOSE
- SYSTEM BUILDING
- FENCE
- FENCED AREA
- PLANT 2
- PLANT 3

0 60 120

SCALE IN FEET

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

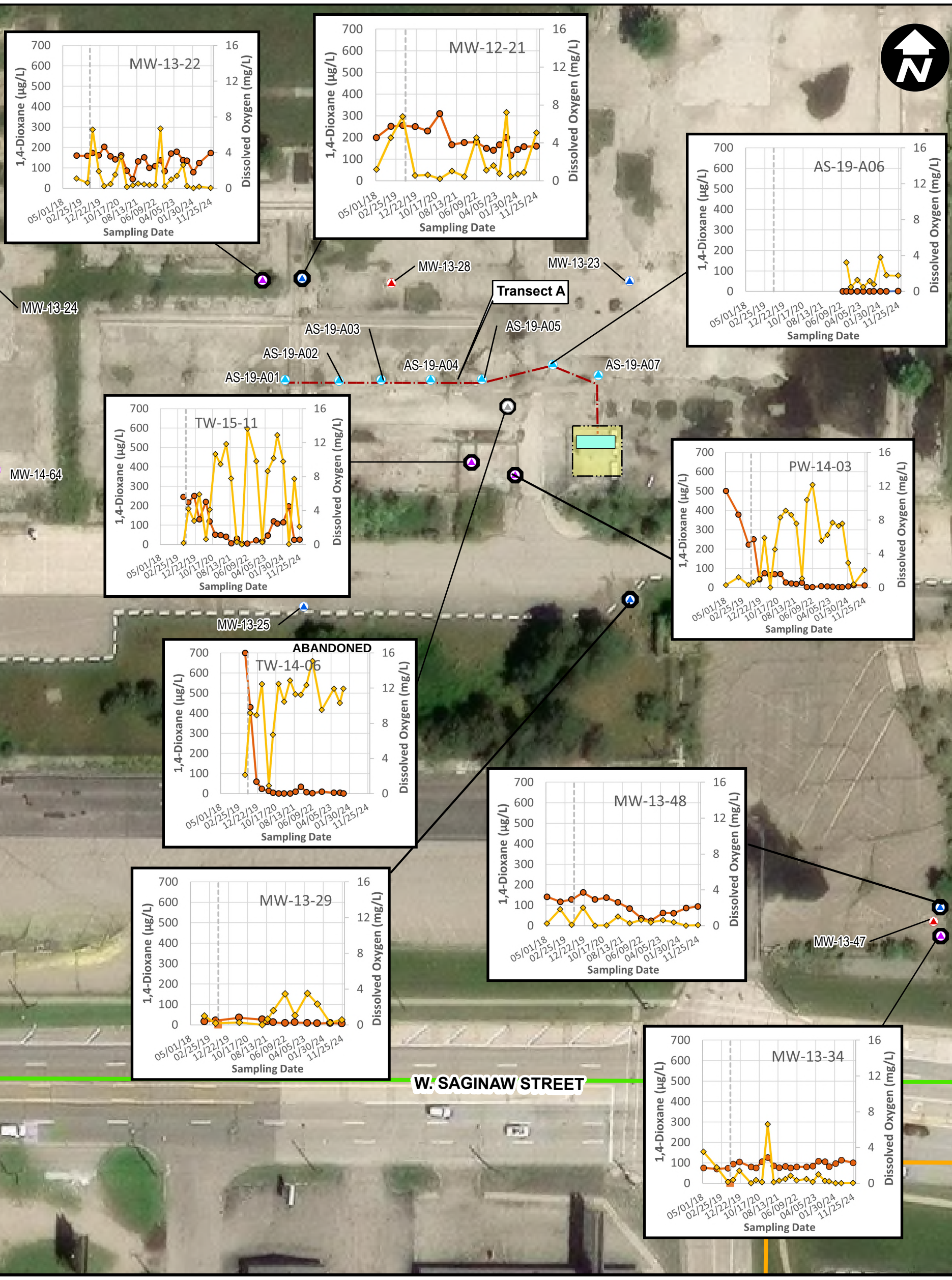
RACER TRUST
LANSING INDUSTRIAL LAND
LANSING, MICHIGAN

PLANT 3 BIOSPARGE SYSTEM AND PERFORMANCE MONITORING WELLS

ARCADIS

FIGURE
2

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 10:54 AM BY: KPullen



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 10:56 AM BY: KPullen

LEGEND

WELLS
- BIOSPARGE
- DEEP OVERBUDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- ABANDONED MONITORING WELL
- BIOSPARGE/IGMP SEMI-ANNUAL PERFORMANCE MONITORING WELL
- SYSTEM BUILDING
- FENCE
- FENCED AREA
- 1-INCH CONVEYANCE HOSE

PLANT BOUNDARIES
- PLANT 2
- PLANT 3

GRAPH LEGEND
- 1,4-DIOXANE
- DISSOLVED OXYGEN
- SYSTEM AIR + PROPANE START DATE

ug/L MICROGRAMS PER LITER
mg/L MILLIGRAMS PER LITER

0 60 120
SCALE IN FEET

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

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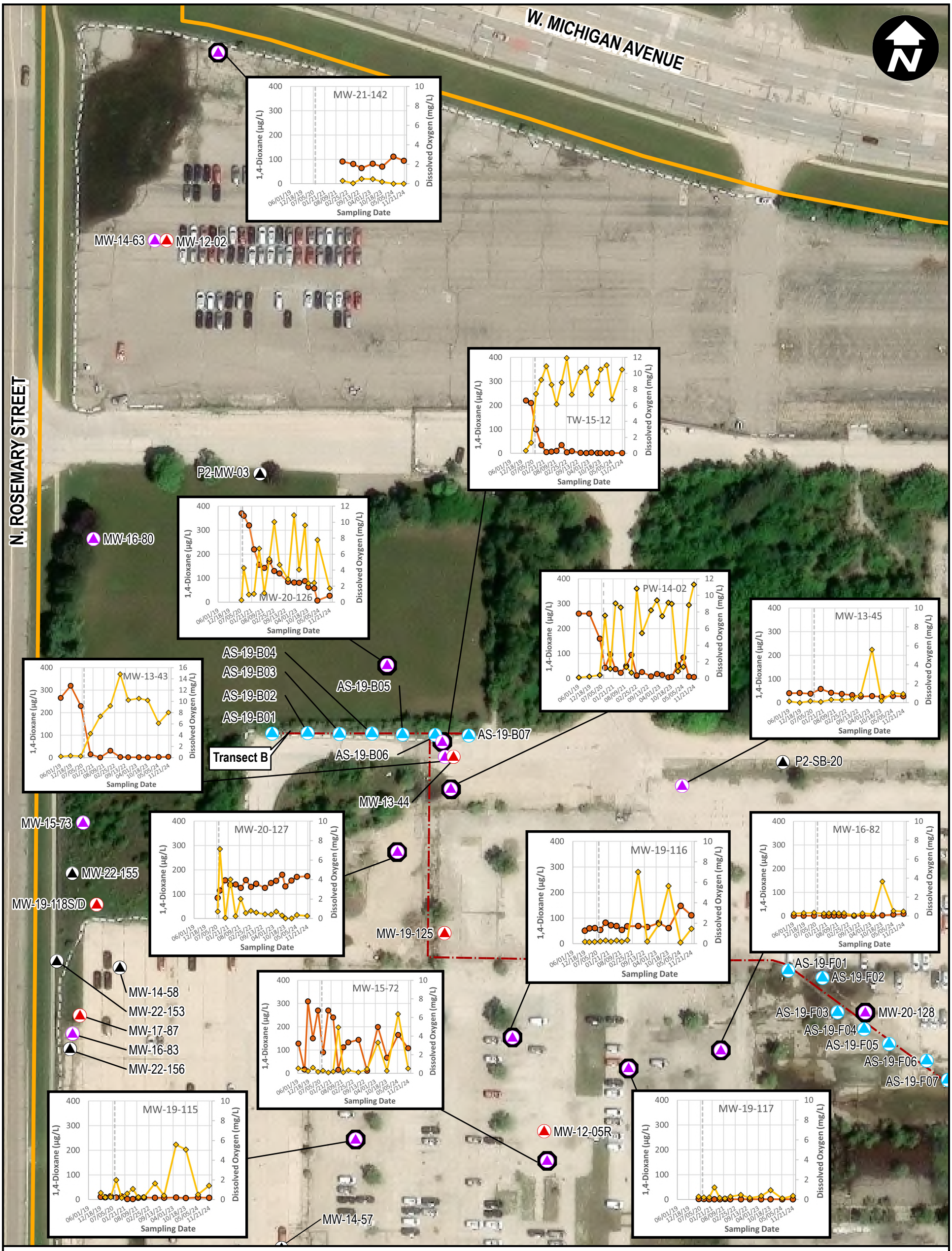
LANSING, MICHIGAN

PLANT 3 BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE
3



LEGEND

WELLS

- BIOSPARGE
- PERCHED MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- 1-INCH CONVEYANCE HOSE

PLANT BOUNDARIES

- PLANT 2
- PLANT 3

GRAPH LEGEND

- 1,4-DIOXANE
- DISSOLVED OXYGEN
- SYSTEM AIR + PROPANE START DATE

ug/L MICROGRAMS PER LITER
mg/L MILLIGRAMS PER LITER

0 90 180
SCALE IN FEET

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

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LANSING, MICHIGAN

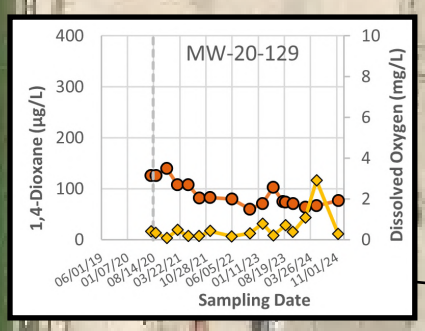
PLANT 2 NORTH BIOSPARGE PERFORMANCE MONITORING RESULTS

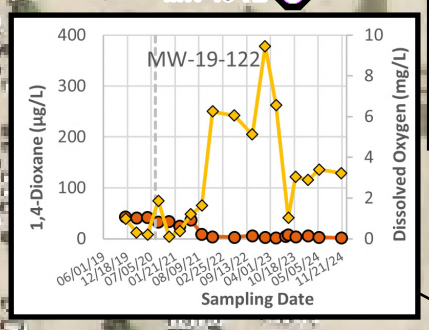
ARCADIS

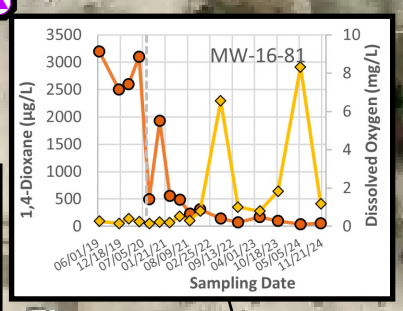
FIGURE 4

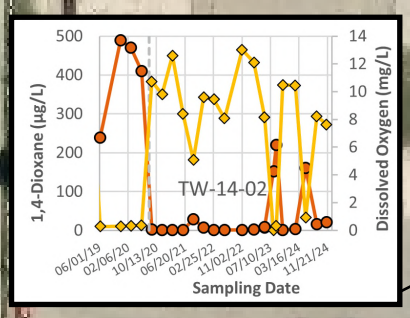
CITY: Novi DIV: ENV PIC: J. BARRETT PM: T.LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 11:02 AM BY: KPullen

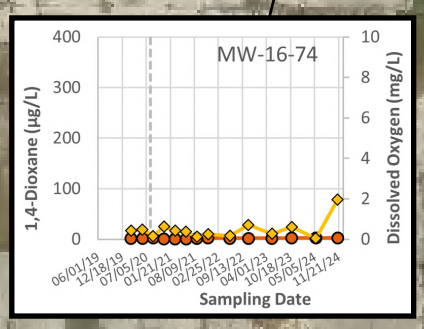
MW-22-155
MW-23-163
MW-20-127
MW-19-118S/D
MW-19-125
MW-14-59
MW-16-85
MW-22-153
MW-14-58R
AS-19-F02
AS-19-F01
MW-20-128
Transect F
MW-17-87
AS-19-F03
MW-16-84
MW-14-60
MW-16-83
MW-19-116
AS-19-F04
MW-16-82
AS-19-F05
AS-19-F06
MW-17-86
MW-22-156
MW-19-117
AS-19-F07
AS-19-F08
AS-19-F09
MW-19-115
MW-12-05R
AS-19-F10
MW-15-72
MW-14-61
AS-19-F11
MW-12-06
AS-19-F12
MW-19-120
AS-19-E12
AS-19-E11
AS-19-E10
MW-19-124
P2-SB-06
AS-19-E09
Transect E
AS-19-E08
MW-14-62
AS-19-E07
AS-19-E02
AS-19-E05
AS-19-E06
AS-19-E01
AS-19-E04
MW-12-18
AS-19-G10
AS-19-E03
AS-19-G06
AS-19-G08
AS-19-G09
AS-19-G04
AS-19-G07
AS-19-G03
AS-19-G05
MW-14-54
AS-19-G02
AS-19-G01
Transect G
MW-16-78
PW-14-01
P2-MW-02
MW-12-08
MW-13-51
MW-13-53
MW-01(2)
N. ROSEMARY STREET

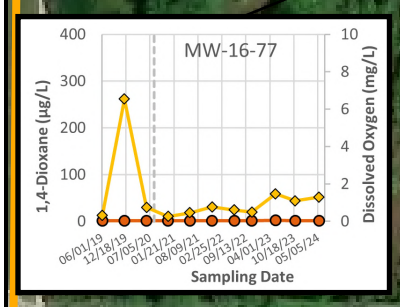


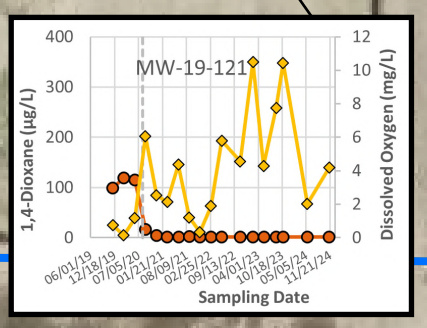


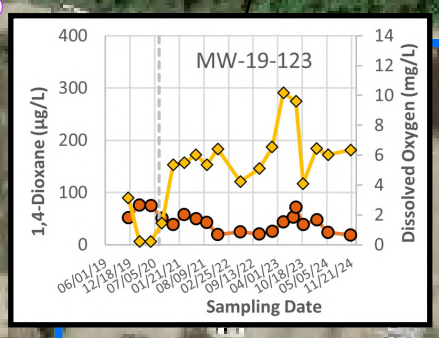


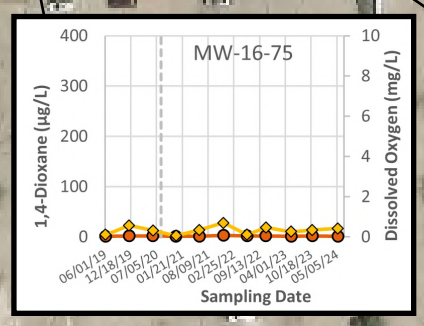












LEGEND

WELLS

- BIOSPARGE
- PERCHED MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- FENCE
- SYSTEM BUILDING
- FENCED AREA
- 1-INCH CONVEYANCE HOSE
- PLANT 2
- PLANT 3
- PLANT 6

GRAPH LEGEND

- 1,4-DIOXANE
- DISSOLVED OXYGEN
- SYSTEM AIR + PROPANE START DATE

ug/L MICROGRAMS PER LITER
mg/L MILLIGRAMS PER LITER

0 120 240
SCALE IN FEET

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

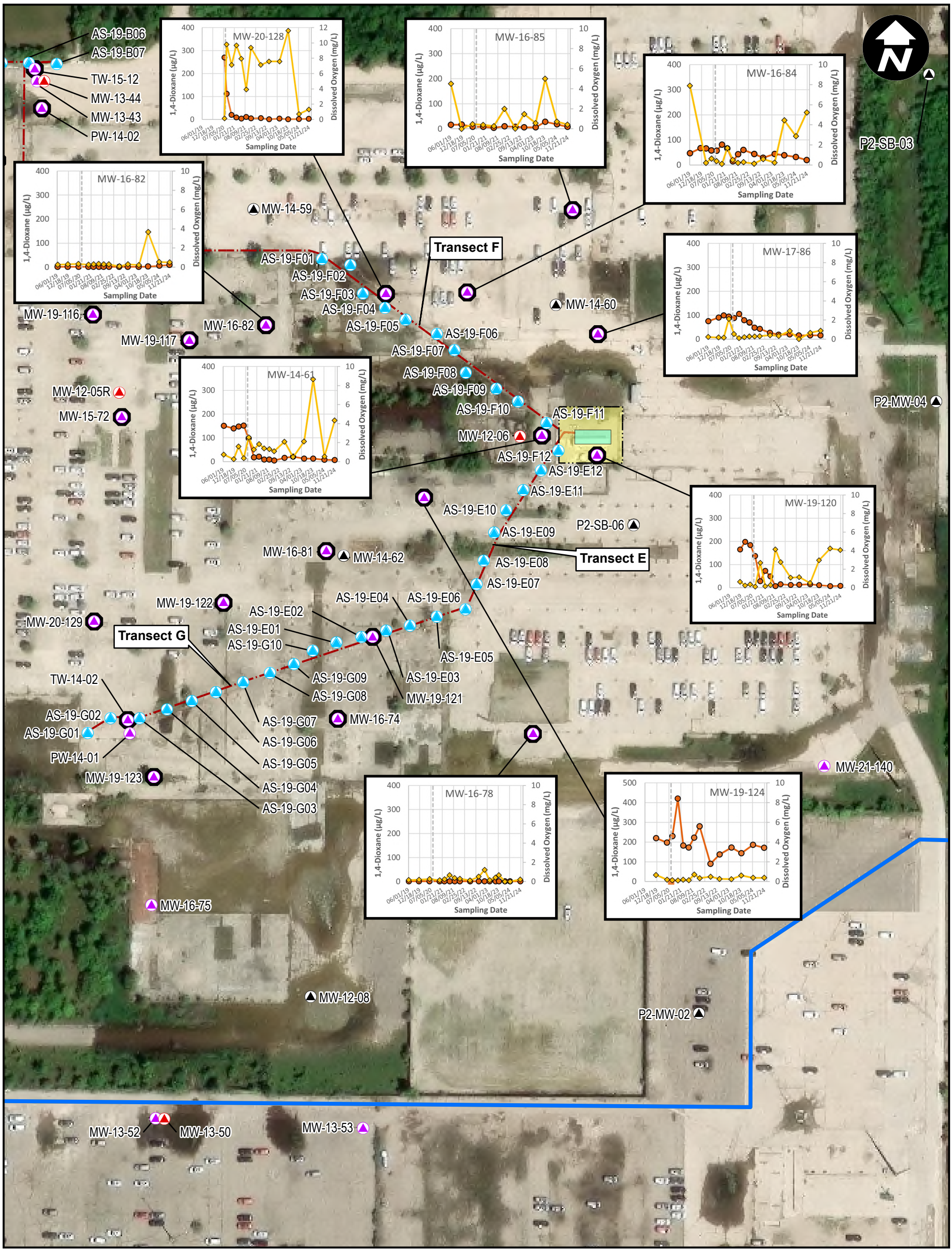
RACER TRUST
LANSING INDUSTRIAL LAND
LANSING, MICHIGAN

PLANT 2 SOUTH BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE
5

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 11:25 AM BY: KPullen



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T.LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30214036.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl T:\RACER\Lansing_BuffaloData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 2:25 PM BY: KPullen

LEGEND

- BIOSPARGE
- PERCHED MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- FENCE
- SYSTEM BUILDING
- FENCED AREA
- 1-INCH CONVEYANCE HOSE
- PLANT 2
- PLANT 3
- PLANT 6

GRAPH LEGEND

- 1,4-DIOXANE
- DISSOLVED OXYGEN
- SYSTEM AIR + PROPANE START DATE

ug/L MICROGRAMS PER LITER
mg/L MILLIGRAMS PER LITER

0 110 220
SCALE IN FEET

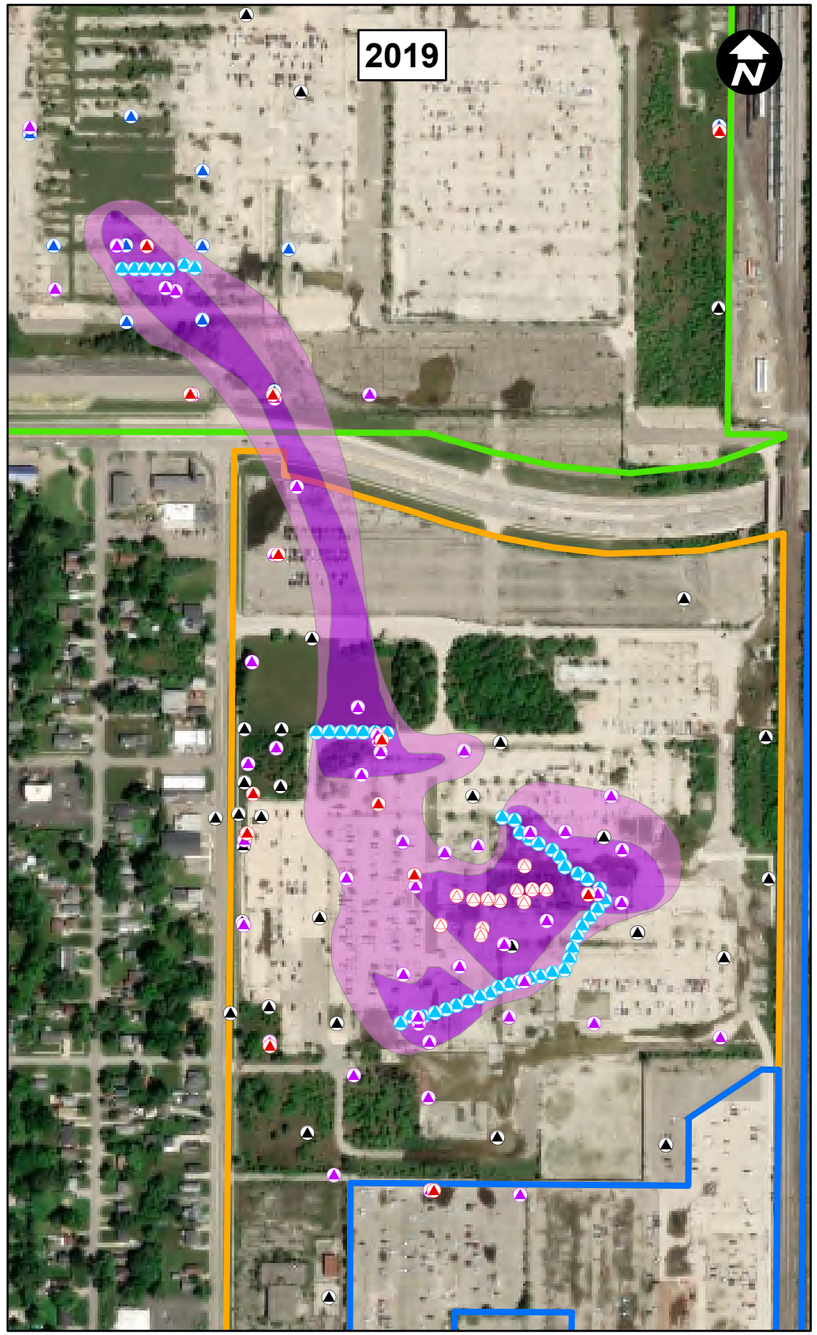
Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

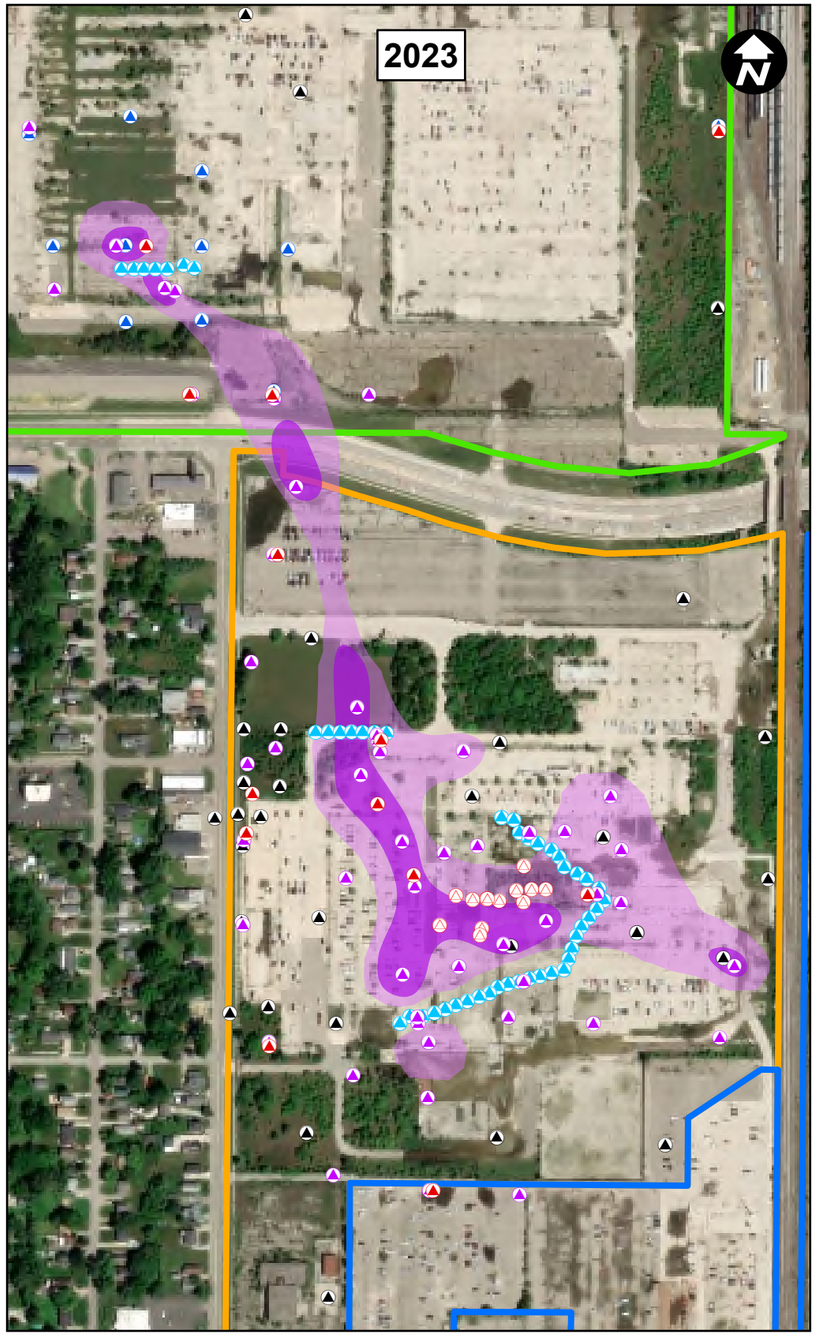
RACER TRUST
LANSING INDUSTRIAL LAND
LANSING, MICHIGAN

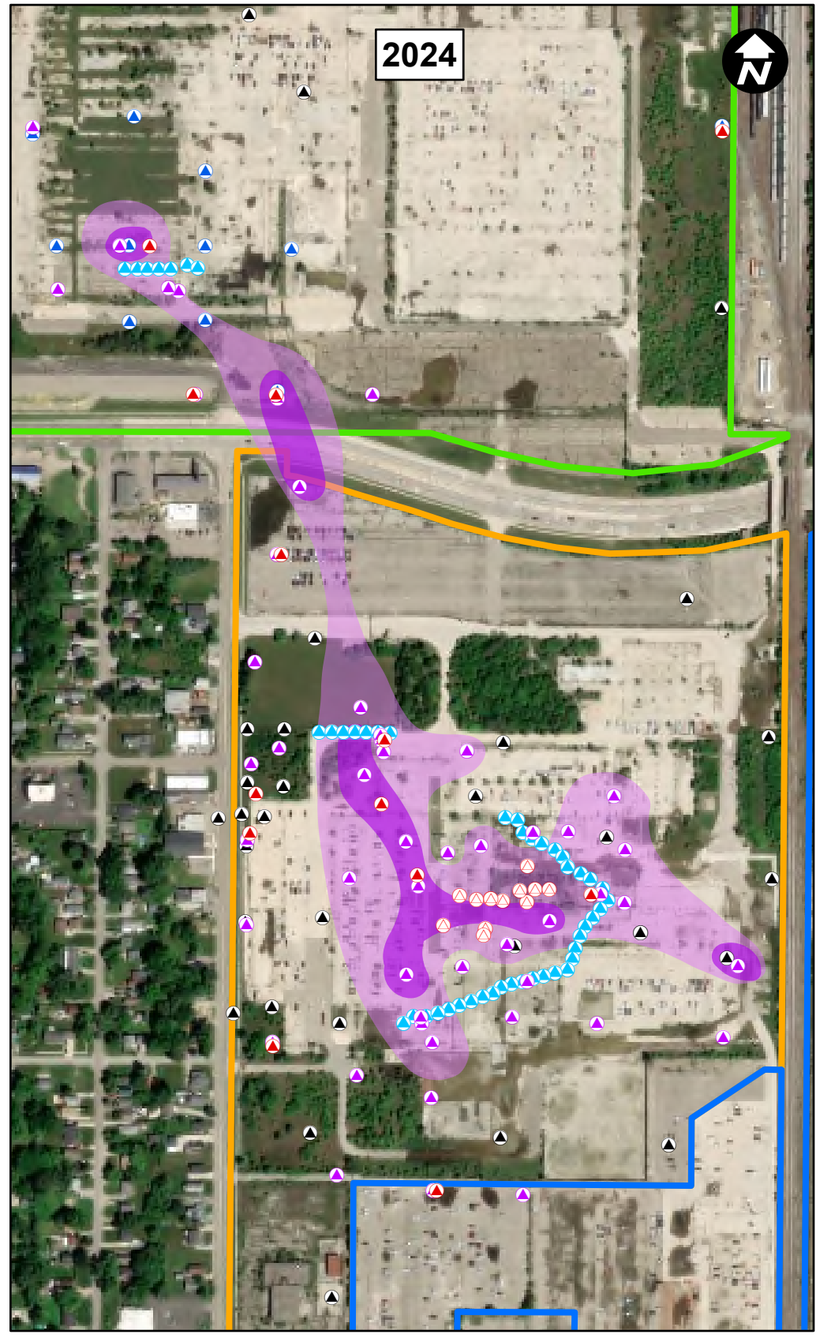
PLANT 2 CENTRAL/EAST BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE
6







LEGEND:

- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- LOWER 1,4-DIOXANE PLUME > 72 µg/L
- LOWER 1,4-DIOXANE IMPACTS > DW CRITERIA (7.2 µg/L)
- PLANT 2
- PLANT 3
- PLANT 6

0 200 400 800 Feet

Imagery Source:
ESRI World Imagery Service
Imagery Date: 7/30/2023

RACER TRUST
LANSING INDUSTRIAL LAND
LANSING, MICHIGAN

LOWER 1,4-DIOXANE PLUME COMPARISON 2019 VS 2023 VS 2024

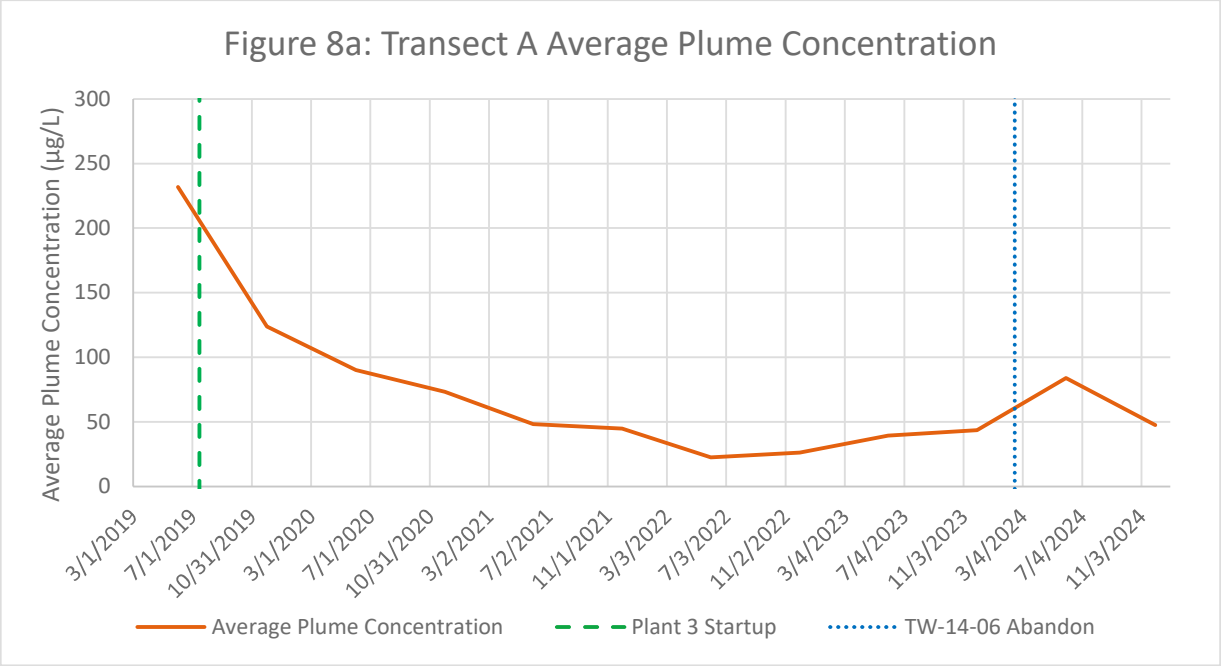
ARCADIS

FIGURE 7

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. VILLHAUER TR: PROJECT NUMBER: 30171056 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:\RACER\Lansing_BuffalioData\MXDs\2024 Biosparge\Biosparge_2024.aprx PLOTTED: 3/13/2025 2:13 PM BY: KPullen

Figure 8
Plant 3 Transect A Average Plume Concentration and 12-month Reduction of 1,4-Dioxane

Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan



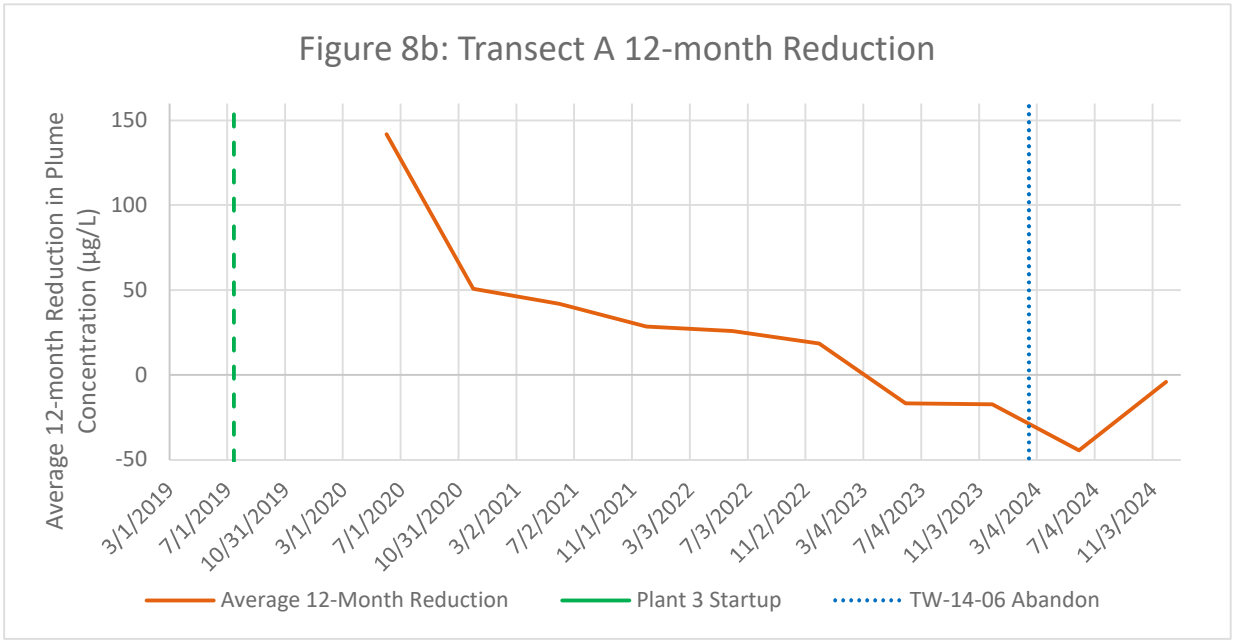
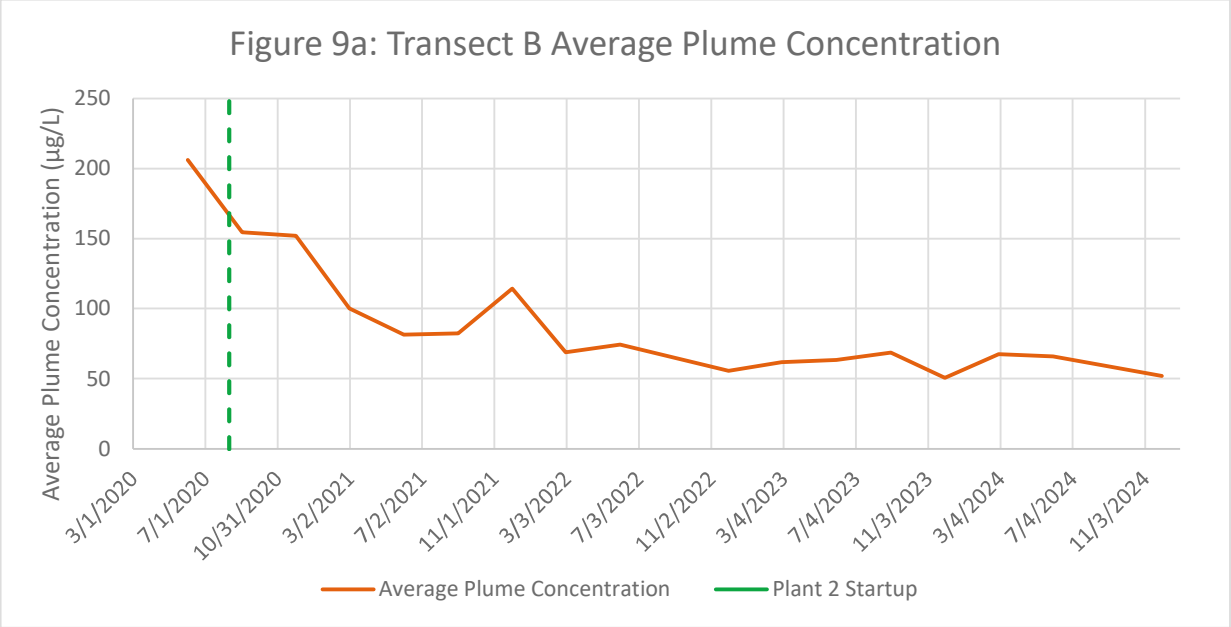


Figure 9
Plant 2 Transect B Average Plume Concentration and 12-month Reduction of 1,4-Dioxane

Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan



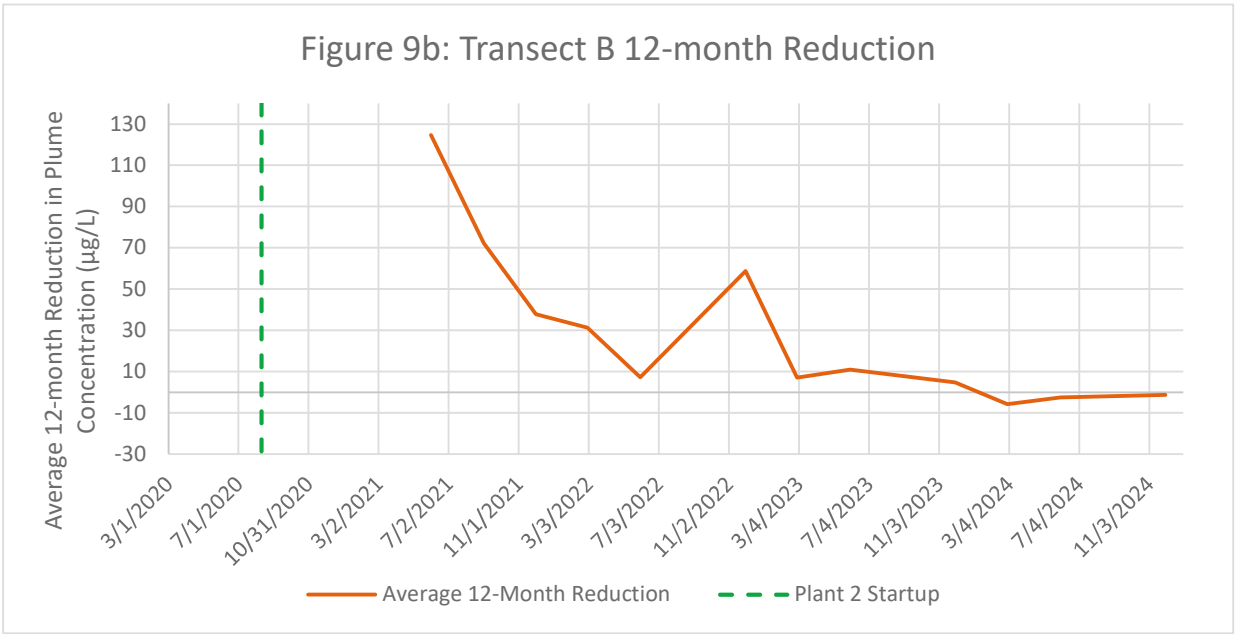
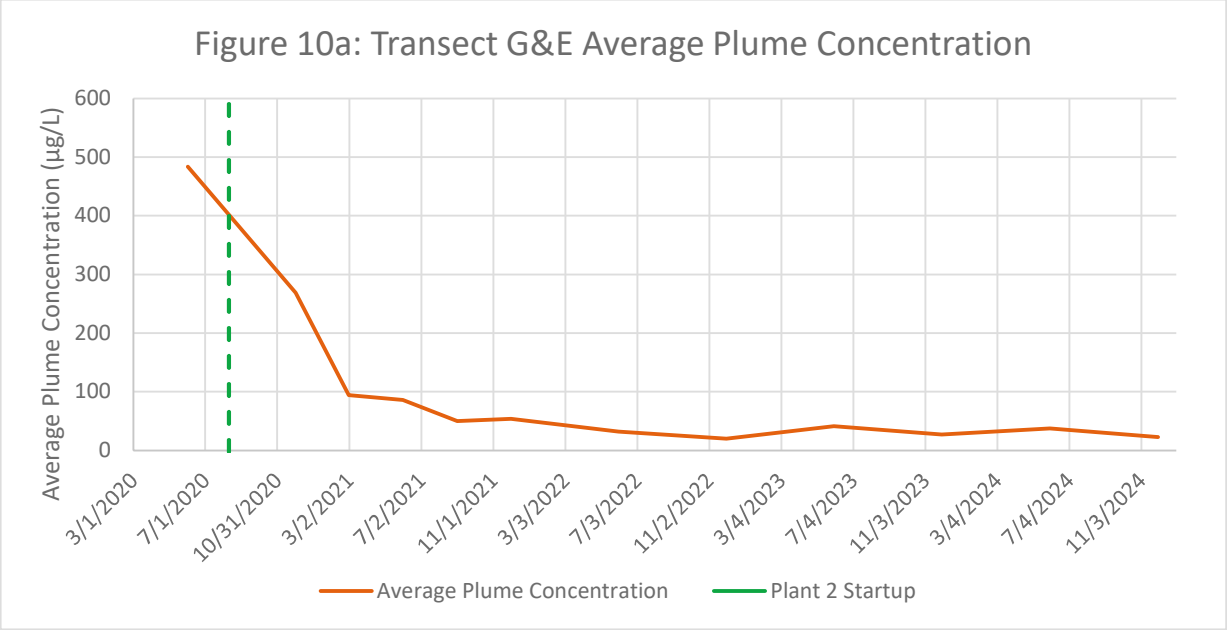


Figure 10
Plant 2 Transect G and E Average Plume Concentration and 12-month Reduction of 1,4-Dioxane

Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan



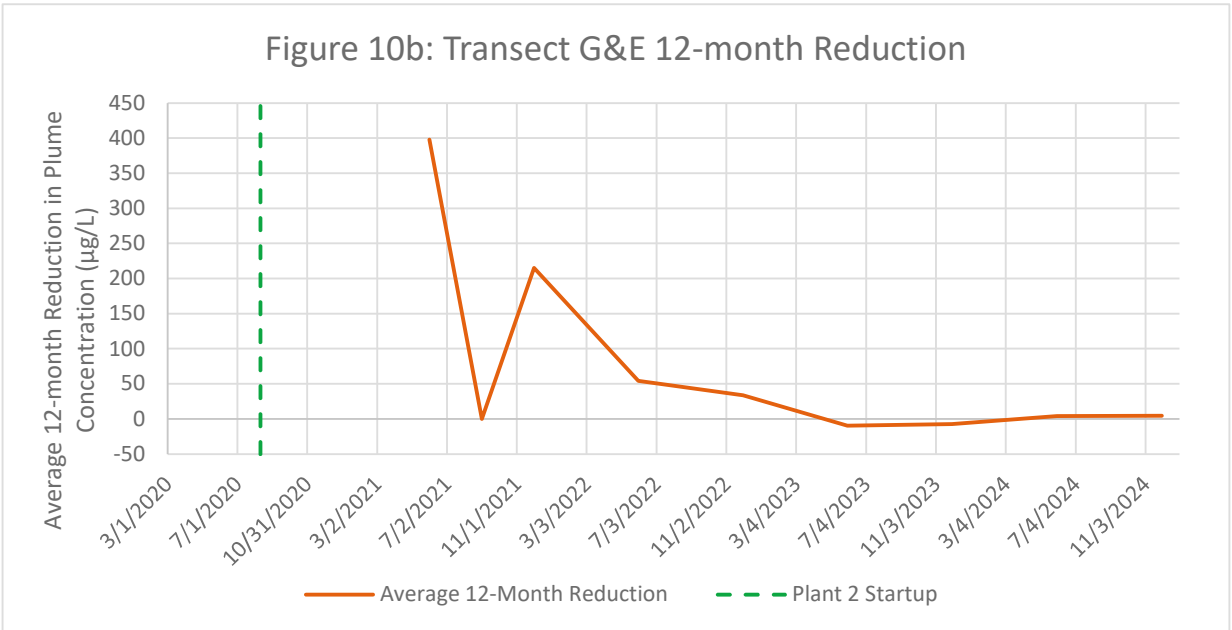
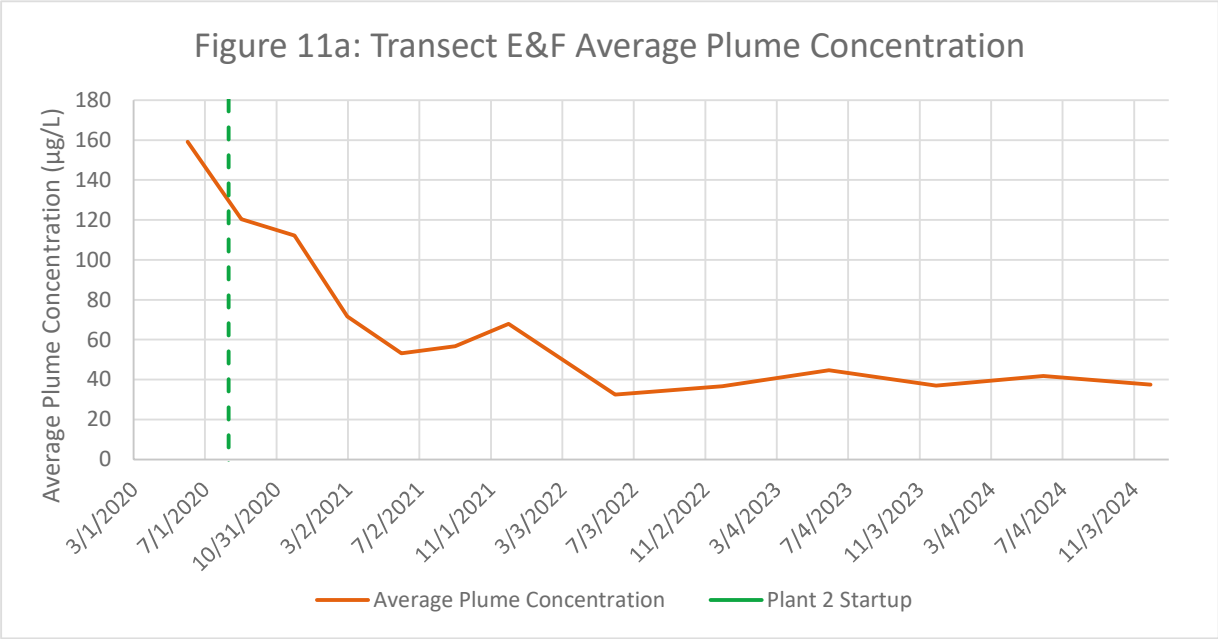
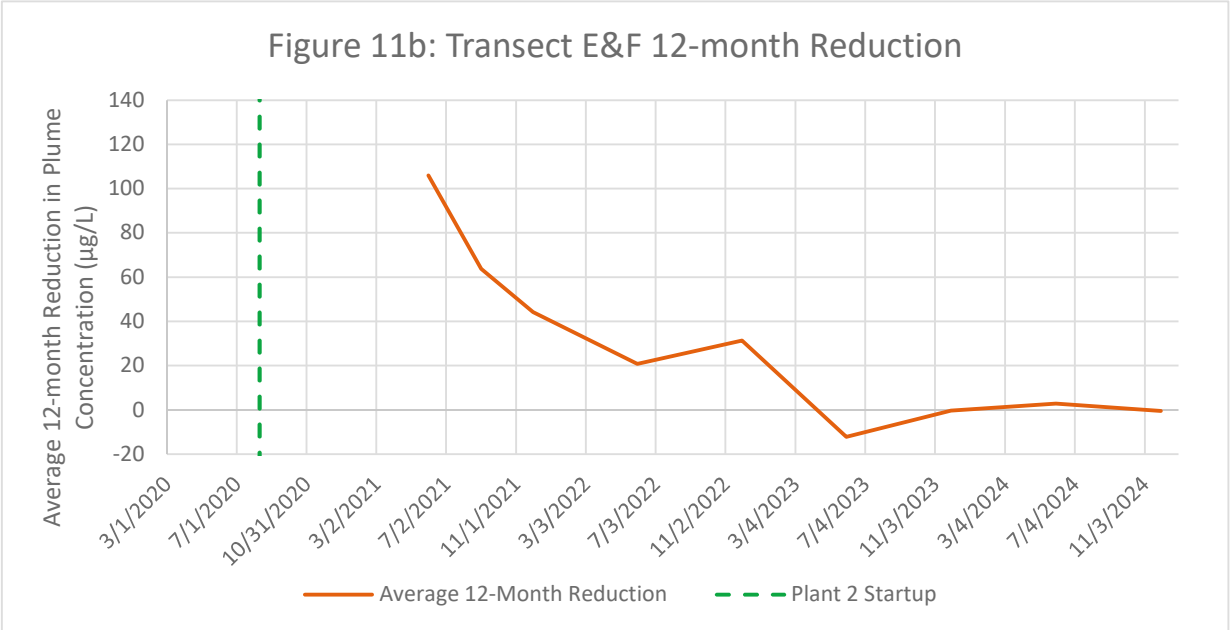


Figure 11
Plant 2 Transect E and F Average Plume Concentration and 12-month Reduction of 1,4-Dioxane

Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan





Appendix A

Operation and Maintenance Logs

Inspection Date	January 5, 2024
Last Quarterly Event Date	
Arrival Time	09:30
Personnel	Robert Prigge
Weather	20s-30s Overcast
FWL Electrical Meter Reading (kWh)	3603.16

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.568
PIT-101 (PSIG)	51.2
PIT-102 (PSIA)	65.2
FQI-101 (SLPM)	1998
PIT-201 (PSIA)	107.8
PIT-300 (PSIG)	26.1
FQI-201 (LPM)	5.608
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	26468
Oil Pressure (PSIG)	4
Wet receiver tank loading pressure (PI-101)	110
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	25
PI-101 (PSIG)	127
PI-102 (PSIG)	108
PI-103 (PSIG)	50
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	14.47
MFC-101 standardized flow rate on display (SLPM)	1999
MFC-101 uncorrected flow rate on display (LPM)	435
Comments	

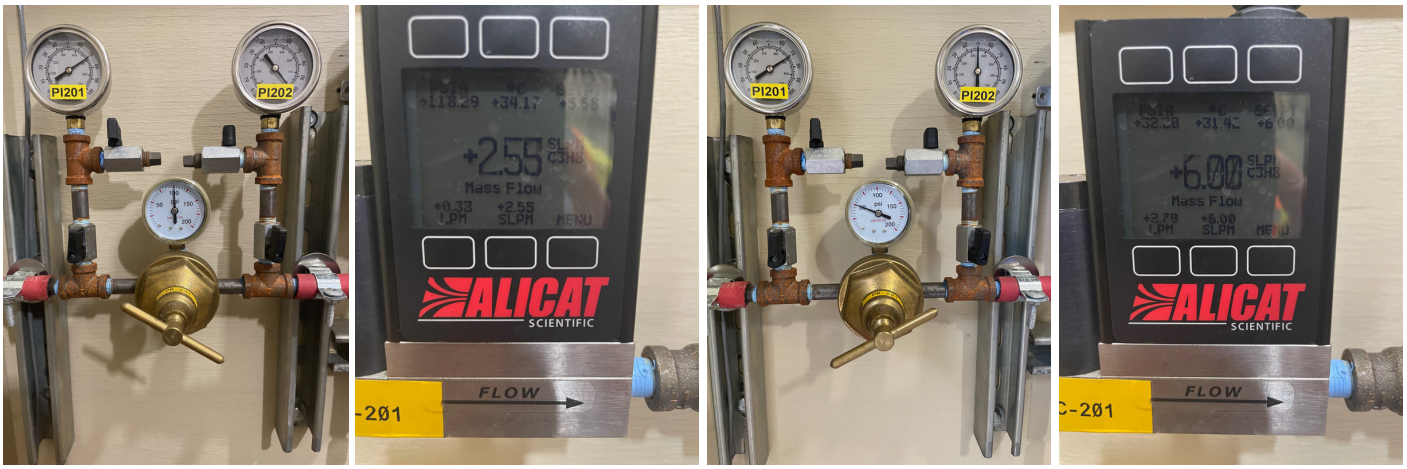
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	September 5, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	71
PI-202 (PSIG)	48
MFC-201 temperature	50
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.02
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.43
PI-300 (PSIG)	24
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	Pressure regulator was sticking and cause propane pressure in PI201 and PI-202 to be high. Cleared and re-adjusted

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	19
AS-19-G01 Manifold Flowrate (CFM)	2
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	3.5
AS-19-G09 Manifold Pressure (PSIG)	5
AS-19-G09 Manifold Flowrate (CFM)	1.5
AS-19-E02 Manifold Pressure (PSIG)	13
AS-19-E02 Manifold Flowrate (CFM)	3
AS-19-E05 Manifold Pressure (PSIG)	4

AS-19-E05 Manifold Flowrate (CFM)	2
AS-19-E08 Manifold Pressure (PSIG)	12
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (CFM)	25
AS-19-G05 Manifold Pressure (PSIG)	2
AS-19-G05 Manifold Flowrate (CFM)	12
AS-19-G08 Manifold Pressure (PSIG)	3
AS-19-G08 Manifold Flowrate (CFM)	5
AS-19-E01 Manifold Pressure (PSIG)	4.5
AS-19-E01 Manifold Flowrate (CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	4
AS-19-E04 Manifold Flowrate (CFM)	5
AS-19-E07 Manifold Pressure (PSIG)	11
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	10
AS-19-E10 Manifold Flowrate (CFM)	3.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	17
AS-19-G04 Manifold Flowrate (CFM)	12
AS-19-G07 Manifold Pressure (PSIG)	7
AS-19-G07 Manifold Flowrate (CFM)	4.5
AS-19-G10 Manifold Pressure (PSIG)	9
AS-19-G10 Manifold Flowrate (CFM)	3
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (CFM)	2
AS-19-E06 Manifold Pressure (PSIG)	7
AS-19-E06 Manifold Flowrate (CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	15
AS-19-E09 Manifold Flowrate (CFM)	2.5
AS-19-E12 Manifold Pressure (PSIG)	12
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	15
AS-19-F12 Manifold Flowrate (CFM)	2.5
AS-19-F09 Manifold Pressure (PSIG)	7
AS-19-F09 Manifold Flowrate (CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	9
AS-19-F06 Manifold Flowrate (CFM)	4.5
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	28
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	12
AS-19-E11 Manifold Flowrate (CFM)	3.5
AS-19-F11 Manifold Pressure (PSIG)	9
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	15
AS-19-F08 Manifold Flowrate (CFM)	2.5
AS-19-F05 Manifold Pressure (PSIG)	8
AS-19-F05 Manifold Flowrate (CFM)	4.5
AS-19-F02 Manifold Pressure (PSIG)	16
AS-19-F02 Manifold Flowrate (CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	8
AS-19-B02 Manifold Flowrate (CFM)	4.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	5
AS-19-F04 Manifold Pressure (PSIG)	18
AS-19-F04 Manifold Flowrate (CFM)	3.5
AS-19-F01 Manifold Pressure (PSIG)	8

AS-19-F01 Manifold Flowrate (CFM)	2.5
AS-19-B07 Manifold Pressure (PSIG)	12
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	13
Number of condensate drums outside	4

Drum Photo

Electric Meter Reading (kWh)	565598
Last fire extinguisher certification date	September 5, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	One well was bubbling water
Comments on car parkers and site accessibility:	No cars
Car parking photos if near buildings	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 1/5/2024, 11:49:55 AM EST
Departure Time	12:00

Inspection Date	February 7, 2024
Last Quarterly Event Date	
Arrival Time	09:10
Personnel	Robert Prigge
Weather	30 overcast with sun peeking through. Ice
FWL Electrical Meter Reading (kWh)	5124.6

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.577
PIT-101 (PSIG)	51
PIT-102 (PSIA)	65.1
FQI-101 (SLPM)	1997
PIT-201 (PSIA)	113.8
PIT-300 (PSIG)	27.2
FQI-201 (LPM)	2.374
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	All moving parts appear intact?, No deformation?, Needle in the green?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	27193
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	109
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	33
PI-101 (PSIG)	125
PI-102 (PSIG)	110
PI-103 (PSIG)	49
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	25.05
MFC-101 standardized flow rate on display (SLPM)	2000

MFC-101 uncorrected flow rate on display (LPM)	450
Comments	

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 7, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	70
PI-202 (PSIG)	48
MFC-201 temperature	36.24
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.1
PI-300 (PSIG)	30
Bi-Weekly XP Instrumentation Checks	AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0

AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	The PI201 and PI202 built up propane pressure again and had to be manually relieved

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	12
AS-19-G01 Manifold Flowrate (CFM)	3
AS-19-G03 Manifold Pressure (PSIG)	12
AS-19-G03 Manifold Flowrate (CFM)	2
AS-19-G06 Manifold Pressure (PSIG)	8
AS-19-G06 Manifold Flowrate (CFM)	2.5
AS-19-G09 Manifold Pressure (PSIG)	7
AS-19-G09 Manifold Flowrate (CFM)	1.5
AS-19-E02 Manifold Pressure (PSIG)	12
AS-19-E02 Manifold Flowrate (CFM)	3
AS-19-E05 Manifold Pressure (PSIG)	5
AS-19-E05 Manifold Flowrate (CFM)	3
AS-19-E08 Manifold Pressure (PSIG)	12
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (CFM)	25

AS-19-G05 Manifold Pressure (PSIG)	2
AS-19-G05 Manifold Flowrate (CFM)	11
AS-19-G08 Manifold Pressure (PSIG)	3.5
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	5
AS-19-E01 Manifold Flowrate (CFM)	3
AS-19-E04 Manifold Pressure (PSIG)	6
AS-19-E04 Manifold Flowrate (CFM)	5
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	5
AS-19-E10 Manifold Pressure (PSIG)	9
AS-19-E10 Manifold Flowrate (CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	10
AS-19-G04 Manifold Flowrate (CFM)	13
AS-19-G07 Manifold Pressure (PSIG)	7
AS-19-G07 Manifold Flowrate (CFM)	4.5
AS-19-G10 Manifold Pressure (PSIG)	9
AS-19-G10 Manifold Flowrate (CFM)	3
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (CFM)	1.5
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	17
AS-19-E09 Manifold Flowrate (CFM)	2.5
AS-19-E12 Manifold Pressure (PSIG)	13
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	13
AS-19-F12 Manifold Flowrate (CFM)	2
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	12

AS-19-F03 Manifold Flowrate (CFM)	4.5
AS-19-B06 Manifold Pressure (PSIG)	25
AS-19-B06 Manifold Flowrate (CFM)	1.5
AS-19-B03 Manifold Pressure (PSIG)	9
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	22
AS-19-E11 Manifold Flowrate (CFM)	1
AS-19-F11 Manifold Pressure (PSIG)	9
AS-19-F11 Manifold Flowrate (CFM)	3.5
AS-19-F08 Manifold Pressure (PSIG)	15
AS-19-F08 Manifold Flowrate (CFM)	2.5
AS-19-F05 Manifold Pressure (PSIG)	7
AS-19-F05 Manifold Flowrate (CFM)	5
AS-19-F02 Manifold Pressure (PSIG)	16
AS-19-F02 Manifold Flowrate (CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	8
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	9
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	18
AS-19-F04 Manifold Flowrate (CFM)	4
AS-19-F01 Manifold Pressure (PSIG)	9
AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	12
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	9
AS-19-B04 Manifold Flowrate (CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	9
AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	3
Number of condensate drums outside	4

Drum Photo

Electric Meter Reading (kWh)	585547
Last fire extinguisher certification date	October 7, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	
Comments on car parkers and site accessibility:	None

Car parking photos if near buildings

Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 2/8/2024, 4:15:38 PM EST
Departure Time	16:15

Inspection Date	March 6, 2024
Last Quarterly Event Date	
Arrival Time	09:40
Personnel	Robert Prigge
Weather	30s overcast
FWL Electrical Meter Reading (kWh)	5450.18

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

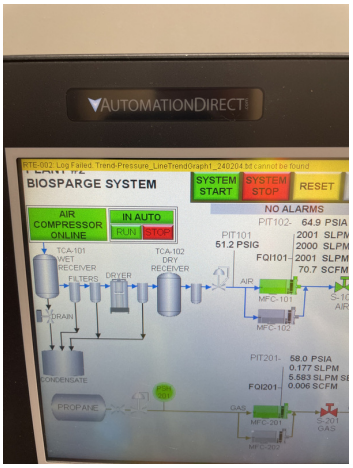
HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.583
PIT-101 (PSIG)	51.1
PIT-102 (PSIA)	65
FQI-101 (SLPM)	2001
PIT-201 (PSIA)	57.9
PIT-300 (PSIG)	28.7
FQI-201 (LPM)	0.172
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.2
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

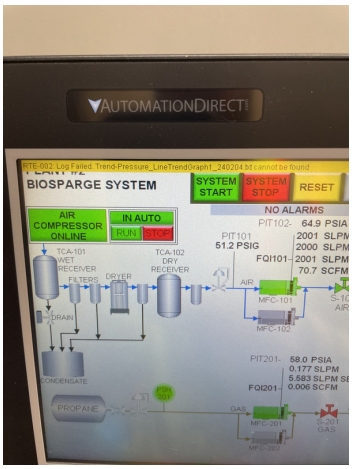
Non-XP Room

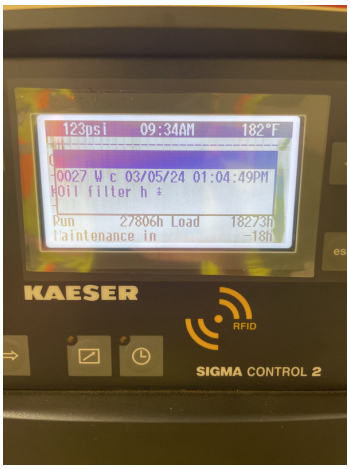
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	27807
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	109
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	50
PI-101 (PSIG)	105
PI-102 (PSIG)	98
PI-103 (PSIG)	50
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No

Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	23.24
MFC-101 standardized flow rate on display (SLPM)	2002
MFC-101 uncorrected flow rate on display (LPM)	450
Comments	

Non-XP room photo







XP-Room

First Aid Kit Expiration Date	March 6, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	70
PI-202 (PSIG)	42
MFC-201 temperature	31.64

MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.01
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.42
PI-300 (PSIG)	25
Bi-Weekly XP Instrumentation Checks	AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	27
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	26

AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	8
AS-19-G09 Manifold Flowrate (CFM)	2.5
AS-19-E02 Manifold Pressure (PSIG)	16
AS-19-E02 Manifold Flowrate (CFM)	3
AS-19-E05 Manifold Pressure (PSIG)	5
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	15
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	28
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	9
AS-19-G05 Manifold Flowrate (CFM)	2.5
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (CFM)	3.5
AS-19-E01 Manifold Pressure (PSIG)	5
AS-19-E01 Manifold Flowrate (CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	5
AS-19-E04 Manifold Flowrate (CFM)	3.5
AS-19-E07 Manifold Pressure (PSIG)	11
AS-19-E07 Manifold Flowrate (CFM)	2.5
AS-19-E10 Manifold Pressure (PSIG)	13
AS-19-E10 Manifold Flowrate (CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	3
AS-19-G04 Manifold Flowrate (CFM)	12.5
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	2.5
AS-19-G10 Manifold Pressure (PSIG)	8
AS-19-G10 Manifold Flowrate (CFM)	3.5
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (CFM)	1.5

AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	15
AS-19-E09 Manifold Flowrate (CFM)	3.5
AS-19-E12 Manifold Pressure (PSIG)	12
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	14
AS-19-F12 Manifold Flowrate (CFM)	2.5
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	12
AS-19-F03 Manifold Flowrate (CFM)	5.5
AS-19-B06 Manifold Pressure (PSIG)	28
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	22
AS-19-E11 Manifold Flowrate (CFM)	0
AS-19-F11 Manifold Pressure (PSIG)	12
AS-19-F11 Manifold Flowrate (CFM)	2.5
AS-19-F08 Manifold Pressure (PSIG)	16
AS-19-F08 Manifold Flowrate (CFM)	2
AS-19-F05 Manifold Pressure (PSIG)	6
AS-19-F05 Manifold Flowrate (CFM)	4.5
AS-19-F02 Manifold Pressure (PSIG)	14
AS-19-F02 Manifold Flowrate (CFM)	4.5
AS-19-B05 Manifold Pressure (PSIG)	9
AS-19-B05 Manifold Flowrate (CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	8
AS-19-B02 Manifold Flowrate (CFM)	5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	17
AS-19-F04 Manifold Flowrate (CFM)	4
AS-19-F01 Manifold Pressure (PSIG)	9
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	12
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	83
Number of condensate drums outside	5

Drum Photo

Electric Meter Reading (kWh)	597732
Last fire extinguisher certification date	March 6, 2024
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	

Comments on car parkers and site accessibility:	None

Car parking photos if near buildings

Monthly Outdoor Maintenance Tasks	
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 3/6/2024, 12:39:11 PM EST
Departure Time	12:45

Inspection Date	April 5, 2024
Last Quarterly Event Date	
Arrival Time	09:22
Personnel	Robert Prigge
Weather	30s-40s sunny with clouds
FWL Electrical Meter Reading (kWh)	5770.12

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.586
PIT-101 (PSIG)	51.3
PIT-102 (PSIA)	65.2
FQI-101 (SLPM)	1862
PIT-201 (PSIA)	61.1
PIT-300 (PSIG)	27.3
FQI-201 (LPM)	0.549
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.2
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	18614
Oil Pressure (PSIG)	4
Wet receiver tank loading pressure (PI-101)	109
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	107
PI-103 (PSIG)	50
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	14.66
MFC-101 standardized flow rate on display (SLPM)	2003
MFC-101 uncorrected flow rate on display (LPM)	434
Comments	

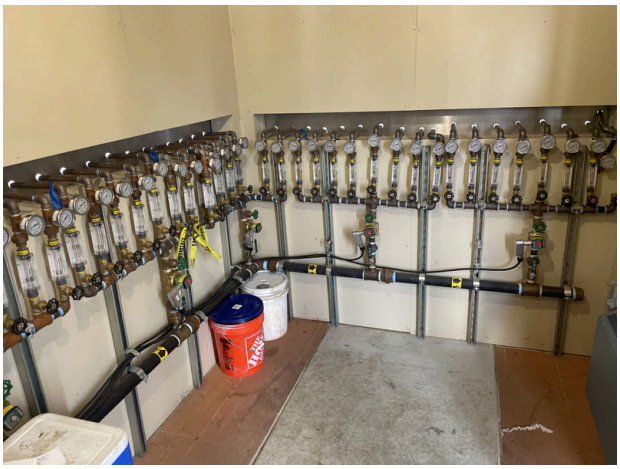
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	April 5, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	74
PI-202 (PSIG)	48
MFC-201 temperature	27.2
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.01
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.11
PI-300 (PSIG)	30
Bi-Weekly XP Instrumentation Checks	AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	0
AS-19-G01 Manifold Flowrate (3-5 CFM)	30
AS-19-G03 Manifold Pressure (PSIG)	0.5
AS-19-G03 Manifold Flowrate (3-5 CFM)	29
AS-19-G06 Manifold Pressure (PSIG)	3.5
AS-19-G06 Manifold Flowrate (3-5 CFM)	10
AS-19-G09 Manifold Pressure (PSIG)	5
AS-19-G09 Manifold Flowrate (3-5 CFM)	10
AS-19-E02 Manifold Pressure (PSIG)	0

AS-19-E02 Manifold Flowrate (3-5 CFM)	0
AS-19-E05 Manifold Pressure (PSIG)	4
AS-19-E05 Manifold Flowrate (3-5 CFM)	5
AS-19-E08 Manifold Pressure (PSIG)	3
AS-19-E08 Manifold Flowrate (3-5 CFM)	12

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0.5
AS-19-G02 Manifold Flowrate (3-5 CFM)	16
AS-19-G05 Manifold Pressure (PSIG)	2
AS-19-G05 Manifold Flowrate (3-5 CFM)	10
AS-19-G08 Manifold Pressure (PSIG)	3
AS-19-G08 Manifold Flowrate (3-5 CFM)	6
AS-19-E01 Manifold Pressure (PSIG)	4
AS-19-E01 Manifold Flowrate (3-5 CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	3.5
AS-19-E04 Manifold Flowrate (3-5 CFM)	7
AS-19-E07 Manifold Pressure (PSIG)	3
AS-19-E07 Manifold Flowrate (3-5 CFM)	10
AS-19-E10 Manifold Pressure (PSIG)	3
AS-19-E10 Manifold Flowrate (3-5 CFM)	12

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	0
AS-19-G04 Manifold Flowrate (3-5 CFM)	0
AS-19-G07 Manifold Pressure (PSIG)	3
AS-19-G07 Manifold Flowrate (3-5 CFM)	7
AS-19-G10 Manifold Pressure (PSIG)	3
AS-19-G10 Manifold Flowrate (3-5 CFM)	10
AS-19-E03 Manifold Pressure (PSIG)	4

AS-19-E03 Manifold Flowrate (3-5 CFM)	5
AS-19-E06 Manifold Pressure (PSIG)	2
AS-19-E06 Manifold Flowrate (3-5 CFM)	10
AS-19-E09 Manifold Pressure (PSIG)	3
AS-19-E09 Manifold Flowrate (3-5 CFM)	13
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (3-5 CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	3
AS-19-F12 Manifold Flowrate (3-5 CFM)	6
AS-19-F09 Manifold Pressure (PSIG)	3
AS-19-F09 Manifold Flowrate (3-5 CFM)	12
AS-19-F06 Manifold Pressure (PSIG)	5
AS-19-F06 Manifold Flowrate (3-5 CFM)	9
AS-19-F03 Manifold Pressure (PSIG)	4
AS-19-F03 Manifold Flowrate (3-5 CFM)	10
AS-19-B06 Manifold Pressure (PSIG)	1
AS-19-B06 Manifold Flowrate (3-5 CFM)	30
AS-19-B03 Manifold Pressure (PSIG)	4
AS-19-B03 Manifold Flowrate (3-5 CFM)	13

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2.5
AS-19-E11 Manifold Flowrate (3-5 CFM)	18
AS-19-F11 Manifold Pressure (PSIG)	2
AS-19-F11 Manifold Flowrate (3-5 CFM)	17
AS-19-F08 Manifold Pressure (PSIG)	3
AS-19-F08 Manifold Flowrate (3-5 CFM)	16
AS-19-F05 Manifold Pressure (PSIG)	4

AS-19-F05 Manifold Flowrate (3-5 CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	4
AS-19-F02 Manifold Flowrate (3-5 CFM)	10
AS-19-B05 Manifold Pressure (PSIG)	4
AS-19-B05 Manifold Flowrate (3-5 CFM)	8
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (3-5 CFM)	8

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	4
AS-19-F10 Manifold Flowrate (3-5 CFM)	10
AS-19-F07 Manifold Pressure (PSIG)	4
AS-19-F07 Manifold Flowrate (3-5 CFM)	10
AS-19-F04 Manifold Pressure (PSIG)	3.5
AS-19-F04 Manifold Flowrate (3-5 CFM)	16
AS-19-F01 Manifold Pressure (PSIG)	4
AS-19-F01 Manifold Flowrate (3-5 CFM)	14
AS-19-B07 Manifold Pressure (PSIG)	2.5
AS-19-B07 Manifold Flowrate (3-5 CFM)	14
AS-19-B04 Manifold Pressure (PSIG)	3.5
AS-19-B04 Manifold Flowrate (3-5 CFM)	12
AS-19-B01 Manifold Pressure (PSIG)	2
AS-19-B01 Manifold Flowrate (3-5 CFM)	17

Outdoors and General

Propane tank level (%)	78
Number of condensate drums outside	7

Drum Photo

Electric Meter Reading (kWh)	610451
Last fire extinguisher certification date	September 5, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	E-03 leaking and turned off
Comments on car parkers and site accessibility:	None

Car parking photos if near buildings

Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	

Comments, questions, ruminations, suggestions for improvement?	Fencing needs supplies and repair. New buckets and potential snow fence. Extra barrel weights
Signature	 Signed 4/5/2024, 1:12:11 PM EDT
Departure Time	13:25

Inspection Date	May 3, 2024
Last Quarterly Event Date	
Arrival Time	09:30
Personnel	Robert Prigge
Weather	50s sunny
FWL Electrical Meter Reading (kWh)	5864.07

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.584
PIT-101 (PSIG)	50.9
PIT-102 (PSIA)	64.7
FQI-101 (SLPM)	2002
PIT-201 (PSIA)	62.7
PIT-300 (PSIG)	34.1
FQI-201 (LPM)	0.1
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	29072
Oil Pressure (PSIG)	12
Wet receiver tank loading pressure (PI-101)	115
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	25
PI-101 (PSIG)	130
PI-102 (PSIG)	115
PI-103 (PSIG)	49
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	26.01
MFC-101 standardized flow rate on display (SLPM)	2002
MFC-101 uncorrected flow rate on display (LPM)	455
Comments	

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 3, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	69
PI-202 (PSIG)	48
MFC-201 temperature	33.43
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.58
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.62
PI-300 (PSIG)	39
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	Need new 16oz eyewash x2

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	5
AS-19-G01 Manifold Flowrate (3-5 CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	5
AS-19-G03 Manifold Flowrate (3-5 CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	11
AS-19-G06 Manifold Flowrate (3-5 CFM)	4.5
AS-19-G09 Manifold Pressure (PSIG)	10
AS-19-G09 Manifold Flowrate (3-5 CFM)	6
AS-19-E02 Manifold Pressure (PSIG)	0

AS-19-E02 Manifold Flowrate (3-5 CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	5
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	14
AS-19-E08 Manifold Flowrate (3-5 CFM)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (3-5 CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	12
AS-19-G05 Manifold Flowrate (3-5 CFM)	3.5
AS-19-G08 Manifold Pressure (PSIG)	6
AS-19-G08 Manifold Flowrate (3-5 CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	5
AS-19-E01 Manifold Flowrate (3-5 CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	6
AS-19-E04 Manifold Flowrate (3-5 CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (3-5 CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (3-5 CFM)	3.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	21
AS-19-G04 Manifold Flowrate (3-5 CFM)	4
AS-19-G07 Manifold Pressure (PSIG)	6
AS-19-G07 Manifold Flowrate (3-5 CFM)	2.5
AS-19-G10 Manifold Pressure (PSIG)	8
AS-19-G10 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E03 Manifold Pressure (PSIG)	4

AS-19-E03 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E06 Manifold Pressure (PSIG)	7
AS-19-E06 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	14
AS-19-E09 Manifold Flowrate (3-5 CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (3-5 CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	7
AS-19-F12 Manifold Flowrate (3-5 CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	15
AS-19-F09 Manifold Flowrate (3-5 CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	6
AS-19-F03 Manifold Pressure (PSIG)	11
AS-19-F03 Manifold Flowrate (3-5 CFM)	5
AS-19-B06 Manifold Pressure (PSIG)	8
AS-19-B06 Manifold Flowrate (3-5 CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	14
AS-19-B03 Manifold Flowrate (3-5 CFM)	6

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	0
AS-19-E11 Manifold Flowrate (3-5 CFM)	0
AS-19-F11 Manifold Pressure (PSIG)	15
AS-19-F11 Manifold Flowrate (3-5 CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	20
AS-19-F08 Manifold Flowrate (3-5 CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	7

AS-19-F05 Manifold Flowrate (3-5 CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	16
AS-19-F02 Manifold Flowrate (3-5 CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (3-5 CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	9
AS-19-B02 Manifold Flowrate (3-5 CFM)	3.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (3-5 CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	16
AS-19-F04 Manifold Flowrate (3-5 CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	10
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	11
AS-19-B07 Manifold Flowrate (3-5 CFM)	2.5
AS-19-B04 Manifold Pressure (PSIG)	10
AS-19-B04 Manifold Flowrate (3-5 CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	12
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	70
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	622115
Last fire extinguisher certification date	September 3, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	
Comments on car parkers and site accessibility:	None in area. Although car haulers are beginning to bring them in
Car parking photos if near buildings	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	H&S moment warm weather approaching. Found one yellow jacket in propane cap. Good to have spray on site
Signature	Signed 5/3/2024, 6:35:13 PM UTC
Departure Time	12:40

Inspection Date	June 6, 2024
Last Quarterly Event Date	
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 60’s-70’s
FWL Electrical Meter Reading (kWh)	5926.29

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.008
PIT-101 (PSIG)	54.5
PIT-102 (PSIA)	68.2
FQI-101 (SLPM)	0
PIT-201 (PSIA)	64.3
PIT-300 (PSIG)	21
FQI-201 (LPM)	0.02
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	29782
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	132
How full is the condensate drum? (Percentage)	50
PI-101 (PSIG)	125
PI-102 (PSIG)	120
PI-103 (PSIG)	53
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	24.22
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	Rest cycle

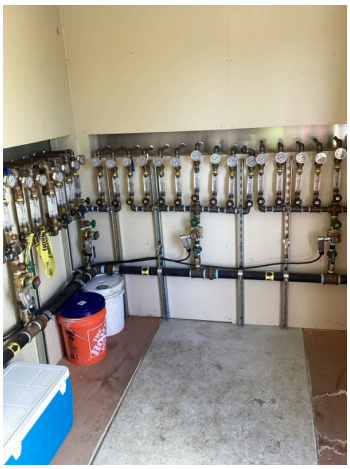
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 3, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	73
PI-202 (PSIG)	51
MFC-201 temperature	35.08
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.62
PI-300 (PSIG)	24
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	2
AS-19-G01 Manifold Flowrate (3-5 CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	3
AS-19-G03 Manifold Flowrate (3-5 CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	11
AS-19-G06 Manifold Flowrate (3-5 CFM)	4.5
AS-19-G09 Manifold Pressure (PSIG)	10
AS-19-G09 Manifold Flowrate (3-5 CFM)	6
AS-19-E02 Manifold Pressure (PSIG)	0

AS-19-E02 Manifold Flowrate (3-5 CFM)	1
AS-19-E05 Manifold Pressure (PSIG)	2
AS-19-E05 Manifold Flowrate (3-5 CFM)	6
AS-19-E08 Manifold Pressure (PSIG)	15
AS-19-E08 Manifold Flowrate (3-5 CFM)	4.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (3-5 CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	15
AS-19-G05 Manifold Flowrate (3-5 CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E01 Manifold Pressure (PSIG)	4
AS-19-E01 Manifold Flowrate (3-5 CFM)	4.5
AS-19-E04 Manifold Pressure (PSIG)	5
AS-19-E04 Manifold Flowrate (3-5 CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (3-5 CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	10
AS-19-E10 Manifold Flowrate (3-5 CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	22
AS-19-G04 Manifold Flowrate (3-5 CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (3-5 CFM)	2
AS-19-G10 Manifold Pressure (PSIG)	10
AS-19-G10 Manifold Flowrate (3-5 CFM)	3
AS-19-E03 Manifold Pressure (PSIG)	4

AS-19-E03 Manifold Flowrate (3-5 CFM)	3
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (3-5 CFM)	4
AS-19-E09 Manifold Pressure (PSIG)	15
AS-19-E09 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (3-5 CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (3-5 CFM)	3.5
AS-19-F09 Manifold Pressure (PSIG)	18
AS-19-F09 Manifold Flowrate (3-5 CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	6
AS-19-F03 Manifold Pressure (PSIG)	11
AS-19-F03 Manifold Flowrate (3-5 CFM)	5
AS-19-B06 Manifold Pressure (PSIG)	9
AS-19-B06 Manifold Flowrate (3-5 CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	12
AS-19-B03 Manifold Flowrate (3-5 CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	0
AS-19-E11 Manifold Flowrate (3-5 CFM)	0
AS-19-F11 Manifold Pressure (PSIG)	15
AS-19-F11 Manifold Flowrate (3-5 CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	18
AS-19-F08 Manifold Flowrate (3-5 CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	9

AS-19-F05 Manifold Flowrate (3-5 CFM)	5
AS-19-F02 Manifold Pressure (PSIG)	20
AS-19-F02 Manifold Flowrate (3-5 CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (3-5 CFM)	5
AS-19-B02 Manifold Pressure (PSIG)	10
AS-19-B02 Manifold Flowrate (3-5 CFM)	4.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (3-5 CFM)	4.5
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (3-5 CFM)	3
AS-19-F04 Manifold Pressure (PSIG)	17
AS-19-F04 Manifold Flowrate (3-5 CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	15
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	12
AS-19-B07 Manifold Flowrate (3-5 CFM)	2.5
AS-19-B04 Manifold Pressure (PSIG)	10
AS-19-B04 Manifold Flowrate (3-5 CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	15
AS-19-B01 Manifold Flowrate (3-5 CFM)	2

Outdoors and General

Propane tank level (%)	65
Number of condensate drums outside	3

Drum Photo

Electric Meter Reading (kWh)	632133
Last fire extinguisher certification date	September 3, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	
Comments on car parkers and site accessibility:	No issues
Car parking photos if near buildings	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo




Photos


Area 5-3 looking west


Area 5-2 looking south


Area 5-2 looking north

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Generated 3 drums of condensate (130 gallons). Inspected cover areas 5-3&5-2. Both look good. Tire marks on 5-3.

Signature	 Signed 6/6/2024, 8:41:50 AM EDT
Departure Time	12:30

Inspection Date	July 1, 2024
Last Quarterly Event Date	
Arrival Time	12:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 40’s-70’s
FWL Electrical Meter Reading (kWh)	5956.82

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.006
PIT-101 (PSIG)	54.5
PIT-102 (PSIA)	68.6
FQI-101 (SLPM)	0
PIT-201 (PSIA)	64.4
PIT-300 (PSIG)	17
FQI-201 (LPM)	0
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	30335
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	132
How full is the condensate drum? (Percentage)	50
PI-101 (PSIG)	120
PI-102 (PSIG)	118
PI-103 (PSIG)	53
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	26.54
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	Rest cycle

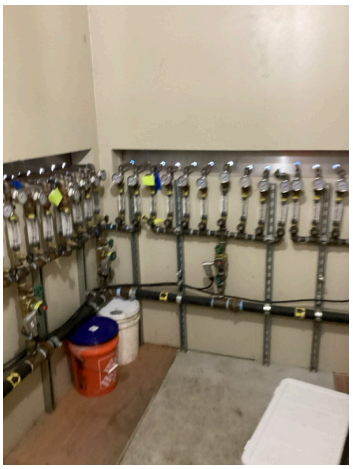
Non-XP room photo


XP-Room

First Aid Kit Expiration Date	July 3, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	72
PI-202 (PSIG)	51
MFC-201 temperature	36.42
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0
PI-300 (PSIG)	20
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	30
AS-19-G01 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	0
AS-19-G03 Manifold Flowrate (3-5 CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (3-5 CFM)	3.5
AS-19-G09 Manifold Pressure (PSIG)	10
AS-19-G09 Manifold Flowrate (3-5 CFM)	5
AS-19-E02 Manifold Pressure (PSIG)	0

AS-19-E02 Manifold Flowrate (3-5 CFM)	0
AS-19-E05 Manifold Pressure (PSIG)	4
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	16
AS-19-E08 Manifold Flowrate (3-5 CFM)	3

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	4
AS-19-G05 Manifold Flowrate (3-5 CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	2
AS-19-G08 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E01 Manifold Pressure (PSIG)	0.5
AS-19-E01 Manifold Flowrate (3-5 CFM)	3
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (3-5 CFM)	2
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (3-5 CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	12
AS-19-E10 Manifold Flowrate (3-5 CFM)	2

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	18
AS-19-G04 Manifold Flowrate (3-5 CFM)	2.5
AS-19-G07 Manifold Pressure (PSIG)	2
AS-19-G07 Manifold Flowrate (3-5 CFM)	1
AS-19-G10 Manifold Pressure (PSIG)	8
AS-19-G10 Manifold Flowrate (3-5 CFM)	1.5
AS-19-E03 Manifold Pressure (PSIG)	2

AS-19-E03 Manifold Flowrate (3-5 CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	4
AS-19-E06 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	20
AS-19-E09 Manifold Flowrate (3-5 CFM)	4
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (3-5 CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	5
AS-19-F12 Manifold Flowrate (3-5 CFM)	3
AS-19-F09 Manifold Pressure (PSIG)	18
AS-19-F09 Manifold Flowrate (3-5 CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (3-5 CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	35
AS-19-B06 Manifold Flowrate (3-5 CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (3-5 CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	0
AS-19-E11 Manifold Flowrate (3-5 CFM)	0
AS-19-F11 Manifold Pressure (PSIG)	15
AS-19-F11 Manifold Flowrate (3-5 CFM)	1.5
AS-19-F08 Manifold Pressure (PSIG)	24
AS-19-F08 Manifold Flowrate (3-5 CFM)	7
AS-19-F05 Manifold Pressure (PSIG)	2

AS-19-F05 Manifold Flowrate (3-5 CFM)	3
AS-19-F02 Manifold Pressure (PSIG)	16
AS-19-F02 Manifold Flowrate (3-5 CFM)	7
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (3-5 CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	10
AS-19-B02 Manifold Flowrate (3-5 CFM)	4.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	5
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (3-5 CFM)	3.5
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (3-5 CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	9
AS-19-F01 Manifold Flowrate (3-5 CFM)	4
AS-19-B07 Manifold Pressure (PSIG)	8
AS-19-B07 Manifold Flowrate (3-5 CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (3-5 CFM)	2.5
AS-19-B01 Manifold Pressure (PSIG)	9
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	60
Number of condensate drums outside	3

Drum Photo



Electric Meter Reading (kWh)	641919
Last fire extinguisher certification date	September 3, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	
Comments on car parkers and site accessibility:	No issues
Car parking photos if near buildings	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos


Area 5-3 looking west. Barrels and chains set.

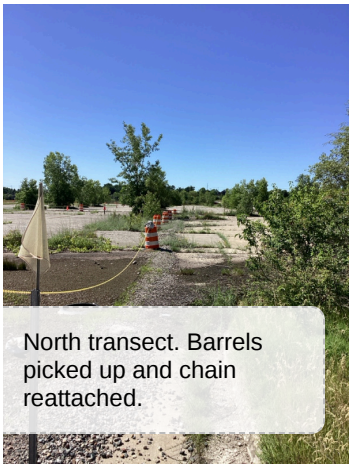

Area 5-2 looking north. Barrels and chains set.

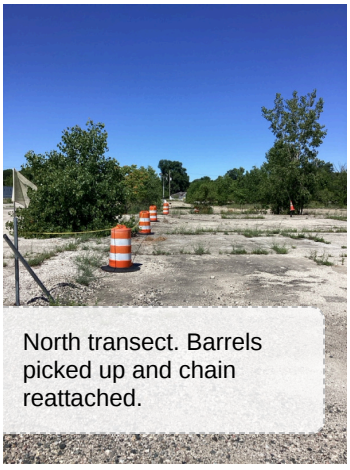

Area 5-2 looking north. Barrels and chains set.


North transect. Barrels picked up and chain reattached.


North transect. Barrels picked up and chain reattached.


North transect. Barrels picked up and chain reattached.


North transect. Barrels picked up and chain reattached.


North transect. Barrels picked up and chain reattached.


Snow fence and broken pails from first section

North transect. Barrels picked up and chain reattached.

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Generated 3 drums of condensate (125 gallons). Inspected cover areas 5-3 & 5-2. Both look good. Placed barrels and chain around areas 5-3 & 5-2. 20 empty drums inside Plant 2 BioSparge fence.

Signature	 Signed 7/1/2024, 4:19:09 PM UTC
Departure Time	13:30

Inspection Date	August 9, 2024
Last Quarterly Event Date	
Arrival Time	09:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 40’s-70’s
FWL Electrical Meter Reading (kWh)	5992.07

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	0.152
PIT-101 (PSIG)	50.8
PIT-102 (PSIA)	64.5
FQI-101 (SLPM)	2002
PIT-201 (PSIA)	44.5
PIT-300 (PSIG)	30.5
FQI-201 (LPM)	0.011
AE-350 (%LEL)	0.1
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	Clear alarm and restarted system. Set the clock. Changed out Alicat.

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	31108
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	132
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	110
PI-103 (PSIG)	49
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	

Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	21.43
MFC-101 standardized flow rate on display (SLPM)	2001
MFC-101 uncorrected flow rate on display (LPM)	451
Comments	Changed out Alicat.

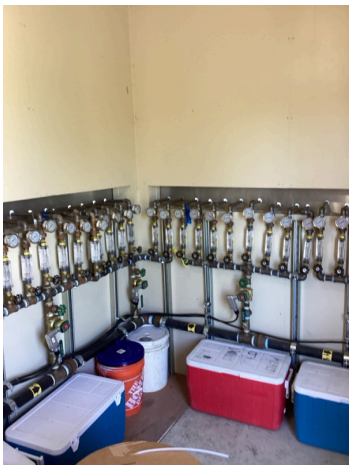
Non-XP room photo


XP-Room

First Aid Kit Expiration Date	July 3, 2024
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	73
PI-202 (PSIG)	51
MFC-201 temperature	26.86
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.01
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.23
PI-300 (PSIG)	28
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	Changed out Alicat.

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	25
AS-19-G01 Manifold Flowrate (3-5 CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	15
AS-19-G03 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	15
AS-19-G06 Manifold Flowrate (3-5 CFM)	2.5
AS-19-G09 Manifold Pressure (PSIG)	15
AS-19-G09 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E02 Manifold Pressure (PSIG)	25

AS-19-E02 Manifold Flowrate (3-5 CFM)	1
AS-19-E05 Manifold Pressure (PSIG)	8
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	26
AS-19-E08 Manifold Flowrate (3-5 CFM)	0.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	30
AS-19-G02 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	19
AS-19-G05 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (3-5 CFM)	3
AS-19-E01 Manifold Pressure (PSIG)	4
AS-19-E01 Manifold Flowrate (3-5 CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	6
AS-19-E04 Manifold Flowrate (3-5 CFM)	2
AS-19-E07 Manifold Pressure (PSIG)	13
AS-19-E07 Manifold Flowrate (3-5 CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (3-5 CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	24
AS-19-G04 Manifold Flowrate (3-5 CFM)	1
AS-19-G07 Manifold Pressure (PSIG)	8
AS-19-G07 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G10 Manifold Pressure (PSIG)	10
AS-19-G10 Manifold Flowrate (3-5 CFM)	1.5
AS-19-E03 Manifold Pressure (PSIG)	8

AS-19-E03 Manifold Flowrate (3-5 CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	12
AS-19-E06 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	0
AS-19-E09 Manifold Flowrate (3-5 CFM)	0
AS-19-E12 Manifold Pressure (PSIG)	20
AS-19-E12 Manifold Flowrate (3-5 CFM)	2

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	11
AS-19-F12 Manifold Flowrate (3-5 CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	28
AS-19-F09 Manifold Flowrate (3-5 CFM)	1.5
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	5.5
AS-19-F03 Manifold Pressure (PSIG)	15
AS-19-F03 Manifold Flowrate (3-5 CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	35
AS-19-B06 Manifold Flowrate (3-5 CFM)	1.5
AS-19-B03 Manifold Pressure (PSIG)	15
AS-19-B03 Manifold Flowrate (3-5 CFM)	3.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	10
AS-19-E11 Manifold Flowrate (3-5 CFM)	0.5
AS-19-F11 Manifold Pressure (PSIG)	16
AS-19-F11 Manifold Flowrate (3-5 CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	30
AS-19-F08 Manifold Flowrate (3-5 CFM)	3.5
AS-19-F05 Manifold Pressure (PSIG)	15

AS-19-F05 Manifold Flowrate (3-5 CFM)	3
AS-19-F02 Manifold Pressure (PSIG)	25
AS-19-F02 Manifold Flowrate (3-5 CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	12
AS-19-B05 Manifold Flowrate (3-5 CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	15
AS-19-B02 Manifold Flowrate (3-5 CFM)	5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	17
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	20
AS-19-F07 Manifold Flowrate (3-5 CFM)	3
AS-19-F04 Manifold Pressure (PSIG)	27
AS-19-F04 Manifold Flowrate (3-5 CFM)	1
AS-19-F01 Manifold Pressure (PSIG)	12
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	15
AS-19-B07 Manifold Flowrate (3-5 CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	12
AS-19-B04 Manifold Flowrate (3-5 CFM)	2.5
AS-19-B01 Manifold Pressure (PSIG)	15
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	50
Number of condensate drums outside	9

Drum Photo


9 condensate drums


6 empty drums


5 empty drums

Electric Meter Reading (kWh)	654618
Last fire extinguisher certification date	September 3, 2023
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	
Comments on car parkers and site accessibility:	No issues

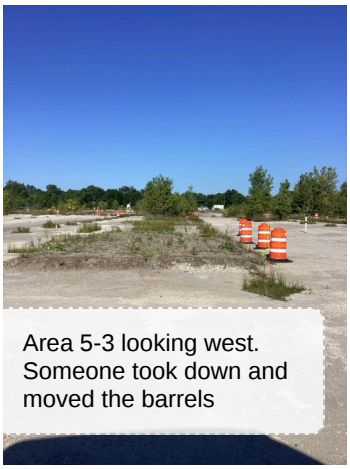
Car parking photos if near buildings

Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos


Area 5-2 looking south still well barricaded


Area 5-3 looking west. Someone took down and moved the barrels


Area 5-3 looking west. Barricading is back up.

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Generated 4 drums of condensate (170 gallons). Inspected cover areas 5-3 & 5-2. Both areas looked good. I had to set the barrels back at area 5-3. Someone had moved them.
Signature	 Signed 8/9/2024, 10:35:23 AM EDT
Departure Time	11:30

Inspection Date	September 3, 2024
Last Quarterly Event Date	
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 50’s-70’s
FWL Electrical Meter Reading (kWh)	6015.93

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	0.152
PIT-101 (PSIG)	54.5
PIT-102 (PSIA)	68.9
FQI-101 (SLPM)	0
PIT-201 (PSIA)	66.9
PIT-300 (PSIG)	14.5
FQI-201 (LPM)	0.026
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	Air Components on site at 11:30 for annual maintenance on the Kaeser air compressor.

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	Condensate drain: Change the service unit, Display: Sigma Control 2: Maintain the drive belt, Display: Sigma Control 2: Change the air filter
Is the annual compressor inspection happening during this event?	Yes
Annual Compressor Inspection	Display Sigma Control 2: Change the oil filter, Check The safety Valve, Check the overheating safety function, Check the Emergency Stop, Refrigerated Dryer: check pressure monitor, Check the cooler for leaks, Maintain the heat recovery system, Check the electrical connections are tight, Replace drive belt, Biennial: Display Sigma Control 2: Change the oil separator cartridge
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	31655
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	132
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	120
PI-103 (PSIG)	54
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure

Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.
Semiannual Non-XP Instrument Maintenance	HS-401 Hit button to test system shutdown and that alarm is sent, ENC198 Take used compressor oil to Advanced Auto Parts for recycling (it can be recycled like used car oil), TP-401/402 Verify outlet pressure, TP-401/402 change mechanical seal, TP-401/402 Clean descsale pump, FQI-451-462 Verify digital display ON / replace battery, T-401 / T-402 Verify level
Quarterly Filter Maintenance	PF-101 Check and clean filter (knock out dirt and rinse with DI water). Replace filter if necessary., CF-101 Check and clean filter element and chamber. Replace if necessary., PF-102 Check and replace filter element, PF-103 Check/Replace Filter element, PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	17.32
MFC-101 standardized flow rate on display (SLPM)	1863
MFC-101 uncorrected flow rate on display (LPM)	406
Comments	

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 3, 2026
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater turned on and verified to be operating?	Yes

Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	76
PI-202 (PSIG)	52
MFC-201 temperature	26.85
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.95
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.23
PI-300 (PSIG)	32
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	HS-402 Hit button to test system shutdown and that alarm is sent
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	29
AS-19-G01 Manifold Flowrate (3-5 CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	25
AS-19-G03 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	11
AS-19-G06 Manifold Flowrate (3-5 CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	14
AS-19-G09 Manifold Flowrate (3-5 CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	12
AS-19-E02 Manifold Flowrate (3-5 CFM)	3
AS-19-E05 Manifold Pressure (PSIG)	6
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	15
AS-19-E08 Manifold Flowrate (3-5 CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	26
AS-19-G02 Manifold Flowrate (3-5 CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	15
AS-19-G05 Manifold Flowrate (3-5 CFM)	2
AS-19-G08 Manifold Pressure (PSIG)	4
AS-19-G08 Manifold Flowrate (3-5 CFM)	3
AS-19-E01 Manifold Pressure (PSIG)	2
AS-19-E01 Manifold Flowrate (3-5 CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	4
AS-19-E04 Manifold Flowrate (3-5 CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (3-5 CFM)	2.5

AS-19-E10 Manifold Pressure (PSIG)	12
AS-19-E10 Manifold Flowrate (3-5 CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	22
AS-19-G04 Manifold Flowrate (3-5 CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G10 Manifold Pressure (PSIG)	10
AS-19-G10 Manifold Flowrate (3-5 CFM)	1.5
AS-19-E03 Manifold Pressure (PSIG)	3
AS-19-E03 Manifold Flowrate (3-5 CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	0
AS-19-E09 Manifold Flowrate (3-5 CFM)	0
AS-19-E12 Manifold Pressure (PSIG)	12
AS-19-E12 Manifold Flowrate (3-5 CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	5
AS-19-F12 Manifold Flowrate (3-5 CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	14
AS-19-F09 Manifold Flowrate (3-5 CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (3-5 CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (3-5 CFM)	1.5

AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (3-5 CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	9
AS-19-E11 Manifold Flowrate (3-5 CFM)	0.5
AS-19-F11 Manifold Pressure (PSIG)	13
AS-19-F11 Manifold Flowrate (3-5 CFM)	2.5
AS-19-F08 Manifold Pressure (PSIG)	25
AS-19-F08 Manifold Flowrate (3-5 CFM)	6
AS-19-F05 Manifold Pressure (PSIG)	6
AS-19-F05 Manifold Flowrate (3-5 CFM)	3
AS-19-F02 Manifold Pressure (PSIG)	22
AS-19-F02 Manifold Flowrate (3-5 CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (3-5 CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	12
AS-19-B02 Manifold Flowrate (3-5 CFM)	4.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	10
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	12
AS-19-F07 Manifold Flowrate (3-5 CFM)	3
AS-19-F04 Manifold Pressure (PSIG)	17
AS-19-F04 Manifold Flowrate (3-5 CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	10
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (3-5 CFM)	2

AS-19-B04 Manifold Pressure (PSIG)	10
AS-19-B04 Manifold Flowrate (3-5 CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	40
Number of condensate drums outside	12

Drum Photo

12 condensate drums

8 empty drums

Plant 2 groundwater

Plant 6 groundwater drums

Plant 3 groundwater drum

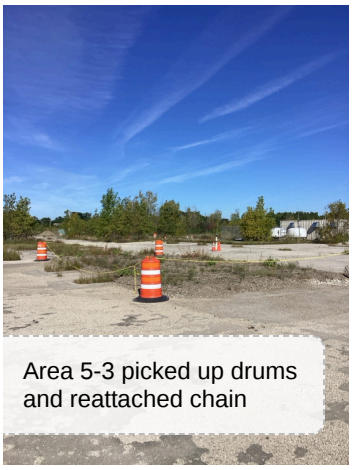
Electric Meter Reading (kWh)	664197
Last fire extinguisher certification date	September 3, 2024
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	No issues
Comments on car parkers and site accessibility:	No issues

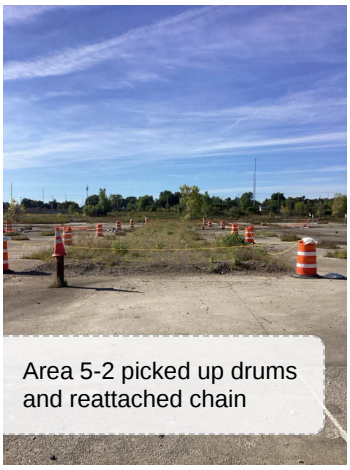
Car parking photos if near buildings

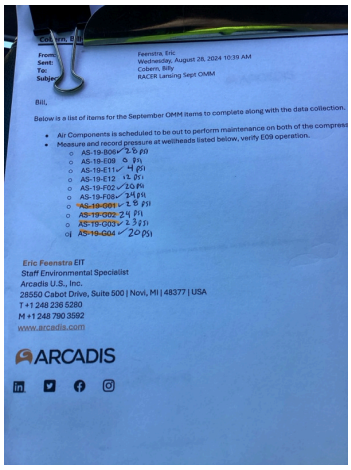
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos







Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Generated 3 drums of condensate (140 gallons). Inspected cover areas 5-3 & 5-2. Both areas looked good. I had to set the barrels back at both locations and reattach chain.
Signature	 Signed 9/3/2024, 9:23:32 AM EDT
Departure Time	12:30

Inspection Date	November 1, 2024
Last Quarterly Event Date	
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Cloudy, windy, 40's
FWL Electrical Meter Reading (kWh)	6160.96

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	5.576
PIT-101 (PSIG)	51.2
PIT-102 (PSIA)	65.2
FQI-101 (SLPM)	1998
PIT-201 (PSIA)	64.5
PIT-300 (PSIG)	25.4
FQI-201 (LPM)	0.036
AE-350 (%LEL)	0
AE-351 (%LEL)	0
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	System on rest cycle upon arrival. Drove site and picked up barrels and cones. Completed cap inspection areas.

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	Condensate drain: Change the service unit, Display: Sigma Control 2: Maintain the drive belt, Display: Sigma Control 2: Change the air filter
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	32939
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	132
How full is the condensate drum? (Percentage)	20
PI-101 (PSIG)	128
PI-102 (PSIG)	115
PI-103 (PSIG)	50
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.

Semiannual Non-XP Instrument Maintenance	HS-401 Hit button to test system shutdown and that alarm is sent, ENC198 Take used compressor oil to Advanced Auto Parts for recycling (it can be recycled like used car oil), TP-401/402 Verify outlet pressure, TP-401/402 change mechanical seal, TP-401/402 Clean descsale pump, FQI-451-462 Verify digital display ON / replace battery, T-401 / T-402 Verify level
Quarterly Filter Maintenance	PF-101 Check and clean filter (knock out dirt and rinse with DI water). Replace filter if necessary., CF-101 Check and clean filter element and chamber. Replace if necessary., PF-102 Check and replace filter element, PF-103 Check/Replace Filter element, PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	14.73
MFC-101 standardized flow rate on display (SLPM)	1998
MFC-101 uncorrected flow rate on display (LPM)	434
Comments	Emptied trash and removed empty boxes.

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 3, 2026
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	76
PI-202 (PSIG)	51
MFC-201 temperature	34.22
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.01

MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.57
PI-300 (PSIG)	33
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	No
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	26
AS-19-G01 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	22

AS-19-G03 Manifold Flowrate (3-5 CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (3-5 CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (3-5 CFM)	5
AS-19-E02 Manifold Pressure (PSIG)	18
AS-19-E02 Manifold Flowrate (3-5 CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	2
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	16
AS-19-E08 Manifold Flowrate (3-5 CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	26
AS-19-G02 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	15
AS-19-G05 Manifold Flowrate (3-5 CFM)	2
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E01 Manifold Pressure (PSIG)	3
AS-19-E01 Manifold Flowrate (3-5 CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	4
AS-19-E04 Manifold Flowrate (3-5 CFM)	2
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (3-5 CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	22

AS-19-G04 Manifold Flowrate (3-5 CFM)	3.5
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (3-5 CFM)	1.5
AS-19-G10 Manifold Pressure (PSIG)	10
AS-19-G10 Manifold Flowrate (3-5 CFM)	1
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (3-5 CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	9
AS-19-E06 Manifold Flowrate (3-5 CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	22
AS-19-E09 Manifold Flowrate (3-5 CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	16
AS-19-E12 Manifold Flowrate (3-5 CFM)	1

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	5
AS-19-F12 Manifold Flowrate (3-5 CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	14
AS-19-F09 Manifold Flowrate (3-5 CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	9
AS-19-F06 Manifold Flowrate (3-5 CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	9
AS-19-F03 Manifold Flowrate (3-5 CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	29
AS-19-B06 Manifold Flowrate (3-5 CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	9
AS-19-B03 Manifold Flowrate (3-5 CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	15

AS-19-E11 Manifold Flowrate (3-5 CFM)	0.5
AS-19-F11 Manifold Pressure (PSIG)	15
AS-19-F11 Manifold Flowrate (3-5 CFM)	2.5
AS-19-F08 Manifold Pressure (PSIG)	26
AS-19-F08 Manifold Flowrate (3-5 CFM)	7
AS-19-F05 Manifold Pressure (PSIG)	7
AS-19-F05 Manifold Flowrate (3-5 CFM)	3
AS-19-F02 Manifold Pressure (PSIG)	23
AS-19-F02 Manifold Flowrate (3-5 CFM)	3
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (3-5 CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	12
AS-19-B02 Manifold Flowrate (3-5 CFM)	5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	12
AS-19-F07 Manifold Flowrate (3-5 CFM)	3
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (3-5 CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	6
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	8
AS-19-B07 Manifold Flowrate (3-5 CFM)	2.5
AS-19-B04 Manifold Pressure (PSIG)	12
AS-19-B04 Manifold Flowrate (3-5 CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	9
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	40
Number of condensate drums outside	15
Drum Photo	
Electric Meter Reading (kWh)	685348
Last fire extinguisher certification date	September 3, 2024
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	No issues
Comments on car parkers and site accessibility:	No issues
Car parking photos if near buildings	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Inspected cover areas 5-3 & 5-2. Both areas looked good. I had to set the barrels back at both locations and reattach chain.
Signature	 Signed 11/1/2024, 10:29:05 AM EDT
Departure Time	11:00

Inspection Date	December 13, 2024
Last Quarterly Event Date	
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Mostly Cloudy, teens
FWL Electrical Meter Reading (kWh)	6693.42

HMI and Control Panel

Surge Suppressor Visual Checks

Main surge suppressor: all 3 green lights on?	Yes
Main Surge Suppressor Comments	
Control panel surge suppressor: all 3 green lights on?	Yes
Control panel Surge Suppressor Comments	
Breaker box surge suppressor: all 3 green lights on?	Yes
Breaker box Surge Suppressor Comments	

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	3.073
PIT-101 (PSIG)	51.6
PIT-102 (PSIA)	66
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	65.8
PIT-300 (PSIG)	29.9
FQI-201 (LPM)	0.001
AE-350 (%LEL)	0
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	System on rest cycle upon arrival. Turned on 1 and 4 to check measurements.

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain, Used compressed air to blow out the air filter mat
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Change oil filter
Semiannual Compressor Maintenance	Condensate drain: Change the service unit, Display: Sigma Control 2: Maintain the drive belt, Display: Sigma Control 2: Change the air filter
Is the annual compressor inspection happening during this event?	No
Compressor Audio	2 Audio Files
Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	33627
Oil Pressure (PSIG)	13
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	130
How full is the condensate drum? (Percentage)	35
PI-101 (PSIG)	130
PI-102 (PSIG)	115
PI-103 (PSIG)	50
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, Close valve on autodrain and clean strainer. Re-open valve to place back into operation.

Semiannual Non-XP Instrument Maintenance	HS-401 Hit button to test system shutdown and that alarm is sent, ENC198 Take used compressor oil to Advanced Auto Parts for recycling (it can be recycled like used car oil), TP-401/402 Verify outlet pressure, TP-401/402 change mechanical seal, TP-401/402 Clean descsale pump, FQI-451-462 Verify digital display ON / replace battery, T-401 / T-402 Verify level
Quarterly Filter Maintenance	PF-101 Check and clean filter (knock out dirt and rinse with DI water). Replace filter if necessary., CF-101 Check and clean filter element and chamber. Replace if necessary., PF-102 Check and replace filter element, PF-103 Check/Replace Filter element, PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	17.77
MFC-101 standardized flow rate on display (SLPM)	1860
MFC-101 uncorrected flow rate on display (LPM)	402
Comments	Cleaned condensate solenoid valve screen. It was really clean and didn't require much effort.

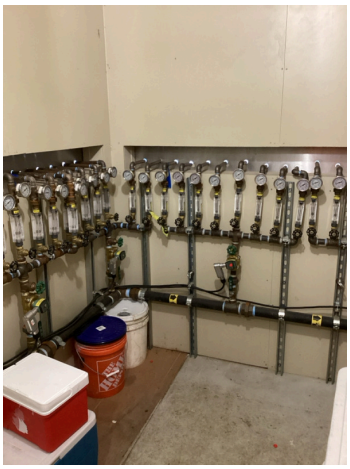
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 3, 2026
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Recertification
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	65
PI-202 (PSIG)	47
MFC-201 temperature	35.92
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	6.01

MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.48
PI-300 (PSIG)	25
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	No
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	30
AS-19-G01 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	30

AS-19-G03 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	12
AS-19-G06 Manifold Flowrate (3-5 CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	5
AS-19-G09 Manifold Flowrate (3-5 CFM)	6
AS-19-E02 Manifold Pressure (PSIG)	22
AS-19-E02 Manifold Flowrate (3-5 CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	4
AS-19-E05 Manifold Flowrate (3-5 CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	18
AS-19-E08 Manifold Flowrate (3-5 CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (3-5 CFM)	1
AS-19-G05 Manifold Pressure (PSIG)	5
AS-19-G05 Manifold Flowrate (3-5 CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (3-5 CFM)	2.5
AS-19-E01 Manifold Pressure (PSIG)	2
AS-19-E01 Manifold Flowrate (3-5 CFM)	3.5
AS-19-E04 Manifold Pressure (PSIG)	3
AS-19-E04 Manifold Flowrate (3-5 CFM)	2
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (3-5 CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (3-5 CFM)	2

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	22

AS-19-G04 Manifold Flowrate (3-5 CFM)	3.5
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (3-5 CFM)	0.5
AS-19-G10 Manifold Pressure (PSIG)	10
AS-19-G10 Manifold Flowrate (3-5 CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (3-5 CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	9
AS-19-E06 Manifold Flowrate (3-5 CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	22
AS-19-E09 Manifold Flowrate (3-5 CFM)	2
AS-19-E12 Manifold Pressure (PSIG)	15
AS-19-E12 Manifold Flowrate (3-5 CFM)	1.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	5
AS-19-F12 Manifold Flowrate (3-5 CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	16
AS-19-F09 Manifold Flowrate (3-5 CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (3-5 CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (3-5 CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	31
AS-19-B06 Manifold Flowrate (3-5 CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (3-5 CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	10

AS-19-E11 Manifold Flowrate (3-5 CFM)	0.5
AS-19-F11 Manifold Pressure (PSIG)	20
AS-19-F11 Manifold Flowrate (3-5 CFM)	0.5
AS-19-F08 Manifold Pressure (PSIG)	26
AS-19-F08 Manifold Flowrate (3-5 CFM)	6
AS-19-F05 Manifold Pressure (PSIG)	5
AS-19-F05 Manifold Flowrate (3-5 CFM)	3
AS-19-F02 Manifold Pressure (PSIG)	24
AS-19-F02 Manifold Flowrate (3-5 CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (3-5 CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	10
AS-19-B02 Manifold Flowrate (3-5 CFM)	6

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	10
AS-19-F10 Manifold Flowrate (3-5 CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	9
AS-19-F07 Manifold Flowrate (3-5 CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	18
AS-19-F04 Manifold Flowrate (3-5 CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	12
AS-19-F01 Manifold Flowrate (3-5 CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (3-5 CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	10
AS-19-B04 Manifold Flowrate (3-5 CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	11
AS-19-B01 Manifold Flowrate (3-5 CFM)	3

Outdoors and General

Propane tank level (%)	75
Number of condensate drums outside	15

Drum Photo

Electric Meter Reading (kWh)	699060
Last fire extinguisher certification date	September 3, 2024
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	No issues
Comments on car parkers and site accessibility:	No issues

Car parking photos if near buildings

Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo


Photos


Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Inspected cover areas 5-3 & 5-2. Both areas looked good. Barrels and chains along both transects looked good.
Signature	Signed 12/13/2024, 9:21:01 AM EST
Departure Time	10:15

Inspection Date	January 10, 2024
Last Quarterly Event Date	
Arrival Time	09:20
Personnel	Robert Prigge
Weather	30 overcast

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	21.5
PIT-102 (PSIA)	27.5
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	20.7
FE-301 (LPM)	299.9
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	14.9
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	22853.11
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done

Oil sample taken?	No
Number of routine maintenance kits remaining	0.5
Number of air filters remaining	0
Compressor Audio	2 Audio Files
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	239.8
Motor Current while loading (amps)	14.5
Motor RPMs while loading	1737
VFD thermal state	26
VFD line voltage in (while compressor is loading)	290
Wet receiver tank loading pressure (PI-101)	79
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	19
PI-102 (PSIG)	22
PI-103 (PSIG)	24
Trident Desiccant Dryer Pressure (PSIG)	4
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-102 needle green, PF-101 drained manually, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	70
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	54.86
MFC-101 standardized flow rate on display (SLPM)	298.5
MFC-101 uncorrected flow rate on display (LPM)	146.5
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 10, 2024
Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	60
PI-202 (PSIG)	45
MFC-201 temperature (Fahrenheit)	64.47
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.339
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	14
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	15
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	13
AS-19-A02 Wellhead Pressure (PSIG)	14
AS-19-A03 Wellhead Pressure (PSIG)	8
AS-19-A04 Wellhead Pressure (PSIG)	14
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	179587
Electric meter power draw (kW) while compressor is on	10.3
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	
Comments on car parkers and site accessibility:	No issues
Car parking photos if near buildings	
Last fire extinguisher certification date	September 10, 2023
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	Air filters
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 1/10/2024, 12:53:00 PM EST
Departure Time	13:10

Inspection Date	February 8, 2024
Last Quarterly Event Date	
Arrival Time	10:00
Personnel	Robert Prigge
Weather	40 sunny with clouds

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	22.1
PIT-102 (PSIA)	27.4
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	0
PIT-202 (PSIA)	16.3
FE-301 (LPM)	299.9
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	14.9
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	All moving parts appear intact, Needle in the green, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	23202.06
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done

Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	222
Motor Current while loading (amps)	14.71
Motor RPMs while loading	1785
VFD thermal state	39
VFD line voltage in (while compressor is loading)	231
Wet receiver tank loading pressure (PI-101)	66
Wet receiver tank unloading pressure (PI-101)	79
How full is the condensate drum? (Gallons)	19
PI-102 (PSIG)	22
PI-103 (PSIG)	23
Trident Desiccant Dryer Pressure (PSIG)	4
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	
Dried air tank pressure (PSIG)	70
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	66.76
MFC-101 standardized flow rate on display (SLPM)	300.65
MFC-101 uncorrected flow rate on display (LPM)	148.09
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 8, 2024
Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Not yet- still have propane
PI-201 (PSIG)	82
PI-202 (PSIG)	43
MFC-201 temperature (Fahrenheit)	75.34
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.389
PI-300 (PSIG)	13
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	12
PI-303 Z3 (PSIG)	13
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	

XP-room photo




Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	14
AS-19-A02 Wellhead Pressure (PSIG)	13
AS-19-A03 Wellhead Pressure (PSIG)	10
AS-19-A04 Wellhead Pressure (PSIG)	13
AS-19-A05 Wellhead Pressure (PSIG)	12.5
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	185171
Electric meter power draw (kW) while compressor is on	10.89
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	September 8, 2023
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 2/8/2024, 4:14:04 PM EST
Departure Time	11:45

Inspection Date	March 6, 2024
Last Quarterly Event Date	
Arrival Time	15:40
Personnel	Robert Prigge
Weather	40 Sunny

HMI and Control Panel

HMI display functioning (not frozen)?	No
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	22.2
PIT-102 (PSIA)	28
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	21.1
FE-301 (LPM)	300.6
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	15.5
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	23545.58
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done

Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	211
Motor Current while loading (amps)	14.36
Motor RPMs while loading	1737
VFD thermal state	33
VFD line voltage in (while compressor is loading)	236.4
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	19
PI-102 (PSIG)	22
PI-103 (PSIG)	22
Trident Desiccant Dryer Pressure (PSIG)	3.5
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	50
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	72.75
MFC-101 standardized flow rate on display (SLPM)	300.44
MFC-101 uncorrected flow rate on display (LPM)	150.23
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	March 6, 2024
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	No- still propane left
PI-201 (PSIG)	78
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	62.15
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.38
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.381
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	13
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	13
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	13
AS-19-A02 Wellhead Pressure (PSIG)	13
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	13
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	189648
Electric meter power draw (kW) while compressor is on	10.74
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	March 6, 2024
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 3/6/2024, 4:36:58 PM EST
Departure Time	17:00

Inspection Date	June 6, 2024
Last Quarterly Event Date	
Arrival Time	12:30
Personnel	Billy J Cobern
Weather	Partly Cloudy, breezy, 70’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	20.5
PIT-102 (PSIA)	28.2
FQI-101 (SLPM)	301.1
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.2
FE-301 (LPM)	300.3
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	16.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Manually set to Zone 1 to take readings

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	23892.84
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	212
Motor Current while loading (amps)	15.02
Motor RPMs while loading	1737
VFD thermal state	33
VFD line voltage in (while compressor is loading)	234.4
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	19.5
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	56
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	81.25
MFC-101 standardized flow rate on display (SLPM)	300.18
MFC-101 uncorrected flow rate on display (LPM)	144.32
Comments	Air Components on site for the quarterly compressor maintenance

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2024
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	No. Both tanks over 1/2 full. Spoke with Robert and both tanks were replaced on Monday, June 3rd
PI-201 (PSIG)	13
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	80.73
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.392
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.391
PI-300 (PSIG)	10
PI-301 Z1 (PSIG)	14
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	14
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)

Comments	Calibration gas expired in May 2024. AE-401 calibrated fine. AE-350 did not calibrate. Called Eric Feenstra and he stated that the sensors were bad and it was no longer being used.

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	0
AS-19-A03 Wellhead Pressure (PSIG)	0
AS-19-A04 Wellhead Pressure (PSIG)	15
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	195518
Electric meter power draw (kW) while compressor is on	4.81
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	
Comments on car parkers and site accessibility:	None

Car parking photos if near buildings

Last fire extinguisher certification date	March 6, 2024
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 6/6/2024, 12:31:59 PM EDT
Departure Time	14:00

Inspection Date	July 1, 2024
Last Quarterly Event Date	
Arrival Time	13:45
Personnel	Billy J Cobern
Weather	Partly Cloudy, breezy, 70’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	20
PIT-102 (PSIA)	29.4
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	22.1
FE-301 (LPM)	300.1
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	16.8
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	24333.25
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	222
Motor Current while loading (amps)	7.21
Motor RPMs while loading	1800
VFD thermal state	55
VFD line voltage in (while compressor is loading)	231.6
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	23.5
PI-102 (PSIG)	20
PI-103 (PSIG)	19
Trident Desiccant Dryer Pressure (PSIG)	58
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	84.07
MFC-101 standardized flow rate on display (SLPM)	300.42
MFC-101 uncorrected flow rate on display (LPM)	142.36
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2024
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	105
PI-202 (PSIG)	46
MFC-201 temperature (Fahrenheit)	82.9
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.394
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.391
PI-300 (PSIG)	16
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	14
PI-303 Z3 (PSIG)	14
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, No
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	16
AS-19-A02 Wellhead Pressure (PSIG)	0
AS-19-A03 Wellhead Pressure (PSIG)	4
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	11
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	197533
Electric meter power draw (kW) while compressor is on	6.06
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	All good
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	March 6, 2024
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 7/1/2024, 6:46:52 PM UTC
Departure Time	15:00

Inspection Date	August 9, 2024
Last Quarterly Event Date	
Arrival Time	11:30
Personnel	Billy J Cobern
Weather	Partly Cloudy, breezy, 70's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	21.4
PIT-102 (PSIA)	30.2
FQI-101 (SLPM)	299.4
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	29.2
FE-301 (LPM)	299.9
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	17.8
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2485438
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	222
Motor Current while loading (amps)	7.24
Motor RPMs while loading	1802
VFD thermal state	67
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	29
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	55
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	74.82
MFC-101 standardized flow rate on display (SLPM)	299.9
MFC-101 uncorrected flow rate on display (LPM)	137.6
Comments	Changed out Alicat

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2024
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	120
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	81.07
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.601
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.285
PI-300 (PSIG)	18
PI-301 Z1 (PSIG)	0
PI-302 Z2 (PSIG)	16
PI-303 Z3 (PSIG)	16
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	Changed out Alicats. XP room vent needs to be vacuumed out. Will do during the next visit.

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	16
AS-19-A02 Wellhead Pressure (PSIG)	2
AS-19-A03 Wellhead Pressure (PSIG)	5
AS-19-A04 Wellhead Pressure (PSIG)	2
AS-19-A05 Wellhead Pressure (PSIG)	5
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	200081
Electric meter power draw (kW) while compressor is on	4.85
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	All good
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	March 6, 2024
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 8/9/2024, 2:36:16 PM EDT
Departure Time	15:05

Inspection Date	September 3, 2024
Last Quarterly Event Date	
Arrival Time	12:30
Personnel	Billy J Cobern
Weather	Partly Cloudy, 70’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	20.3
PIT-102 (PSIA)	27.9
FQI-101 (SLPM)	300.3
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	28.8
FE-301 (LPM)	300.3
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	15.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation, Recertification
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2537724
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	224
Motor Current while loading (amps)	14.58
Motor RPMs while loading	1801
VFD thermal state	57
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	34.5
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	62
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	Check and clean PF-101, Check, clean, and replace filter element on CF-101, Check PF-102 filter element and inform TM if it needs to be replaced, Check PF-103 filter element and inform TM if it needs to be replaced, Open and clean CF-102, inform TM if element needs to be replaced, Open and check PF-104, inform TM if element needs to be replaced, Open desiccant dryer towers, take picture, note condition in the comments (Q2 and Q4)
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	70
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	76.05
MFC-101 standardized flow rate on display (SLPM)	301.1
MFC-101 uncorrected flow rate on display (LPM)	147.3

Comments	Annual compressor maintenance completed

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2026
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green, Recertification
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	130
PI-202 (PSIG)	40
MFC-201 temperature (Fahrenheit)	82.53
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.288
PI-300 (PSIG)	13
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	12
PI-303 Z3 (PSIG)	12
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, Yes: AE-401 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)

Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	11
AS-19-A02 Wellhead Pressure (PSIG)	14
AS-19-A03 Wellhead Pressure (PSIG)	11
AS-19-A04 Wellhead Pressure (PSIG)	14
AS-19-A05 Wellhead Pressure (PSIG)	11
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	202685
Electric meter power draw (kW) while compressor is on	6.77
Walked hose corridors and fixed fallen barrels?	Yes

Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	All good
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	September 3, 2024
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment
System building photo	

Photos	
Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 9/3/2024, 1:05:38 PM EDT
Departure Time	16:05

Inspection Date	October 9, 2024
Last Quarterly Event Date	
Arrival Time	11:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 30’s-60’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	23.8
PIT-102 (PSIA)	13.4
FQI-101 (SLPM)	0
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.7
FE-301 (LPM)	0
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	System down due to power failure upon arrival.

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2544781
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No

Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	1
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	224
Motor Current while loading (amps)	7.27
Motor RPMs while loading	1800
VFD thermal state	42
VFD line voltage in (while compressor is loading)	224
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	35
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	62
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	70
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	76.05
MFC-101 standardized flow rate on display (SLPM)	301.1
MFC-101 uncorrected flow rate on display (LPM)	147.3
Comments	Annual compressor maintenance completed

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2026
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	100
PI-202 (PSIG)	60
MFC-201 temperature (Fahrenheit)	82.53
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.288
PI-300 (PSIG)	13
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	12
PI-303 Z3 (PSIG)	12
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	System stopped working after I connected the Tosi box.

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	0
AS-19-A02 Wellhead Pressure (PSIG)	0
AS-19-A03 Wellhead Pressure (PSIG)	0
AS-19-A04 Wellhead Pressure (PSIG)	0
AS-19-A05 Wellhead Pressure (PSIG)	0
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	204472
Electric meter power draw (kW) while compressor is on	4.46
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	All good
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	September 3, 2024
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	Connected the Tosi box and the screen went blank.
Signature	 Signed 10/9/2024, 11:30:07 AM EDT
Departure Time	14:00

Inspection Date	November 1, 2024
Last Quarterly Event Date	
Arrival Time	11:00
Personnel	Billy J Cobern
Weather	Cloudy, windy, 40's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	19.8
PIT-102 (PSIA)	28.6
FQI-101 (SLPM)	299.3
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.9
FE-301 (LPM)	300.6
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	15.3
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Set time
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Switched on zone 1 for readings

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2591961
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No

Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	1
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	230
Motor Current while loading (amps)	14.58
Motor RPMs while loading	1800
VFD thermal state	58
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	36
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	60
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	59.23
MFC-101 standardized flow rate on display (SLPM)	300.1
MFC-101 uncorrected flow rate on display (LPM)	143.9
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2026
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	85
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	62.55
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.266
PI-300 (PSIG)	15
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	12
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	12
AS-19-A02 Wellhead Pressure (PSIG)	14
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	14
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	207439
Electric meter power draw (kW) while compressor is on	7.63
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	All good
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	September 3, 2024
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 11/1/2024, 12:21:02 PM EDT
Departure Time	13:00

Inspection Date	December 13, 2024
Last Quarterly Event Date	
Arrival Time	10:20
Personnel	Billy J Cobern
Weather	Mostly Cloudy, 20's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	20.3
PIT-102 (PSIA)	30.1
FQI-101 (SLPM)	301.5
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.9
FE-301 (LPM)	300.4
AE-350 (%LEL)	0.1
PIT-300 (PSIG)	16.6
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Set time
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Switched on zone 1 for readings, changed vent fan thermostat to 80.

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2659924
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No

Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	1
Compressor Audio	2 Audio Files
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	230
Motor Current while loading (amps)	14.63
Motor RPMs while loading	1800
VFD thermal state	48
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	65
Wet receiver tank unloading pressure (PI-101)	78
How full is the condensate drum? (Gallons)	37.5
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	60
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-101 drained manually, PF-102 needle green, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	62.73
MFC-101 standardized flow rate on display (SLPM)	299.9
MFC-101 uncorrected flow rate on display (LPM)	139.8
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 6, 2026
Fire Extinguisher Check	All moving parts appear intact, No deformation, Needle in the green
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	45
PI-202 (PSIG)	45
MFC-201 temperature (Fahrenheit)	58.48
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.262
PI-300 (PSIG)	18
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	12
PI-303 Z3 (PSIG)	12
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, No
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	14
AS-19-A02 Wellhead Pressure (PSIG)	12
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	12
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	216066
Electric meter power draw (kW) while compressor is on	10.77
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	Good. No leaks.
Comments on car parkers and site accessibility:	None
Car parking photos if near buildings	
Last fire extinguisher certification date	September 3, 2024
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 12/13/2024, 11:26:06 AM EST
Departure Time	11:45

Daily Log

Project Name :	RACER Lansing 2024	**Weather(°F) :**	Mid 30s
Project Number :	30214036	**Prepared By:**	Megan Lee
Purpose :	Nutrient injections		
PPE :	Level D		
Equipment:	N/A		

Date	Time	Description of Activities
03/25/2024	09:19	H& S kickoff with water boy
03/25/2024	09:22	Begin adding dap to Plant 3 tanks. 1/6 of a bag each. Water boy is unrolling hoses
03/25/2024	09:33	Water boy filling tanks with water
03/25/2024	10:18	Labeling wells that will not be injected
03/25/2024	10:44	Finished setting up tubing to inject Zone 2 and 5
03/25/2024	10:52	Starting to inject
03/25/2024	10:55	Finish at plant 3. Return to plant 2 and begin filling tank's
03/25/2024	11:04	Took photos of any flowmeters not working. Goal to track which wells they are linked to during each injection. Aiming for 7-8 GPM on each that works
03/25/2024	11:39	Finished injecting into Zones 2 and 5. Leaving site for lunch
03/25/2024	12:10	Return to site. Clarify which Zone 3 wells will be included with Anyssa and Billy
03/25/2024	12:42	Begin injecting zone 3 and 6
03/25/2024	13:30	Finished with zone 3 and 6. Set up zones 1 and 4
03/25/2024	13:58	Began injecting zone 1 and 4
03/25/2024	15:00	Finished injecting zones 1 and 4. Coil up tubing and reattach lines for normal operation
03/25/2024	16:05	Finish work

Signature: 

Daily Log

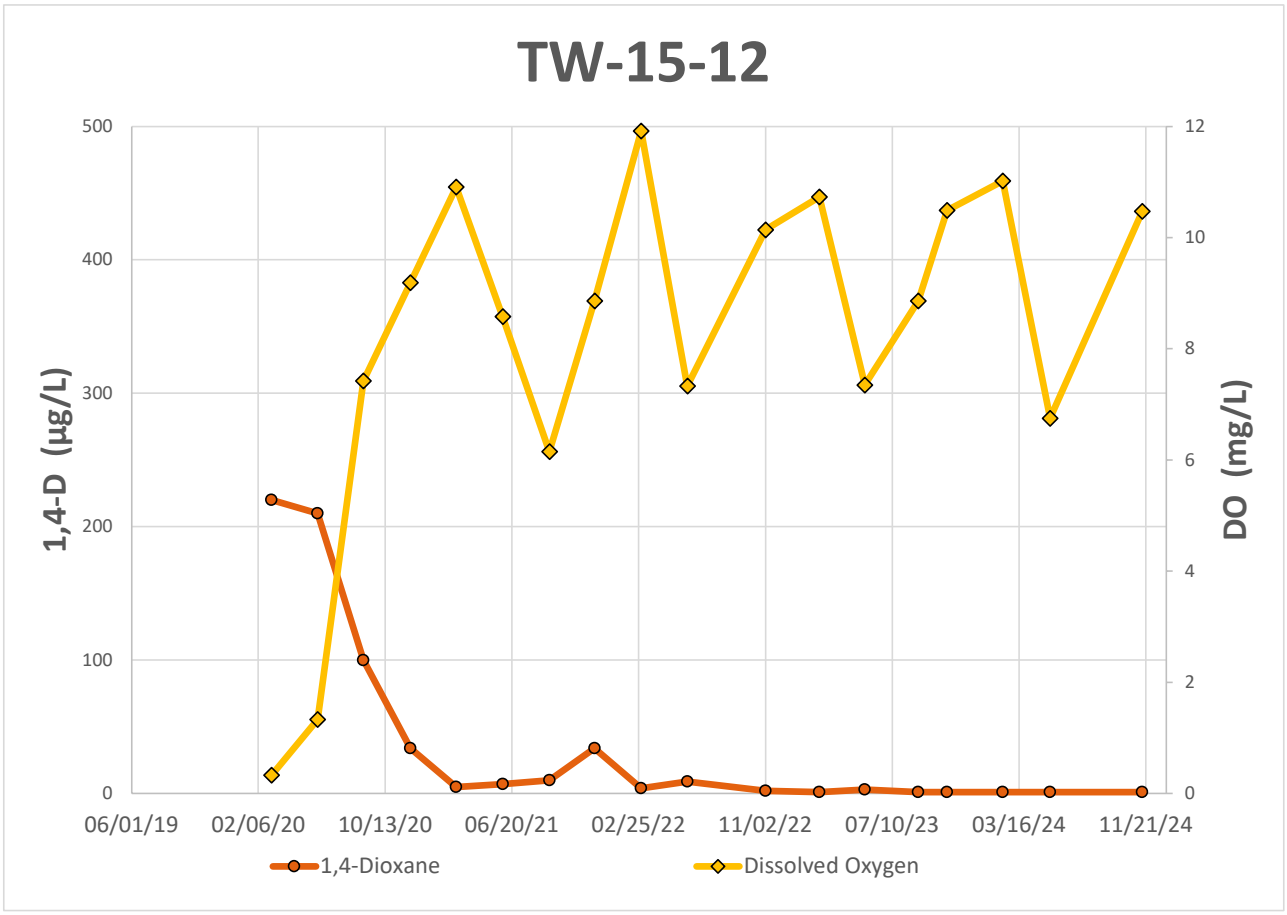
Project Name :	RACER Lansing 2024	**Weather(°F) :**	Mid 40s and windy. Chance of rain
Project Number :	30214036	**Prepared By:**	Megan Lee
Purpose :	Nutrient injections		
PPE :	Level D		
Equipment:	N/A		

Date	Time	Description of Activities
03/26/2024	08:30	Arrive on site. H& S tailgate
03/26/2024	08:40	Start system and check for leaks. Zone by zone
03/26/2024	09:00	Finish up at plant 2. 3 wells were turned off due to bubbling at injection point.
03/26/2024	09:30	Head to Plant 3
03/26/2024	10:20	Setup done at plant 3. Begin injecting into wells 1, 2, and 4. 3 tanks total
03/26/2024	11:30	Done injecting first set. Using sump pump to tranfer liquid for injecting.
03/26/2024	12:45	Begin injecting wells 3 and 5
03/26/2024	14:15	Finish injecting wells 3 and 5 and check for leaks at connections and we'll heads
03/26/2024	14:32	Consulting Eric and Anyssa about bubbles. Told to shut system down and will be consulting Andrew about redoing set up
03/26/2024	14:38	Verified with Bill that Plant 2 is correctly reset to run propane cycles as well as air
03/26/2024	15:00	Leaving site

Signature: 

Appendix B

Performance Graphs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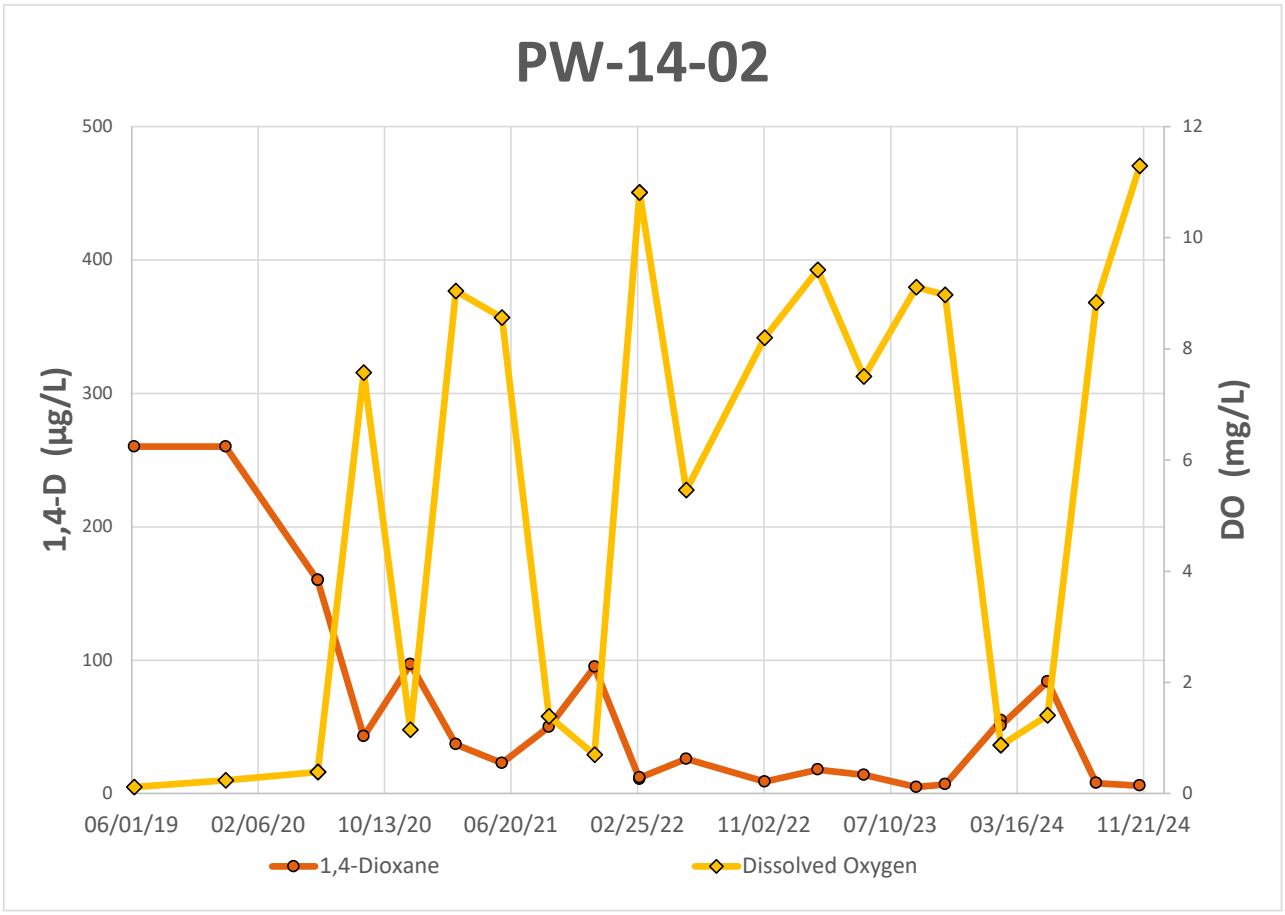
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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1,4-D (µg/L)
DO (mg/L)
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400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
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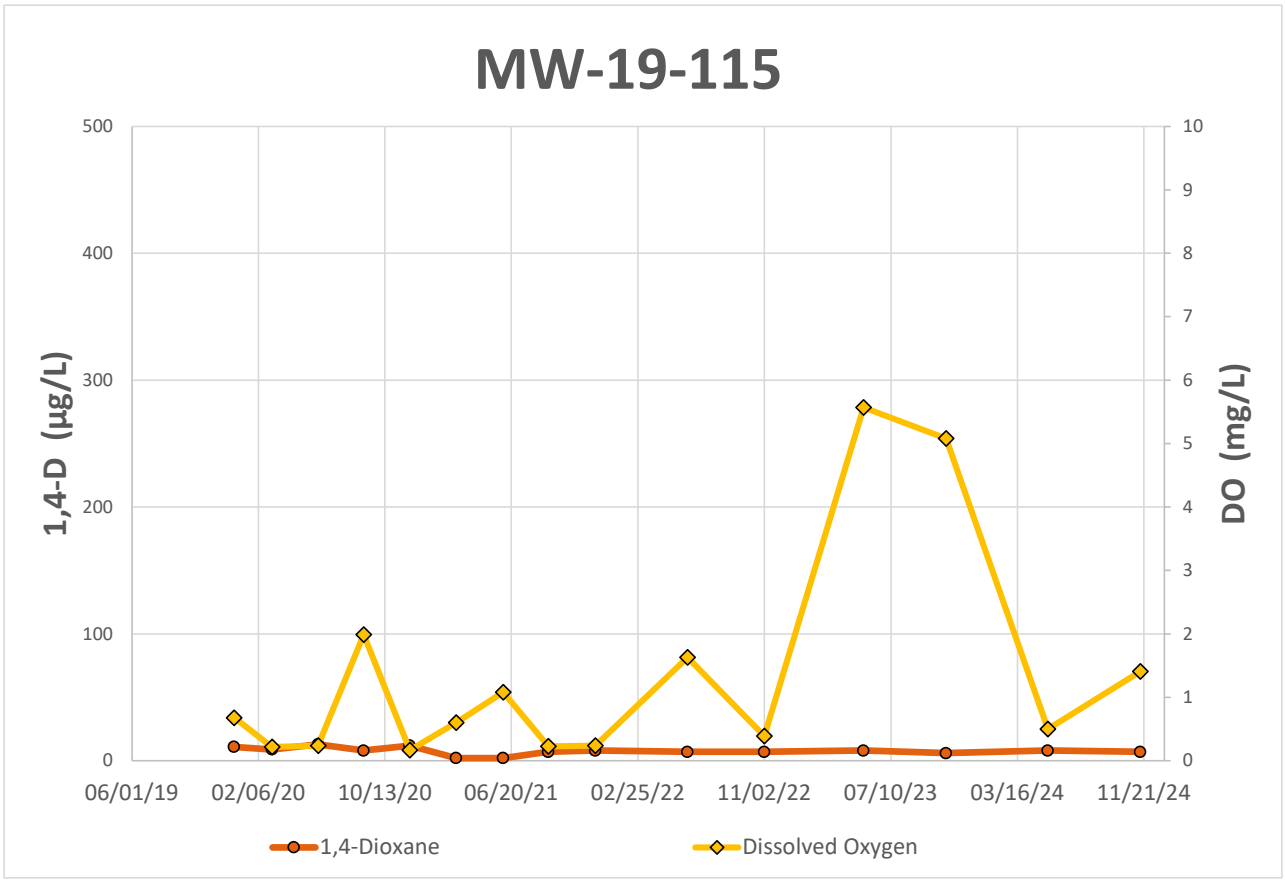
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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1,4-D (µg/L)
DO (mg/L)
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400
300
200
100
0
10
9
8
7
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5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
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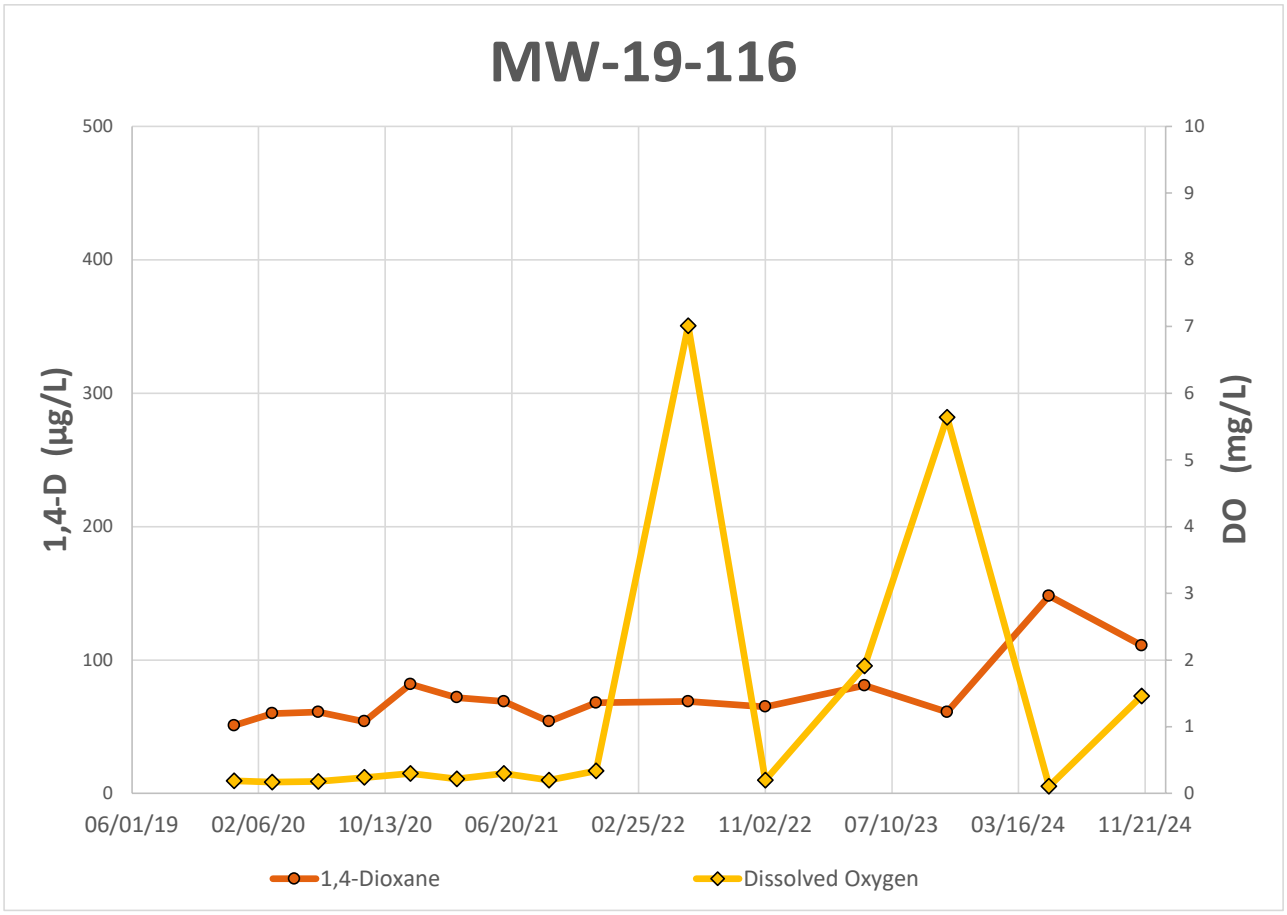
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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1,4-D (µg/L)
DO (mg/L)
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400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
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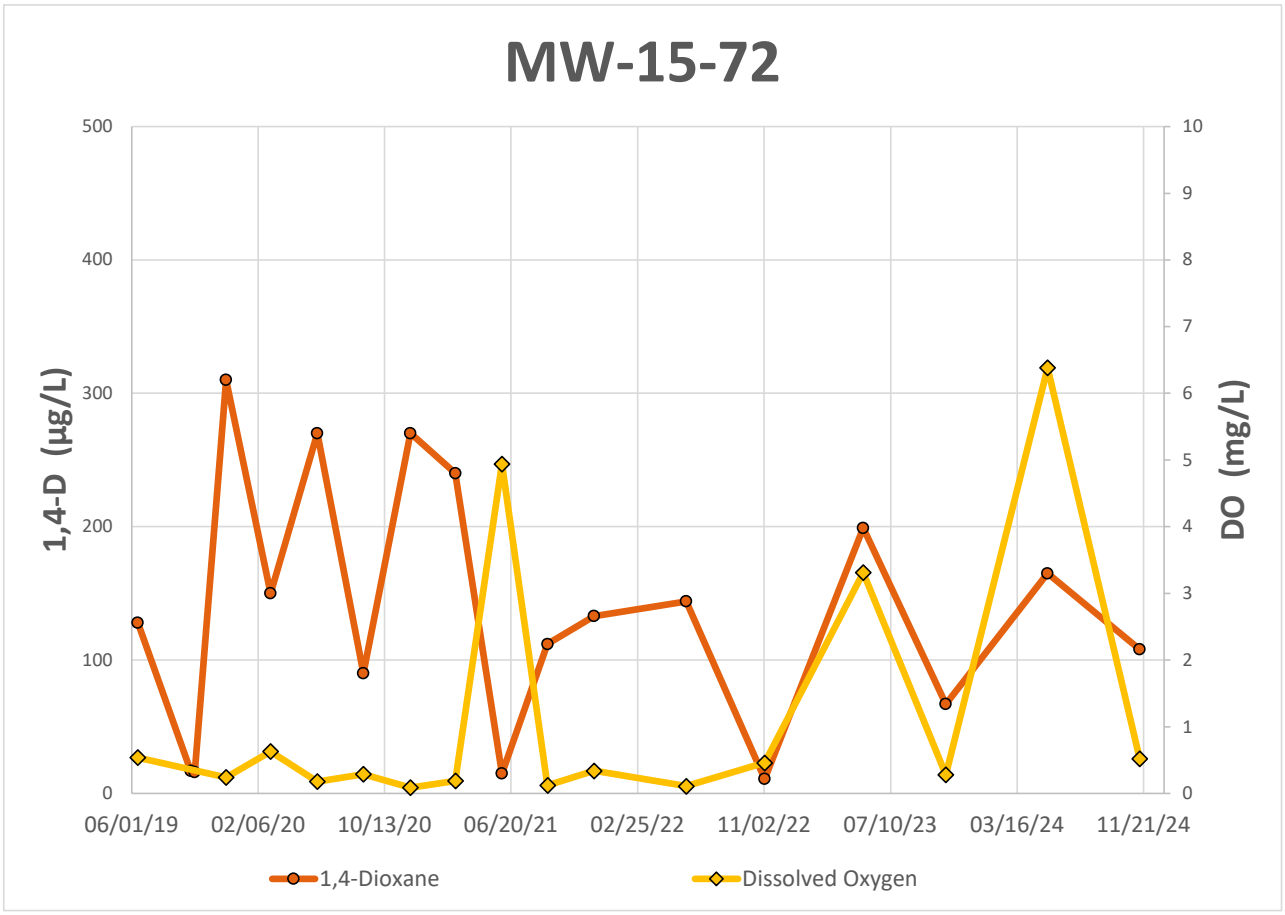
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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1,4-D (µg/L)
DO (mg/L)
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400
300
200
100
0
10
9
8
7
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4
3
2
1
0
06/01/19
02/06/20
10/13/20
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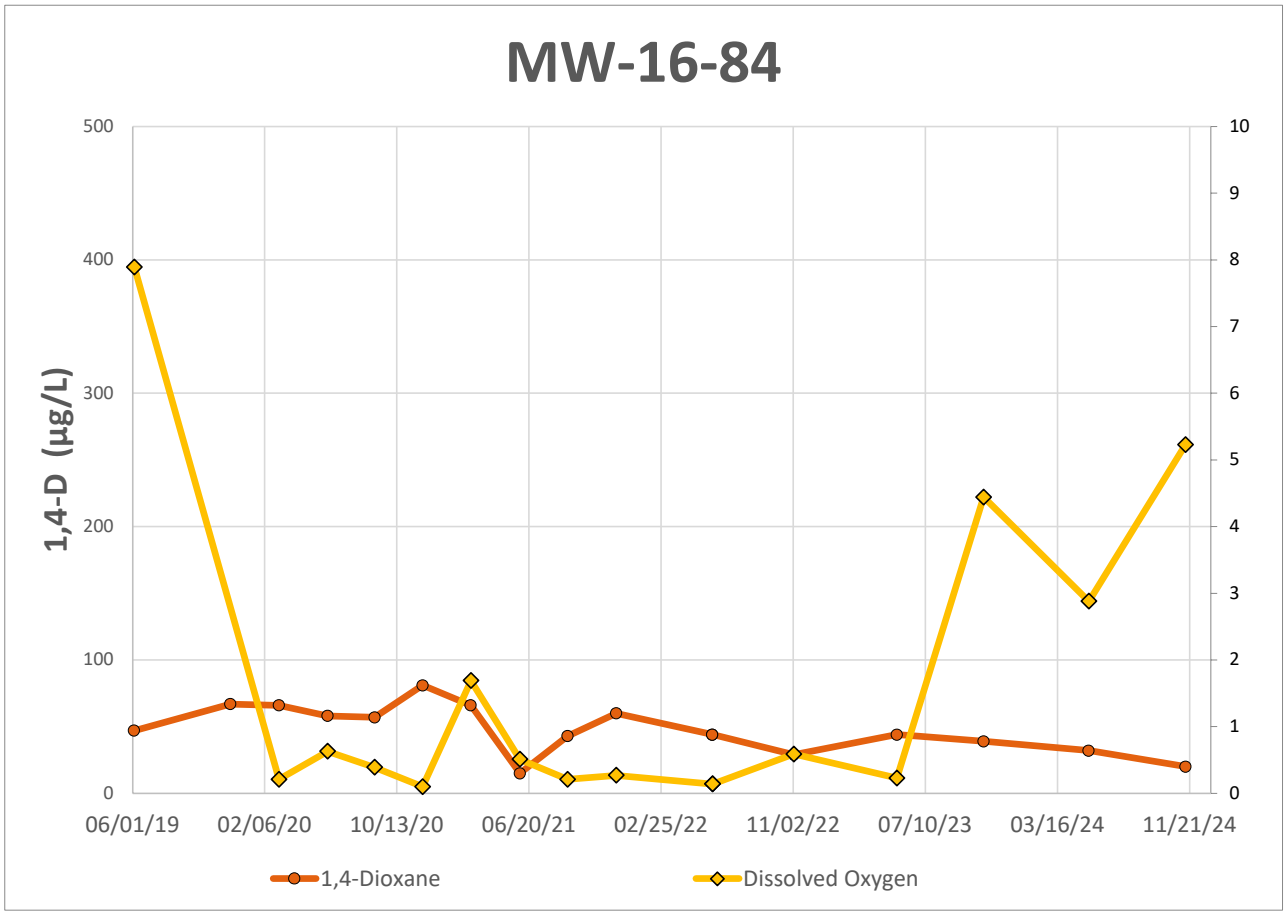
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
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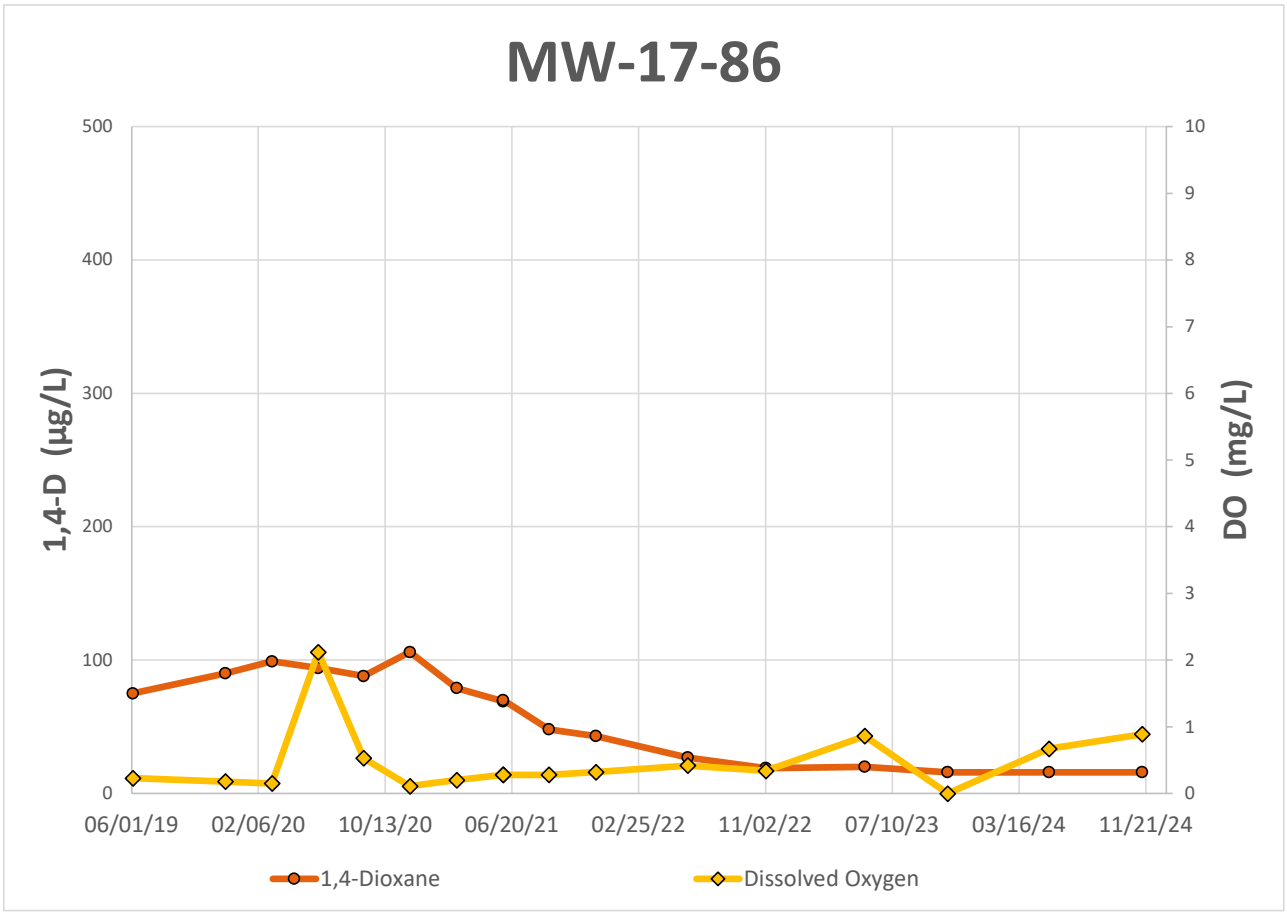
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen


MW-17-86
1,4-D (µg/L)
DO (mg/L)
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400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
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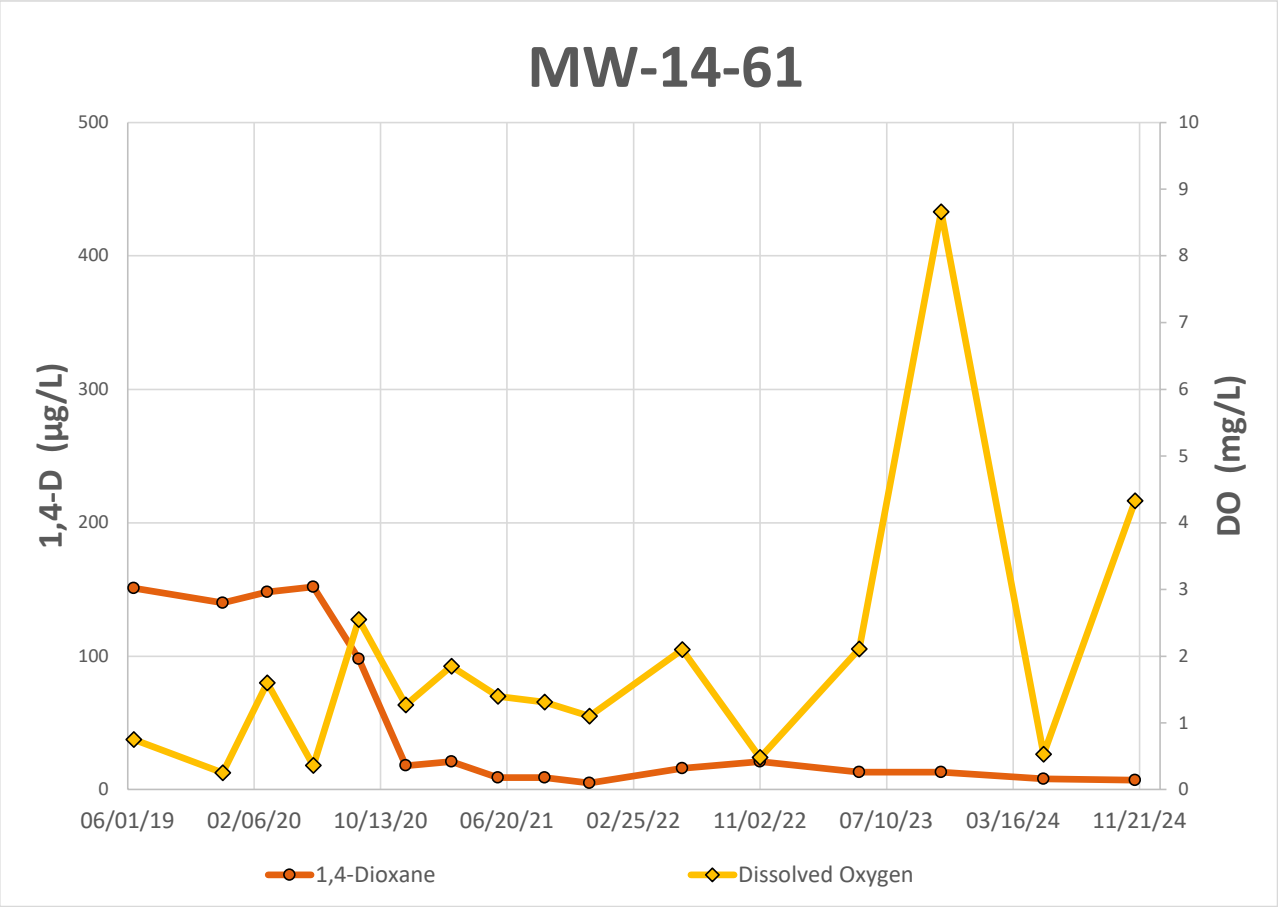
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
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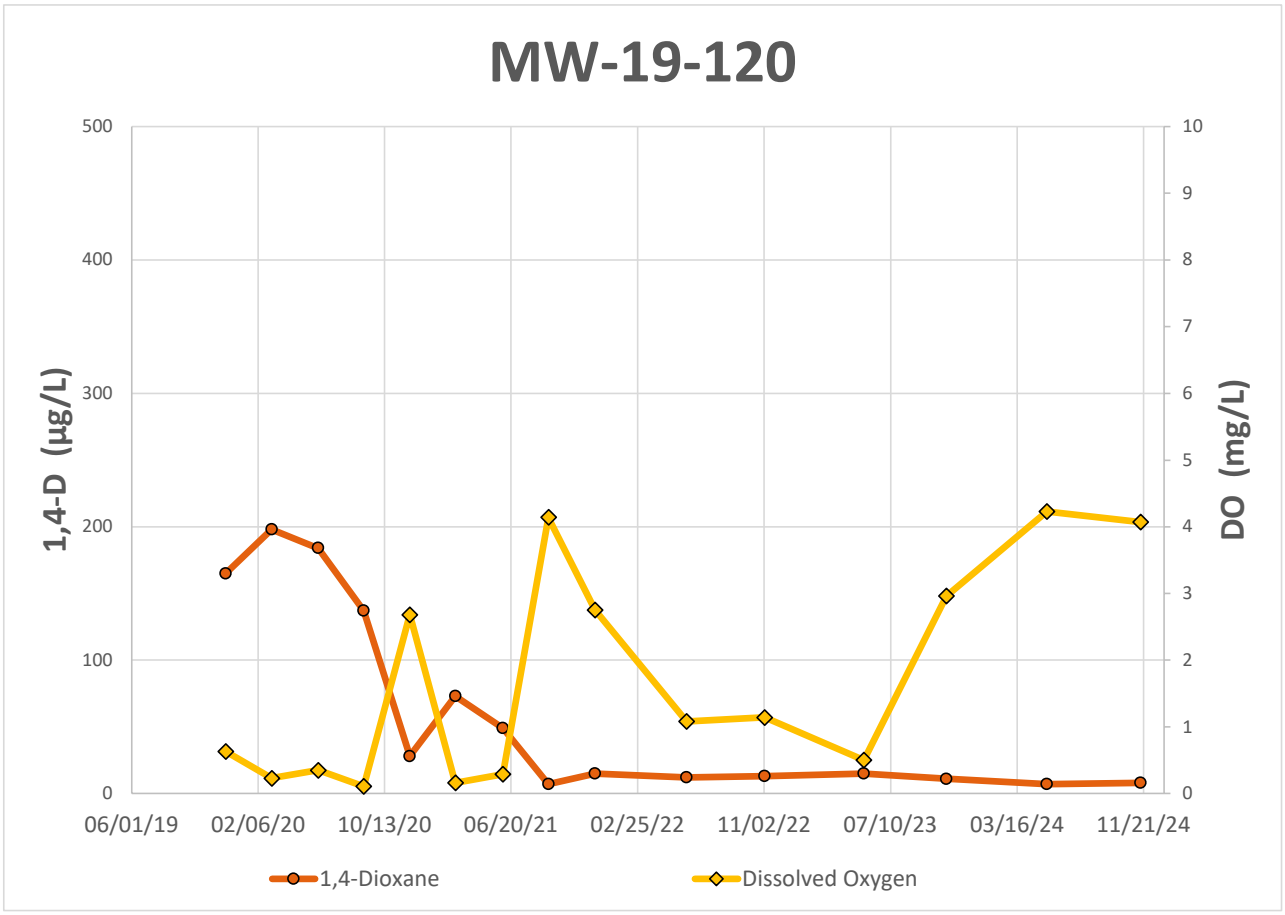
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen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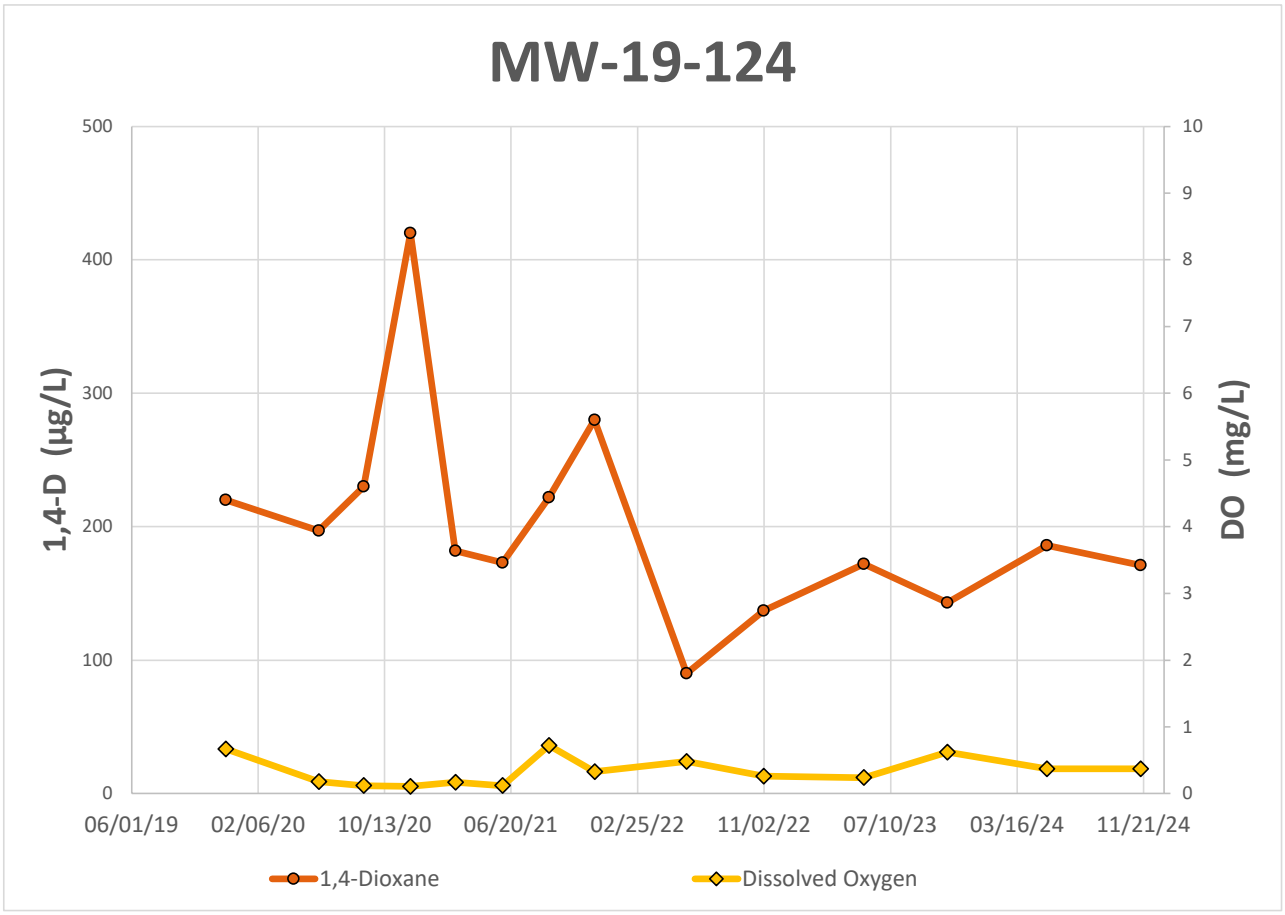
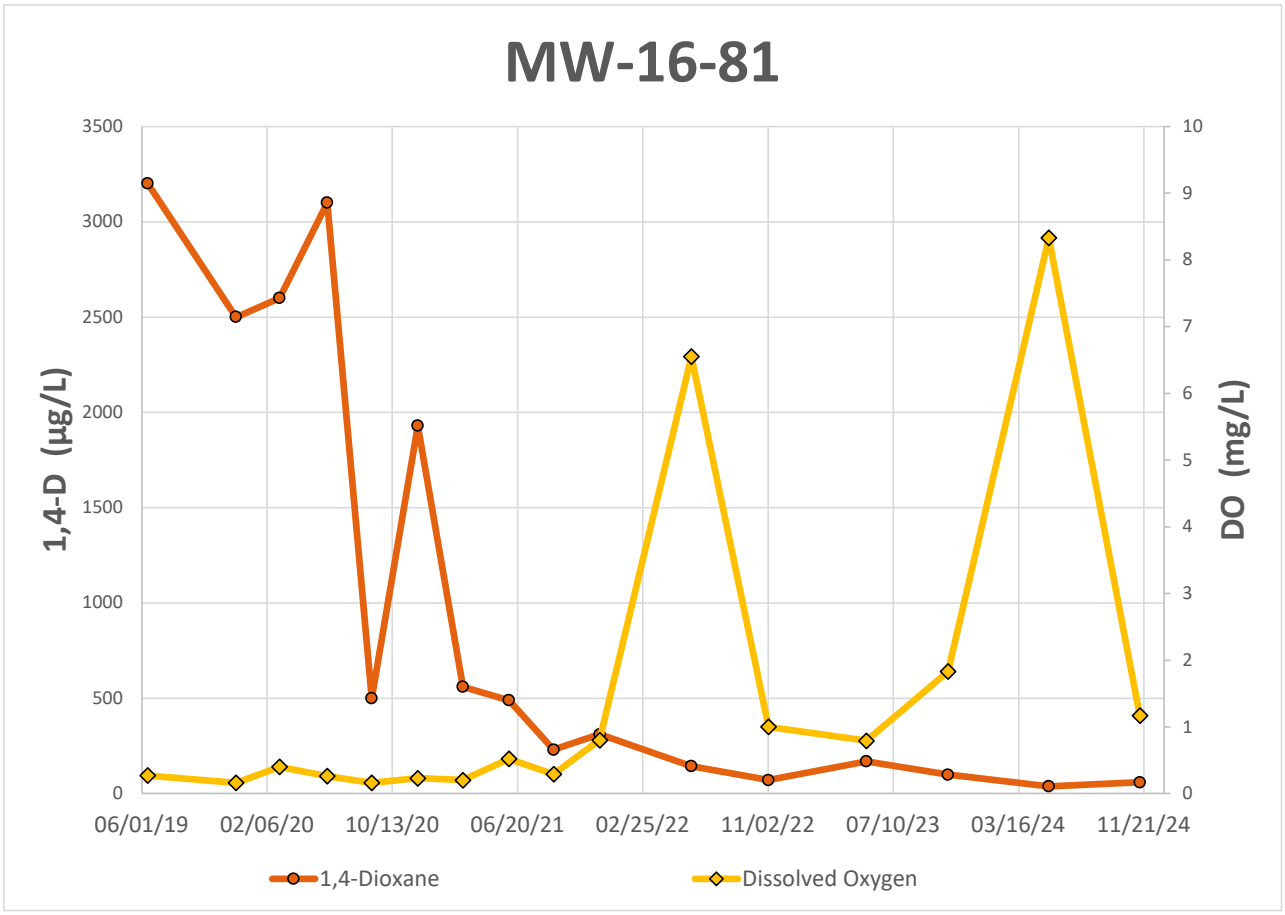
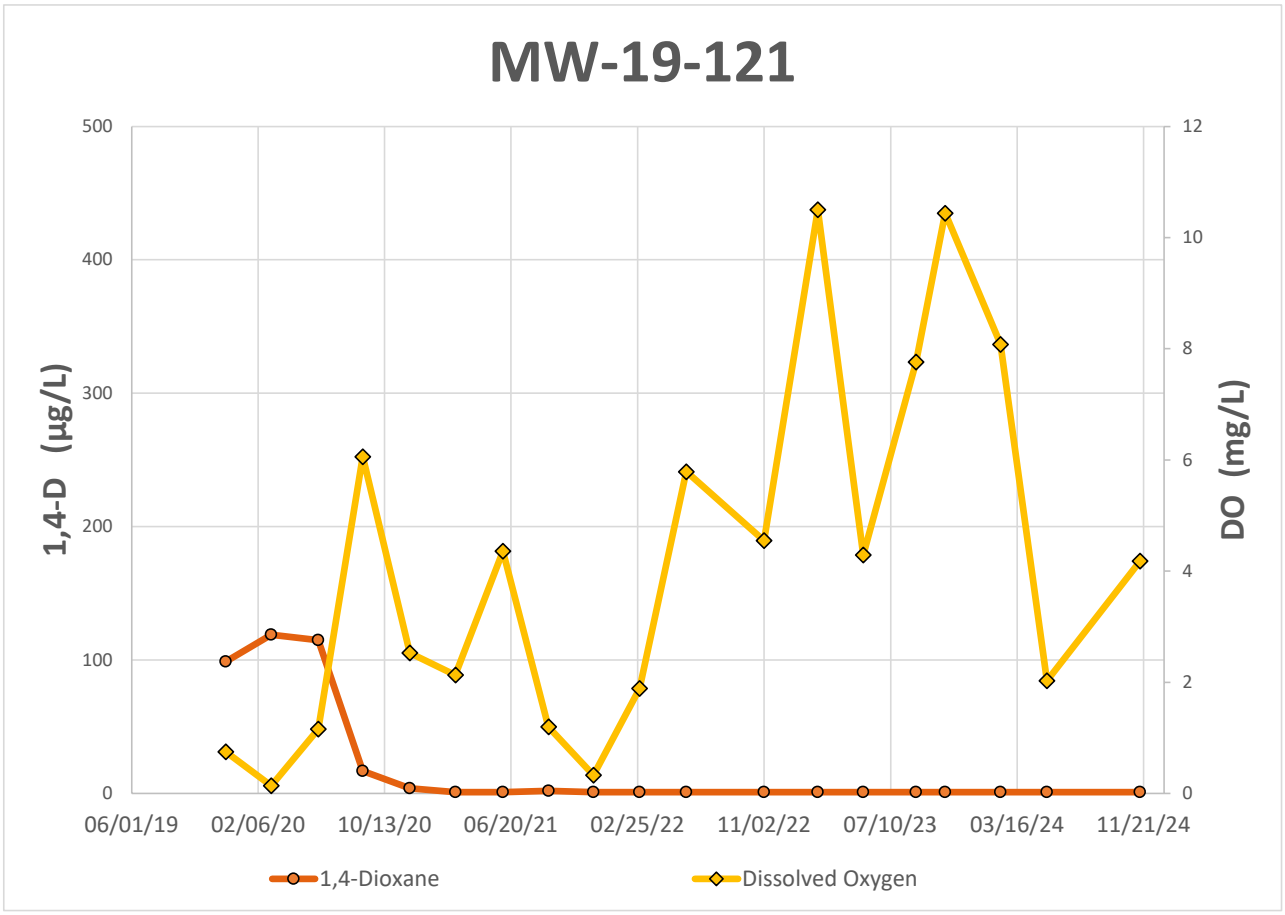
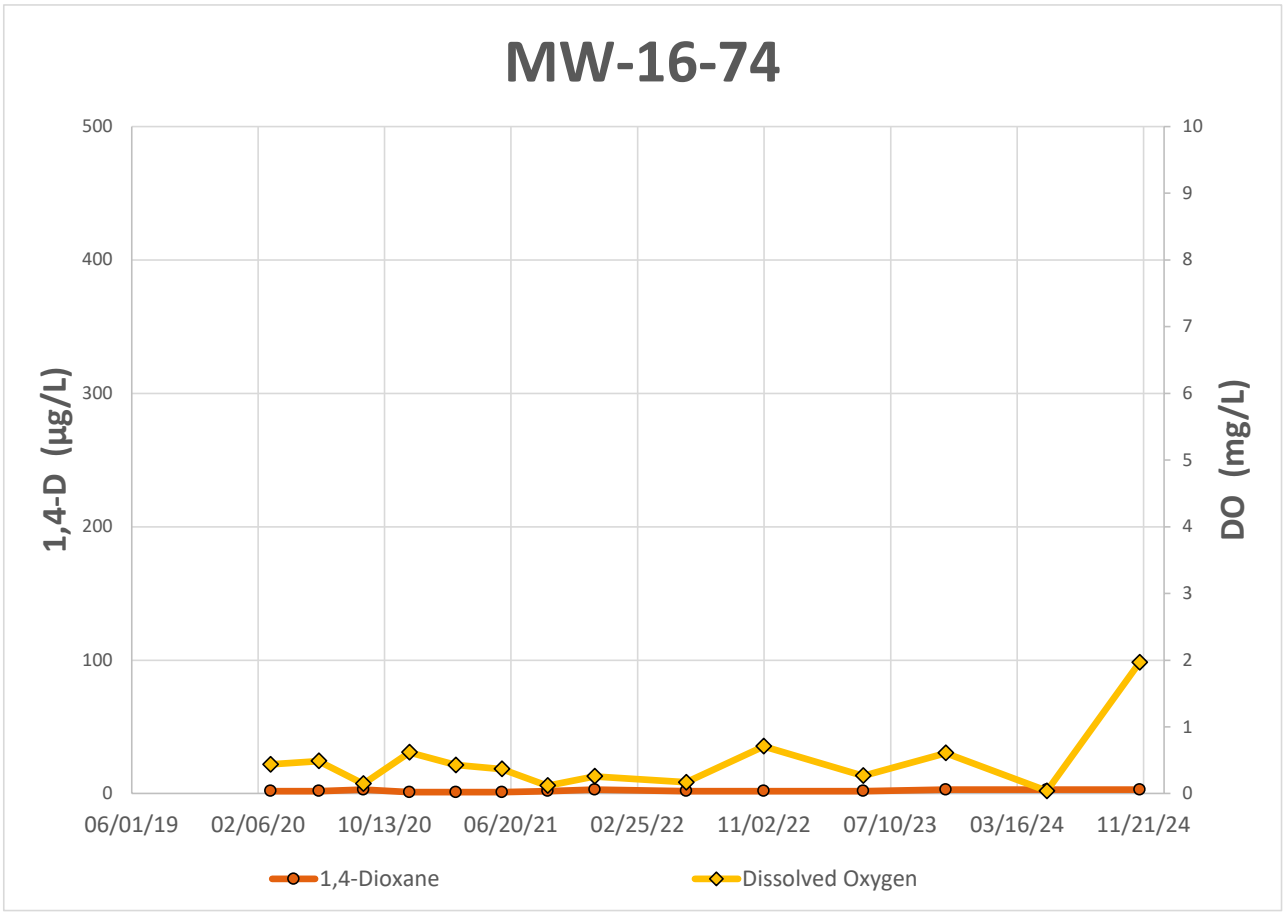
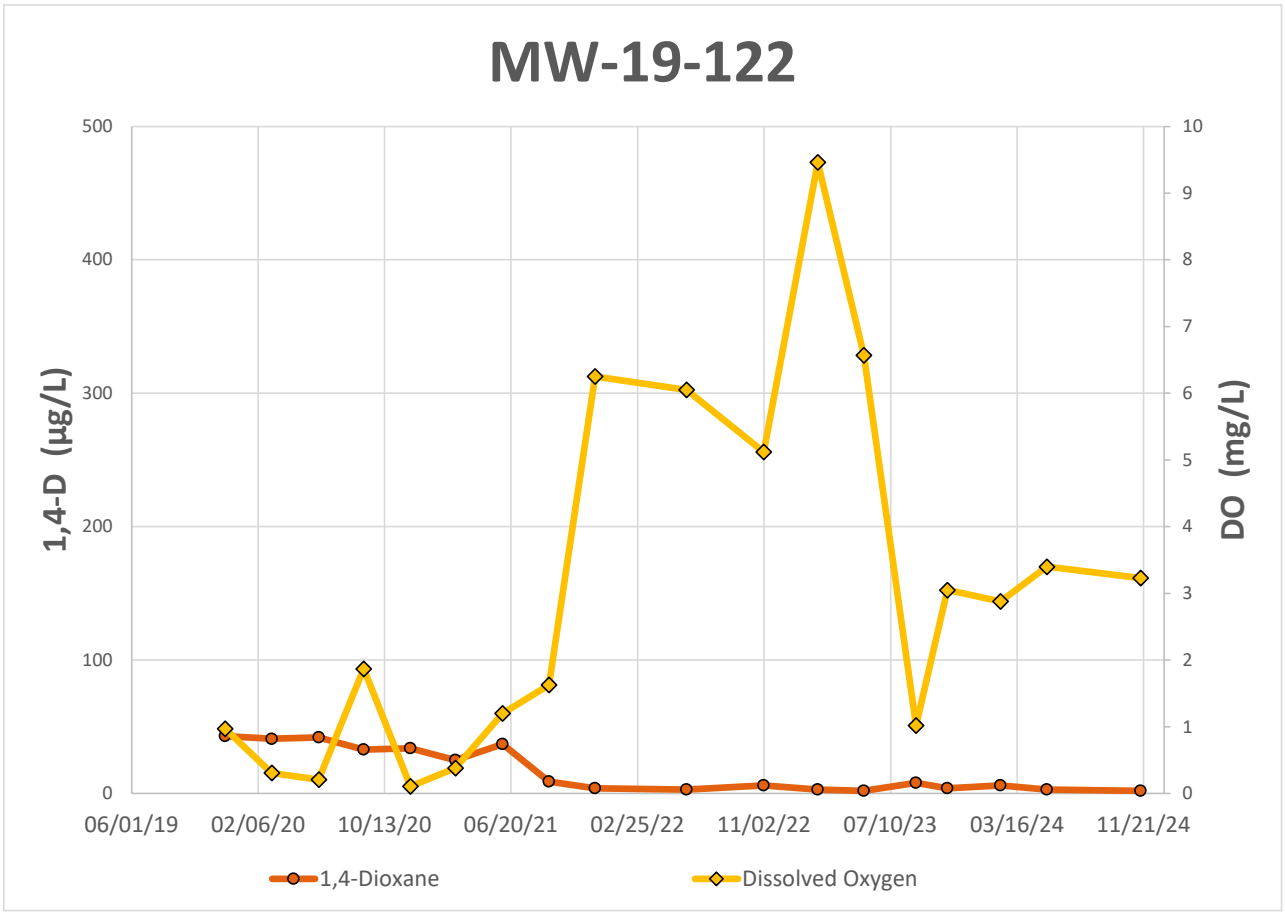
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

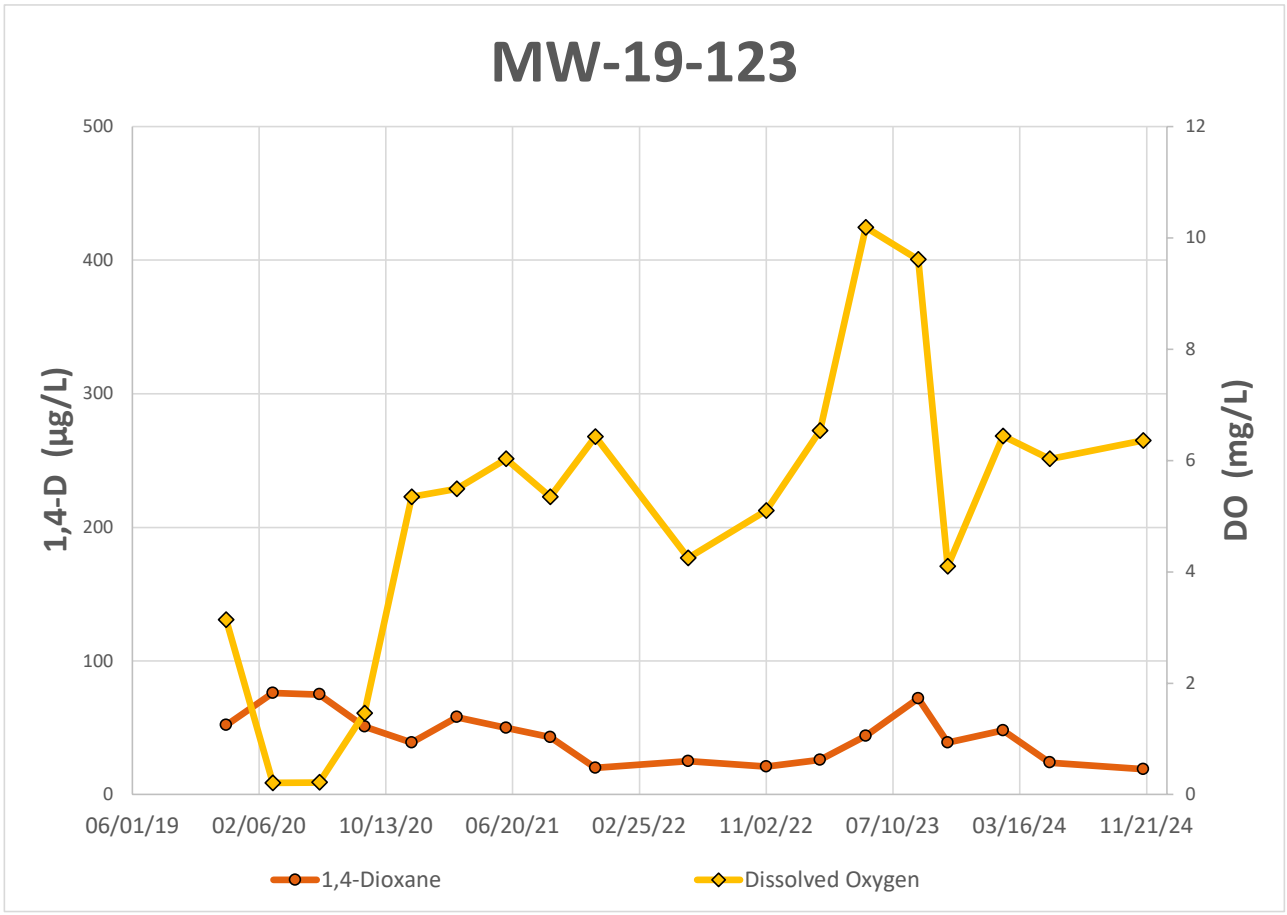

MW-19-124
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

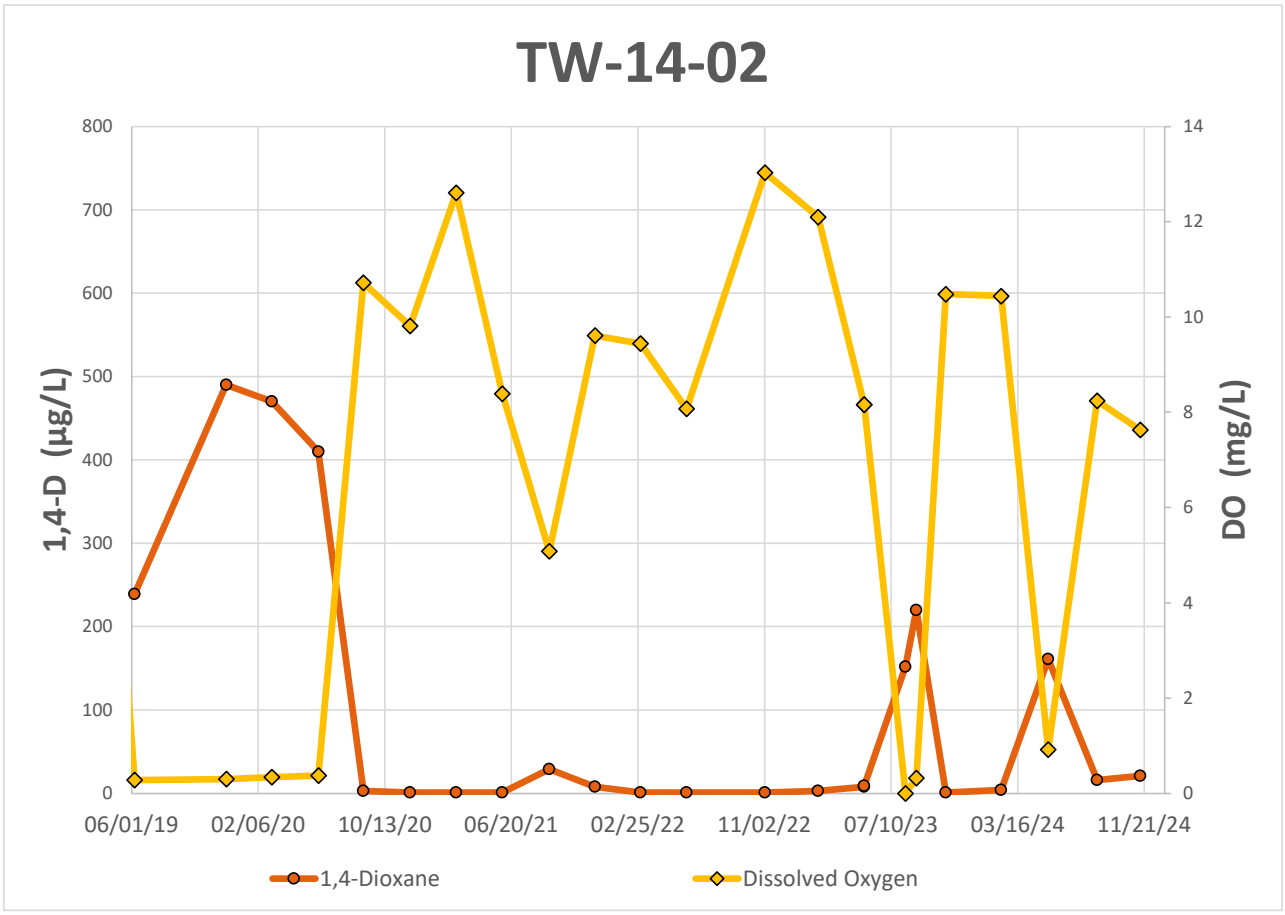

MW-16-81
1,4-D (µg/L)
DO (mg/L)
3500
3000
2500
2000
1500
1000
500
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

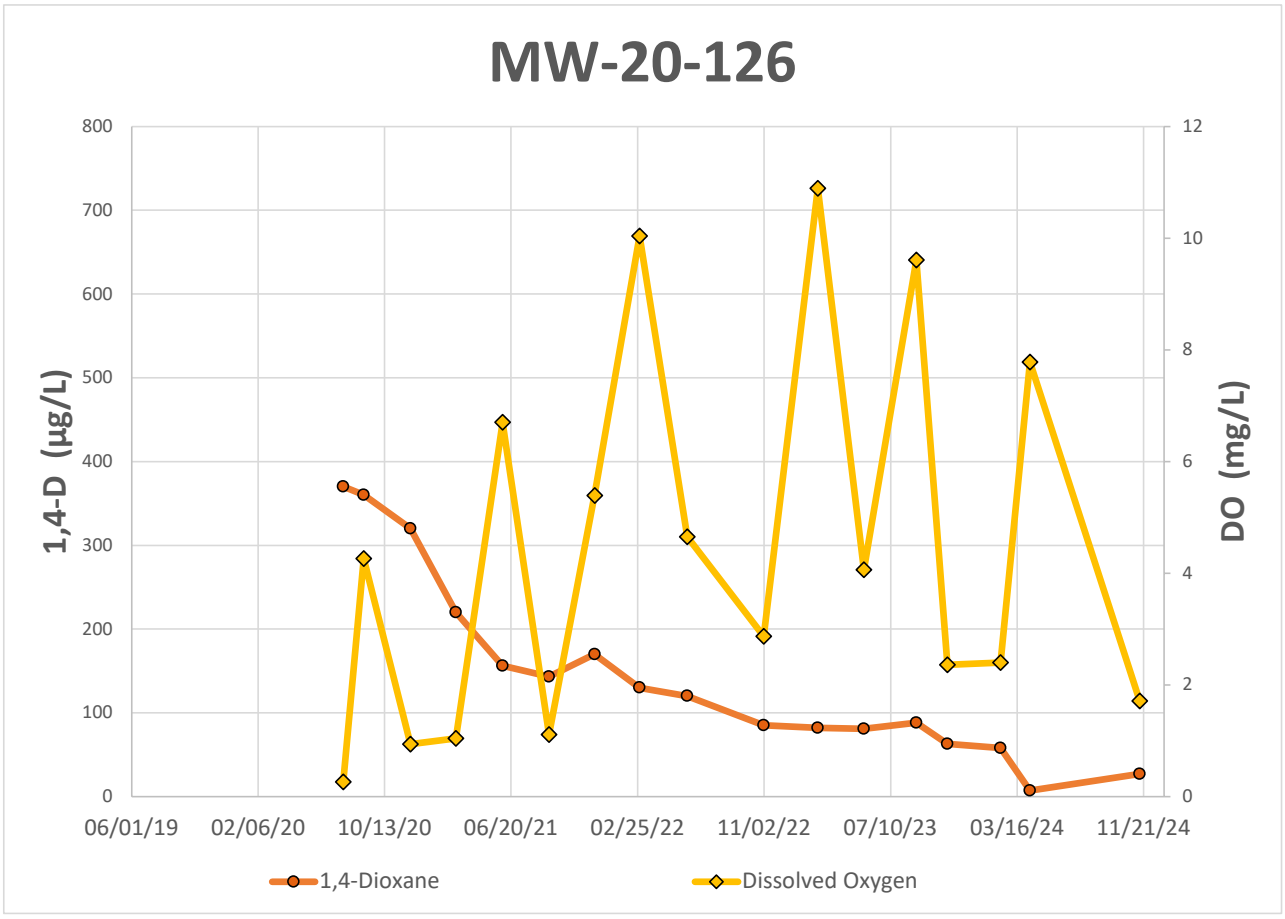

MW-19-121
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

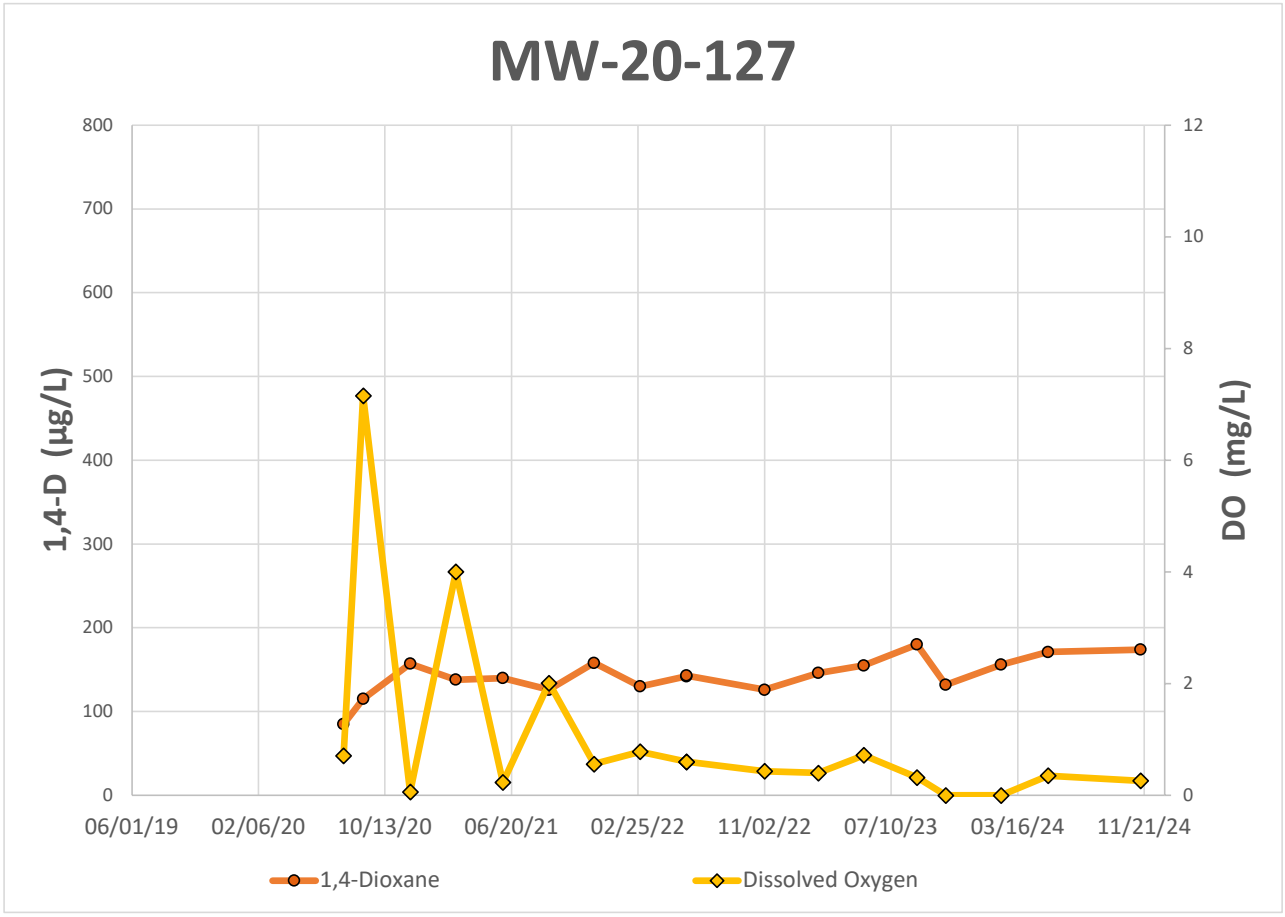

MW-16-74
500
400
300
200
100
0
1,4-D (µg/L)
10
9
8
7
6
5
4
3
2
1
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

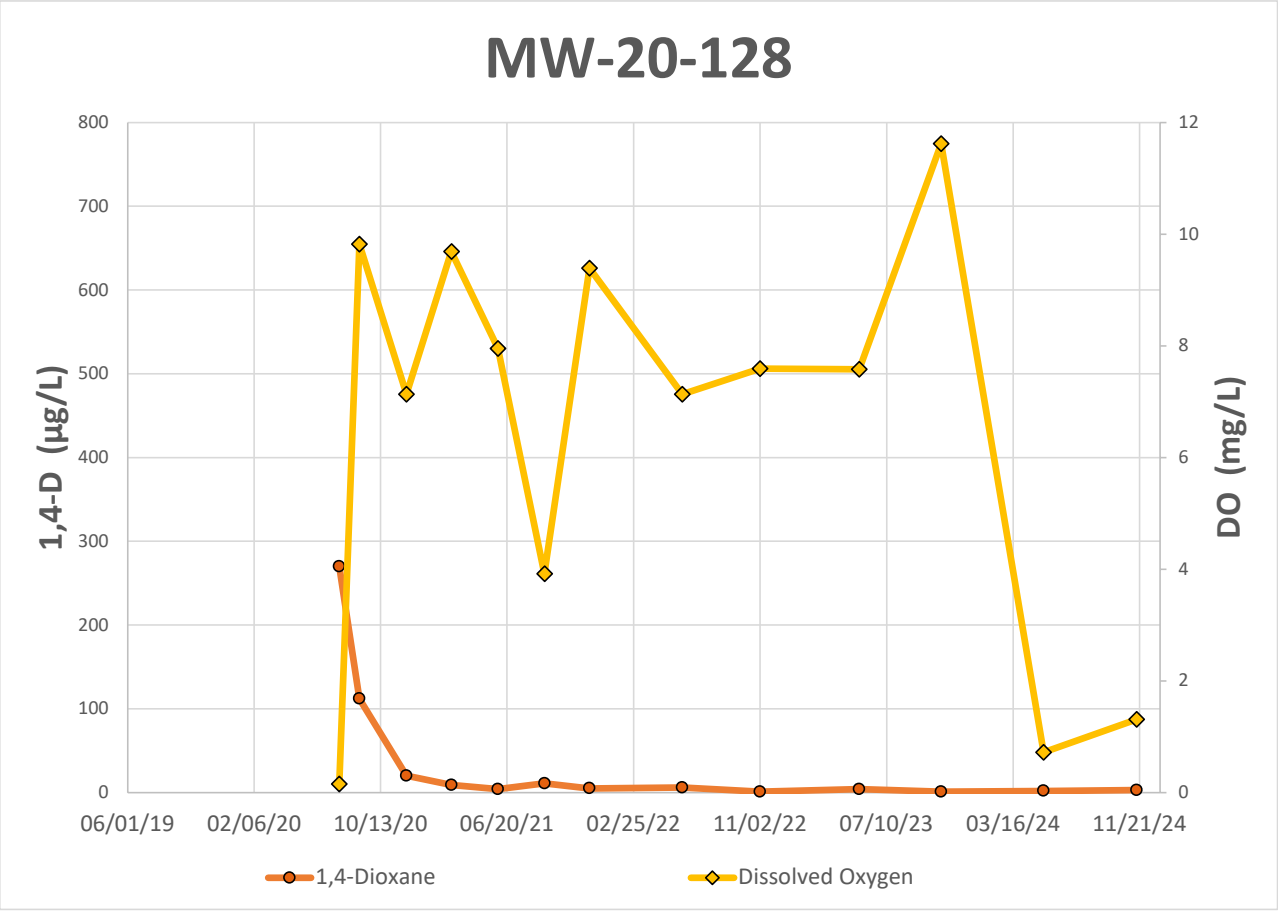

MW-19-122
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

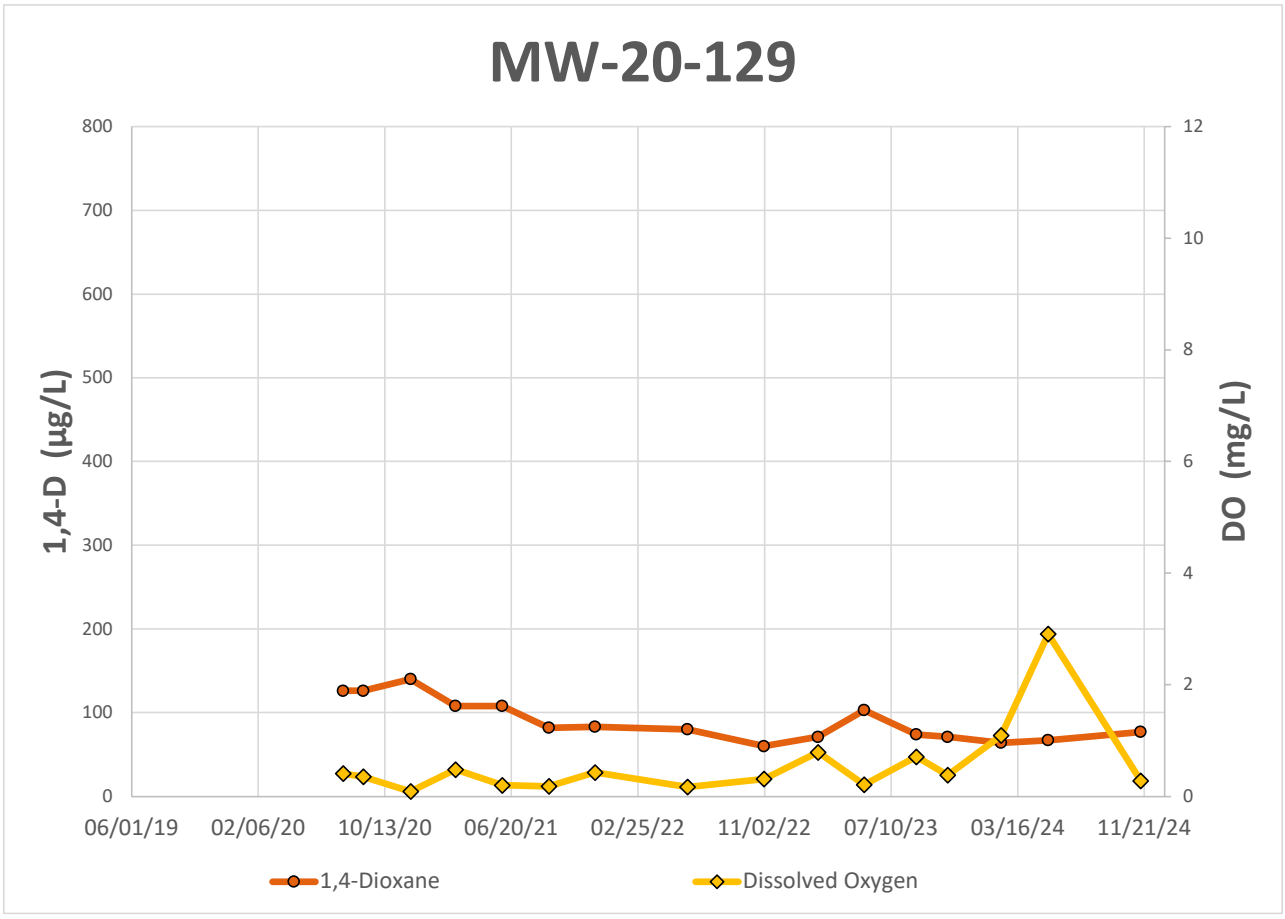

MW-19-123
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

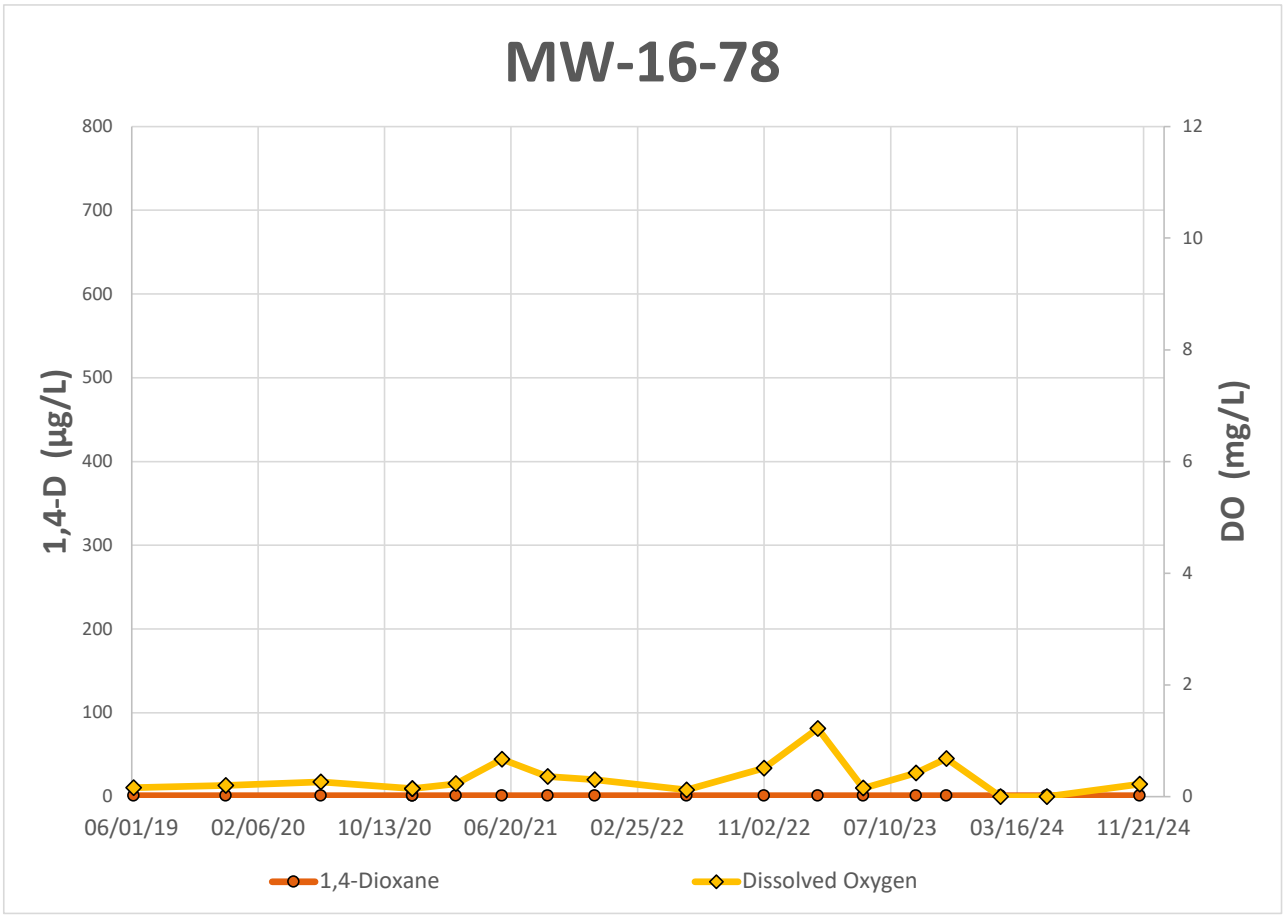

TW-14-02
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
14
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

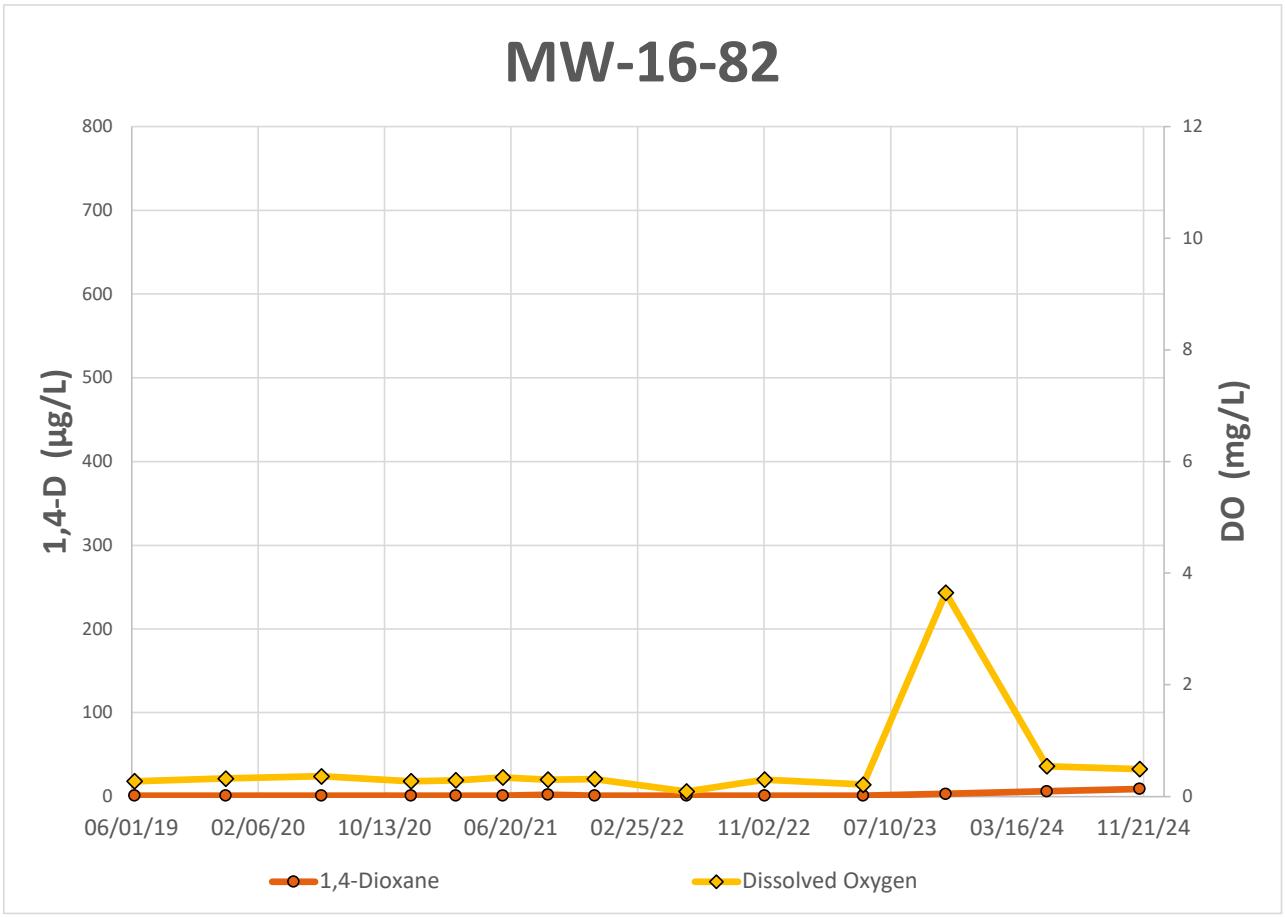

MW-20-126
1,4-D (µg/L)
DO (mg/L)
800
700
600
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

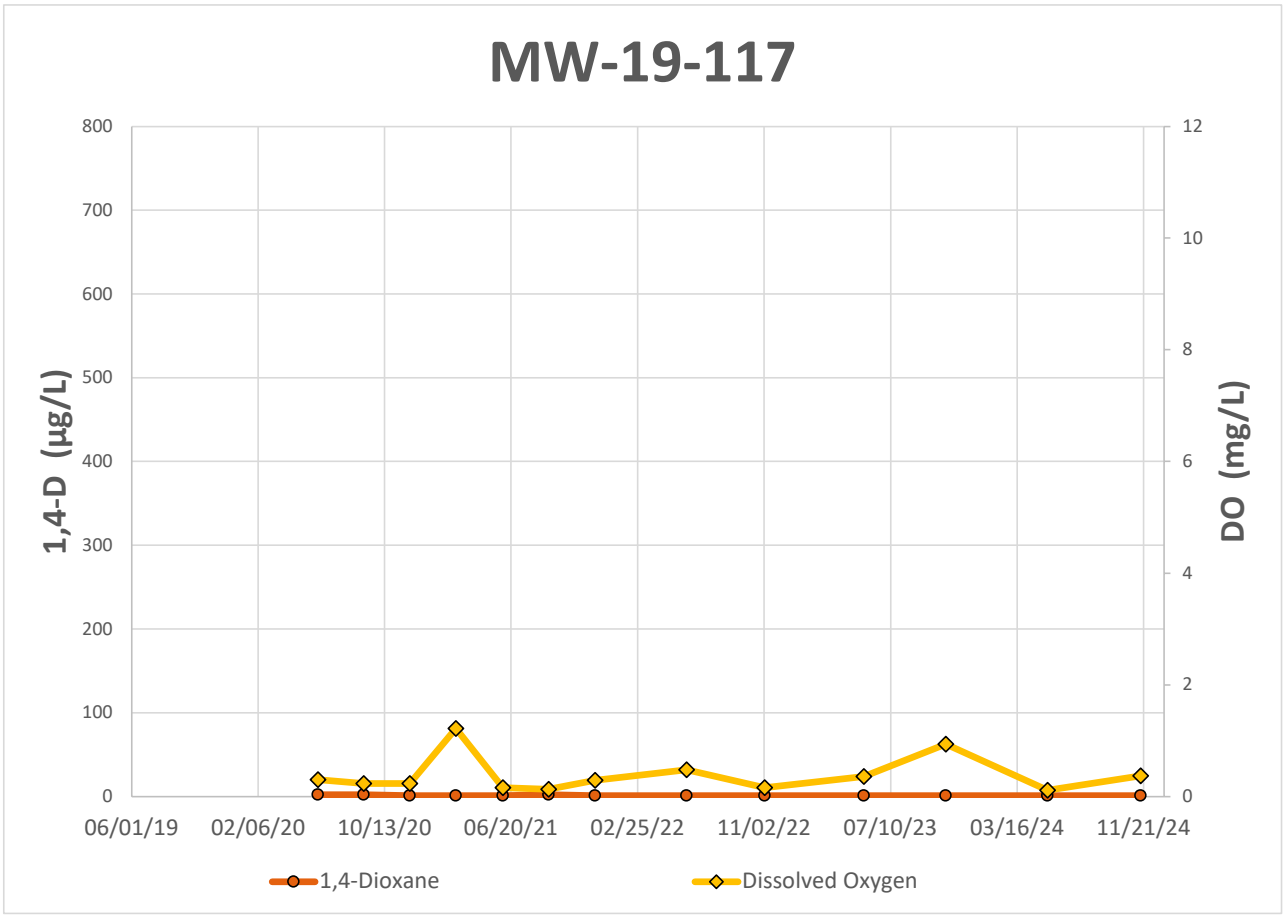

MW-20-127
1,4-D (µg/L)
DO (mg/L)
800
700
600
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

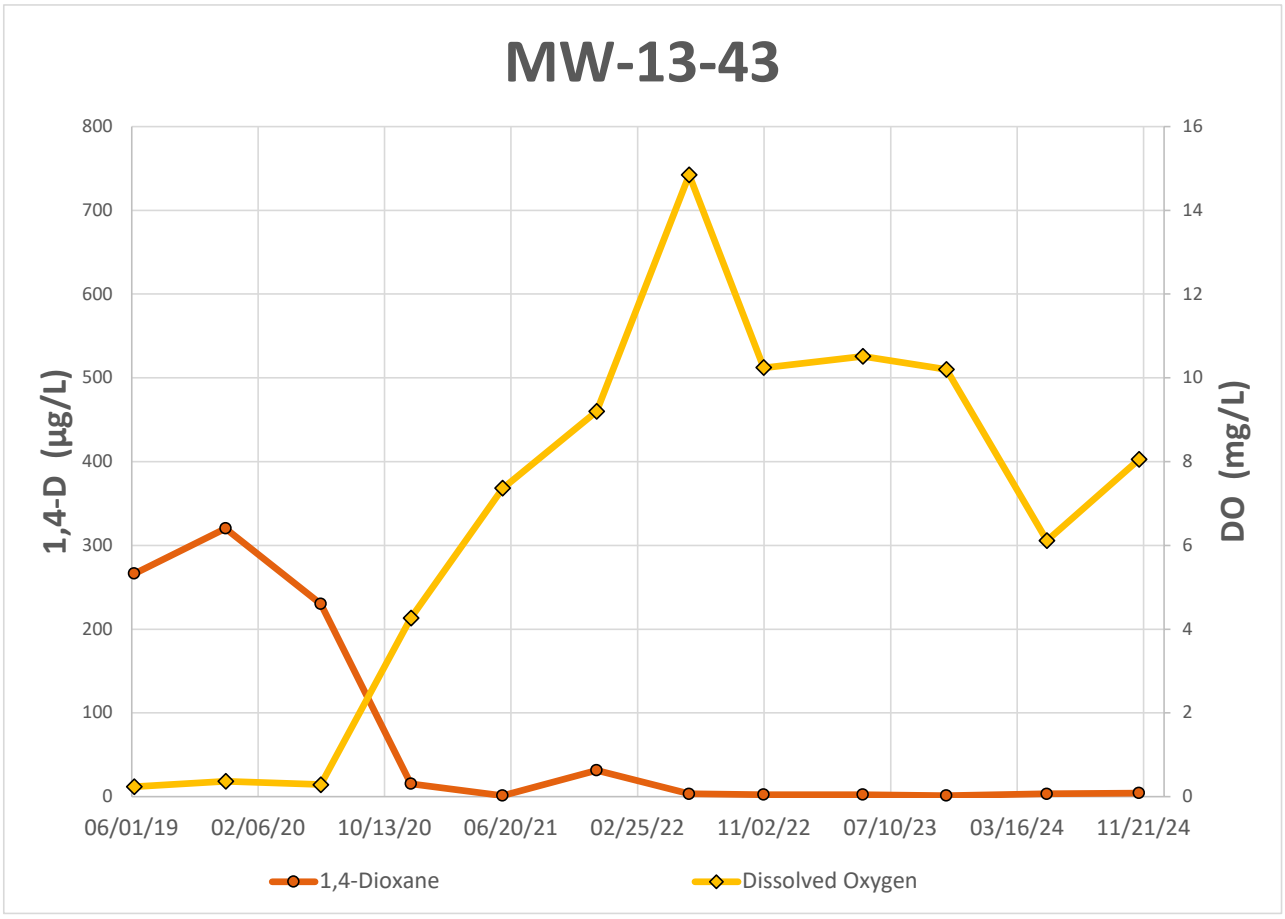

MW-20-128
1,4-D (µg/L)
DO (mg/L)
800
700
600
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

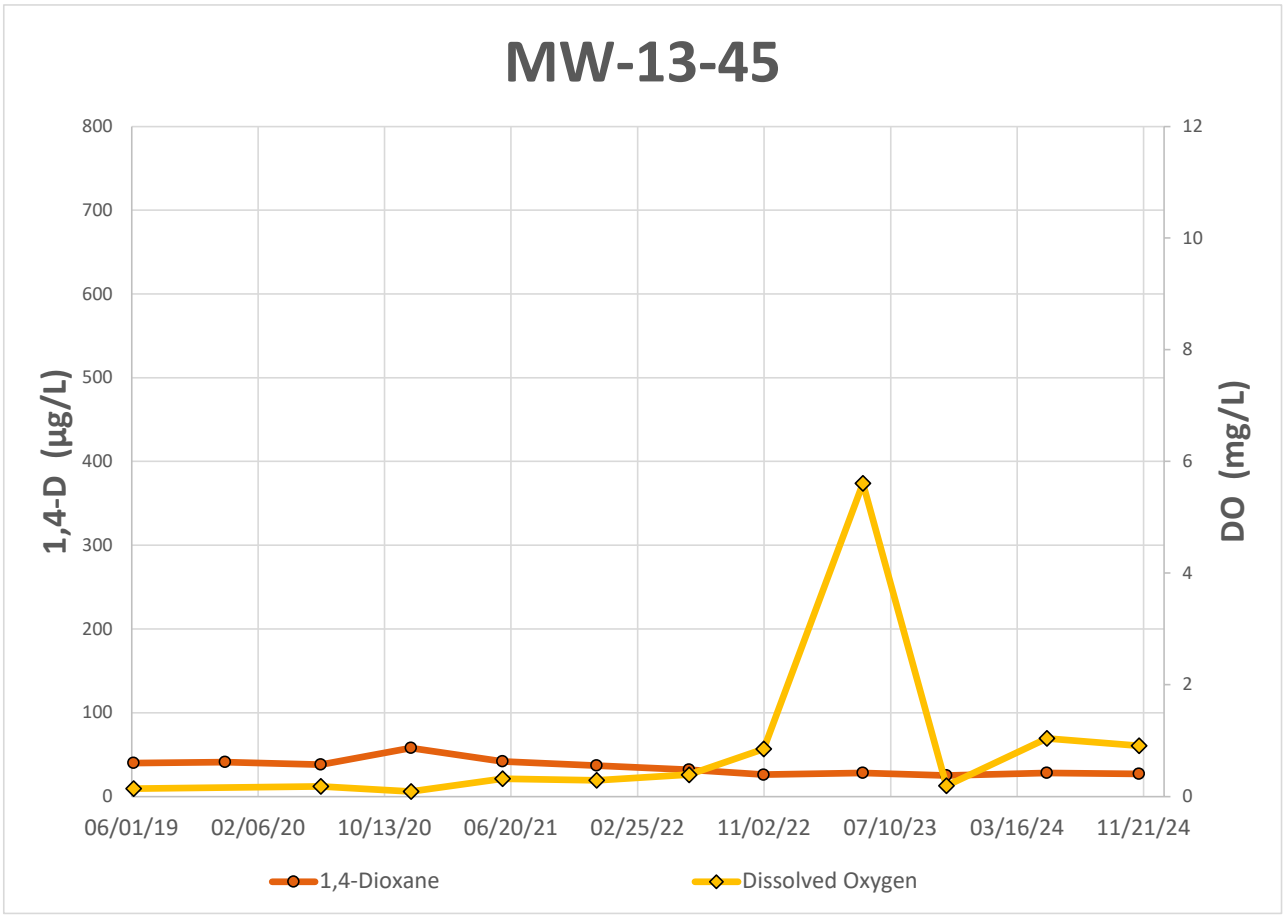

MW-20-129
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

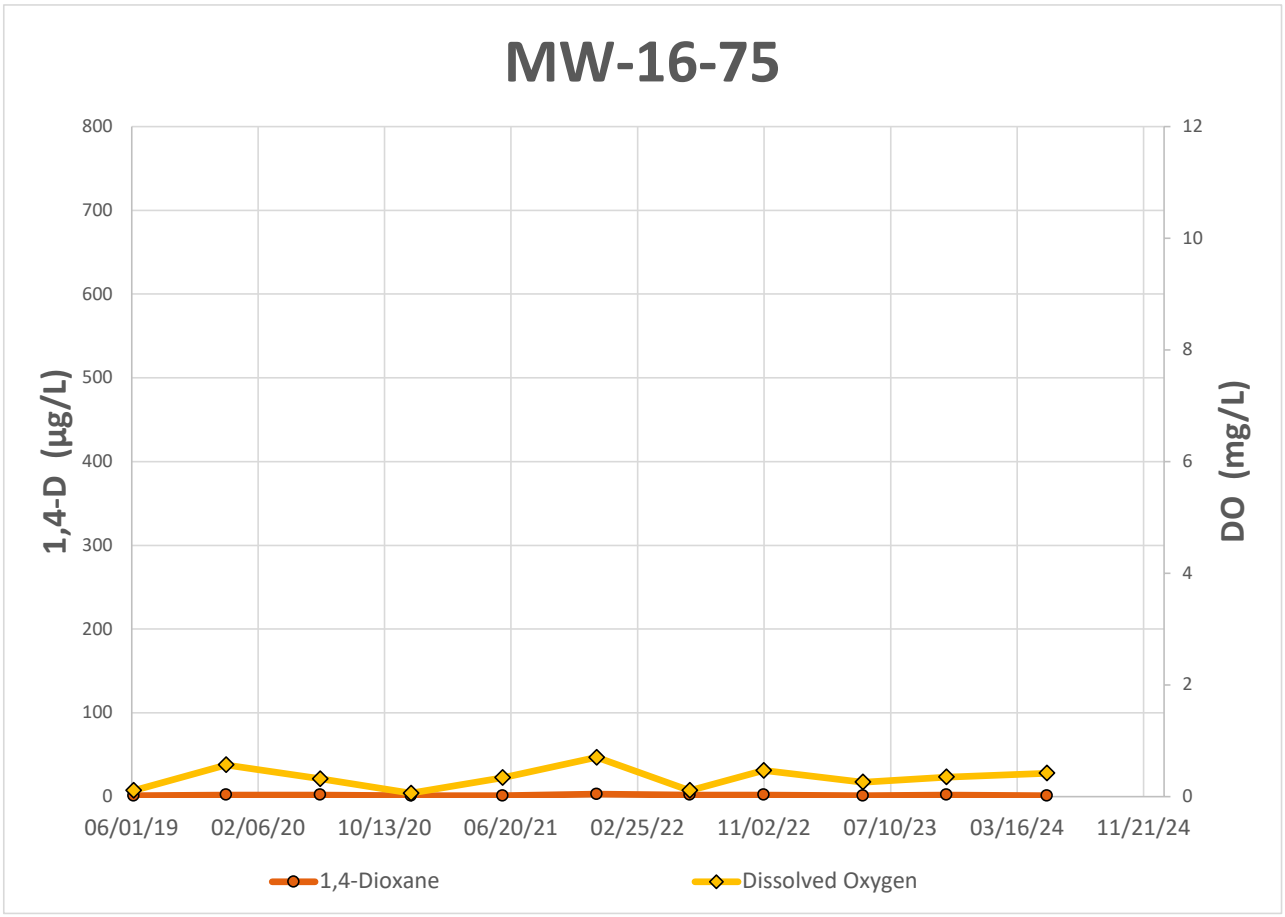

MW-16-78
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

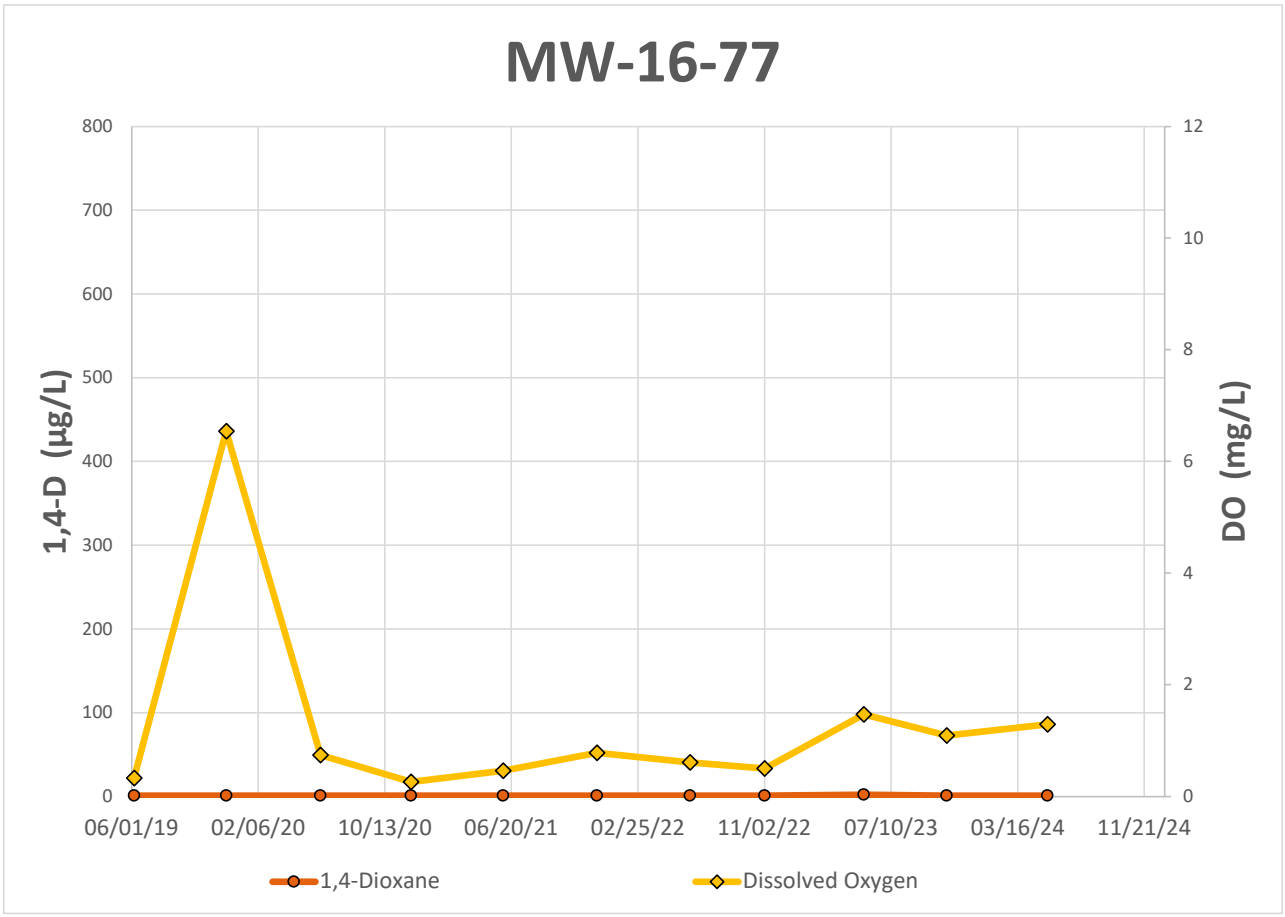

MW-16-82
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

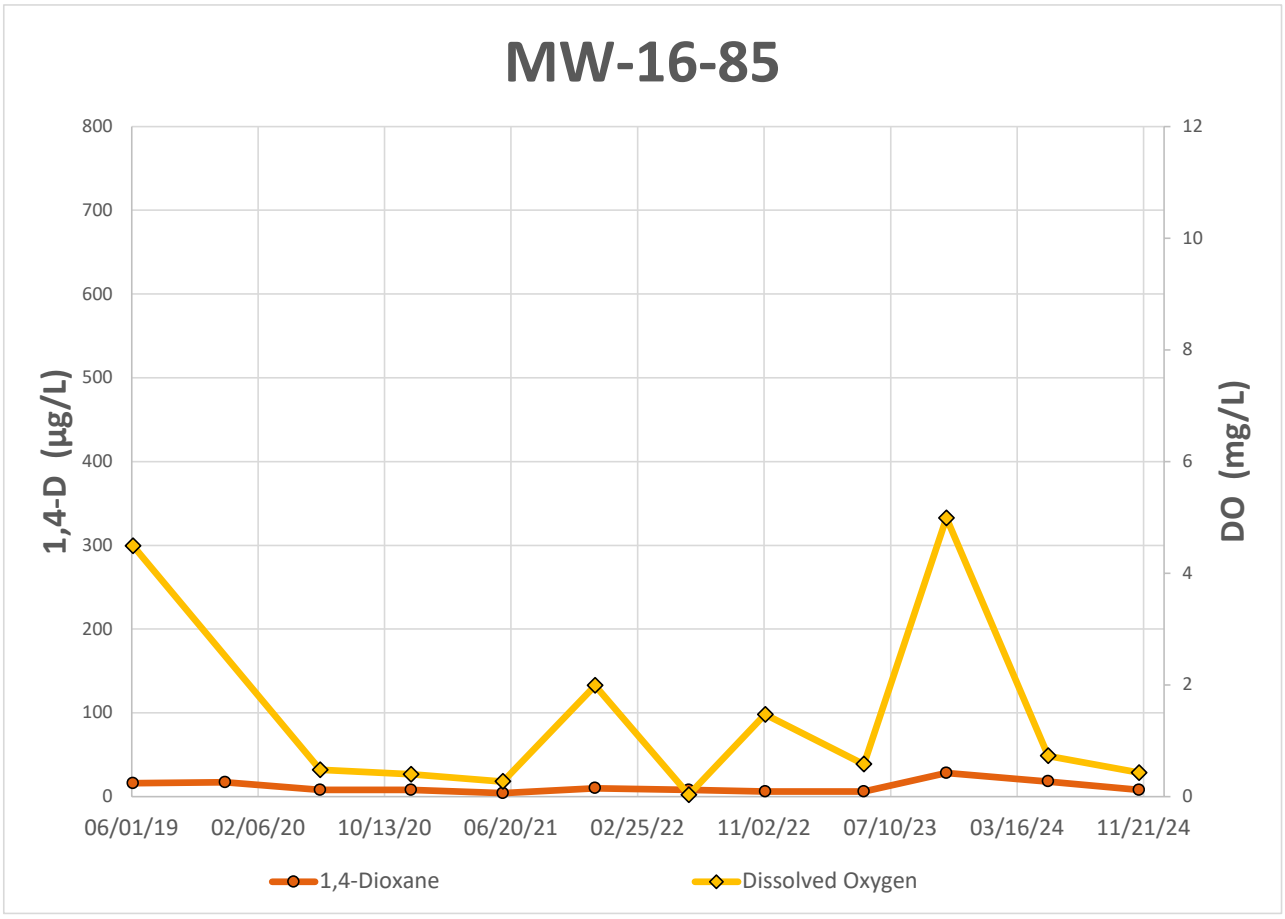

MW-19-117
1,4-D (µg/L)
DO (mg/L)
800
700
600
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

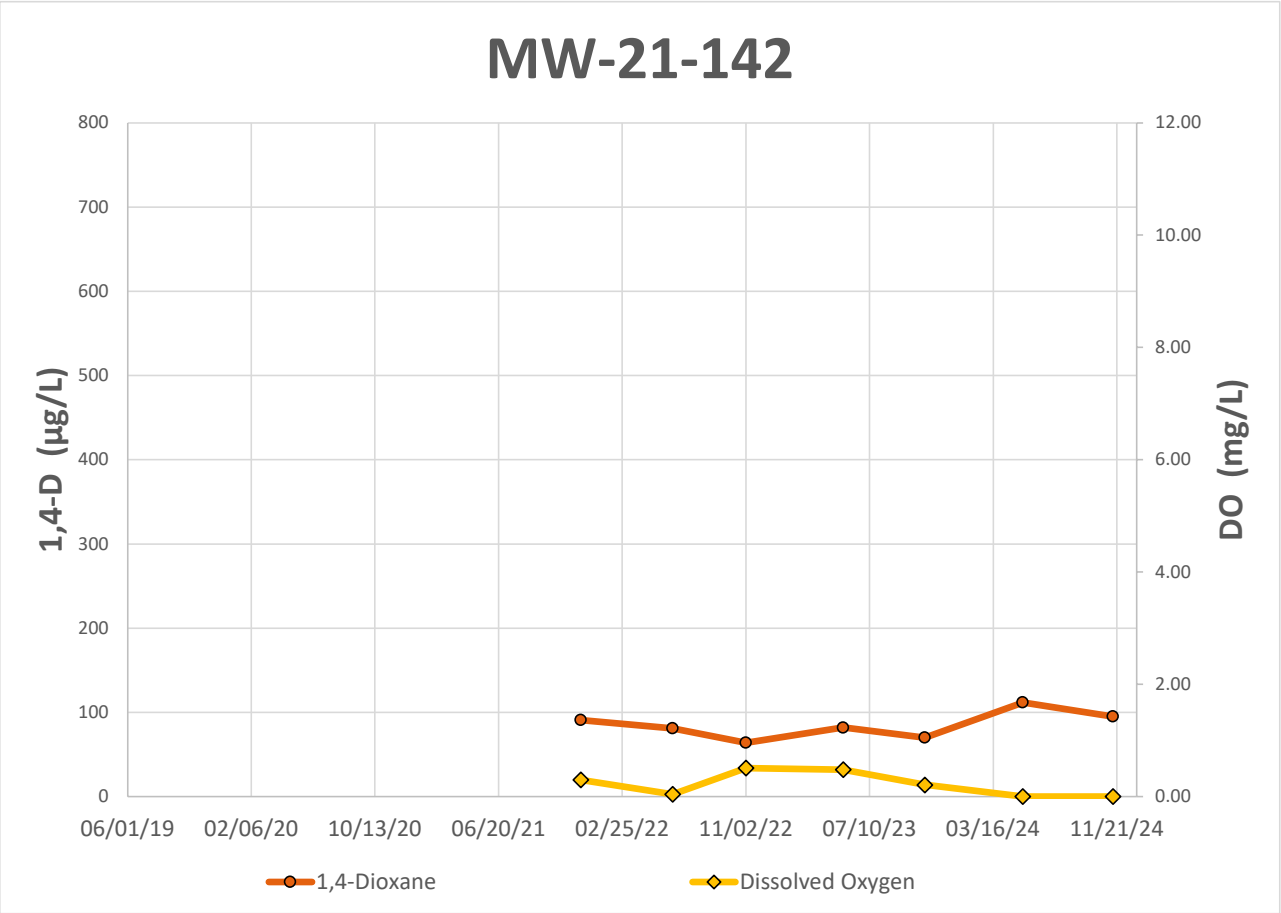

MW-13-43
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
16
14
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

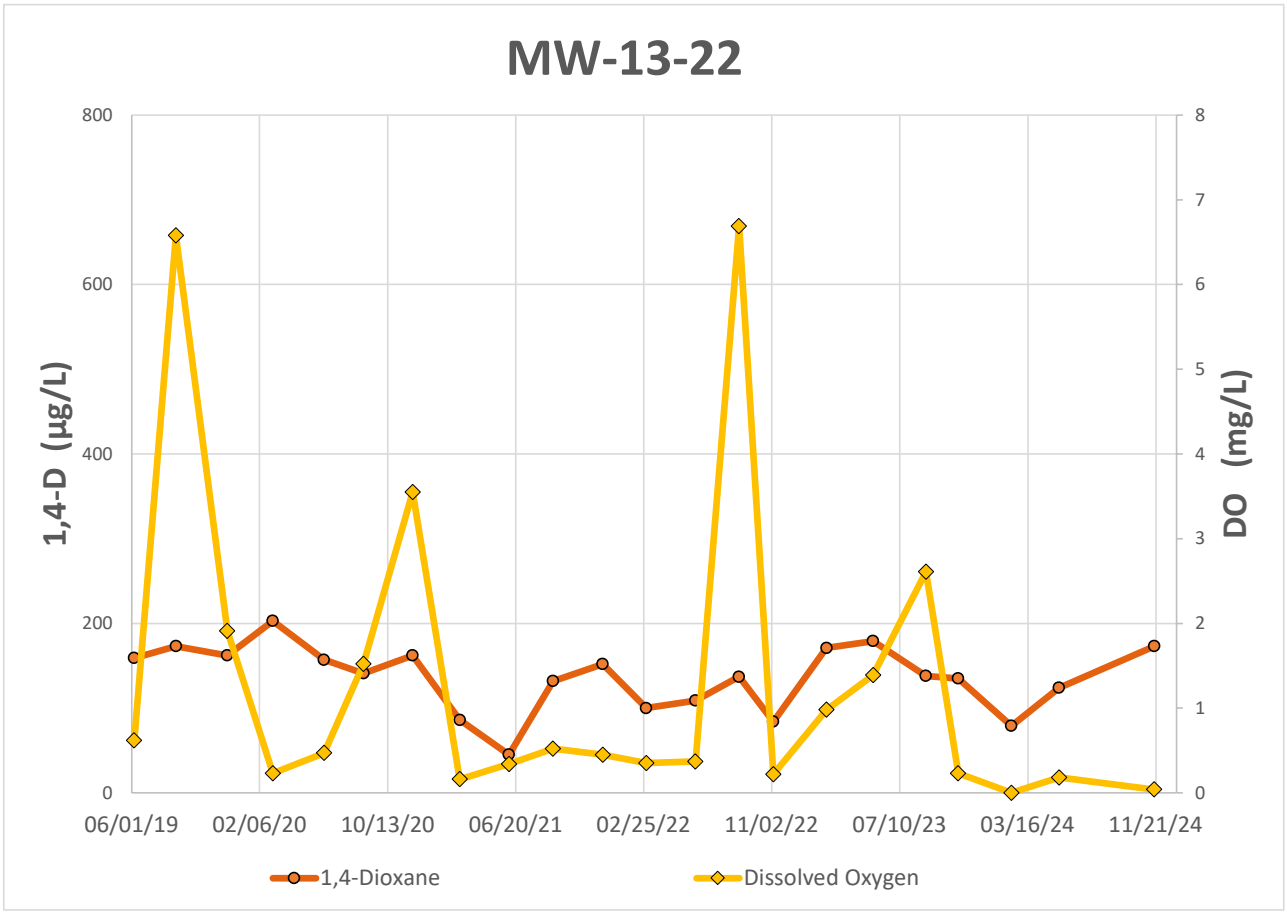

MW-13-45
1,4-D (µg/L)
DO (mg/L)
800
700
600
500
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

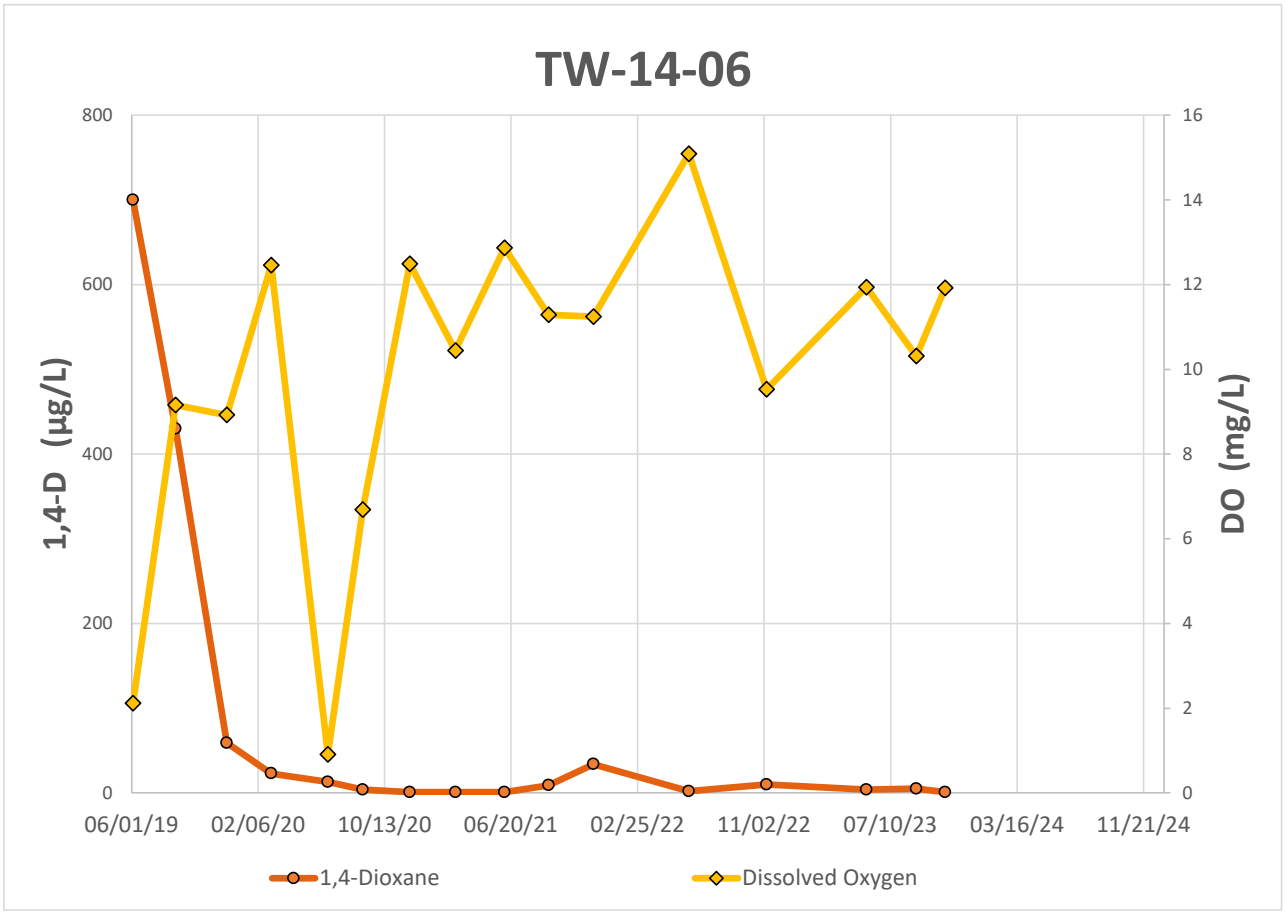

MW-16-75
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

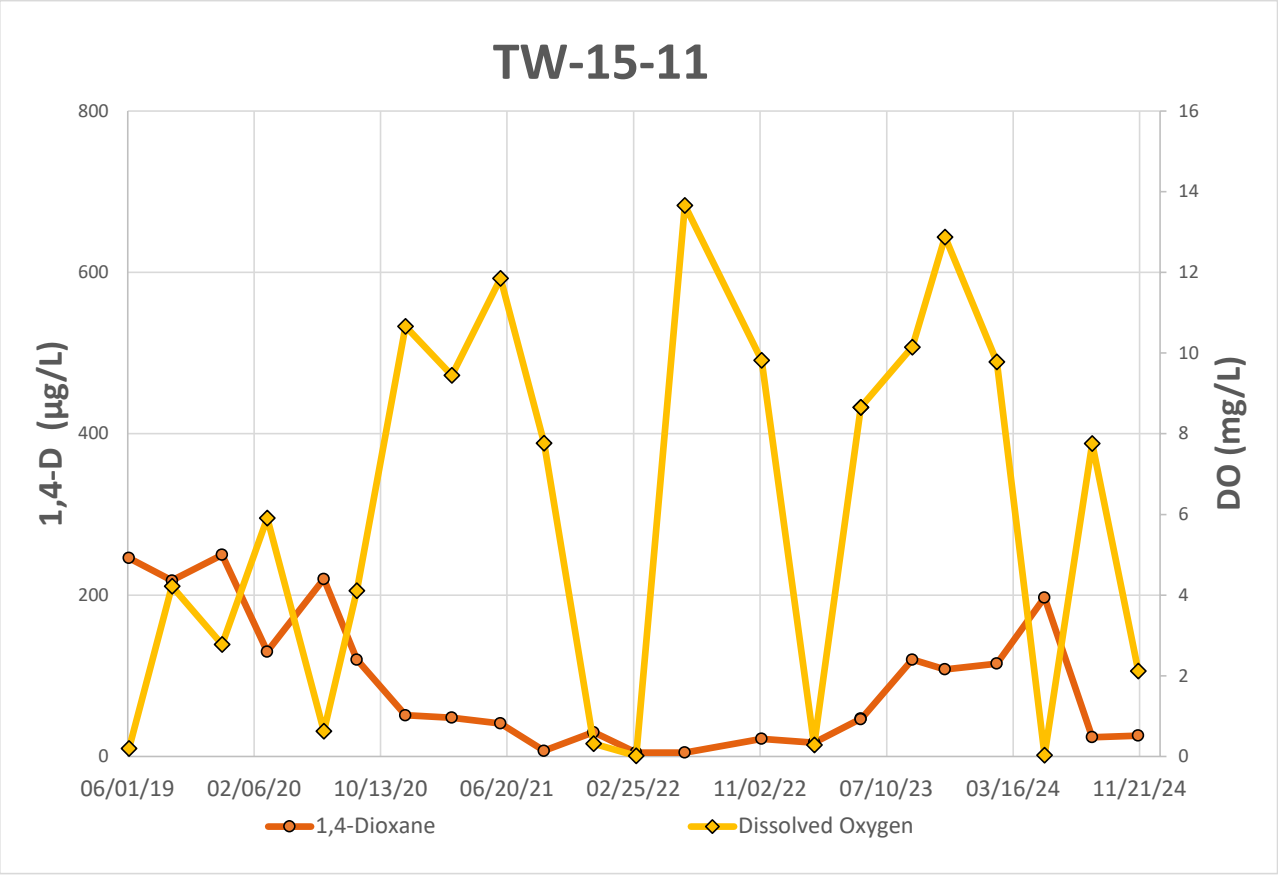

MW-16-77
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

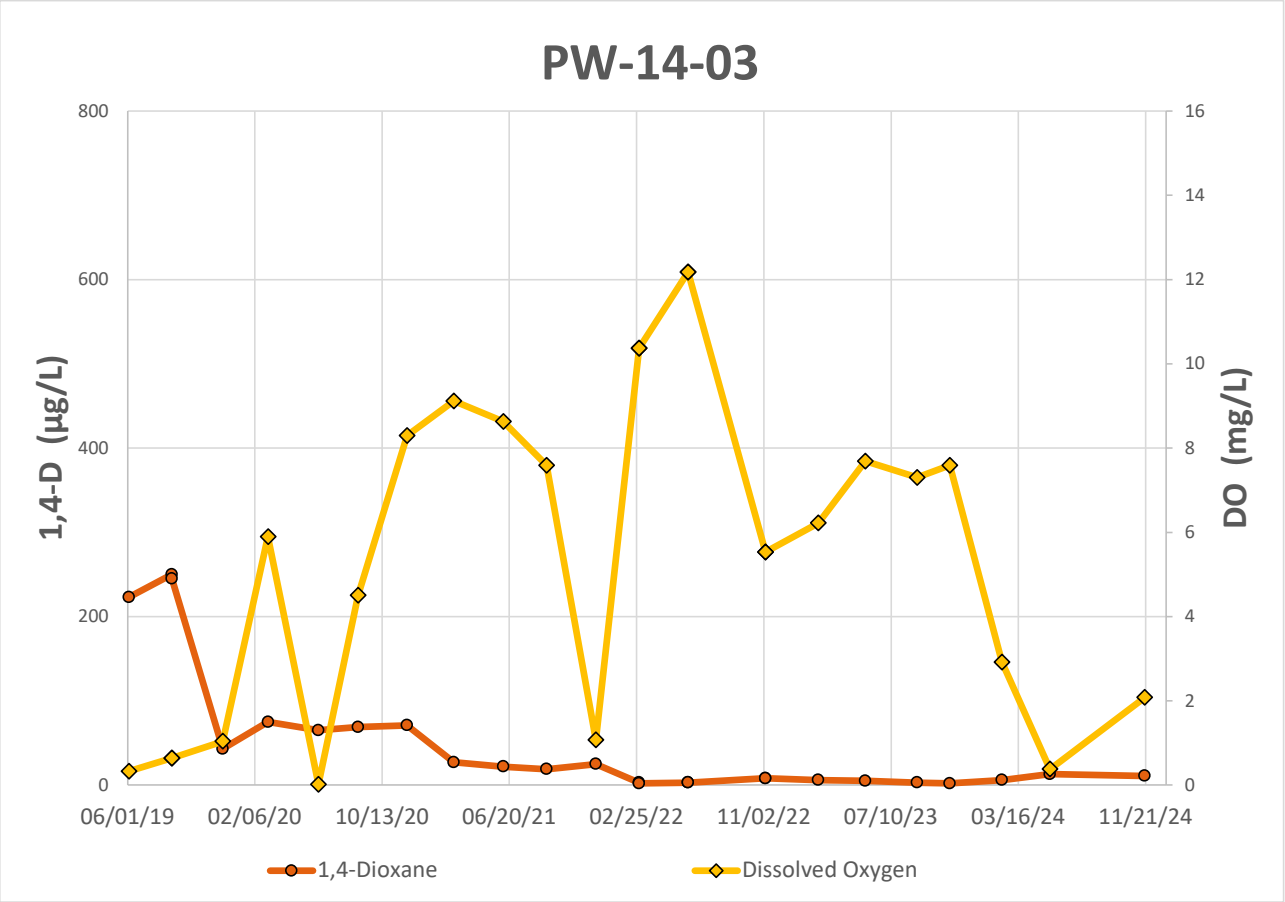

MW-16-85
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

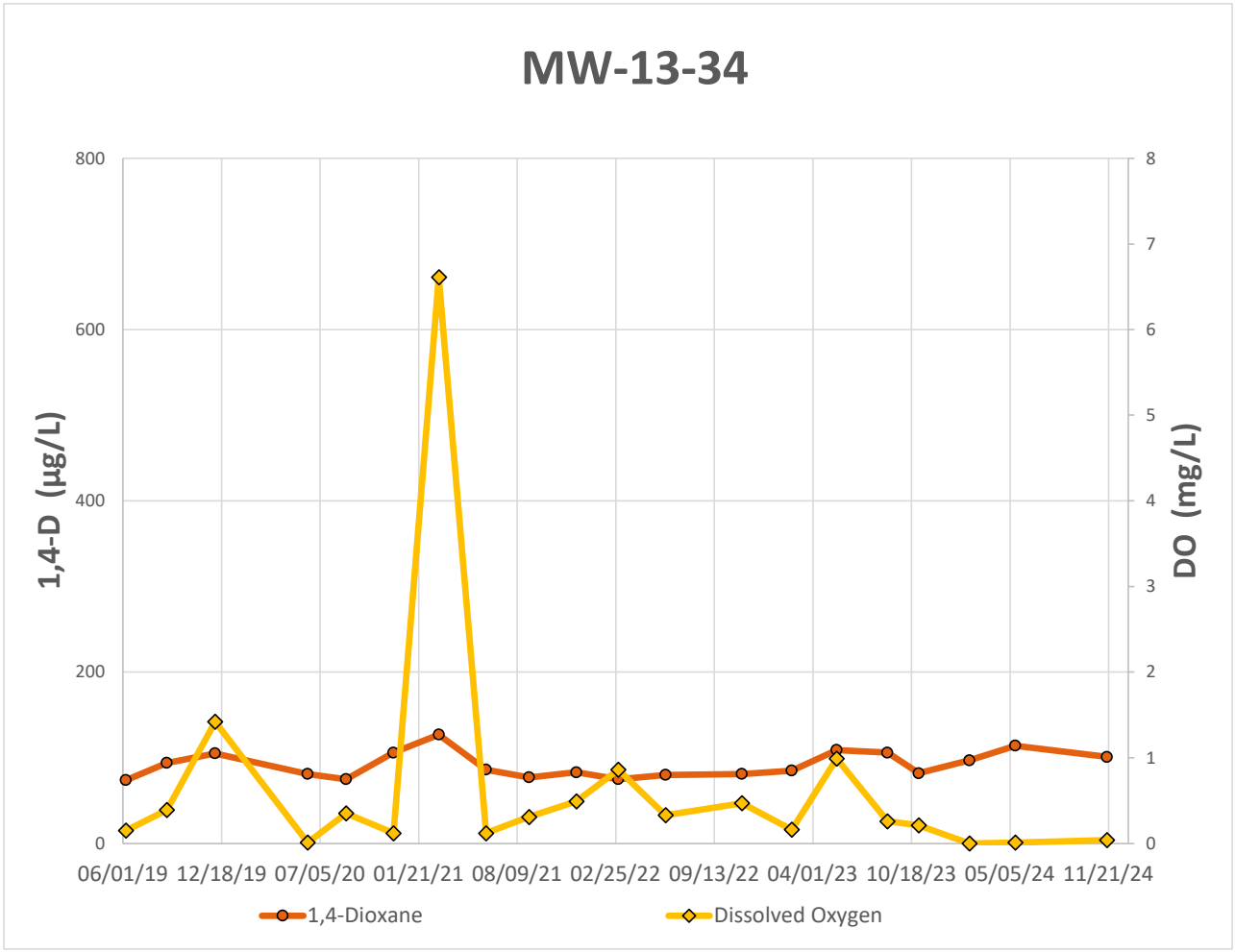

MW-21-142
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

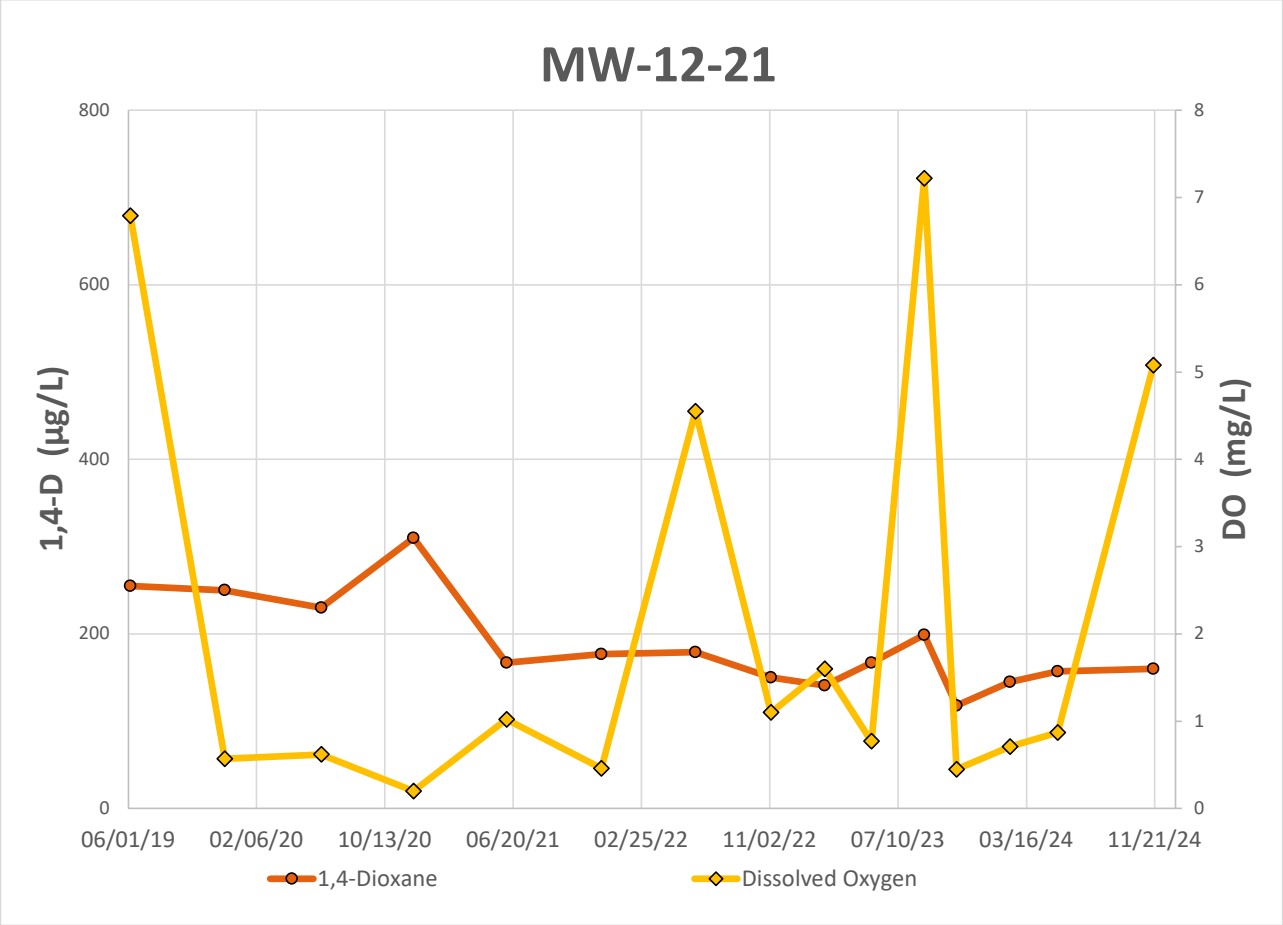

MW-13-22
800
600
400
200
0
8
7
6
5
4
3
2
1
0
1,4-D (µg/L)
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

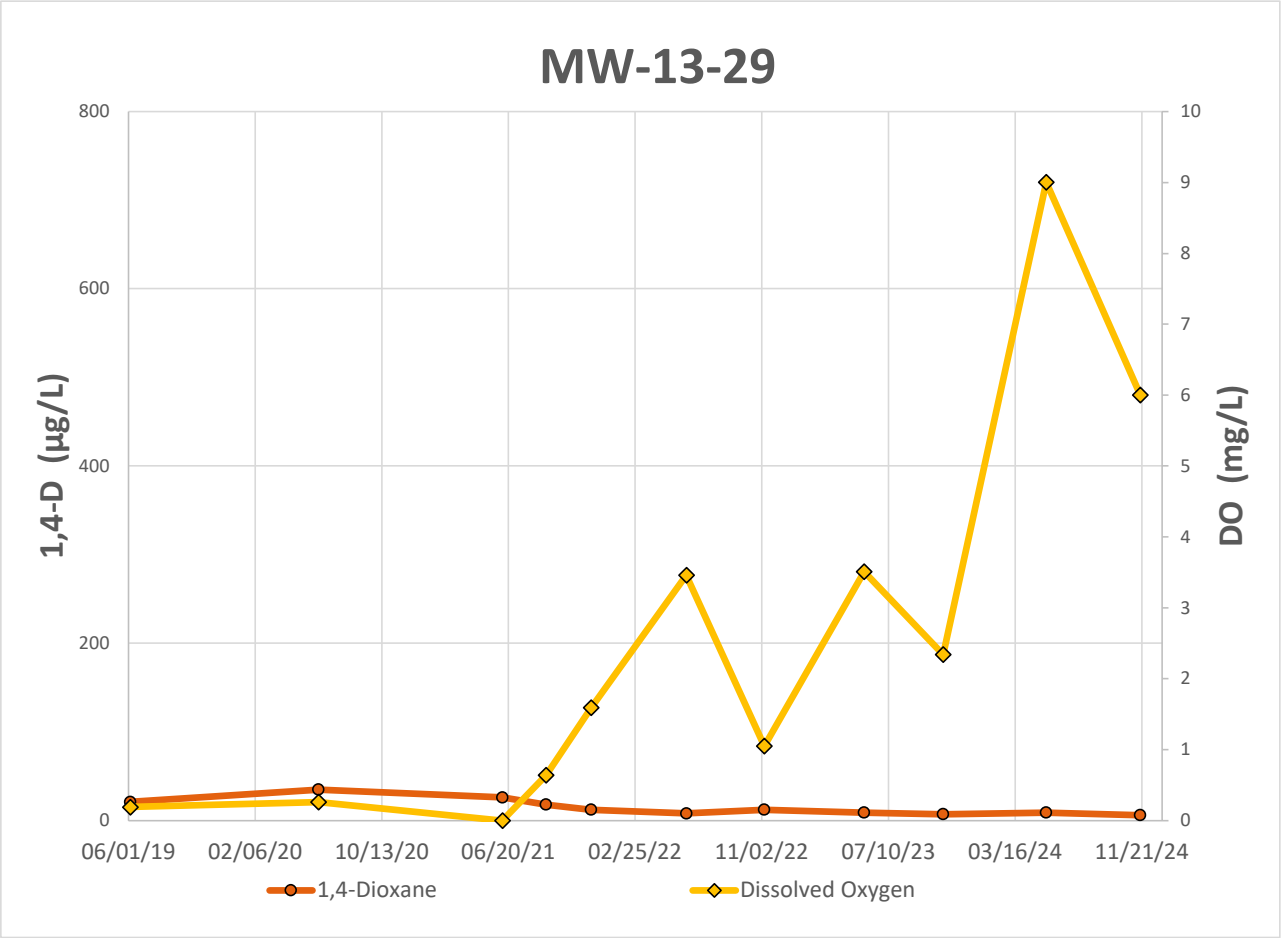

TW-14-06
800
600
400
200
0
16
14
12
10
8
6
4
2
0
1,4-D (µg/L)
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

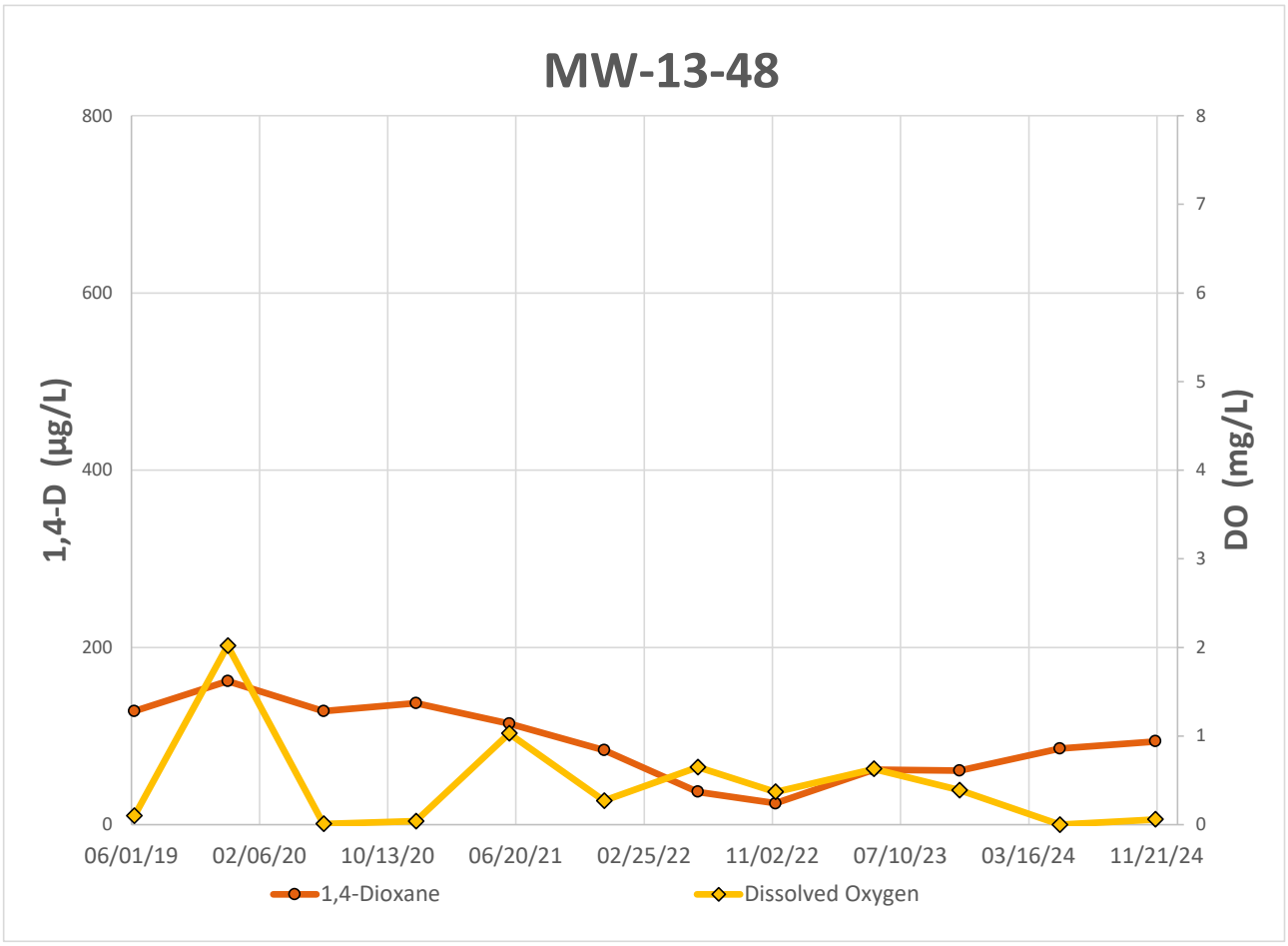

TW-15-11
1,4-D (µg/L)
DO (mg/L)
800
600
400
200
0
16
14
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

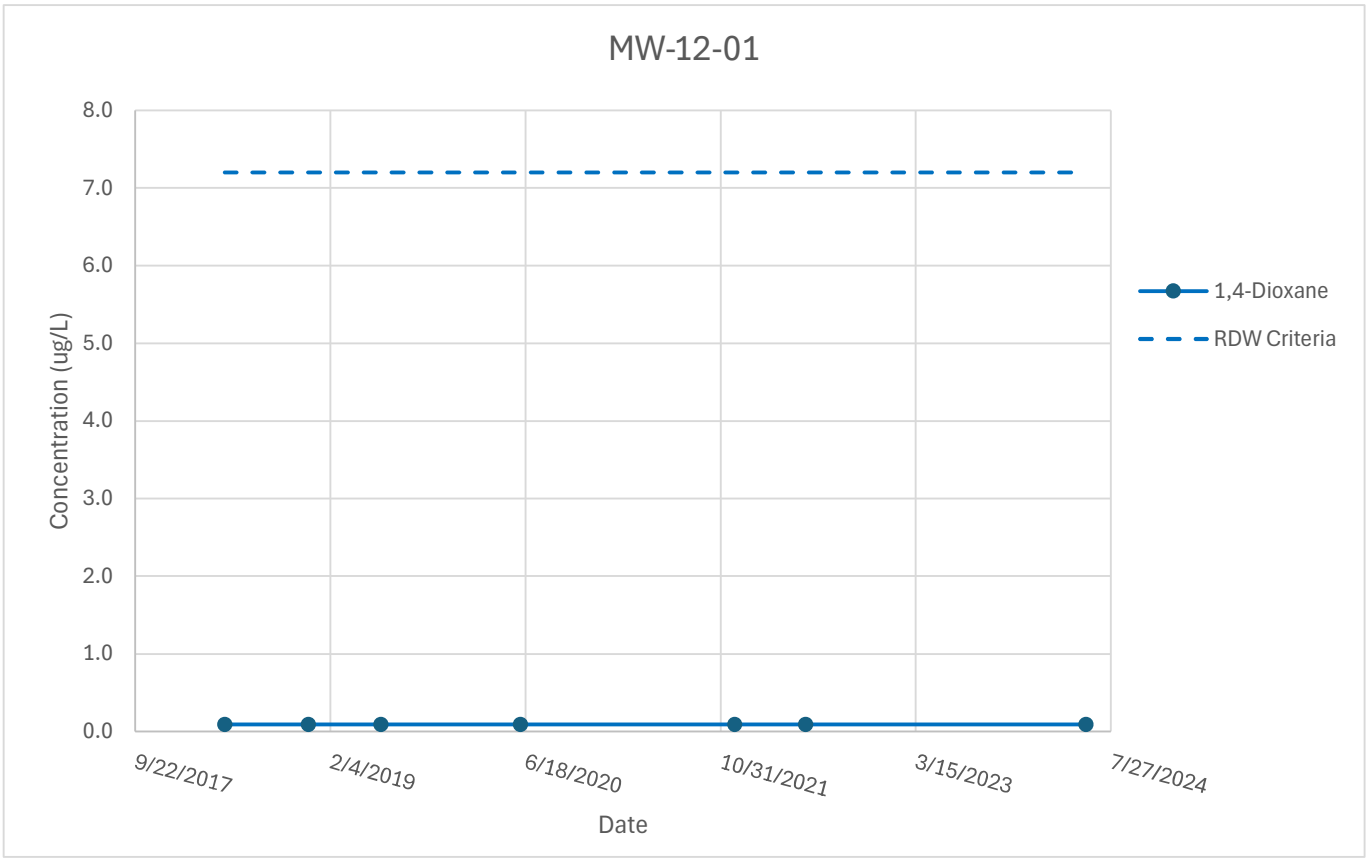

PW-14-03
1,4-D (µg/L)
DO (mg/L)
800
600
400
200
0
16
14
12
10
8
6
4
2
0
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

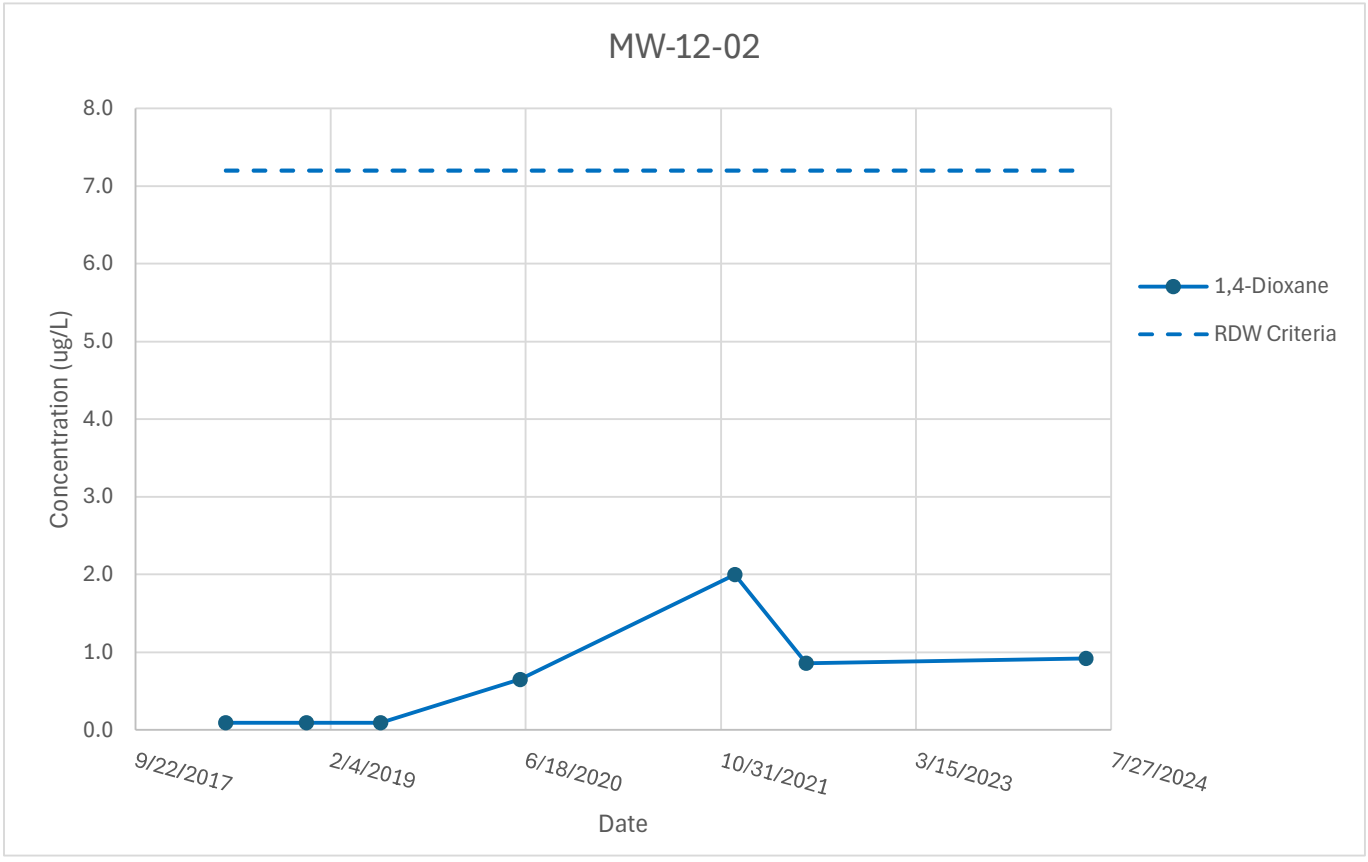

MW-13-34
800
600
400
200
0
1,4-D (µg/L)
8
7
6
5
4
3
2
1
0
DO (mg/L)
06/01/19
12/18/19
07/05/20
01/21/21
08/09/21
02/25/22
09/13/22
04/01/23
10/18/23
05/05/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

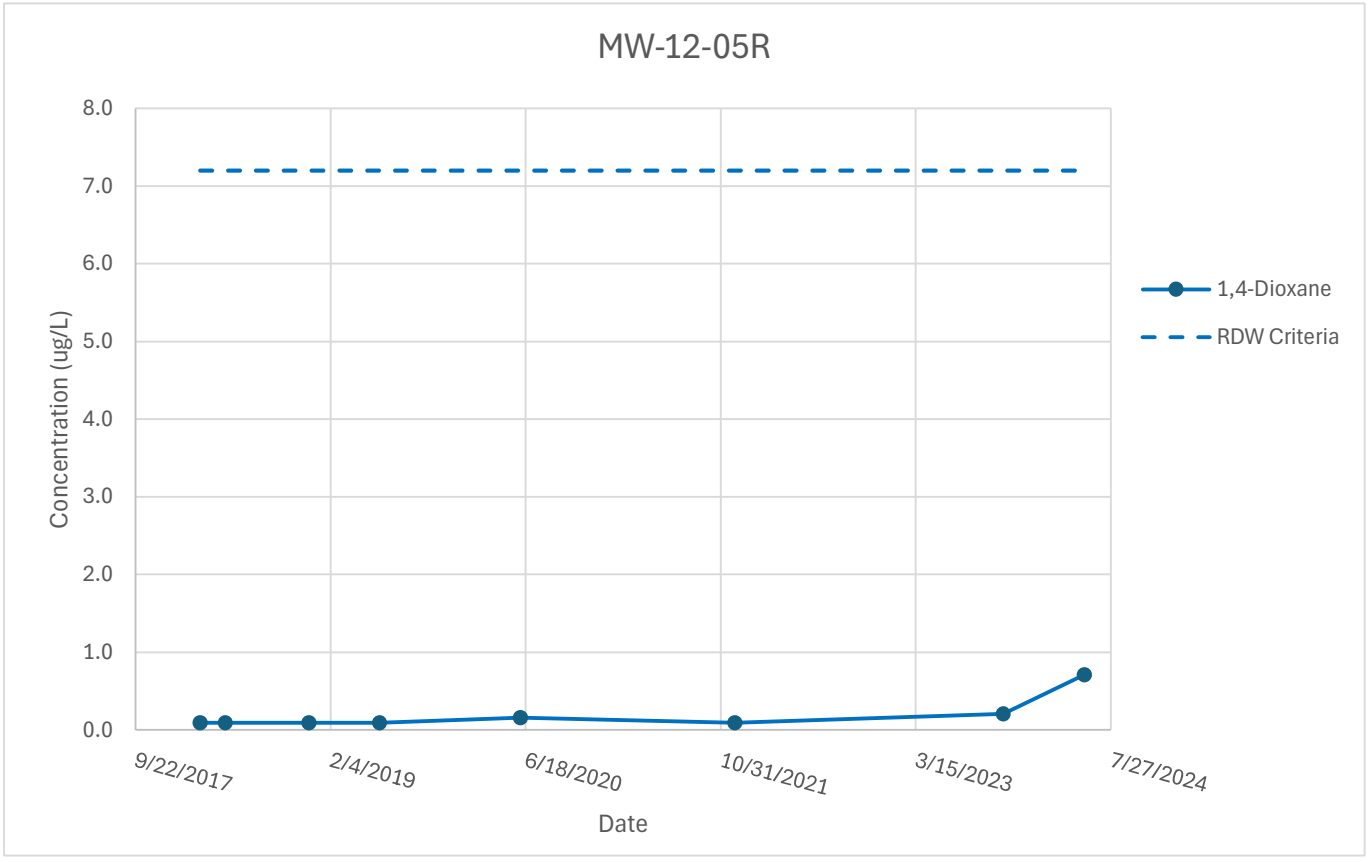

MW-12-21
800
600
400
200
0
1,4-D (µg/L)
8
7
6
5
4
3
2
1
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

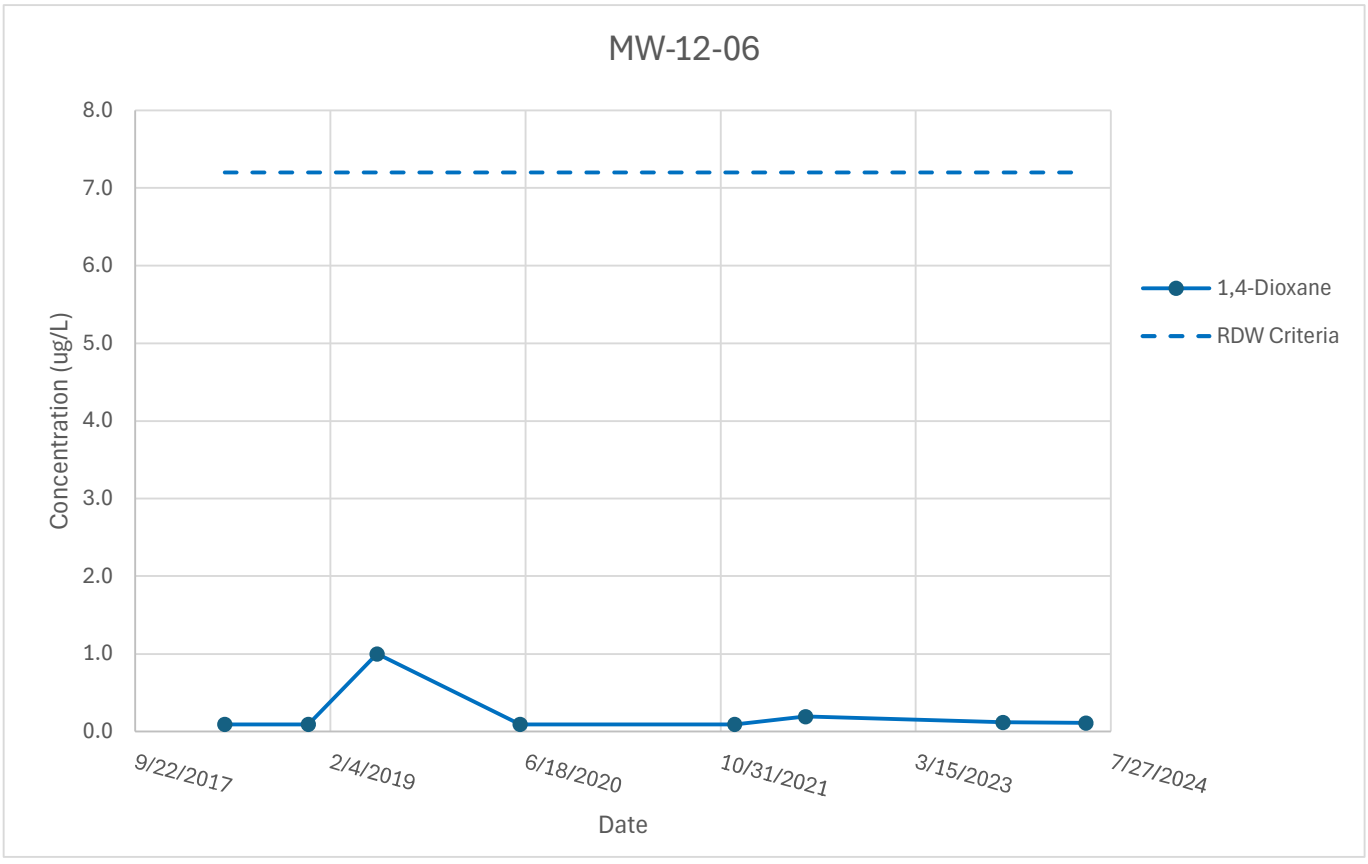

MW-13-29
800
600
400
200
0
1,4-D (µg/L)
10
9
8
7
6
5
4
3
2
1
0
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

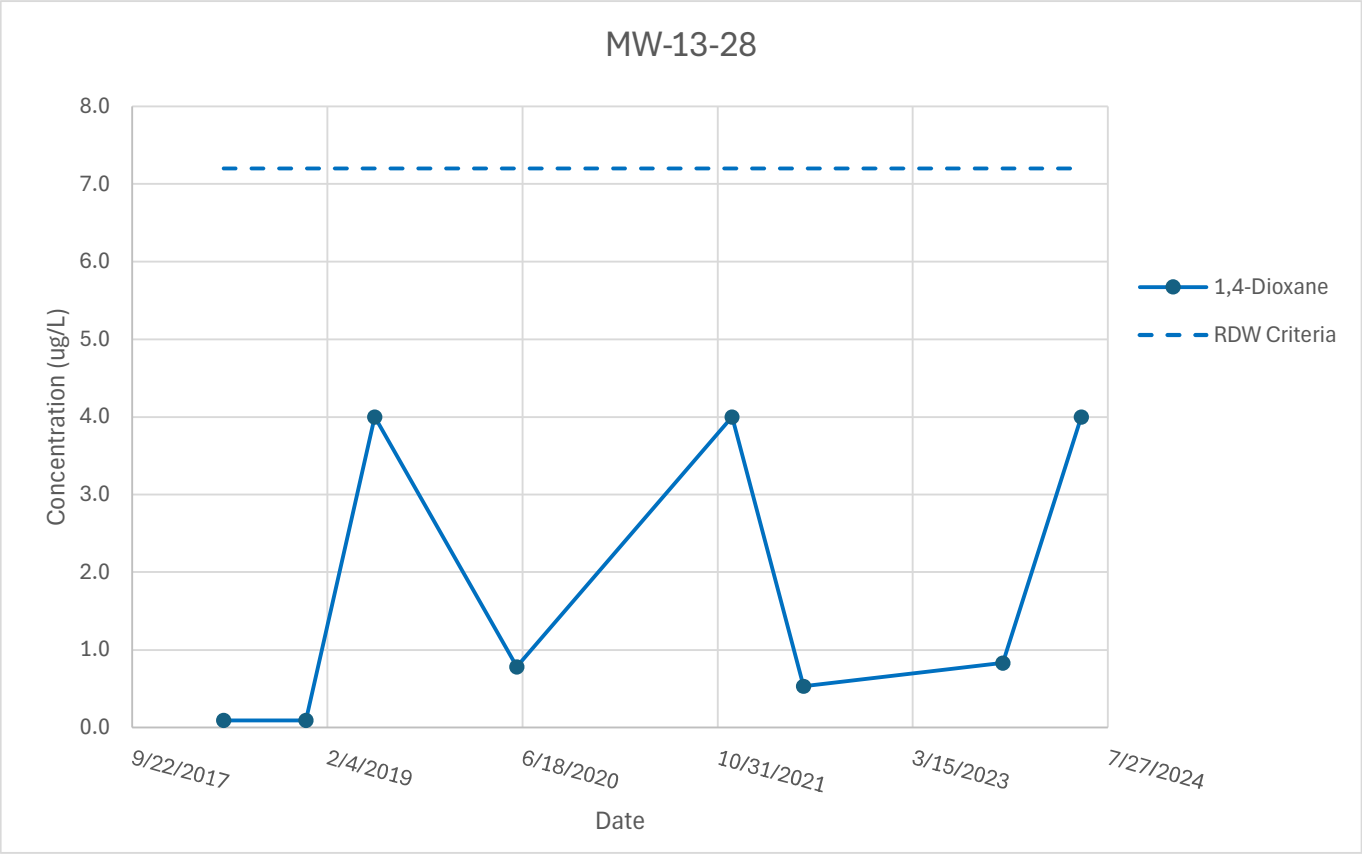

MW-13-48
800
600
400
200
0
8
7
6
5
4
3
2
1
0
1,4-D (µg/L)
DO (mg/L)
06/01/19
02/06/20
10/13/20
06/20/21
02/25/22
11/02/22
07/10/23
03/16/24
11/21/24
1,4-Dioxane
Dissolved Oxygen

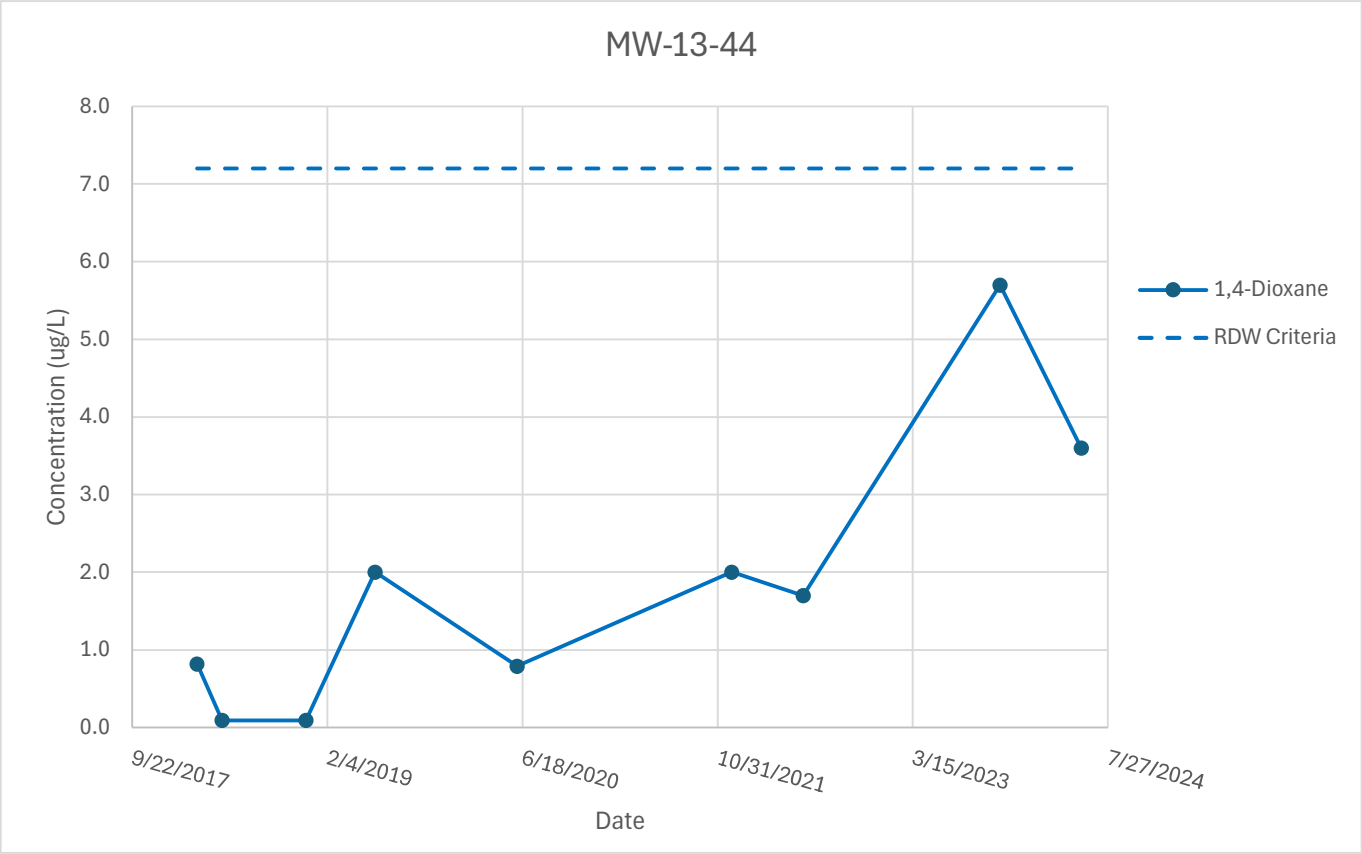

MW-12-01
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

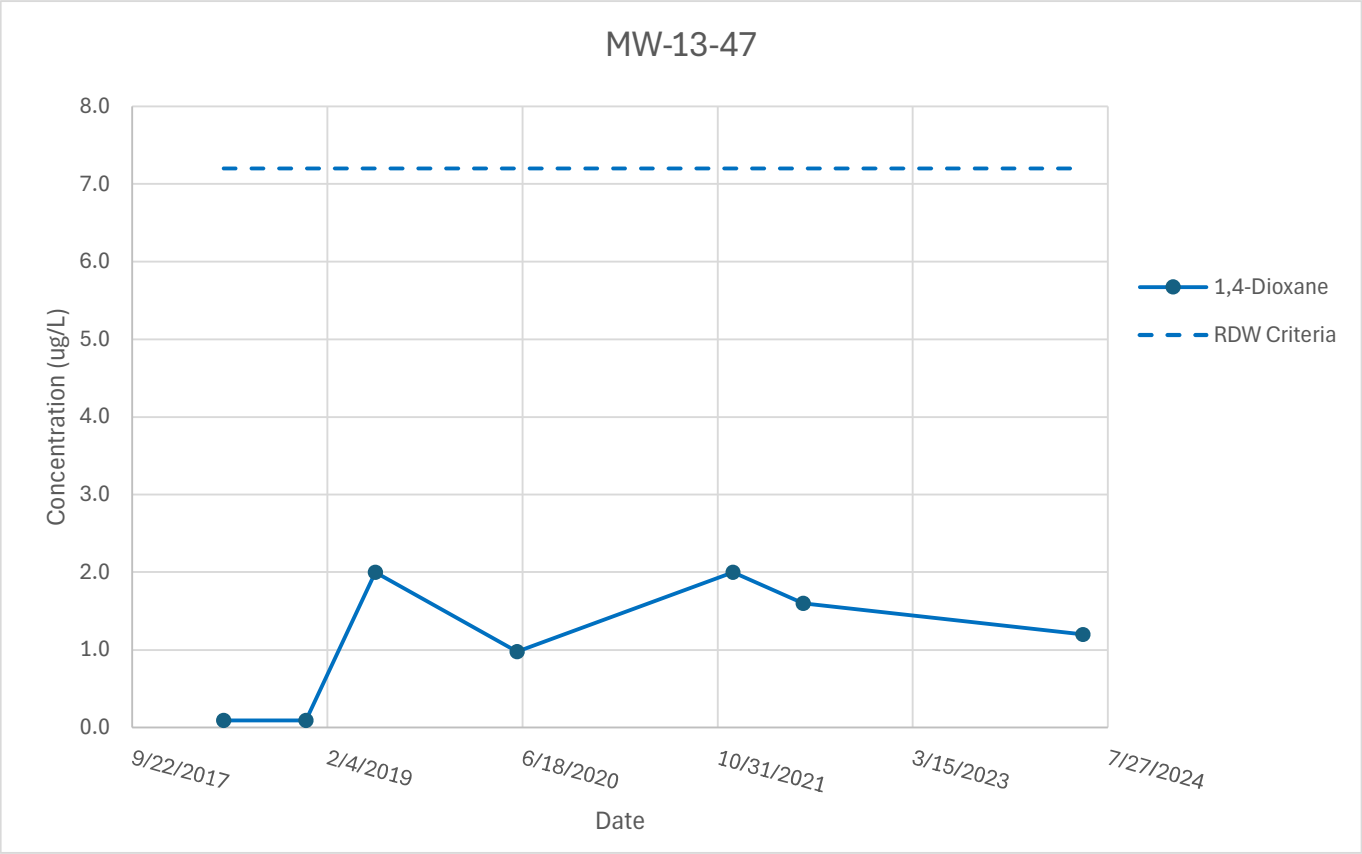

MW-12-02
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

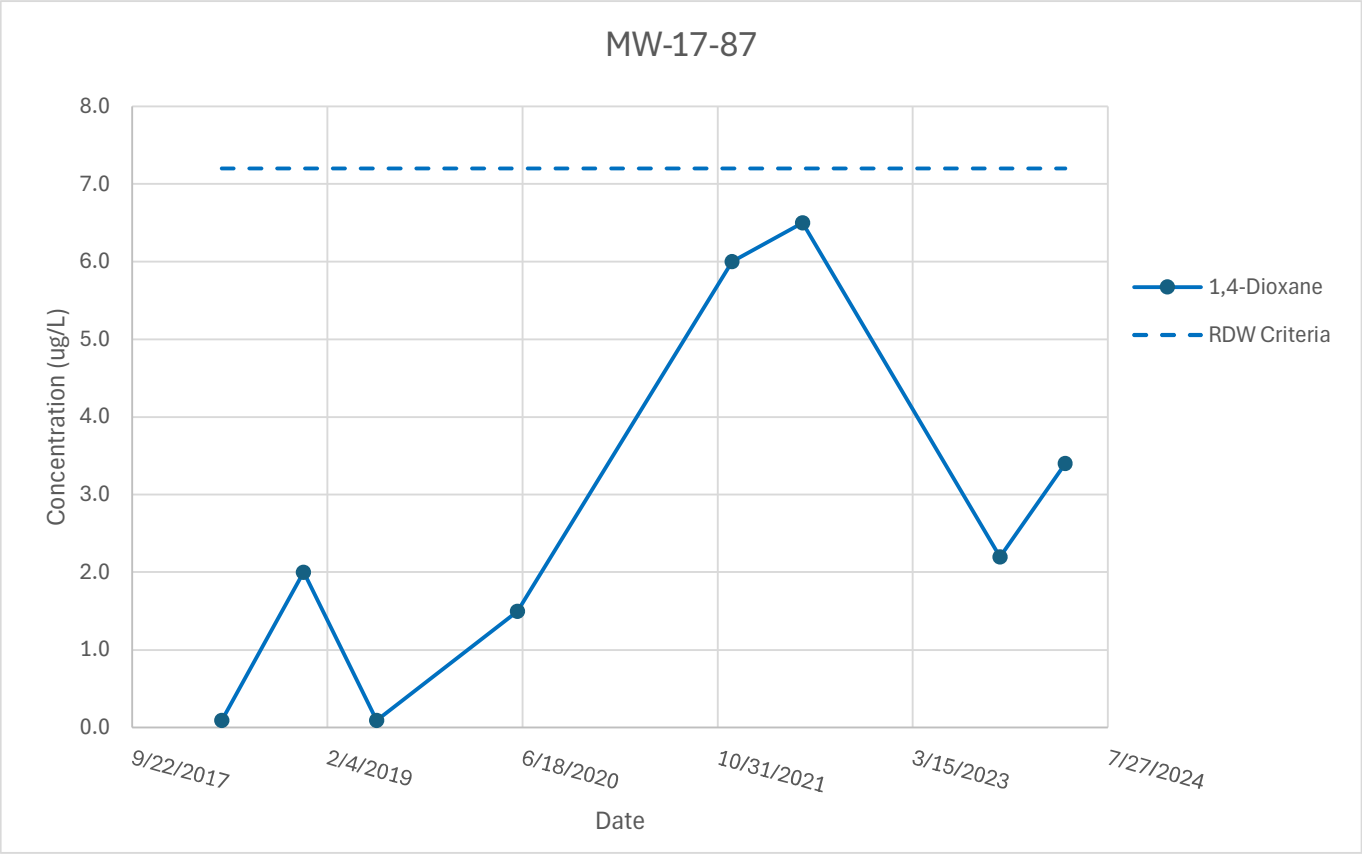

MW-12-05R
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

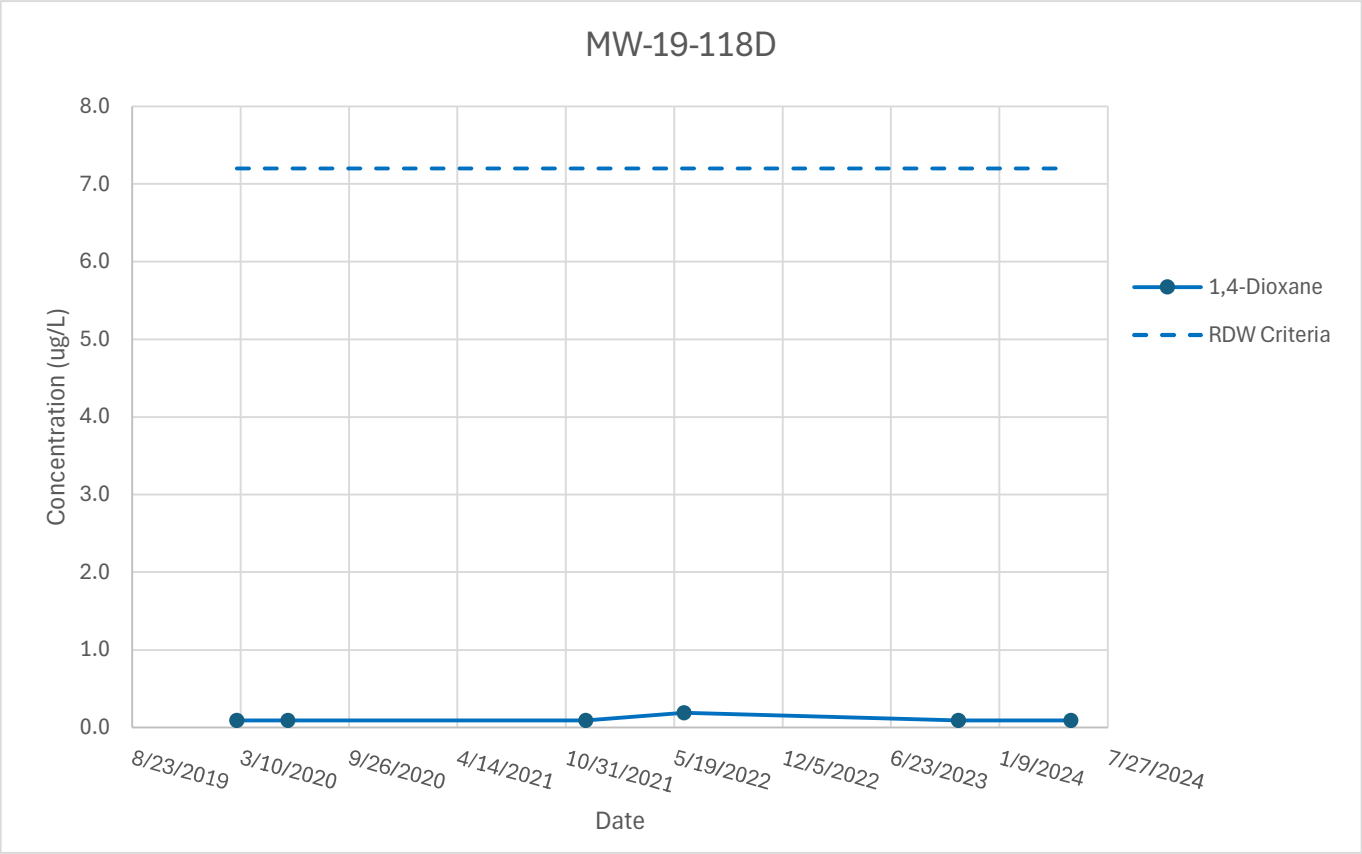

MW-12-06
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

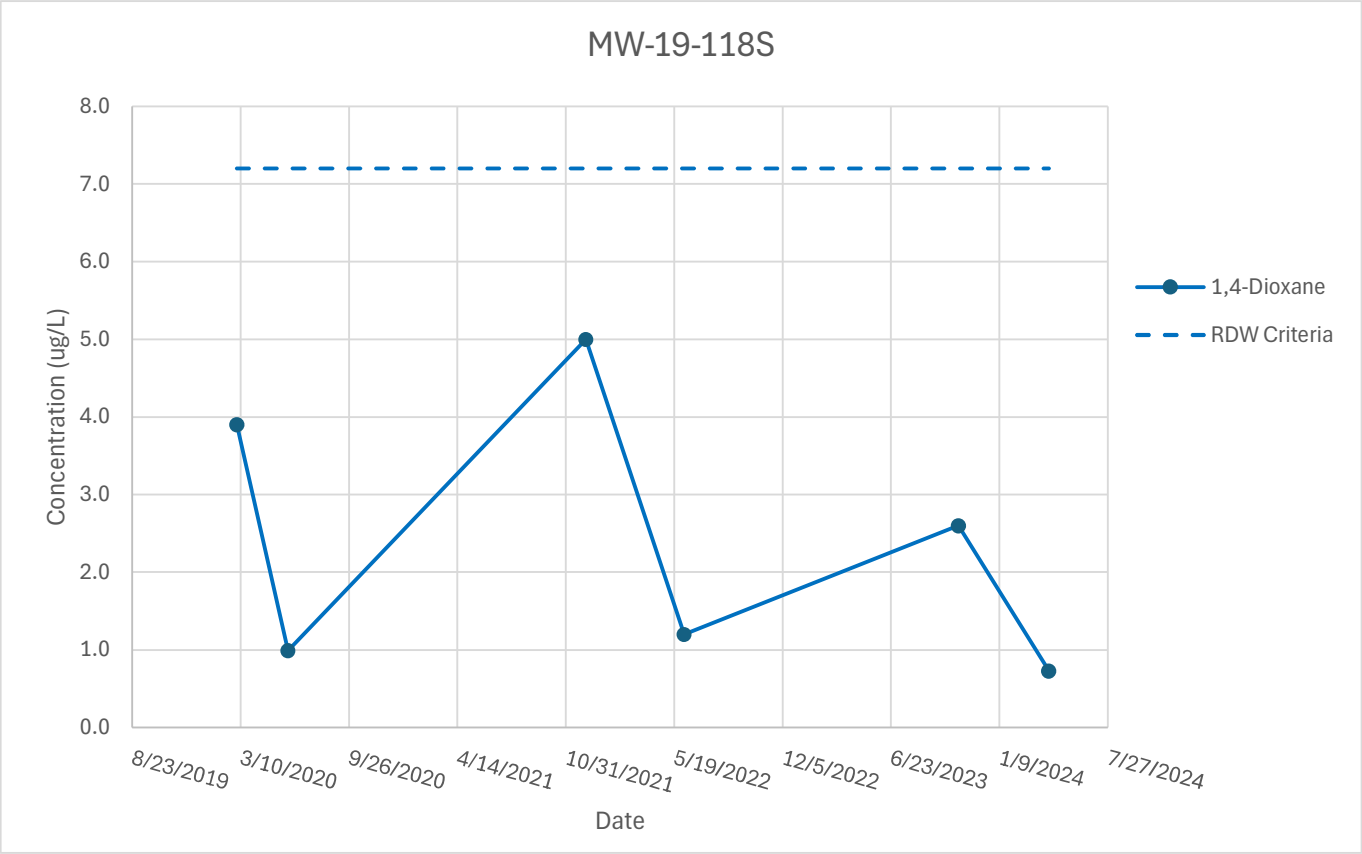

MW-13-28
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

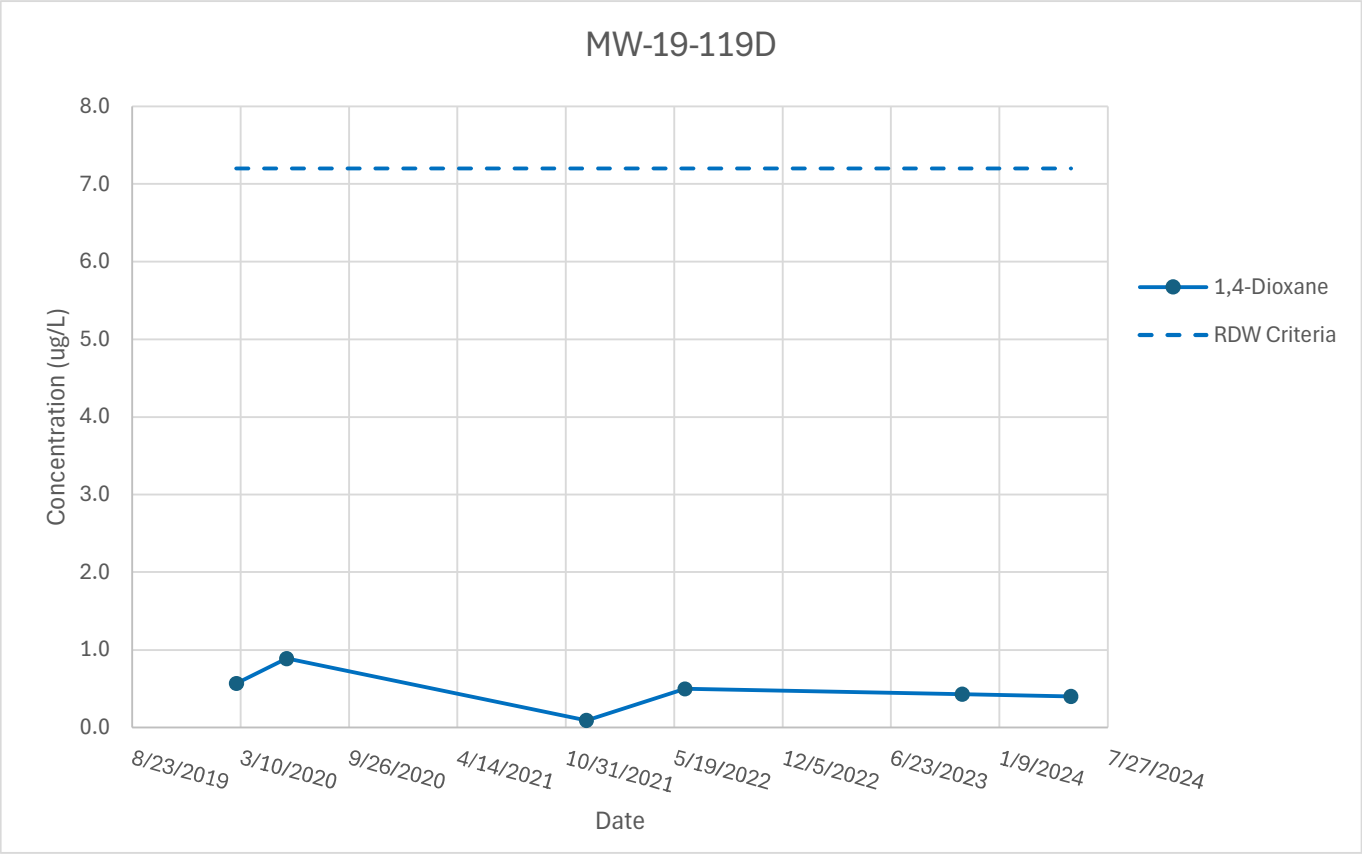

MW-13-44
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

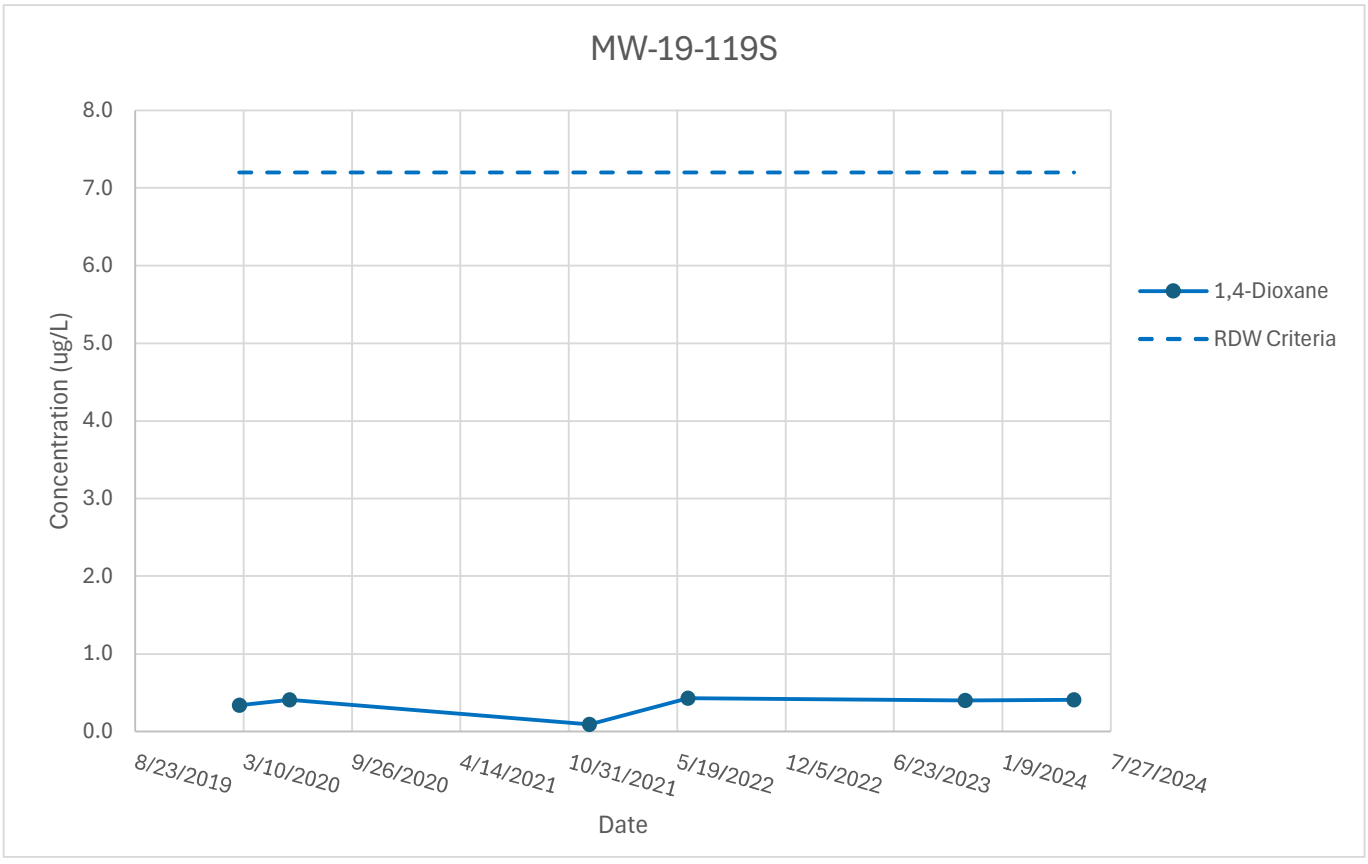

MW-13-47
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

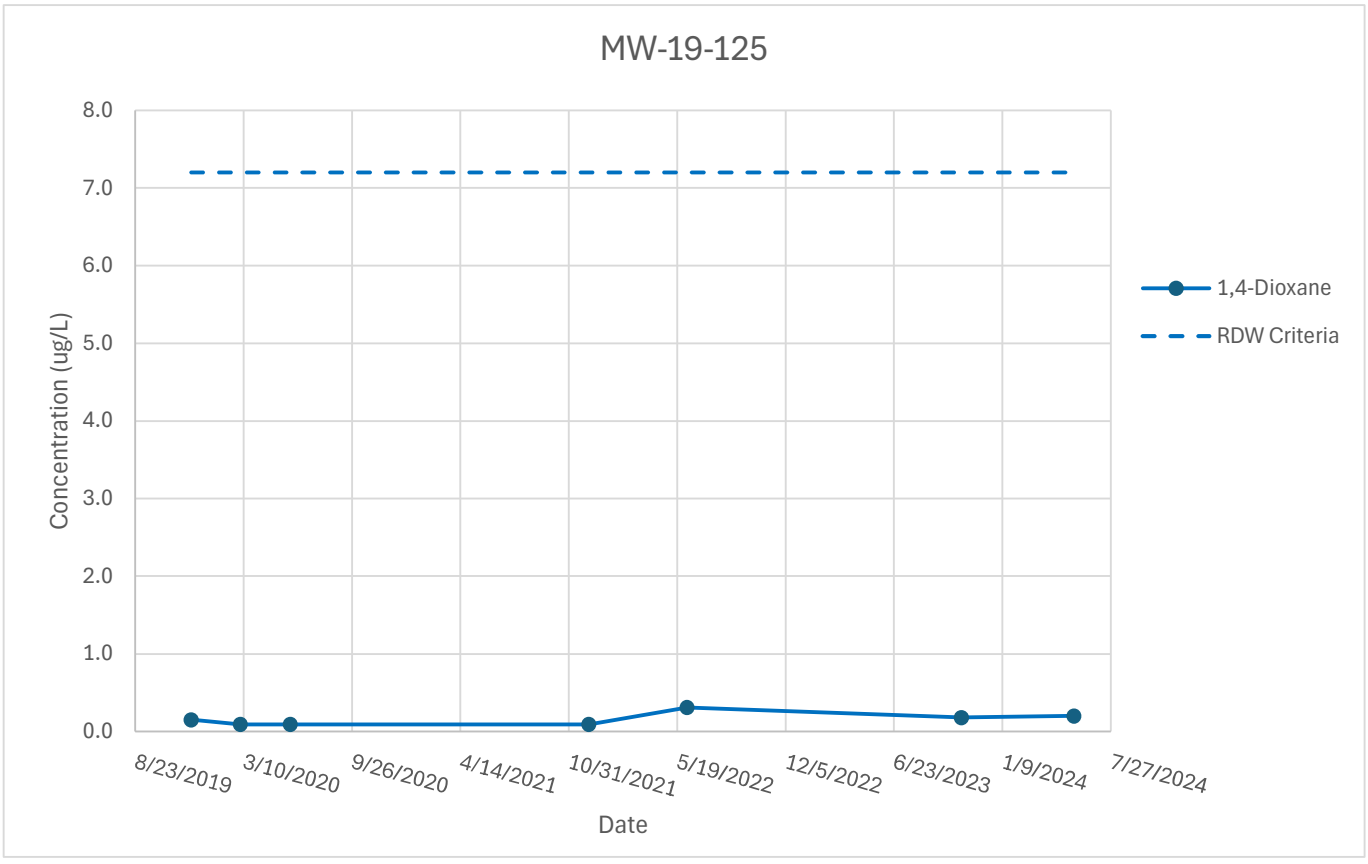

MW-17-87
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria

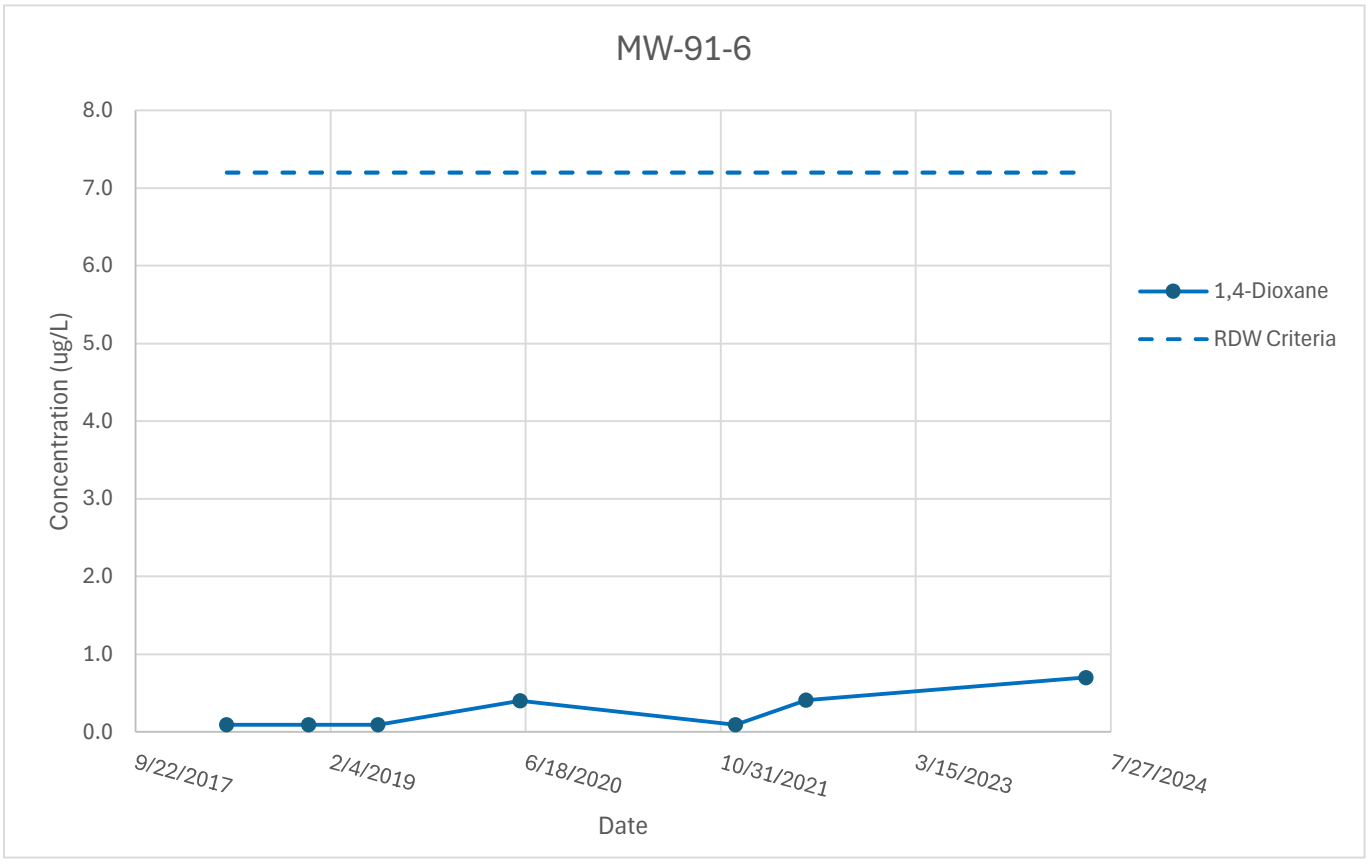

MW-19-118D
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
8/23/2019
3/10/2020
9/26/2020
4/14/2021
10/31/2021
5/19/2022
12/5/2022
6/23/2023
1/9/2024
7/27/2024
Date
1,4-Dioxane
RDW Criteria

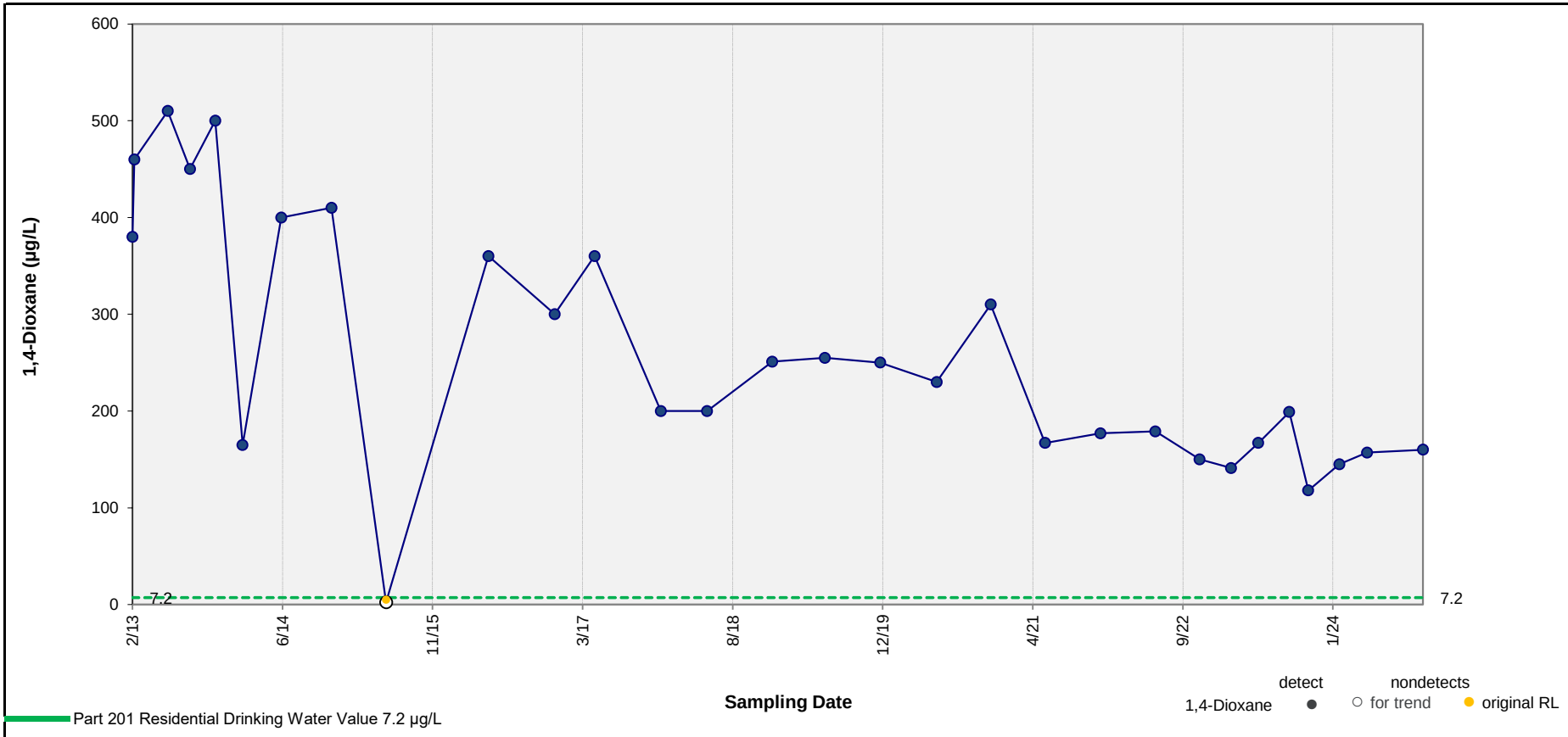

MW-19-118S
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
8/23/2019
3/10/2020
9/26/2020
4/14/2021
10/31/2021
5/19/2022
12/5/2022
6/23/2023
1/9/2024
7/27/2024
Date
1,4-Dioxane
RDW Criteria


MW-19-119D
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
8/23/2019
3/10/2020
9/26/2020
4/14/2021
10/31/2021
5/19/2022
12/5/2022
6/23/2023
1/9/2024
7/27/2024
Date
1,4-Dioxane
RDW Criteria


MW-19-119S
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
8/23/2019
3/10/2020
9/26/2020
4/14/2021
10/31/2021
5/19/2022
12/5/2022
6/23/2023
1/9/2024
7/27/2024
Date
1,4-Dioxane
RDW Criteria


MW-19-125
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
8/23/2019
3/10/2020
9/26/2020
4/14/2021
10/31/2021
5/19/2022
12/5/2022
6/23/2023
1/9/2024
7/27/2024
Date
1,4-Dioxane
RDW Criteria


MW-91-6
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Concentration (ug/L)
9/22/2017
2/4/2019
6/18/2020
10/31/2021
3/15/2023
7/27/2024
Date
1,4-Dioxane
RDW Criteria



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

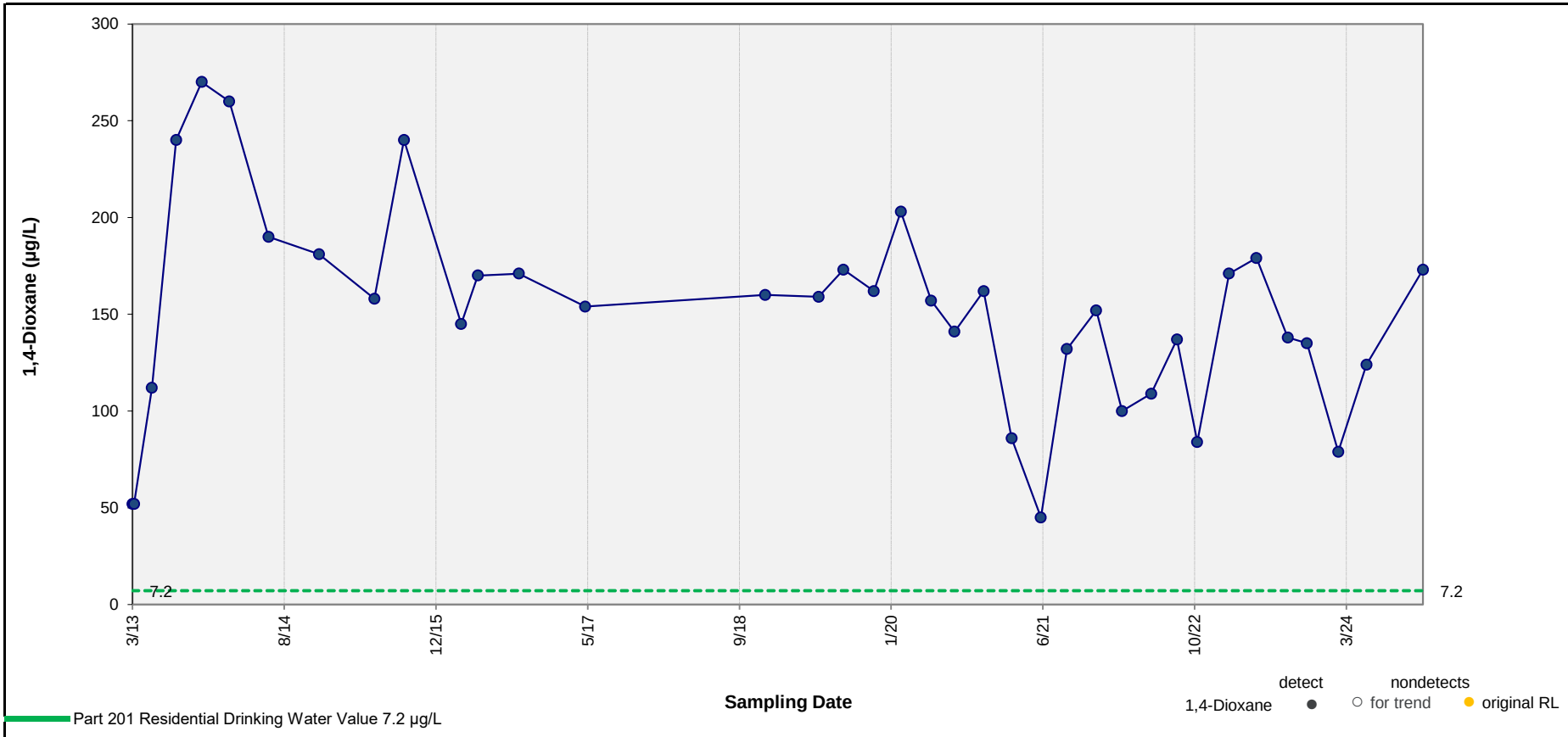
p value = <0.001 Note: p value < 0.1 indicates a statistically significant trend (90% confidence level).

ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well MW-12-21

RACER Lansing

Figure F-58



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

p value = 0.014 Note: p value < 0.1 indicates a statistically significant trend (90% confidence level).

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Concentration vs. Time Plot – 1,4-Dioxane in Well MW-13-22

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Figure F-59

Appendix C

Treatment Cost Evaluation

Appendix C
Biosparge Performance Cost Tracking

Lower 1,4-Dioxane Biosparge Progress Report
Lansing Industrial Land, Lansing, Michigan

Plant 3 Operations Cost Per ug/L Treated (without up-gradient well, with deep overburden wells)

Year	Months of Operation	Yearly Operation Price	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L Reduction)
2019*	7	$23,333	108	$216
2020	12	$40,000	51	$784
2021	12	$57,841	29	$1,995
2022	12	$41,129	19	$2,165
2023	12	$53,843	-17	NA
2024	12	$55,865	-4	NA

*Plant 3 system began operation in June 2019 – concentrations and costs were based on 7 months of operation (June – December 2019)

Plant 2 Operations Cost Per ug/L Treated

			P2 North - B		P2 South - G&E		P2 East - E&F	
Year	Months of Operation	Yearly Operation Price	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L Reduction)	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L Reduction)	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L Reduction)
2020*	5	$66,667	54	$211	215	$121	47	$623
2021	12	$231,356	38	$1,039	215	$420	44	$2,308
2022	12	$164,516	59	$476	34	$1,888	31	$2,330
2023	12	$215,372	5	$7,354	-7	NA	0	NA
2024	12	$223,462	-1	NA	5	$17,441	-1	NA

*Plant 2 system began operation in August 2020 – concentrations and costs were based on 5 months of operation (Aug – Dec 2020)

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