Revitalizing Auto Communities Environmental Response (RACER) Trust

Lower 1,4-Dioxane Biosparge Progress Report and Shutdown Evaluation

Lansing Industrial Land
Lansing, Michigan

March 2023

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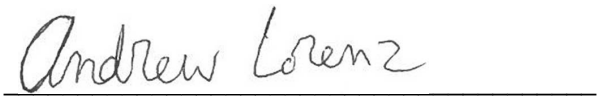

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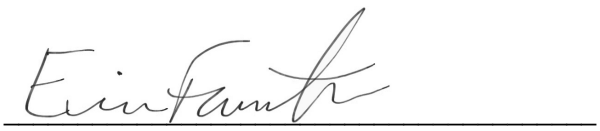

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Acronyms and Abbreviations

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
LEL	lower explosive limit
LNAPL	light non-aqueous phase liquid
O&M	operation and maintenance
psi	pounds per square inch
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, 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 on Plant 2 with an equipment enclosure, and 7 wells on Plant 3 with an equipment enclosure, comprise the overall biosparge system. The biosparge system was designed to inject air and propane to facilitate co-metabolic biodegradation of 1,4-dioxane. This report provides an update of system operations and performance and presents recommendations for system optimization. This report addresses operations of the biosparge system for 2022. This report also includes a proposal to conduct a shutdown evaluation for select transects to evaluate the potential rebound of 1,4-dioxane concentrations and to optimize operation and cost-effectiveness of the biosparge remedy.

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 into 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 report. The diminishing return evaluation process has been updated, 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 2022 to continue treating 1,4-dioxane in the lower weathered bedrock. A summary of operations and maintenance is outlined below.

2.1 Summary of Operations

The operational uptime of the Plant 3 system was 90 percent (%) during 2022. The Plant 3 system was down approximately 2% of the time for routine maintenance activities and approximately 8% of the time for non-routine maintenance activities. The Plant 2 system was operational 92% of the time during 2022. The Plant 2 system was down approximately 2% of the time for routine maintenance activities and approximately 6% 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 2022:

- Air flow rates were maintained at 3 to 5 actual cubic feet per minute per biosparge well using the gate valves installed on the manifolds.
- Wells were grouped into three sparge zones, which alternated sparging, with a one-hour system rest cycle; any given biosparge well received one hour of air sparging followed by three hours of rest.
- Propane dosage for both Plant 2 and Plant 3 was 15% to 20% LEL, two hours total per day per well, in one-half hour increments.
- Most of the wells maintained a wellhead pressure of 8 to 12 pounds per square inch (psi), except for three former pilot wells (AS-17-G01, AS-17-G02, and AS-17-G03) in Transect G, one well in Transect B (AS-19-B06), and two wells in Transect A (AS-19-06 and AS-19-07). These six wells were rehabilitated and cleaned in 2022. The Transect B and G wells continue to operate but still exhibit higher than average wellhead pressures.
- Plant 3 Transect A biosparge wells AS-19-06 and AS-19-07 were idled in June following rehabilitation because the wells still would not accept air and water injections.

Detailed operation and maintenance (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 2022 and included data collection, equipment maintenance, and system checks for verifying normal system operation. Onsite data collection included flow rates and pressures for individual wells; the system flow and pressure data were logged remotely through the programmable logic controller. At the Plant 3 system, propane tank changeouts occurred once a month. At the Plant 2 system, propane was delivered on an as-needed basis, approximately three times per year.

Other routine O&M included compressor maintenance, equipment calibration, and nutrient injections. Both compressors were serviced quarterly in 2022 in accordance with the manufacturer recommendations. Nutrient injections were performed twice to maintain optimal conditions for biodegradation, in April 2022 and September 2022. Nutrient injections accounted for most of the routine O&M downtime for both systems, while shutdowns for equipment calibration, equipment replacement, and compressor maintenance accounted for the remainder of the routine maintenance shutdowns. The 2022 O&M logs are included in **Appendix A**.

2.3 Non-Routine Operation and Maintenance

2.3.1 Plant 2

The following non-routine maintenance was completed at the Plant 2 biosparge system in 2022:

- Three power outages required manual restart of the system.
- Cold outdoor temperatures between January and February triggered LEL shutdown alarms; freezing moisture in the LEL discharge lines caused buildup of gases in the measurement container.
- Condensate buildup in the wet receiver tank resulted in the formation of small rust particles, which blocked the auto drain valve, causing the system to shut down in July. Continued monthly cleaning of the auto drain strainer is now conducted as part of monthly O&M visits.
- Well screen rehabilitations were completed in early 2022 at four biosparge wells at Plant 2 where elevated wellhead pressure trends were observed in the fourth quarter of 2021. While limited changes in wellhead pressures were observed, increased flows and dissolved oxygen levels were noted post rehabilitation.
- An air leak in the biosparge hose was repaired. The leak was caused by a stake that punctured the hose during Site tenant activities.
- Modem software and firmware were updated to resolve issues with periodic internet disruptions.

2.3.2 Plant 3

The following non-routine maintenance was completed at the Plant 3 biosparge system in 2022:

- Four power outages required manual restart of the system.
- Biosparge wells AS-19-A06 and AS-19-A07 were cleaned due to elevated wellhead pressures and lack of injection air flow into the formation. After the cleaning event, pressures remained elevated, and no flow was observed. Nearby wells exhibited elevated dissolved oxygen concentrations and the sparge wells themselves were non-detect for 1,4-dioxane; therefore, it was decided that wells AS-19-A06 and AS-19-A07 would remain off. Continued sampling of AS-19-A06 was completed to evaluate 1,4-dioxane rebound while AS-19-A06 and AS-19-A07 are offline.

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 are presented on **Figure 1** and **Figure 2**, respectively. Performance monitoring wells are set within the biosparge well radius of influence (ROI), upgradient, and downgradient positioned approximately every 300 feet along the transects. Groundwater samples and field parameters have been collected quarterly since system startup. **Figures 3** through **6** show the 1,4-dioxane and dissolved oxygen concentrations for performance monitoring wells. 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, are provided in the 2019 Annual Groundwater Report (Arcadis 2020a), the 2020 Annual Groundwater Report (Arcadis 2021b), the 2021 Annual Groundwater Report (Arcadis 2022), and the upcoming 2022 Annual Groundwater Report.

3.1 Performance Evaluation

The biosparge system will be operated until the corrective action objectives in Section 1 of this report are met. The biosparge system has met the short-term objective of reducing 1,4-dioxane concentrations along the core of the weathered bedrock plume. 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.

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

- Upgradient wells: Upgradient weathered bedrock well, MW-13-22, had an overall downward trend in 2022. Results during the last 10 years, since the well's installation, suggest that natural flushing of groundwater entering the Plant 3 biosparge treatment transect has resulted in a decreasing trend of 1,4-dioxane (**Appendix B**). The upgradient deep overburden well, MW-12-21, also exhibits a decreasing concentration trend since its installation in 2012 (**Appendix B**), indicating that mass stored in the deep overburden continues to reduce its contribution to the weathered bedrock transport zone.
- Radius of influence wells: Results for well TW-14-06 demonstrate sustained treatment within the ROI of Transect A.
- Downgradient wells: Weathered bedrock monitoring wells 50 to 60 feet beyond Transect A are exhibiting results indicative of treatment. The next farthest downgradient weathered bedrock well, MW-13-34, approximately 460 feet from Transect A, has not yet exhibited a decreasing concentration trend. Of note, the two deep overburden wells, MW-13-29 and MW-13-48, located 140 and 350 feet downgradient of the treatment transect, have exhibited decreasing trends, indicating that mass flux in the deep overburden is decreasing and its contribution to the downgradient weathered bedrock transport zone continues to decrease. Based on performance monitoring results indicating effective treatment at wells TW-15-11, PW-14-03 and deep overburden wells MW-13-29 and MW-13-48, the estimated groundwater velocity range is 100 to 184 feet per year, compared to the basis of design range for groundwater velocity of 70 to 540 feet per year.

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

- Upgradient wells: Most concentrations are at or less than pre-startup levels.
- Radius of influence wells: Results continue to demonstrate treatment within the ROI of all transects.
- Downgradient wells: Downgradient wells are exhibiting signs of treatment or already exhibited non-detect/low concentrations when installed before the system was started and continue to exhibit non-detect/low concentrations. Weathered bedrock wells 50 to 120 feet downgradient of the Plant 2 treatment transects exhibit decreasing concentration trends, except for MW-20-127, located approximately 110 feet from Transect B. Based on downgradient performance, the estimated groundwater velocity is 41 to 216 feet per year at Transect B, 115 to 153 feet per year at Transect F, and 50 to 63 feet per year at Transect G/E. These velocities are generally consistent with the basis of design groundwater velocity range of 20 to 150 feet per year.

3.2 Point of Diminishing Return Evaluation

Assessment of the point of diminishing returns is an important aspect to evaluate the effectiveness of ongoing biosparge treatment. 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).
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 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. **Table 2a, 2b, and 3** presents the average 1,4-dioxane plume concentrations and 12-month reduction values for Plant 3 and the three groups for Plant 2. For the third line of evidence listed, the maximum 12-month reduction in 1,4-dioxane observed during the first three years of operation serves as the RRV.

In previous annual biosparge update reports, the Plant 3 diminishing returns evaluation included upgradient wells but excluded deep overburden wells. Re-examination of the site conceptual model with respect to biosparge performance data indicates that downgradient deep overburden wells should be included in the biosparge evaluation moving forward. Much of the remaining Plant 3 mass is tied up in the saturated deep overburden sands and silts present both upgradient and downgradient of the biosparge transect. Moving south, the bedrock surface rises and the 1,4-dioxane plume transitions entirely into the weathered bedrock in the northern part of Plant 2 (Arcadis, 2021a), approximately 500 feet north of biosparge transect B. Mass flux from the deep overburden at Plant 3 contributes to the weathered bedrock plume downgradient. Decreases in 1,4-dioxane concentrations since system start up in the deep overburden indicate the deep overburden is influenced by the biosparge system and that contribution to the weathered bedrock transport zone from the 1,4-dioxane mass stored in the deep overburden continues to decrease. Therefore, downgradient deep overburden wells MW-13-29

and MW-13-48 will be included in the Plant 3 diminishing returns evaluation to account for the important mass flux contribution from the deep overburden to this area of the plume.

While the Plant 3 upgradient wells MW-13-22 and MW-12-21 have shown a decreasing concentration trend over the last ten years, they do not appear to be under the direct influence of the biosparge system. Since the upgradient wells are considered in a separate portion of the diminishing returns evaluation (#1 in the list above), MW-13-22 will be removed from the treatment portion of the diminishing returns evaluation, to improve the accuracy of the reference reduction (#2 and #3 in the list above) and financial cost per unit treated (#4 in the list above) evaluations that is specifically evaluating the biosparge system performance. Concentration trends will still be used to assess the stability and magnitude of concentrations of 1,4-dioxane entering the biosparge system and requiring treatment. 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 downgradient flushing of treated water.

This report presents both versions of the evaluation for Plant 3 in 2022: Deep overburden wells included but upgradient wells excluded; and deep overburden wells excluded and upgradient wells included. The purpose of presenting both evaluations is for EGLE's ease of comparison of the evaluation provided in previous reports to the updated evaluation method. Future reports will include deep overburden wells but not upgradient wells in the Plant 3 diminishing returns evaluation. The sections below summarize the progress of each plant toward reaching the point of diminishing returns to date.

3.2.1 Plant 3

3.2.1.1 Upgradient Well Trends

Trends in wells upgradient of the Plant 3 treatment transect were a consideration for evaluating the point of diminishing returns. Upgradient weathered bedrock well, MW-13-22, had an overall downward trend in 2022. Results during the last 10 years, since the well's installation, suggest that natural flushing of groundwater entering the Plant 3 biosparge treatment transect has resulted in a decreasing trend of 1,4-dioxane (**Appendix B**). The upgradient deep overburden well, MW-12-21, also exhibits a decreasing concentration trend since its installation in 2012 (**Appendix B**), 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 average plume concentrations for Plant 3 have reduced over time. Including upgradient wells and no deep overburden wells in the evaluation, consistent with previous biosparge reports (**Table 2a**):

- Pre-startup baseline average plume concentrations (concentrations immediately prior to biosparge system startup) ("Baseline") was 280 µg/L.
- In 2022, the average plume concentrations ranged from 38 to 41 µg/L, an 85% to 87% reduction over baseline.
- In the fourth quarter of 2022, the average plume concentration was 24 µg/L lower than the average plume concentration in the fourth quarter of 2021.

Including deep overburden wells and excluding upgradient wells in the evaluation, consistent with the proposed evaluation methodology moving forward (**Table 2b**):

- Baseline average plume concentrations before start-up of the biosparge system was 232 µg/L.
- In 2022, the average plume concentration ranged from 23 to 26 µg/L, and 89% to 90% reduction over baseline.
- In the fourth quarter of 2022, the average plume concentration was 23 µg/L lower than the average plume concentration in the fourth quarter of 2021.

Although year-over-year reductions in average plume concentrations are still occurring at Plant 3, they are becoming less significant over time.

3.2.1.3 Reference Reduction Value Comparison

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. **Table 2a and 2b** presents the average 1,4-dioxane plume concentrations and 12-month reduction values for Plant 3. The maximum 12-month reduction in 1,4-dioxane observed during the first three years of operation serves as the RRV. For Plant 3, with upgradient well MW-13-22 included, the RRV is 173 µg/L. The point of diminishing returns has been defined as when the 12-month reduction is less than 20% of the RRV, or 34.6 µg/L. As shown in **Table 2a**, the 12-month reduction was less than 34.6 µg/L in the third and fourth quarters of 2021 and all of 2022. For Plant 3, excluding upgradient wells but including deep overburden wells, the RRV is 181 µg/L and the point of diminishing returns is 36.2 µg/L. As shown in **Table 2b**, the 12-month reduction was less than 36.2 µg/L in the fourth quarter of 2021 and for all of 2022.

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. **Exhibits 1 and 2** below summarizes the approximate cost per 1 µg/L of 1,4-dioxane treated. Backup calculation details are included in **Appendix C.**

Exhibit 1. Plant 3 Operations Cost per µg/L Treated (Includes Upgradient Wells and Not Deep Overburden Wells)

Year	Annual Reduction in Average Plume Concentration (µg/L)	Unit Treatment Cost ($ per µg/L)
2019*	157	$149
2020	46	$1,870
2021	13	$3,077
2022	25	$1,600

Exhibit 2. 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 ug/L)
2019*	108	$216
2020	51	$784
2021	29	$1,379
2022	19	$2,105

*The Plant 3 system began operation in June 2019 – concentrations and costs are based on seven months of operation (June to December 2019).

As of the end of 2022, the Plant 3 system has been operating for 3.5 years and, based on the upgradient well trends, the average plume concentration reductions, reference reduction value comparison, and the financial assessment, has reached the point of diminishing returns.

3.2.2 Plant 2

3.2.2.1 Upgradient Well Trends

The monitoring well upgradient of the northernmost Plant 2 transect (Transect B), MW-20-126, has experienced a decreasing trend since system startup. Dissolved oxygen concentrations measured in this well suggest that the well may be influenced by the biosparge system. The 2022 data from new upgradient well MW-21-142 indicates the beginning of a decreasing trend of 1,4-dioxane concentrations (**Figure 4**).

Monitoring wells upgradient of Transects E, F, and G have all experienced decreasing 1,4-dioxane trends since system startup. 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 above, or a combination of these. Two monitoring wells, MW-16-81 and MW-19-122, have also seen elevated DO concentrations approximately 1.5 years after startup of the biosparge system, which indicates direct influence from the treatment wells and likely a larger ROI than expected.

3.2.2.2 Average Plume Concentrations

The average plume concentration in northern Plant 2 (Transect B) prior to startup of the biosparge system in August 2020 was 220 µg/L. In 2022, the average plume concentration ranged from 56 to 74 µg/L, a 66% to 75% reduction over baseline. In the fourth quarter of 2022, the average plume concentration was 59 µg/L lower than the average plume concentration in the fourth quarter of 2021.

The average plume concentration in southern Plant 2 (Transects G and E) prior to startup of the biosparge system was 551 µg/L. In 2022, the average plume concentration ranged from 20 to 32 µg/L, a 94% to 96% reduction over baseline. In the fourth quarter of 2022, the average plume concentration was 34 µg/L lower than the average plume concentration in the fourth quarter of 2021.

In eastern Plant 2 (Transects E and F), the average plume concentration before startup of the biosparge system was 128 µg/L. The average plume concentration ranged from 28 to 32 µg/L in 2022, a 75% to 78% reduction over baseline. The average plume concentration was 27 µg/L lower in the fourth quarter of 2022 than the average plume concentration in the fourth quarter of 2021.

3.2.2.3 Reference Reduction Value Comparison

The current RRV for the Plant 2 northern transect is 125 µg/L. The point of diminishing returns has been defined as when the 12-month reduction is less than 20% of the RRV, or 25 µg/L. This target was achieved in the second quarter of 2022 but was not achieved in fourth quarter 2022, the latest quarter with available performance results.

The current RRV for the Plant 2 southern transect is 457 µg/L. The point of diminishing returns at 20% of the RRV for southern Plant 2 (Transects G and E) is 91.4 µg/L. As shown in **Table 3**, the 12-month reduction was less than 91.4 µg/L as of the second quarter of 2022 and this continued through the fourth quarter of 2022.

The current RRV for the Plant 2 eastern / central transect is 91 µg/L. The point of diminishing returns at 20% of the RRV for eastern / central Plant 2 (Transects E and F) is 18.2 µg/L. As shown in **Table 3**, this target was achieved at the Plant 2 eastern / central transects in second quarter of 2022 the 12-month reduction was 18 µg/L but not in fourth quarter 2022 when the 12-month reduction was 27 µg/L.

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 3** below summarizes the approximate cost per 1 µg/L of 1,4-dioxane treated.

Exhibit 3. Plant 2 Operations Cost per µg/L Treated

Year	P2 North – B		P2 South – G&E		P2 East – E&F	
	Annual Reduction in Average Plume Concentration (µg/L)	**Unit Treatment Cost ($ per µg/L)**	**Annual Average Reduction in Plume Concentration (µg/L)**	**Unit Treatment Cost ($ per µg/L)**	**Annual Average Reduction in Plume Concentration (µg/L)**	**Unit Treatment Cost ($ per µg/L)**
2020*	54*	$211	215*	$121	40*	$732
2021	38	$719	215	$290	38	$1,849
2022	59	$463	34	$1,834	27	$2,602

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

4 Recommendations

Evaluation of biosparge performance monitoring, operations, and treatment cost data presented in Sections 3.2.1.4 and 3.2.2.4 leads to the following recommendations for optimization of the biosparge system.

4.1 Shutdown 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. In addition, the site conceptual model was reviewed to establish whether current trends in groundwater flow and plume stability support shut down testing. Based on this evaluation, presented in Section 5, it is proposed that Transects A and G be shut down to evaluate potential rebound of 1,4-dioxane concentrations. It is recommended that Transect A wells AS-19-01 through AS-19-05 be idled by shutting down the Plant 3 biosparge system (AS-19-06 and AS-19-07 are currently idle). Transect G biosparge wells AS-17-G01 through AS-19-G10 will also be idled. Proposed shut down of Transect G comprises only part of the Plant 2 system; this transect will be isolated from the compressor and some adjustments will be made to the programming. The details of the shutdown evaluation, monitoring plan, and restart thresholds are provided in Section 5.

O&M of all other system components will continue to be conducted on a regular basis. Transects A and G will remain in place and maintained beyond this shutdown evaluation to protect the capital investment of the system and to retain the flexibility to restart it on short notice. During the temporary shutdown evaluation, the idled transects will incur less wear and tear, and the cost to restart the system, if necessary, should be small.

Information gathered during rebound testing will be used to optimize the runtime of the system to lower the unit cost per treatment while still maintaining the short- and long-term objectives of the biosparge treatment system. At the end of the shutdown testing, recommendations will be made and discussed with EGLE based on the data collected during the test that may include restarting portions of the system, continued shut down of portions of the system, shut down testing for other portions of the system, and/or additional monitoring.

4.2 Transect C

Monitoring 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, suggests that installation of this transect is not needed at this time. 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.

4.3 Ongoing Evaluation

As performance monitoring data are collected and evaluated, additional actions will be recommended to EGLE as appropriate. Operational adjustments will be proposed in annual progress reports if future performance monitoring results justify such adjustments. A five-year review will be completed for the biosparge system to document recommendations, proposals, and concurrences with EGLE over the previous five years of operation. The first five-year review is planned for first quarter 2026.

5 Shutdown Evaluation

The objectives of this evaluation are to document which portions of the system have met criteria for a temporary shutdown, and to establish a plan for shutdown testing and rebound sampling. The shutdown evaluation will determine if portions of the system can be idled while still maintaining short- and long-term treatment objectives. Results of the shutdown evaluation will provide valuable information needed to evaluate potential rebound of 1,4-dioxane concentrations and optimize the operation and cost-effectiveness of the remedy, while maintaining the short- and long-term objectives at the Site, specifically:

- Evaluate whether portions of the system can be idled to decrease cost per unit treated.
- Evaluate whether concentration decreases observed in upgradient wells at southern Plant 2 are the direct influence of sparge operation, flushing of treated/lower concentrations groundwater, or reduced mass flux from the above vadose zone.
- Evaluate whether source masses remaining in the Plant 3 deep overburden and Plant 2 perched zone are sufficiently depleted to continue to meet short- and long-term objectives and assess the approximate time to depletion.
- Assess how long equipment and infrastructure may need to be left in place during the monitored natural attenuation period at the end of the treatment lifecycle.

The biosparge system was designed and is monitored to be able to operate adaptively in real time to meet performance objectives most effectively and efficiently. The adaptive design of the system allows sparge points to be turned on and off as necessary to optimize performance and as areas of the Site reach the point of diminishing returns.

5.1 Readiness for Shutdown Evaluation

The biosparge transect performance metrics described in Section 3 were evaluated relative to the diminishing returns criteria and the remedy's short- and long-term objectives to determine whether selected transects are appropriate for a shutdown evaluation. In addition, the updated site conceptual model was reviewed to establish whether current trends in groundwater flow and plume stability support the proposed shut down testing. The focus of this evaluation will be on the Plant 3 system and Plant 2 Transect G.

5.1.1 Plant 3

The Plant 3 system was started up in July 2019 and has been operating for more than 3.5 years. Upgradient deep overburden (MW-12-21) and weathered bedrock (MW-13-22) monitoring wells exhibit decreasing trends in 1,4-dioxane (**Figure 3 and Appendix B**). Results suggest that natural attenuation and flushing of groundwater are occurring and that contribution to the weathered bedrock transport zone from mass stored and moving through the deep overburden continues to decrease. The average plume concentration has decreased by an order of magnitude compared to baseline, from 232 µg/L at baseline to 26 µg/L in the fourth quarter of 2022 (**Table 2b** and **Figure 7**). The average plume concentration remained consistent throughout 2022 at 23 to 26 µg/L. The average 12-month reduction through the second half of 2021 and all of 2022 was less than 20% of the RRV (less than 36.2 µg/L).

The current cost per unit treated is an order of magnitude higher than the first year of operation (**Exhibit 2**). It is expected that the per unit treatment cost will significantly increase moving forward considering the average plume concentration is low and has remained stable for the past year. The Plant 3 biosparge system is the former pilot

test building and equipment that was repurposed. The capital investment for the biosparge system has achieved most of its treatment benefits, as the likelihood of requiring partial or full equipment replacement increases with every year of active operation. Note, the air compressor already needed replacement in 2020 and two wells were shut down in 2022 due to reduced capacity for gas flow.

The conceptual site model supports a temporary shutdown evaluation. Decreasing 1,4-dioxane concentrations in deep overburden wells indicate that contribution to the weathered bedrock transport zone from mass stored in the deep overburden continues to decrease. These results, as well as the findings from the 2014 source investigation indicating that the source mass is tied up in dense till and concentrations are generally limited in the deep overburden (Arcadis, 2014), suggest a depleted source mass with most of the mobile mass released and currently located downgradient (Arcadis 2021a). Shutdown testing can be used to evaluate whether the mass flux from the source area has sufficiently depleted to continue to meet short- and long-term objectives.

IGMP and biosparge performance monitoring indicates that the extent of 1,4-dioxane exceedances has decreased since system startup in 2019. **Figure 8** is a comparison of 1,4-dioxane plume extent between prior to system start-up in 2019 and the end of 2022 after three years of operation. 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 3 biosparge system (Arcadis, 2021b; Arcadis, 2022).

Groundwater velocity assumptions presented in the original Basis of Design (Arcadis 2020b) have been refined based on recent performance monitoring data. At Plant 3, the estimated groundwater velocity range is 100 to 184 feet per year when the weathered bedrock wells and deep overburden wells are included. This is within the range of groundwater velocities of 70 to 540 feet per year presented in the Basis of Design. This corroboration of flow velocity provides additional certainty that groundwater will travel only a short distance during the shutdown evaluation.

The Plant 3 system is recommended for a shutdown evaluation based on the following criteria:

- The diminishing returns criteria outlined in Section 3.2 have been met for the Plant 3 system.
- The short- and long-term objectives outlined in Section 1.1 have been met for the Plant 3 system.
- The site conceptual model indicates a depleted source mass, stable plume, and groundwater velocities within the expected range.

5.1.2 Plant 2 (Transect G)

The Plant 2 system has been operating for approximately 2.5 years (startup in August 2020). Plant 2 has been separated into three areas: northern Plant 2 (Transect B), southern Plant 2 (Transect G/E), and eastern / central Plant 2 (Transect E/F). While other locations at Plant 2 may also be meeting the criteria for shutdown, the focus of the shutdown evaluation will be on Transect G, based on the following:

- Multiple pilot tests have been completed in this area (2016–2017 and 2018–2019), resulting in longer treatment at this location than any other location in Plant 2.
- One objective of shutdown testing is to evaluate whether upgradient wells are experiencing decreasing concentrations from treated water flushing downgradient and/or depleted perched 1,4-dioxane leakage or direct treatment from a larger than expected ROI; to evaluate this, an upgradient transect (B) must be kept operating.
- Limited lateral and vertical migration of the plume historically due to hydrogeologic features present low risk for groundwater migration.

At Transect G, upgradient weathered bedrock monitoring wells (e.g., MW-20-129, MW-19-122, MW-16-81) exhibit decreasing trends in 1,4-dioxane concentrations (**Figure 5**). The average plume concentration has decreased by more than an order of magnitude compared to baseline, from 551 µg/L at baseline to 20 µg/L in the fourth quarter of 2022 (**Table 3** and **Figure 9**). The average plume concentration remained consistent throughout 2022 at approximately 20 to 32 µg/L. The average 12-month reduction through all of 2022 has been less than 20% of the RRV: less than 91.2 µg/L with Transect E included, and less than 21.8 µg/L if only Transect G wells are considered. The current cost per unit treated is an order of magnitude higher than the first year of operation (**Exhibit 2**). It is expected that the per unit treatment cost will significantly increase moving forward considering the average plume concentration is low and has remained stable for the past year. Transect G has achieved most of its treatment benefits, and the likelihood of significant equipment repair and/or replacement increases with every year of active operation.

Evolution of the conceptual site model since system startup in 2020 supports a temporary shutdown evaluation. Decreasing 1,4-dioxane trends observed in Plant 2 perched zone monitoring wells (Arcadis, 2022) suggest less mass with the potential to leach to weathered bedrock. Additional changes to the lower 1,4-dioxane plume morphology were identified during the additional work completed for installation of the biosparge system, including identification of a bedrock high present in the Plant 2 light non-aqueous phase liquid (LNAPL) area (Arcadis, 2021a). This bedrock ridge or dome located just north of the Plant 2 LNAPL area may partially deflect 1,4-dioxane mass migrating south from Plant 3 and serve to separate 1,4-dioxane leaking from the Plant 2 perched zone from the mass migrating south from Plant 3. Although co-mingling most likely occurs, the mass leaking from the Plant 2 perched zone appears to primarily spread northeast and east of the Plant 2 LNAPL area which continues to be treated with Plant 2 biosparge Transects E and F. The Plant 3 plume continues to migrate to the west of the LNAPL area and bedrock ridge, continuing south where it encounters a bedrock high just south of Transect G that inhibits furtherly southern plume migration (Arcadis 2021a).

The extent of the deep 1,4-dioxane plume has shrunk since 2019 (**Figure 8**). The extent of the 72 µg/L contour has decreased to a fraction of its previous size. Annual Mann-Kendall analysis of plume stability demonstrates stable to decreasing concentrations in all key deep overburden and weathered bedrock well wells in the vicinity of Transect G (Arcadis, 2021b; Arcadis, 2022). The decreasing perched zone 1,4-dioxane trends, the apparent deflection of the LNAPL area source to the north/northeast, the bedrock high at the toe of the plume, and a shrinking plume indicate a low potential for plume migration or expansion at this location.

Groundwater velocity assumptions presented in the original Basis of Design (Arcadis 2020b) have been refined based on recent performance monitoring data, which provide additional assurance that flow velocities are within the expected ranges and the plume is stable. Groundwater is expected to travel a minimal distance during the shutdown evaluation. At Transect G, the estimated groundwater velocity range is 50 to 63 feet per year, similar to the Basis of Design rate of 16 to 51 feet per year. While the conceptual Site model does not support further southerly migration beyond the Transect G area, if southerly flow was hypothesized at the estimated rate of 50 to 63 feet per year, it would take 14.5 years for impacts at MW-19-23 to reach the property boundary (920 feet away), or 9 to 10 years for any detection at the Plant 2 southern sentinel wells to reach the southern property boundary (590 feet away).

Plant 2 Transect G is recommended for a shutdown evaluation based on the following criteria:

- The diminishing returns criteria negotiated with EGLE and outlined in Section 3.2 have been met for Plant 2 Transect G.
- The short- and long-term objectives outlined in Section 1.1 have been met for Plant 2 Transect G.
- The site conceptual model indicates decreasing trends in the perched zone, a stable plume, and groundwater velocities within the expected range.

5.2 Shutdown Evaluation and Monitoring Program

A shutdown evaluation is proposed for Transects A and G to evaluate short-term plume concentration trends following idling of select transects. The shutdown evaluation is proposed to last 12 to 18 months, with ongoing data evaluation, but potentially less time depending on the results of the monitoring. At the end of the shutdown testing, recommendations will be made based on the data collected during the test that may include restarting portions of the system, continued shut down of portions of the system, shut down testing for other portions of the system, and/or additional monitoring.

An initial pre-shutdown sampling event will be conducted upon EGLE approval of this plan and prior to the shutdown evaluation. The shutdown evaluation would begin upon receipt of the initial sampling results. Key monitoring wells, ROI and near-up/downgradient wells, will be sampled on a quarterly basis for one year or until the rebound threshold is reached.

Transects A and G were selected for rebound testing in part because they have robust monitoring well networks within the ROI and near-downgradient area to alert of rebound early. The following well networks are proposed for rebound monitoring:

Plant 3

The frequency of monitoring will be increased to quarterly for the following key rebound monitoring wells: MW-13-22 (upgradient), MW-12-21 (deep overburden upgradient), TW-14-06 (ROI), TW-15-11 (downgradient), and PW-14-03 (downgradient) (**Figure 2**). Historical data and the conceptual site model indicate that any potential fluctuations in 1,4-dioxane concentrations would be detected in these wells much earlier than other wells in the network.

Routine Interim Groundwater Monitoring Plan (IGMP) sampling will continue for MW-13-28 (upgradient bedrock sentinel – annual sampling), MW-13-23 (upgradient deep overburden sentinel – biennial), MW-13-29 (downgradient deep overburden – annual), MW-91-6 (far-downgradient bedrock sentinel – biennial), MW-13-47 (far-downgradient bedrock sentinel – biennial), MW-13-34 (far-downgradient weathered bedrock – semi-annual), MW-13-46 (far-downgradient weathered bedrock – annual), and MW-13-48 (far-downgradient deep overburden – semi-annual). These wells and frequencies are based on the 2023 IGMP currently in review and will be updated if any changes are made during the finalization of the 2023 IGMP.

Plant 2 – Transect G

The frequency of monitoring will be increased to quarterly for the following key rebound monitoring wells: MW-20-129 (upgradient), TW-14-02 (ROI), and MW-19-122 and MW-19-123 (downgradient) (**Figure 1**).

Southern Plant 2 has multiple lines of monitoring wells downgradient of Transect G (**Figure 10**). Routine IGMP sampling will continue for MW-12-01 (side-gradient bedrock sentinel – biennial sampling), MW-16-76 (side-gradient weathered bedrock sentinel – annual), MW-16-77 (downgradient weathered bedrock – annual), MW-16-75 (downgradient weathered bedrock – annual), and MW-13-50 (far-downgradient bedrock sentinel – biennial). These wells and frequencies are based on the 2023 IGMP currently in review and will be updated if any changes are made during the finalization of the 2023 IGMP.

5.3 Restart Thresholds

The shutdown evaluation will be conducted in a manner that protects the short- and long-term objectives of the biosparge remedy, including preventing lateral migration of 1,4-dioxane offsite and preventing vertical migration to the underlying bedrock aquifer. The associated transect would be restarted upon confirmation sampling that any of the following thresholds were exceeded:

- Concentrations of 1,4-dioxane exceed 7.2 µg/L in any of the bedrock sentinel wells (MW-13-28, MW-91-6, and MW-13-47 at Plant 3 (**Figure 3**); or MW-12-01 and MW-13-50 at Plant 2 **Figure 10**), or an increasing trend is observed.
- Concentrations of 1,4-dioxane exceed 7.2 µg/L in southern Plant 2 downgradient weathered bedrock sentinel wells MW-16-75 or MW-13-50 (**Figure 10**) or an increasing trend is observed. These wells have historically been non-detect for 1,4-dioxane.
- Concentrations of 1,4-dioxane in upgradient wells at Plant 3 (MW-13-22 and MW-12-21) or at Plant 2 Transect G (MW-19-129 and MW-19-122) exceed their historical maximum concentrations since monitoring began, indicating 1,4-dioxane mobilization requiring active treatment.

The upgradient wells that will be evaluated against the rebound threshold are presented in **Exhibit 3**.

Exhibit 4. Rebound Thresholds for Upgradient Wells

Transect	Wells	Maximum Historical Concentration (µg/L)	Fourth Quarter 2022 Results (µg/L) (for reference)
A	MW-13-22	270	84
	MW-12-21	510	150
G	MW-20-129	140	60
	MW-19-122	43	6

- Concentrations of 1,4-dioxane in selected ROI or near-downgradient wells rebound to greater than 25% of the pre-startup baseline concentrations (the concentration immediately prior to startup of the biosparge systems). This threshold was chosen to allow sufficient rebound for trend analysis without sacrificing long-term progress. The 25% threshold was selected because Transect G monitoring well TW-14-02 concentrations rebounded approximately 25% within six months after the pilot tests with no unacceptable vertical or lateral migration of the plume. The ROI and near-downgradient wells that will be evaluated against the rebound threshold are presented in **Exhibit 5** below.

Exhibit 5. Rebound Thresholds for ROI and Near-Downgradient Wells

Transect	Wells	Pre-Startup Baseline (µg/L)	25% Threshold (µg/L)	Fourth Quarter 2022 Results (µg/L) (for reference)
A	TW-14-06	700	175	10
	TW-15-11	246	61.5	22
	PW-14-03	223	55.8	8

Transect	Wells	Pre-Startup Baseline (µg/L)	25% Threshold (µg/L)	Fourth Quarter 2022 Results (µg/L) (for reference)
G	TW-14-02	470	117.5	<1
	MW-19-123	76	32.8*	21

*The MW-19-123 threshold is set at 32.8 µg/L (25% of difference between baseline and current concentration added to 25% of the baseline concentration) because current concentration of 21 µg/L exceeds the 25% of baseline metric used for other wells.

Based on performance monitoring data from the 2016–2019 pilot tests and full-scale operation, the rebound trigger most likely to occur is a return of 1,4-dioxane concentrations in biosparge ROI monitoring and near-downgradient wells to 25% of the baseline concentration. As noted, even though wells rebounded to 25% of the baseline concentrations after the pilot tests, no unacceptable vertical or lateral migration was observed associated with the rebound.

5.4 Summary

Upon EGLE approval of the shutdown evaluation plan, an initial sampling event of the ROI and near-downgradient wells listed in Section 5.2 will be conducted. Transects A and G will then be shut down, while the rest of the biosparge system will remain operational. Biosparge system infrastructure will be maintained so that transects can be restarted as soon as practical upon confirmation of exceedance of any restart threshold. Transect A represents the entire Plant 3 system; therefore, all equipment in the Plant 3 system will need to be maintained and checked to verify that it is ready for restart, if needed.

Sampling results from the biosparge and IGMP monitoring wells will be reviewed according to the rebound thresholds outlined in Section 5.3, with actions being taken upon confirmation sampling that any exceedance of the restart thresholds are exceeded. Data collected during the shutdown evaluation when a threshold exceedance is observed will be communicated to EGLE during routine quarterly meetings and will be documented in the Annual Biosparge System Progress Reports. At the end of the shutdown testing, recommendations will be made and discussed with EGLE based on the data collected during the test that may include restarting all or portions of the system, continued shut down of all or portions of the system, shut down testing for other portions of the system, and/or additional monitoring.

6 References

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Arcadis. 2021a. Lower 1,4-Dioxane Conceptual Site Model – Draft. Lansing Industrial Land, Lansing, Michigan. January 6.

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Tables

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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	6/6/2019	0.23	NA	NA	NA	266
		12/4/2019	0.36	NA	NA	NA	320
		6/9/2020	0.28	NA	NA	NA	230
		12/4/2020	4.26	NA	NA	NA	15
		6/3/2021	7.36	NA	NA	NA	1
		12/6/2021	9.20	NA	NA	NA	31
		6/7/2022	14.84	NA	NA	NA	3
		11/1/2022	10.24	NA	NA	NA	2
MW-13-45	2	6/5/2019	0.14	NA	NA	NA	40
		12/3/2019	-	NA	NA	NA	41
		6/9/2020	0.18	NA	NA	NA	38
		12/4/2020	0.09	NA	NA	NA	58
		6/3/2021	0.32	NA	NA	NA	42
		12/6/2021	0.29	NA	NA	NA	37
		6/7/2022	0.39	NA	NA	NA	32
		11/1/2022	0.85	NA	NA	NA	26
MW-14-61	2	6/13/2019	0.75	NA	NA	NA	151
		12/6/2019	0.25	NA	NA	NA	140
		3/3/2020	1.6	<0.5	0.6	0.07	148
		6/2/2020	0.36	<0.5	0.8	0.05	152
		8/31/2020	2.55	<0.5	0.5	0.03	98
		12/2/2020	1.27	<0.5	0.3	0.15	18
		3/2/2021	1.85	<0.5	1	0.76	21
		6/2/2021	1.4	<0.5	0.2	0.23	9
		9/2/2021	1.31	<0.5	0.1	0.09	9
DUP-01		9/2/2021	1.31	<0.5	0.1	0.08	8
		11/30/2021	1.1	NA	0.2	0.14	5
DUP-01		11/30/2021	1.1	NA	0.2	0.12	7
		6/1/2022	2.1	<0.5	0.3	0.11	16
		11/2/2022	0.48	<0.5	0.3	0.13	21
MW-15-72	2	5/16/2016	0.11	NA	NA	NA	190 Y a
		9/9/2016	NA	NA	NA	NA	NA
		11/11/2016	4.31	NA	NA	NA	NA
		12/7/2016	3.3	NA	NA	NA	NA
		12/29/2016	4.85	NA	NA	NA	NA
		1/31/2017	1.95	NA	NA	NA	NA
		4/26/2017	0.23	NA	NA	NA	240 Y [320 Y]
		12/7/2017	1.67	NA	NA	NA	290a
		1/10/2018	0.27	NA	NA	NA	NA
		2/14/2018	0.21	NA	NA	NA	230a
		3/8/2018	0.4	NA	NA	NA	324a
		4/9/2018	0.19	NA	NA	NA	220a
		5/8/2018	0.25	NA	NA	NA	260a
		9/5/2018	0.06	NA	NA	NA	240a
		12/5/2018	0.3	NA	NA	NA	290a
		2/27/2019	0.68	NA	NA	NA	28a
		6/13/2019	0.54	NA	NA	NA	128
		9/26/2019	NA	NA	NA	NA	17
		10/4/2019	NA	NA	NA	NA	16
		12/5/2019	0.24	NA	NA	NA	310
		3/2/2020	0.63	NA	NA	NA	150
		6/2/2020	0.18	NA	NA	NA	270

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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	9/1/2020	0.29	NA	NA	NA	90
		12/3/2020	0.09	NA	NA	NA	270
		3/2/2021	0.19	NA	NA	NA	240
		6/2/2021	4.94	NA	NA	NA	15
		8/31/2021	0.12	NA	NA	NA	112
		12/1/2021	0.34	NA	NA	NA	133
		6/1/2022	0.11	NA	NA	NA	144
		11/3/2022	0.46	NA	NA	NA	11
MW-16-74	2	3/2/2020	0.44	NA	NA	NA	2
		6/5/2020	0.49	NA	NA	NA	2
		9/1/2020	0.15	NA	NA	NA	3
		12/1/2020	0.62	NA	NA	NA	1
		3/3/2021	0.43	NA	NA	NA	1
		6/2/2021	0.37	NA	NA	NA	1
		8/31/2021	0.12	NA	NA	NA	2
		12/2/2021	0.26	NA	NA	NA	3
		6/1/2022	0.17	NA	NA	NA	2
		11/1/2022	0.71	NA	NA	NA	2
MW-16-75	2	6/5/2019	0.11	NA	NA	NA	1
		12/5/2019	0.57	NA	NA	NA	2
		6/8/2020	0.32	NA	NA	NA	2
		12/4/2020	0.06	NA	NA	NA	1
		6/3/2021	0.34	NA	NA	NA	1
		12/6/2021	0.7	NA	NA	NA	3
		6/8/2022	0.11	NA	NA	NA	2
		11/1/2022	0.47	NA	NA	NA	2
MW-16-77	2	6/6/2019	0.33	NA	NA	NA	1
		12/5/2019	6.54	NA	NA	NA	1
		6/8/2020	0.74	NA	NA	NA	1
		12/4/2020	0.26	NA	NA	NA	1
		6/4/2021	0.46	NA	NA	NA	1
		12/6/2021	0.78	NA	NA	NA	1
		6/8/2022	0.61	NA	NA	NA	1
		11/2/2022	0.5	NA	NA	NA	1
MW-16-78	2	6/5/2019	0.16	NA	NA	NA	1
		12/4/2019	0.2	NA	NA	NA	1
		6/9/2020	0.26	NA	NA	NA	1
		12/7/2020	0.14	NA	NA	NA	1
DUP-05		12/7/2020	0.14	NA	NA	NA	1
		3/3/2021	0.23	NA	NA	NA	1
		6/2/2021	0.67	NA	NA	NA	1
		8/31/2021	0.36	NA	NA	NA	1
		12/2/2021	0.3	NA	NA	NA	1
		6/2/2022	0.12	NA	NA	NA	1
		11/2/2022	0.51	NA	NA	NA	1
MW-16-79	2	6/4/2019	0.86	NA	NA	NA	1
		12/4/2019	1.1	NA	NA	NA	2
		6/9/2020	0.79	NA	NA	NA	1
		12/7/2020	0.34	NA	NA	NA	1
		3/3/2021	0.2	NA	NA	NA	1
		6/3/2021	0.75	NA	NA	NA	1
		8/31/2021	0.64	NA	NA	NA	1

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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-16-79 (Cont.)	2	12/2/2021	0.42	NA	NA	NA	1
		6/2/2022	0.71	NA	NA	NA	1
		11/2/2022	NA	NA	NA	NA	1
MW-16-81	2	6/13/2019	0.27	NA	NA	NA	3200
		12/6/2019	0.16	NA	NA	NA	2500
		3/2/2020	0.4	NA	NA	NA	2600
DUP-01		3/2/2020	0.4	NA	NA	NA	2700
		6/5/2020	0.26	NA	NA	NA	3100
DUP-02		6/5/2020	0.26	NA	NA	NA	2700
		9/2/2020	0.16	NA	NA	NA	500
DUP-02		9/2/2020	0.16	NA	NA	NA	590
		12/3/2020	0.23	NA	NA	NA	1930
DUP-02		12/3/2020	0.23	NA	NA	NA	1070
		3/3/2021	0.20	NA	NA	NA	560
DUP-02		3/3/2021	0.20	NA	NA	NA	570
		6/3/2021	0.52	NA	NA	NA	490
DUP-02		6/3/2021	0.52	NA	NA	NA	500
		8/31/2021	0.29	NA	NA	NA	230
		12/1/2021	0.8	NA	NA	NA	310
		6/2/2022	6.55	NA	NA	NA	143
		11/3/2022	1	NA	NA	NA	70
MW-16-82	2	6/7/2019	0.27	NA	NA	NA	1
		12/4/2019	0.32	NA	NA	NA	1
		6/10/2020	0.36	NA	NA	NA	1
		12/4/2020	0.27	NA	NA	NA	1
		3/3/2021	0.29	NA	NA	NA	1
		6/4/2021	0.34	NA	NA	NA	1
		9/1/2021	0.3	NA	NA	NA	2
		12/2/2021	0.31	NA	NA	NA	1
		6/2/2022	0.09	NA	NA	NA	1
		11/3/2022	0.3	NA	NA	NA	1
MW-16-84	2	6/4/2019	7.89	NA	NA	NA	47
		12/3/2019	NA	NA	NA	NA	67
		3/4/2020	0.21	NA	NA	NA	66
		6/4/2020	0.63	NA	NA	NA	58
DUP-03		6/4/2020	0.63	NA	NA	NA	58
		9/1/2020	0.39	NA	NA	NA	57
		12/1/2020	0.1	NA	NA	NA	81
		3/2/2021	1.69	<0.5	0.5	0.06	66
		6/3/2021	0.51	<0.5	0.4	0.09	15
		9/1/2021	0.21	NA	NA	NA	43
		12/2/2021	0.27	NA	NA	NA	60
		6/2/2022	0.14	NA	NA	NA	44
DUP-04		6/2/2022	0.14	NA	NA	NA	44
		11/3/2022	0.59	NA	NA	NA	29
DUP-04		11/3/2022	0.59	NA	NA	NA	30
MW-16-85	2	6/4/2019	4.49	NA	NA	NA	16
		12/3/2019	NA	NA	NA	NA	17
		6/8/2020	0.48	NA	NA	NA	8
		12/4/2020	0.4	NA	NA	NA	8
		6/4/2021	0.27	NA	NA	NA	4
		12/3/2021	1.99	NA	NA	NA	10

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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-16-85 (Cont.)	2	6/6/2022	0.03	NA	NA	NA	8
		11/4/2022	1.47	NA	NA	NA	6
MW-17-86	2	6/4/2019	0.23	NA	NA	NA	75
		12/3/2019	0.18	NA	NA	NA	90
		3/4/2020	0.15	NA	NA	NA	99
		6/3/2020	2.12	NA	NA	NA	94
		9/1/2020	0.53	NA	NA	NA	88
	2	12/1/2020	0.11	NA	NA	NA	106
		3/3/2021	0.2	NA	NA	NA	79
		6/3/2021	0.28	NA	NA	NA	69
DUP-01		6/3/2021	0.28	NA	NA	NA	70
		9/1/2021	0.28	NA	NA	NA	48
		12/3/2021	0.32	NA	NA	NA	43
		6/2/2022	0.42	NA	NA	NA	27
		11/3/2022	0.34	NA	NA	NA	19
MW-19-115	2	12/20/2019	0.68	NA	NA	NA	11
		3/4/2020	0.22	NA	NA	NA	9
		6/3/2020	0.24	NA	NA	NA	13
		9/1/2020	1.99	NA	NA	NA	8
		12/1/2020	0.17	NA	NA	NA	12
		3/3/2021	0.6	NA	NA	NA	2
		6/4/2021	1.08	NA	NA	NA	2
		9/1/2021	0.23	NA	NA	NA	7
		12/3/2021	0.24	NA	NA	NA	8
		6/3/2022	1.63	NA	NA	NA	7
		11/2/2022	0.39	NA	NA	NA	7
MW-19-116	2	12/20/2019	0.19	NA	NA	NA	51
		3/4/2020	0.17	NA	NA	NA	60
		6/3/2020	0.18	NA	NA	NA	61
		9/2/2020	0.24	NA	NA	NA	54
DUP-01		9/2/2020	0.24	NA	NA	NA	55
		12/2/2020	0.3	NA	NA	NA	82
DUP-01		12/2/2020	0.3	NA	NA	NA	83
		3/3/2021	0.22	NA	NA	NA	72
DUP-01		3/3/2021	0.22	NA	NA	NA	71
		6/4/2021	0.3	NA	NA	NA	69
		9/1/2021	0.2	NA	NA	NA	54
DUP-02		9/1/2021	0.2	NA	NA	NA	58
		12/3/2021	0.34	NA	NA	NA	68
DUP-02		12/3/2021	0.34	NA	NA	NA	73
		6/3/2022	7.01	NA	NA	NA	69
		11/2/2022	0.2	NA	NA	NA	65
MW-19-117	2	6/3/2020	0.3	NA	NA	NA	2
		9/2/2020	0.23	NA	NA	NA	2
		12/2/2020	0.23	NA	NA	NA	1
		3/3/2021	1.22	NA	NA	NA	1
		6/4/2021	0.16	NA	NA	NA	1
		9/2/2021	0.13	NA	NA	NA	2
		12/3/2021	0.29	NA	NA	NA	1
		6/2/2022	0.48	NA	NA	NA	1
		11/3/2022	0.16	NA	NA	NA	1

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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-19-120	2	12/4/2019	0.63	NA	NA	NA	165
		3/4/2020	0.23	NA	NA	NA	198
		6/4/2020	0.35	NA	NA	NA	184
		9/2/2020	0.11	NA	NA	NA	137
		12/2/2020	2.68	NA	NA	NA	28
		3/2/2021	0.16	<0.5	0.5	0.02	73
		6/4/2021	0.29	<0.5	0.4	0.02	49
		9/2/2021	4.14	NA	NA	NA	7
		12/3/2021	2.75	NA	NA	NA	15
		6/2/2022	1.08	NA	NA	NA	12
		11/3/2022	1.14	NA	NA	NA	13
MW-19-121	2	12/4/2019	0.75	NA	NA	NA	99
		3/3/2020	0.14	<0.5	0.7	0.1	119
		6/4/2020	1.16	<0.5	0.8	0.14	115
		8/31/2020	6.06	<0.5	0.9	0.06	17
		12/2/2020	2.53	8.2	0.5	1.74	4
		3/2/2021	2.13	2.2	0.4	0.87	1
		6/4/2021	4.36	8.8	0.3	1.66	1
		9/2/2021	1.2	7.6	0.2	0.89	2
		11/30/2021	0.33	NA	0.1	11.3	1
		3/1/2022	1.89	NA	NA	NA	1
		6/1/2022	5.79	18.6	0.4	4.1	1
		11/2/2022	4.55	15	0.8	15.3	1
MW-19-122	2	12/3/2019	0.97	NA	NA	NA	43
		3/4/2020	0.31	NA	NA	NA	41
DUP-02		3/4/2020	0.31	NA	NA	NA	41
		6/5/2020	0.21	NA	NA	NA	42
		9/2/2020	1.87	NA	NA	NA	33
		12/3/2020	0.11	NA	NA	NA	34
		3/2/2021	0.38	NA	NA	NA	25
		6/3/2021	1.2	NA	NA	NA	37
		9/3/2021	1.63	NA	NA	NA	9
		12/3/2021	6.25	NA	NA	NA	4
		6/2/2022	6.05	NA	NA	NA	3
		11/1/2022	5.12	NA	NA	NA	6
MW-19-123	2	12/3/2019	3.14	NA	NA	NA	52
		3/4/2020	0.21	NA	NA	NA	76
		6/4/2020	0.22	NA	NA	NA	75
		9/1/2020	1.46	NA	NA	NA	51
		12/3/2020	5.35	NA	NA	NA	39
		3/2/2021	5.49	<0.5	0.3	0.03	58
		6/7/2021	6.03	<0.5	0.3	0.03	50
		9/2/2021	5.35	<0.5	0.2	0.01	43
		11/30/2021	6.43	NA	0.1	0.02	20
		6/1/2022	4.25	<0.5	0.3	0.01	25
		11/2/2022	5.1	<0.5	0.3	0.01	21
MW-19-124	2	12/4/2019	0.67	NA	NA	NA	220
		6/5/2020	0.18	NA	NA	NA	197
		9/2/2020	0.12	NA	NA	NA	230
		12/3/2020	0.11	NA	NA	NA	420
		3/2/2021	0.17	NA	NA	NA	182
		6/3/2021	0.12	NA	NA	NA	173

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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-19-124 (Cont.)	2	9/3/2021	0.72	NA	NA	NA	222
		12/2/2021	0.33	NA	NA	NA	280
		6/2/2022	0.48	NA	NA	NA	90
		11/1/2022	0.26	NA	NA	NA	137
MW-20-126	2	7/23/2020	0.26	NA	NA	NA	370
		9/2/2020	4.26	NA	NA	NA	360
		12/3/2020	0.94	NA	NA	NA	320
		3/3/2021	1.04	NA	NA	NA	220
		6/3/2021	6.7	NA	NA	NA	156
		9/3/2021	1.11	NA	NA	NA	143
		12/2/2021	5.39	NA	NA	NA	170
		3/1/2022	10.04	NA	NA	NA	130
		6/3/2022	4.65	NA	NA	NA	120
		11/1/2022	2.87	NA	NA	NA	85
MW-20-127	2	7/23/2020	0.71	NA	NA	NA	85
		8/31/2020	7.15	<0.5	0.8	0.04	115
		12/2/2020	0.06	<0.5	0.7	0.16	157
		3/2/2021	4	<0.5	0.7	0.08	138
		6/3/2021	0.23	<0.5	0.8	0.06	140
		9/2/2021	2.01	<0.5	0.5	0.09	126
		11/30/2021	0.56	NA	0.5	0.09	158
		3/1/2022	0.78	NA	NA	NA	130
		6/1/2022	0.6	<0.5	0.7	0.06	142
DUP-05		6/1/2022	0.6	<0.5	0.8	0.07	143
		11/2/2022	0.43	<0.5	0.8	0.04	126
DUP-05		11/2/2022	0.43	<0.5	0.7	0.04	122
MW-20-128	2	7/23/2020	0.15	<0.5	0.6	0.09	270
		9/1/2020	9.82	NA	NA	NA	112
		12/3/2020	7.13	NA	NA	NA	20
		3/2/2021	9.69	<0.5	1.4	0.43	9
		6/2/2021	7.95	0.7	6.1	1	4
		9/2/2021	3.92	<0.5	0.2	0.04	11
		11/30/2021	9.39	NA	2.1	0.7	5
		6/1/2022	7.13	<0.5	2.2	0.39	6
		11/2/2022	7.59	<0.5	1.6	0.6	1
MW-20-129	2	7/23/2020	0.41	NA	NA	NA	126
		9/1/2020	0.35	NA	NA	NA	126
		12/3/2020	0.09	NA	NA	NA	140
		3/2/2021	0.48	NA	NA	NA	108
		6/2/2021	0.2	NA	NA	NA	108
		9/2/2021	0.18	NA	NA	NA	82
		12/2/2021	0.43	NA	NA	NA	83
		6/3/2022	0.17	NA	NA	NA	80
		11/1/2022	0.31	NA	NA	NA	60
MW-21-142	2	12/3/2021	0.3	NA	NA	NA	91
		6/7/2022	0.04	NA	NA	NA	81
		11/2/2022	0.51	NA	NA	NA	64
PW-14-02	2	6/6/2019	0.12	NA	NA	NA	260
		12/4/2019	0.24	NA	NA	NA	260
		6/3/2020	0.39	NA	NA	NA	160
DUP-04		6/3/2020	0.39	NA	NA	NA	160
		9/2/2020	7.57	NA	NA	NA	43

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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	12/3/2020	1.15	NA	NA	NA	97
		3/3/2021	9.04	NA	NA	NA	37
		6/2/2021	8.56	NA	NA	NA	23
		9/3/2021	1.39	NA	NA	NA	50
		12/2/2021	0.7	NA	NA	NA	95
		3/1/2022	10.81	NA	NA	NA	11
DUP-01		3/1/2022	10.81	NA	NA	NA	12
		6/1/2022	5.46	<0.5	0.4	0.03	26
		11/3/2022	8.2	NA	NA	NA	9
TW-14-02	2	3/4/2020	0.34	NA	NA	NA	470
		6/4/2020	0.37	NA	NA	NA	410
		9/1/2020	10.72	NA	NA	NA	3
		12/2/2020	9.81	NA	NA	NA	1
		3/3/2021	12.61	NA	NA	NA	1
		6/2/2021	8.39	NA	NA	NA	1
		9/3/2021	5.08	NA	NA	NA	29
		12/2/2021	9.61	NA	NA	NA	8
		3/2/2022	9.44	NA	NA	NA	1
		6/1/2022	8.07	<0.5	0.5	0.11	1
		11/3/2022	13.03	NA	NA	NA	1
TW-15-12	2	3/3/2020	0.33	<0.5	0.4	0.03	220
		6/2/2020	1.33	<0.5	0.9	0.31	210
		8/31/2020	7.42	<0.5	1.0	0.45	100
		12/2/2020	9.19	<0.5	2.0	0.76	34
		3/2/2021	10.91	<0.5	0.4	0.15	5
		6/2/2021	8.58	<0.5	0.4	0.14	7
		9/2/2021	6.15	<0.5	0.2	0.03	10
		11/30/2021	8.86	NA	0.1	0.02	34
		3/2/2022	11.92	NA	NA	NA	4
		6/1/2022	7.33	0.5	5.1	2.5	9
		11/2/2022	10.14	0.5	4.6	3	2
MW-12-21	3	6/5/2019	6.79	NA	NA	NA	255
		12/6/2019	0.57	NA	NA	NA	250
		6/11/2020	0.62	NA	NA	NA	230
		12/8/2020	0.2	NA	NA	NA	310
		6/7/2021	1.02	NA	NA	NA	167
DUP-07		6/7/2021	1.02	NA	NA	NA	171
		12/9/2021	0.46	NA	NA	NA	177
		6/10/2022	4.55	NA	NA	NA	179
		11/4/2022	1.1	NA	NA	NA	150
MW-13-22	3	6/6/2019	0.62	NA	NA	NA	159
		8/27/2019	6.58	<0.5	1.0	0.39	173
		12/5/2019	1.91	NA	NA	NA	162
		3/3/2020	0.23	NA	NA	NA	203
		6/11/2020	0.47	NA	NA	NA	157
		8/27/2020	1.52	NA	NA	NA	141
		12/1/2020	3.55	NA	NA	NA	162
		3/3/2021	0.16	NA	NA	NA	86
		6/7/2021	0.34	NA	NA	NA	45
		9/1/2021	0.52	NA	NA	NA	132
		12/7/2021	0.45	NA	NA	NA	152
		3/2/2022	0.35	NA	NA	NA	100

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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-13-22 (Cont.)	3	6/6/2022	NA	NA	NA	NA	109
		8/30/2022	6.69	NA	NA	NA	137
		11/5/2022	0.22	NA	NA	NA	84
MW-13-29	3	6/5/2019	0.19	NA	NA	NA	21
		6/10/2020	0.26	NA	NA	NA	35
		6/8/2021	-	<0.5	0.7	0.06	26
		9/2/2021	0.64	<0.5	0.4	0.01	18
		11/30/2021	1.59	NA	0.4	0.06	12
		6/6/2022	3.46	NA	NA	NA	8
		11/7/2022	1.05	<0.5	0.8	0.02	12
MW-13-34	3	6/7/2019	0.15	NA	NA	NA	74
		8/29/2019	0.39	NA	NA	NA	94
		12/5/2019	1.42	NA	NA	NA	105
		6/10/2020	0.01	NA	NA	NA	81
		8/27/2020	0.35	NA	NA	NA	75
		12/1/2020	0.12	NA	NA	NA	106
		3/3/2021	6.61	NA	NA	NA	127
		6/7/2021	0.12	NA	NA	NA	86
		9/2/2021	0.31	NA	NA	NA	77
		12/7/2021	0.49	NA	NA	NA	83
		3/2/2022	0.86	NA	NA	NA	75
		6/6/2022	0.33	NA	NA	NA	80
		11/8/2022	0.47	NA	NA	NA	81
MW-13-48	3	6/7/2019	0.1	NA	NA	NA	128
		12/6/2019	2.02	NA	NA	NA	162
		6/10/2020	0.01	NA	NA	NA	128
		12/7/2020	0.04	NA	NA	NA	137
DUP-07		12/7/2020	0.04	NA	NA	NA	137
		6/7/2021	1.03	NA	NA	NA	114
		12/9/2021	0.27	NA	NA	NA	84
		6/10/2022	0.65	NA	NA	NA	37
		11/8/2022	0.37	NA	NA	NA	24
PW-14-03	3	6/4/2019	0.33	<0.09	1.3	0.08	223
		8/27/2019	0.64	<0.5	1.2	0.14	250
DUP-01		8/27/2019	0.64	<0.5	1.1	0.11	245
		12/5/2019	1.04	NA	NA	NA	43
		3/3/2020	5.9	NA	NA	NA	75
		6/10/2020	0.02	NA	NA	NA	65
		8/27/2020	4.51	NA	NA	NA	69
		12/1/2020	8.3	NA	NA	NA	71
		3/3/2021	9.12	NA	NA	NA	27
		6/8/2021	8.63	NA	NA	NA	22
		9/1/2021	7.59	NA	NA	NA	19
		12/7/2021	1.07	NA	NA	NA	25
		3/2/2022	10.37	NA	NA	NA	3
DUP-03		3/2/2022	10.37	NA	NA	NA	2
		6/6/2022	12.18	NA	NA	NA	3
DUP-12		6/6/2022	12.18	NA	NA	NA	3
		11/5/2022	5.53	NA	NA	NA	8
DUP-12		11/5/2022	5.53	NA	NA	NA	8

Table 1
Biosparge Performance Monitoring Summary
Lower 1,4-Dioxane Biosparge Progress 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
TW-14-06	3	6/4/2019	2.12	<0.09	2.4	1.0	700
		8/27/2019	9.16	<0.5	9.1	14.0	430
		12/6/2019	8.92	<0.5	1.5	1.0	59
DUP-06		12/6/2019	8.92	NA	NA	NA	61
		3/3/2020	12.46	<0.5	22.4	29.0	23
		6/23/2020	0.91	<0.5	2.7	1.6	13
		8/31/2020	6.69	<0.5	2.4	1.6	4
DUP-03		8/31/2020	6.69	<0.5	2.2	1.1	4
		12/2/2020	12.49	<0.5	18	22.0	1
DUP-03		12/2/2020	12.49	<0.5	19.1	24.0	1
		3/2/2021	10.44	<0.5	8.6	10.8	1
DUP-03		3/2/2021	10.44	<0.5	8.4	8.3	1
		6/7/2021	12.87	<0.5	8.2	14.0	1
DUP-03		6/7/2021	12.87	<0.5	7	9.3	1
		9/2/2021	11.29	<0.5	4.7	2.9	9
DUP-03		9/2/2021	11.29	<0.5	4.7	1.9	8
		11/30/2021	11.24	NA	7.5	4.0	34
DUP-03		11/30/2021	11.24	NA	7.7	6.0	36
		3/2/2022	12.34	NA	NA	NA	7
		6/6/2022	15.09	<0.5	4.3	1.5	2
		11/7/2022	9.53	2.5	2.6	0.6	10
TW-15-11	3	6/4/2019	0.2	<0.09	0.90	0.07	246
		8/28/2019	4.22	<0.5	0.40	0.07	218
		12/5/2019	2.78	NA	NA	NA	250
		3/3/2020	5.91	NA	NA	NA	130
		6/23/2020	0.63	NA	NA	NA	220
		8/27/2020	4.11	NA	NA	NA	120
		12/1/2020	10.66	NA	NA	NA	51
		3/3/2021	9.45	NA	NA	NA	48
		6/7/2021	11.85	NA	NA	NA	41
		9/1/2021	7.77	NA	NA	NA	7
		12/8/2021	0.32	NA	NA	NA	30
		3/2/2022	0.02	NA	NA	NA	5
		6/6/2022	13.66	NA	NA	NA	5
		11/5/2022	9.82	NA	NA	NA	22

Notes:
mg/L = milligrams per liter
µg/L = micrograms per liter

Table 2a
Biosparge Performance Tracking

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

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

		Well 1,4-Dioxane						
Descriptor:		MW-13-22	TW-14-06	TW-15-11	PW-14-03	MW-13-34	Average	Average 12-month Reduction
Distance (ft):		UG 66	ROI 14	DG 48	DG 56	DG 460	(µg/L)	(µg/L)*
Year	Date							
1	6/1/2019	159	700	246	223	74	280	--
	9/1/2019	173	430	218	250	94	233	--
	12/1/2019	162	59	250	43	105	124	--
	3/1/2020	203	23	130	75	--	108	--
2	6/1/2020	157	13	220	65	81	107	173
	9/1/2020	141	4	120	69	75	82	151
	12/1/2020	162	1	51	71	106	78	46
	3/1/2021	86	1	48	27	127	58	50
3	6/1/2021	45	1	41	22	86	39	68
	9/1/2021	132	9	7	19	77	49	***33***
	12/1/2021	152	34	30	25	83	65	***13***
	3/1/2022	100	7	5	3	75	38	***20***
4	6/1/2022	109	2	5	3	80	40	***-1***
	9/1/2022	137	--	--	--	--	--	--
	12/1/2022	84	10	22	8	81	41	***24***

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*Reference Reduction Value (RRV) is 173 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 34.6 µg/L
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Table 2b
Biosparge Performance Tracking

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

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

		Well 1,4-Dioxane							
	Descriptor: Distance (ft):	TW-14-06 ROI 14	TW-15-11 DG 48	PW-14-03 DG 56	MW-13-34 DG 460	MW-13-29 DG 250	MW-13-48 DG 460	Average (µg/L)	Average 12-month Reduction (µg/L)*
Year	Date								
1	6/1/2019	700	246	223	74	21	128	232	--
	9/1/2019	430	218	250	94	--	--	248	--
	12/1/2019	59	250	43	105	--	162	124	--
	3/1/2020	23	130	75	--	--	--	76	--
2	6/1/2020	13	220	65	81	34	128	90	142
	9/1/2020	4	120	69	75	--	--	67	181
	12/1/2020	1	51	71	106	--	137	73	***51***
	3/1/2021	1	48	27	127	--	--	51	***25***
3	6/1/2021	1	41	22	86	26	114	48	***42***
	9/1/2021	9	7	19	77	18	--	26	***41***
	12/1/2021	34	30	25	83	12	84	45	***29***
	3/1/2022	7	5	3	75	--	--	23	***28***
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								

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*Reference Reduction Value (RRV) is 181 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 36.2 µg/L
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Table 3
Biosparge Performance Tracking

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

Plant 2 North (Transect B)

	Descriptor:	Well 1,4-Dioxane				Average	Average 12-month Reduction
	Distance (ft):	TW-15-12 ROI 8	PW-14-02 DG 54	MW-20-127 DG 102	MW-20-126 UG 66	(µg/L)	(µg/L)*
Year	Date						
1	3/1/2020	220	--	--	--	220	--
	6/1/2020	210	160	85	370	206	--
	9/1/2020	100	43	115	360	155	--
	12/1/2020	34	97	157	320	152	54
2	3/1/2021	5	37	138	220	100	120
	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	3/1/2022	4	11	130	130	69	31
	6/1/2022	9	26	142	120	74	***7***
	9/1/2022	--	--	--	--	--	--
	12/1/2022	2	9	126	85	56	59

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*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
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Table 3
Biosparge Performance Tracking

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

Plant 2 South (Transect G & E)

		Well 1,4-Dioxane									
	Descriptor:	TW-14-02	MW-19-123	MW-16-74	MW-19-121	MW-20-129	MW-19-122	MW-16-78	MW-16-81	Average	Average 12-month
	Distance (ft):	ROI 2	DG 70	DG 75	ROI 2	UG 121	UG 92	DG 174	UG 120	(µg/L)	Reduction (µg/L)*
Year	Date										
1	3/1/2020	470	76	2	119	--	41	--	2600	551	--
	6/1/2020	410	75	2	115	126	42	1	3100	484	--
	9/1/2020	3	51	3	17	126	33	--	500	105	--
	12/1/2020	1	39	1	4	140	34	1	1930	269	215
2	3/1/2021	1	58	1	1	108	25	1	560	94	457
	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	***55***
	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***

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*Reference Reduction Value (RRV) is 457 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 91.4 µg/L
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Table 3
Biosparge Performance Tracking

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

Plant 2 South (Transect G Only)

		Well 1,4-Dioxane						
	Descriptor:	TW-14-02 ROI	MW-19-123 DG	MW-16-74 DG	MW-20-129 UG	MW-19-122 UG	Average	Average 12-month Reduction
	Distance (ft):	2	70	75	121	92	(µg/L)	(µg/L)*
Year	Date							
1	3/1/2020	470	76	2	--	41	147	--
	6/1/2020	410	75	2	126	42	131	--
	9/1/2020	3	51	3	126	33	43	--
	12/1/2020	1	39	1	140	34	43	88
2	3/1/2021	1	58	1	108	25	39	109
	6/1/2021	1	50	1	108	37	39	92
	9/1/2021	29	43	2	82	9	33	***10***
	12/1/2021	8	20	3	83	4	24	***19***
3	3/1/2022	1	--	--	--	--	--	--
	6/1/2022	1	25	2	80	3	22	***17***
	9/1/2022	--	--	--	--	--	--	--
	12/1/2022	1	21	2	60	6	18	***6***

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*Reference Reduction Value (RRV) is 109 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 21.8 µg/L
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Table 3
Biosparge Performance Tracking

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

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	MW-16-79 UG 196		
Year	Date									
1	3/1/2020	148	198	--	66	99	--	--	128	--
	6/1/2020	152	184	270	58	94	197	1	137	--
	9/1/2020	98	137	112	57	88	230	--	120	--
	12/1/2020	18	28	20	81	106	420	1	96	40
2	3/1/2021	21	73	9	66	79	182	1	62	66
	6/1/2021	9	49	4	15	69	173	1	46	91
	9/1/2021	9	7	11	43	48	222	1	49	72
	12/1/2021	5	15	5	60	43	280	1	58	38
3	3/1/2022	--	--	--	--	--	--	--	--	--
	6/1/2022	16	12	6	44	27	90	1	28	***18***
	9/1/2022	--	--	--	--	--	--	--	--	--
	12/1/2022	21	13	1	29	19	137	1	32	***27***

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter
*Reference Reduction Value (RRV) is 91 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 18.2 µg/L
Values of 1 represent <1 ug/L (non-detect) but are presented as 1 for averaging calculations
Bold and Italic = below 20% of the RRV

Figures

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B0064479.2019 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2020_Biosparge\Completion Report\Figure 1 - Plant 2 Biosparge Performance Monitoring.mxd PLOTTED: 3/23/2023 3:23:43 PM BY: KPullen

WELLS
- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE QUARTERLY PERFORMANCE MONITORING WELL
- BIOSPARGE/IGMP SEMI-ANNUAL PERFORMANCE MONITORING WELL
- IGMP ANNUAL MONITORING WELL
- IGMP BIENNUAL MONITORING WELL

- FENCE
- SYSTEM BUILDING
- FENCED AREA
- LNAPL PLUME
- 1-INCH CONVEYANCE HOSE

PLANT BOUNDARIES
- PLANT 2
- PLANT 3
- PLANT 6

0 150 300
SCALE IN FEET

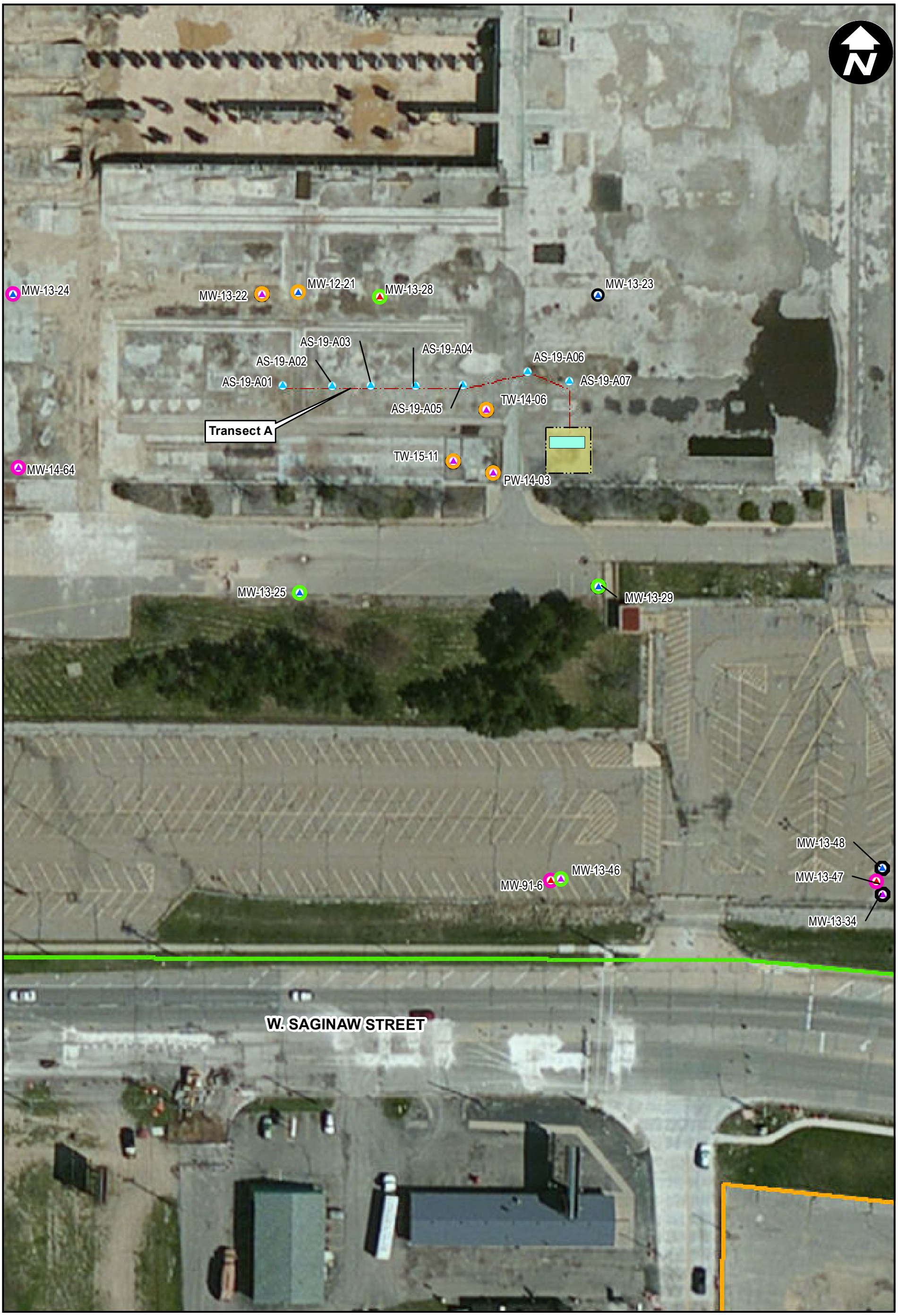
RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 2 BIOSPARGE SYSTEM PERFORMANCE MONITORING PLAN

DRAFT

ARCADIS

FIGURE
1



CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B0064479.2019 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2023 Biosparge\Figure 2 -Plant 3 Biosparge System Performance Monitoring Plan.mxd PLOTTED: 3/23/2023 3:26:07 PM BY: KPullen

LEGEND:

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

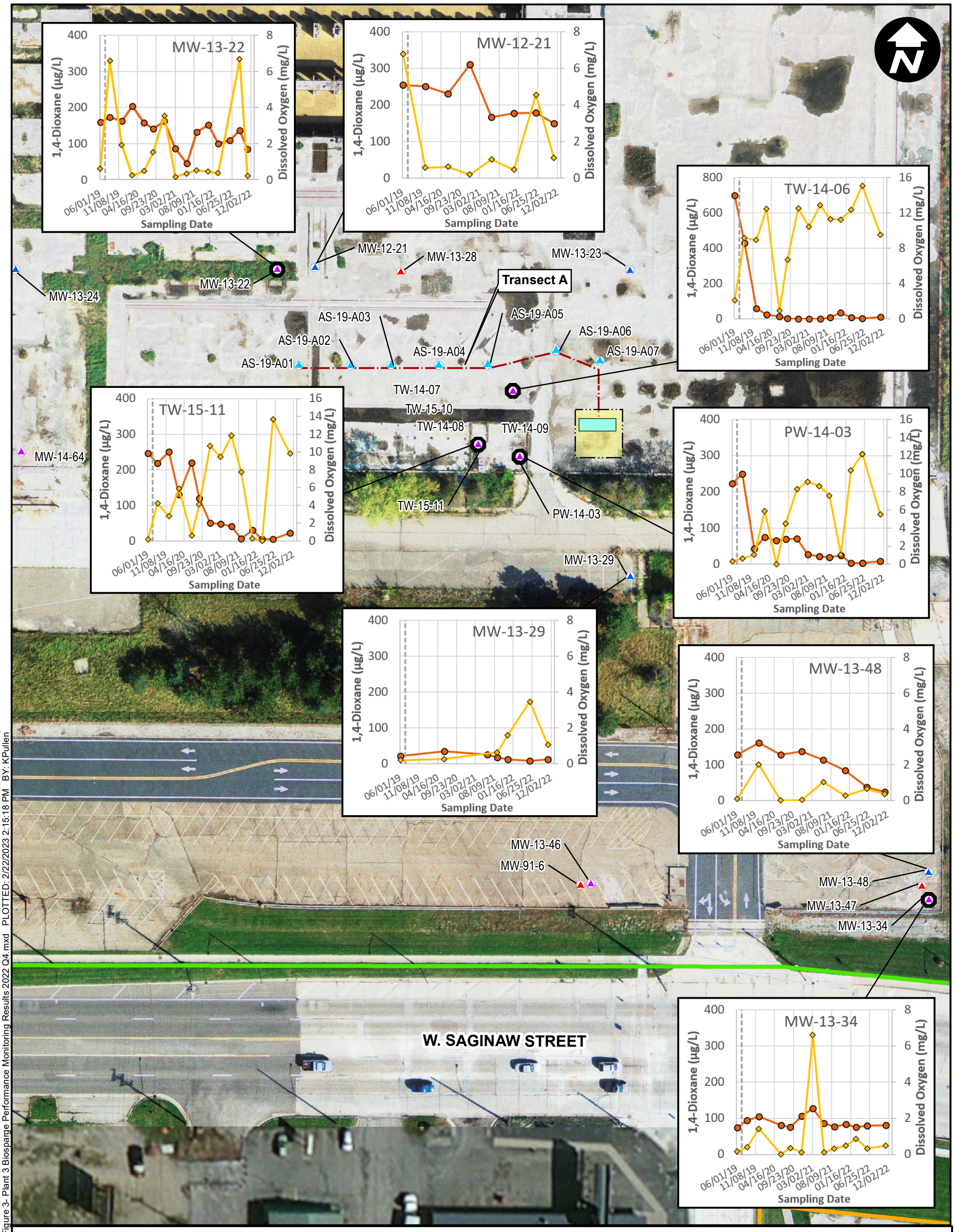
0 60 120
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 3 BIOSPARGE SYSTEM PERFORMANCE MONITORING PLAN

ARCADIS

FIGURE
2



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30112892.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022_Biosparge\Quarterly Results\Figure 3- Plant 3 Biosparge Performance Monitoring Results 2022 Q4.mxd PLOTTED: 2/22/2023 2:15:18 PM BY: KPullen

LEGEND

WELLS
- BIOSPARGE
- DEEP OVERBUDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- 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

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 3 BIOSPARGE PERFORMANCE MONITORING RESULTS

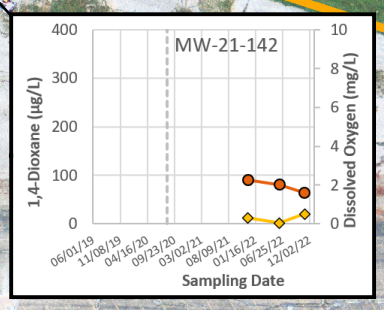
ARCADIS

FIGURE 3

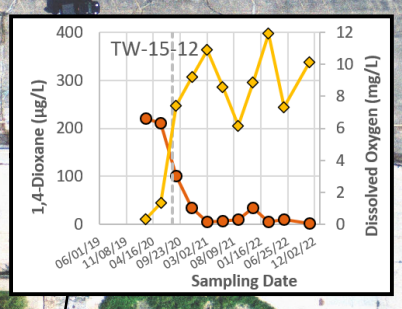
W. MICHIGAN AVENUE

N. ROSEMARY STREET

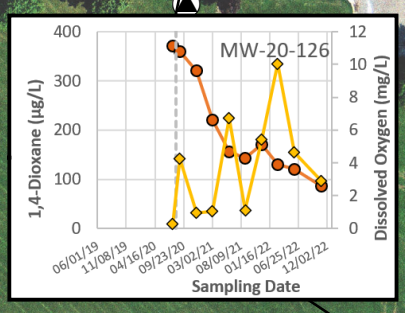
MW-21-142

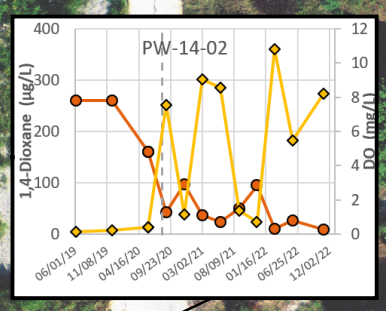


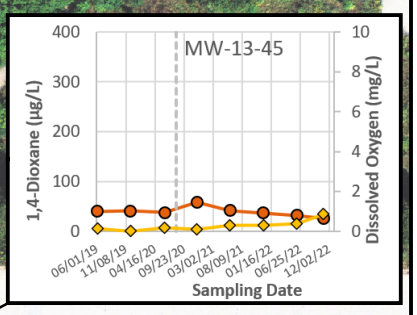
MW-14-63
MW-12-02

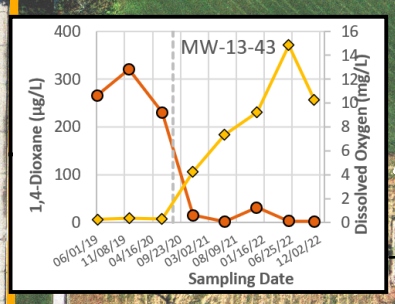


MW-16-80





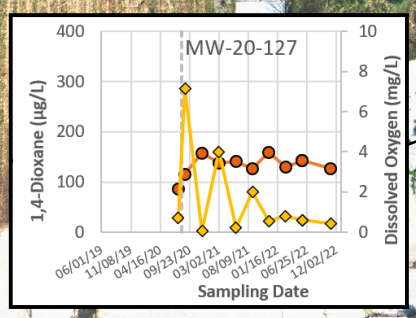




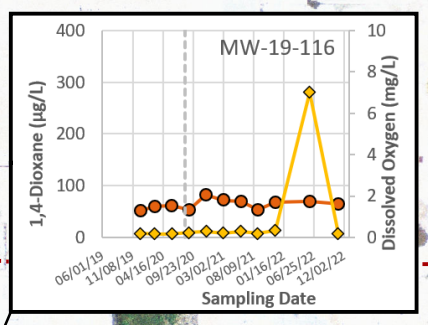
Transect B

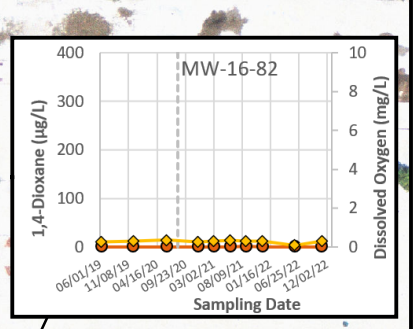
AS-19-B01
AS-19-B02
AS-19-B03
AS-19-B04
AS-19-B05
AS-19-B06
AS-19-B07

TW-15-12
MW-13-45
PW-14-02
MW-13-43
MW-13-44
MW-15-73



MW-22-155
MW-20-127

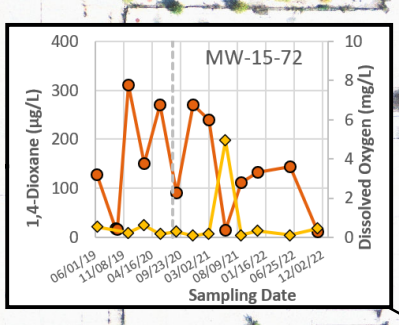




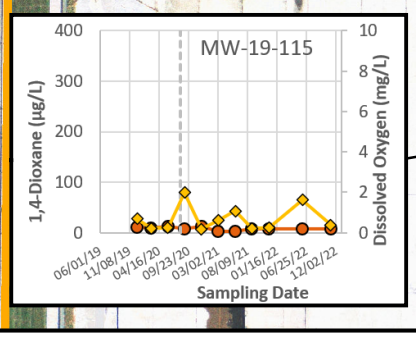
MW-19-118S/D

PSP-F12
CSP-F01
ASP-F03
ASP-F02
ASP-F01

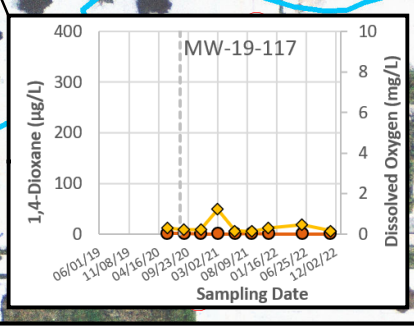
MW-22-153
MW-14-58
MW-17-87
MW-16-83
MW-22-156



MW-19-116
MW-16-82
MW-20-128
MW-19-117



MW-12-05R
MW-19-115
MW-15-72



LEGEND

WELLS

- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- LNAPL PLUME
- 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

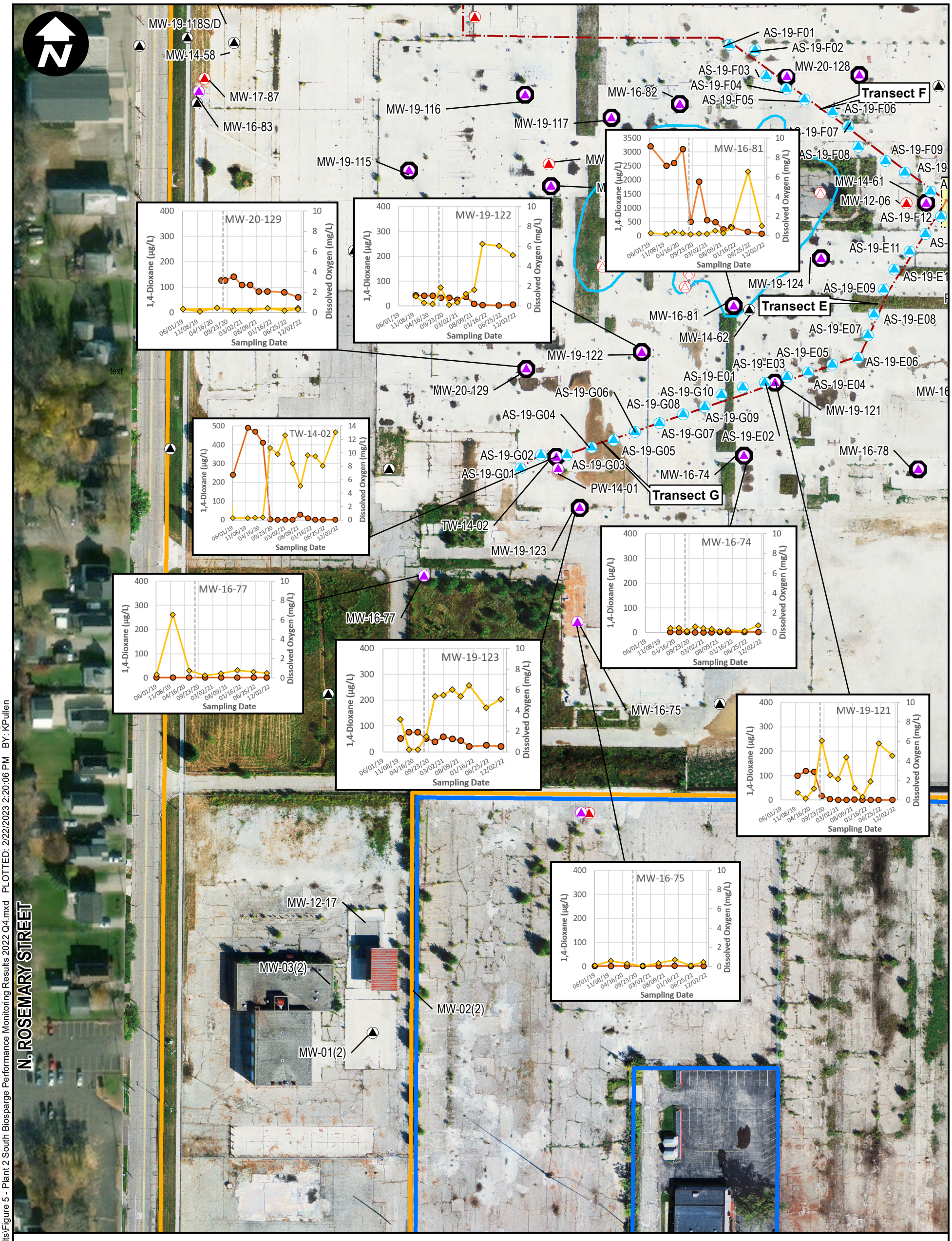
RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

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: 30112892.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022_Biosparge\Quarterly Results\Figure 4 - Plant 2 North Biosparge Performance Monitoring Results 2022 Q4.mxd PLOTTED: 2/22/2023 2:18:07 PM BY: KPullen



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30112892.0470B COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022_Biosparge\Quarterly Results\Figure 5 - Plant 2 South Biosparge Performance Monitoring Results 2022 Q4.mxd PLOTTED: 2/22/2023 2:20:06 PM BY: KPullen

LEGEND

WELLS
- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- FENCE
- SYSTEM BUILDING
- FENCED AREA
- LNAPL PLUME
- 1-INCH CONVEYANCE HOSE

PLANT BOUNDARIES
- PLANT 2
- PLANT 6

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

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

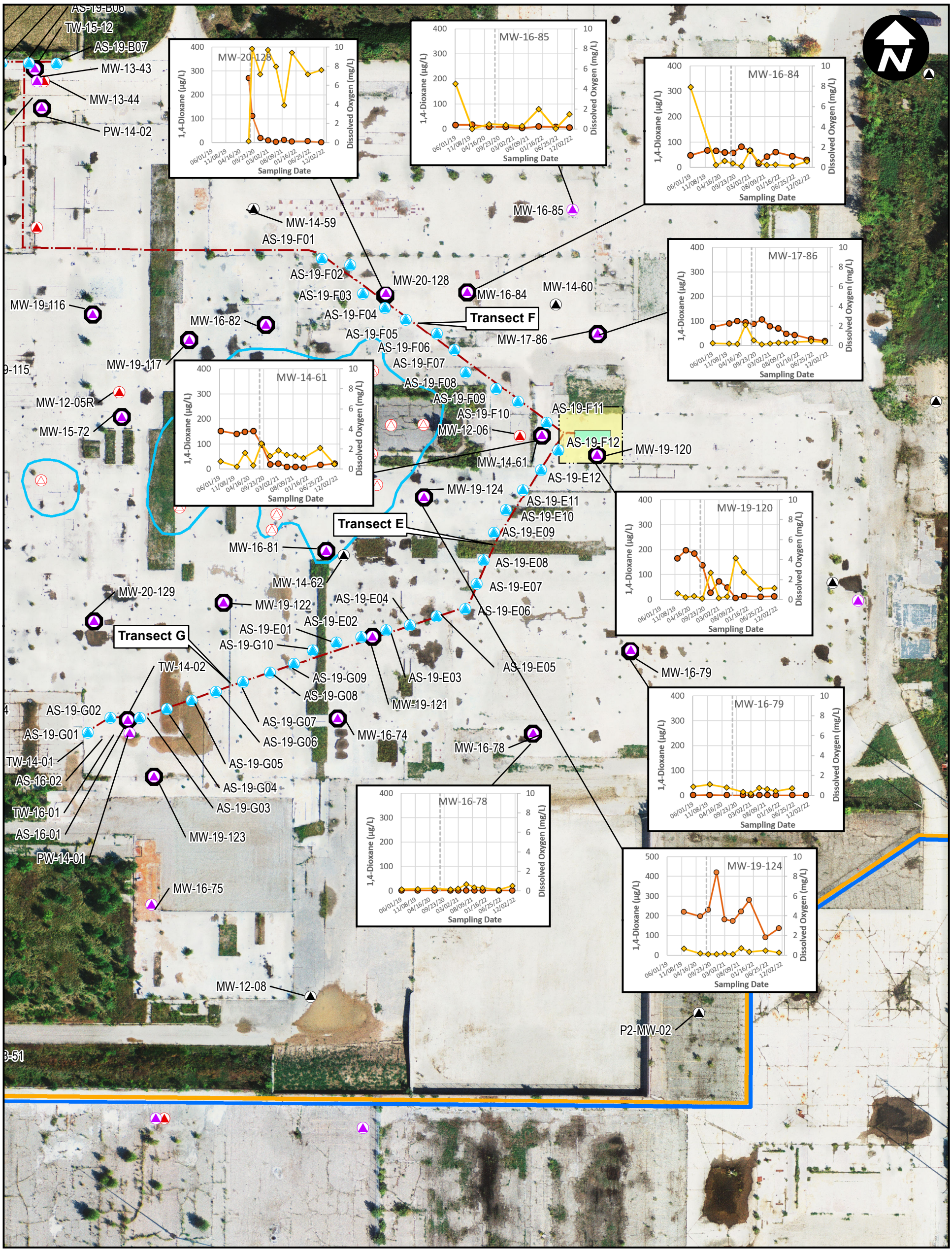
0 120 240
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 2 SOUTH BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE 5



LEGEND

WELLS
- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE PERFORMANCE MONITORING WELL
- FENCE
- SYSTEM BUILDING
- FENCED AREA
- LNAPL PLUME
- 1-INCH CONVEYANCE HOSE

PLANT BOUNDARIES
- PLANT 2
- 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

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

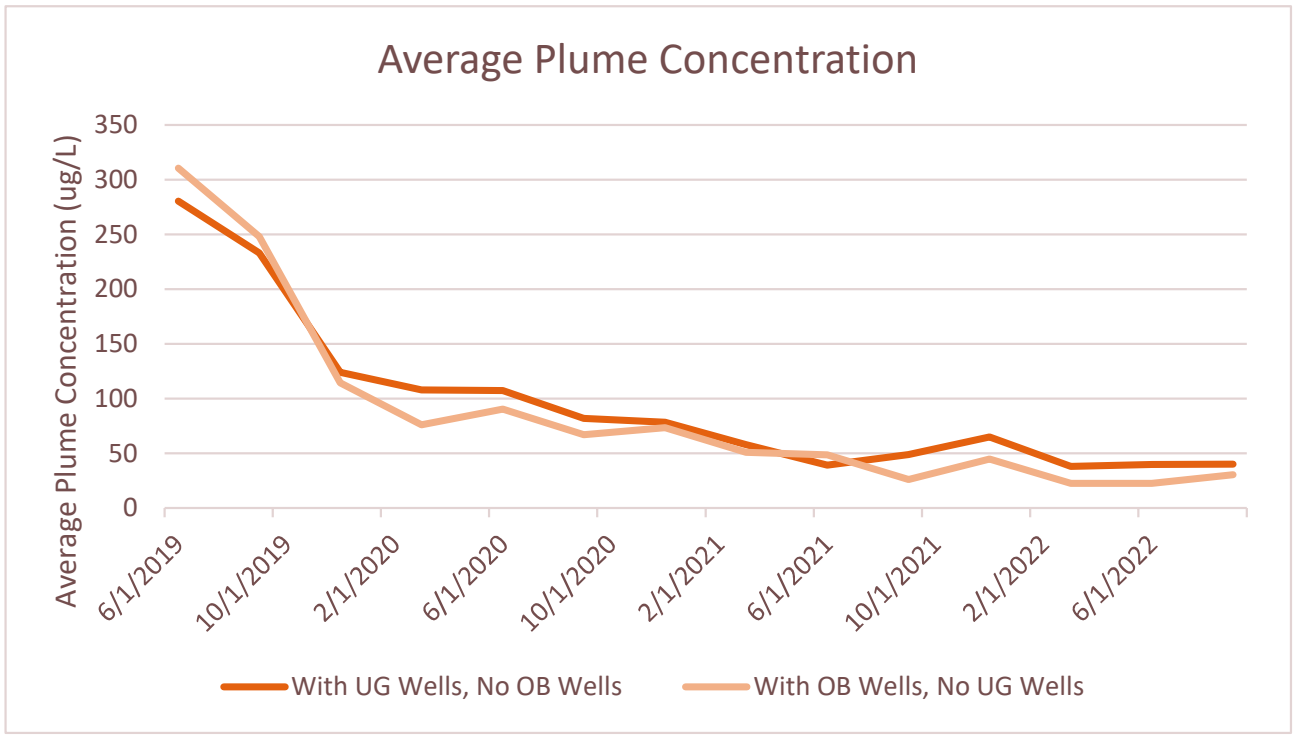
PLANT 2 CENTRAL/EAST BIOSPARGE PERFORMANCE MONITORING RESULTS

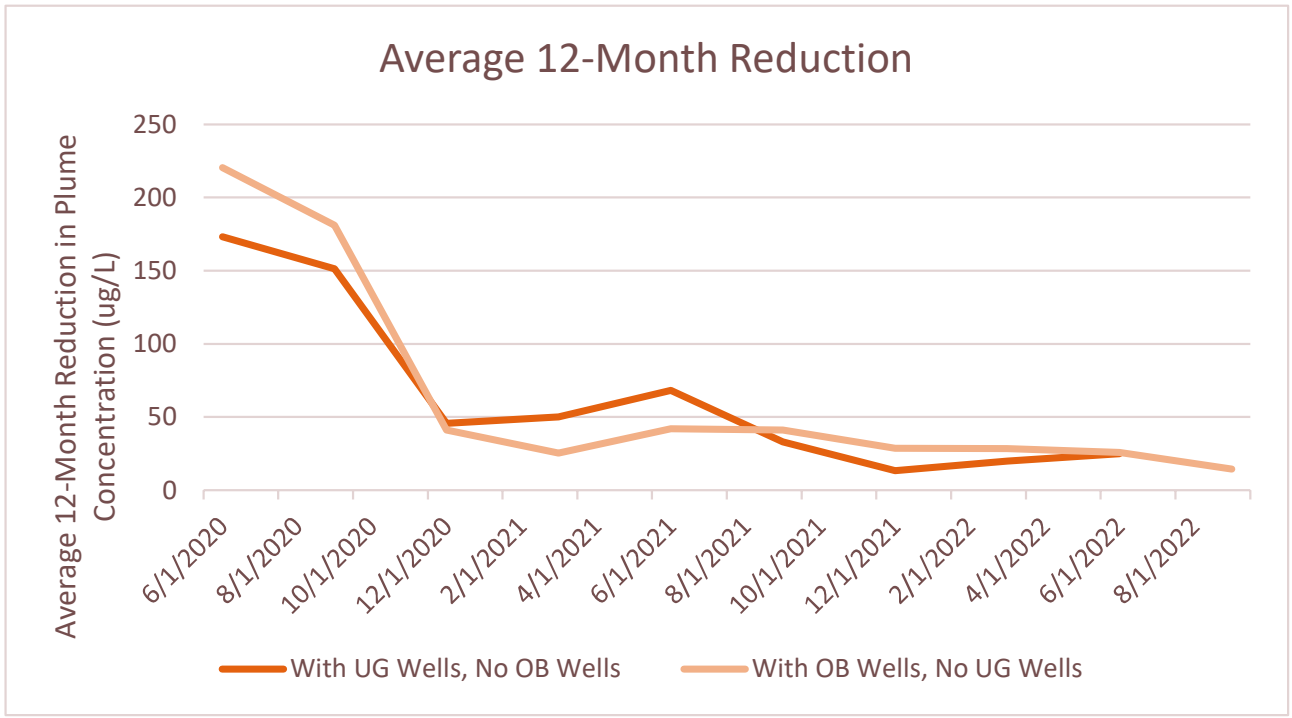
ARCADIS

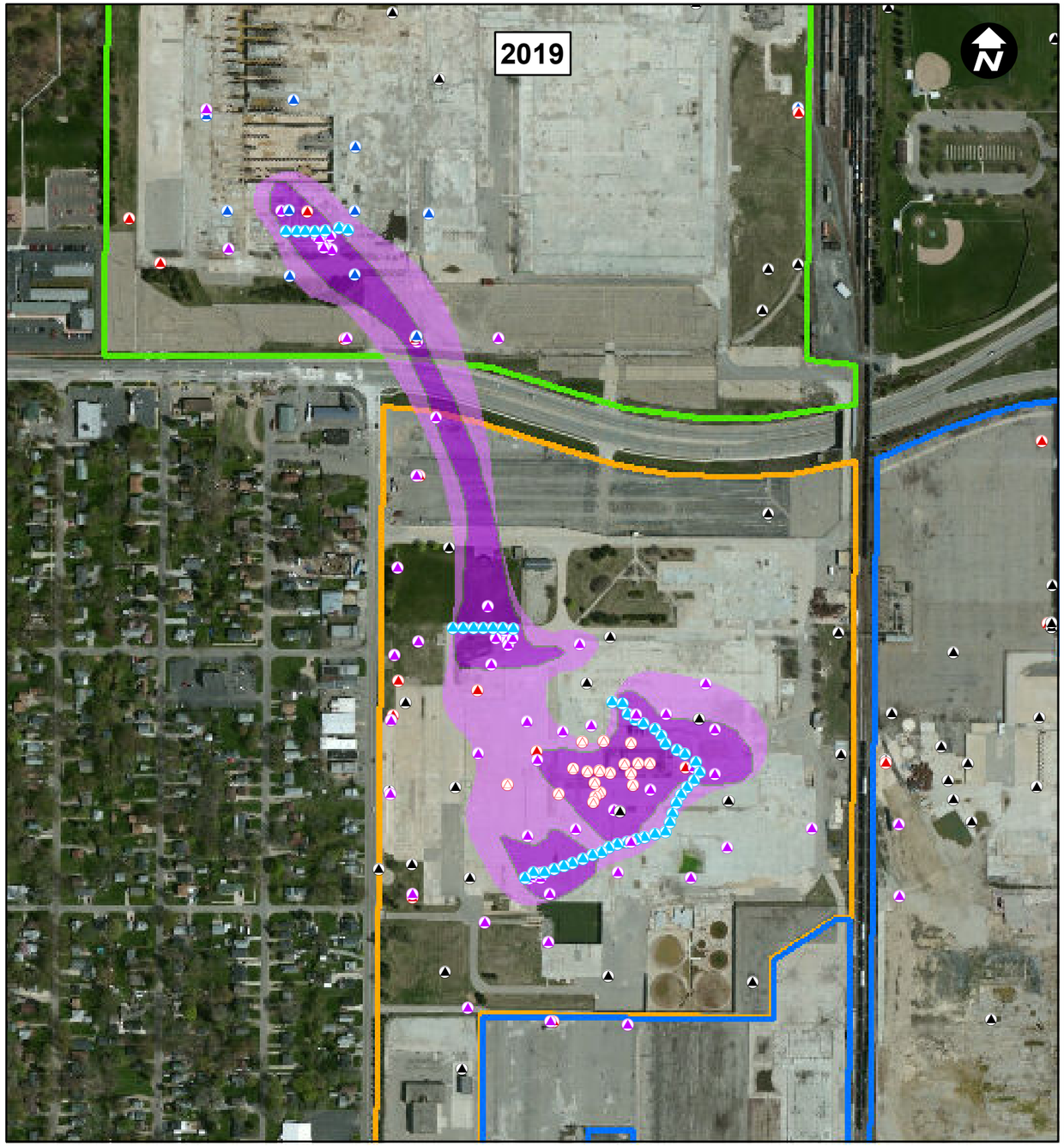
FIGURE 6

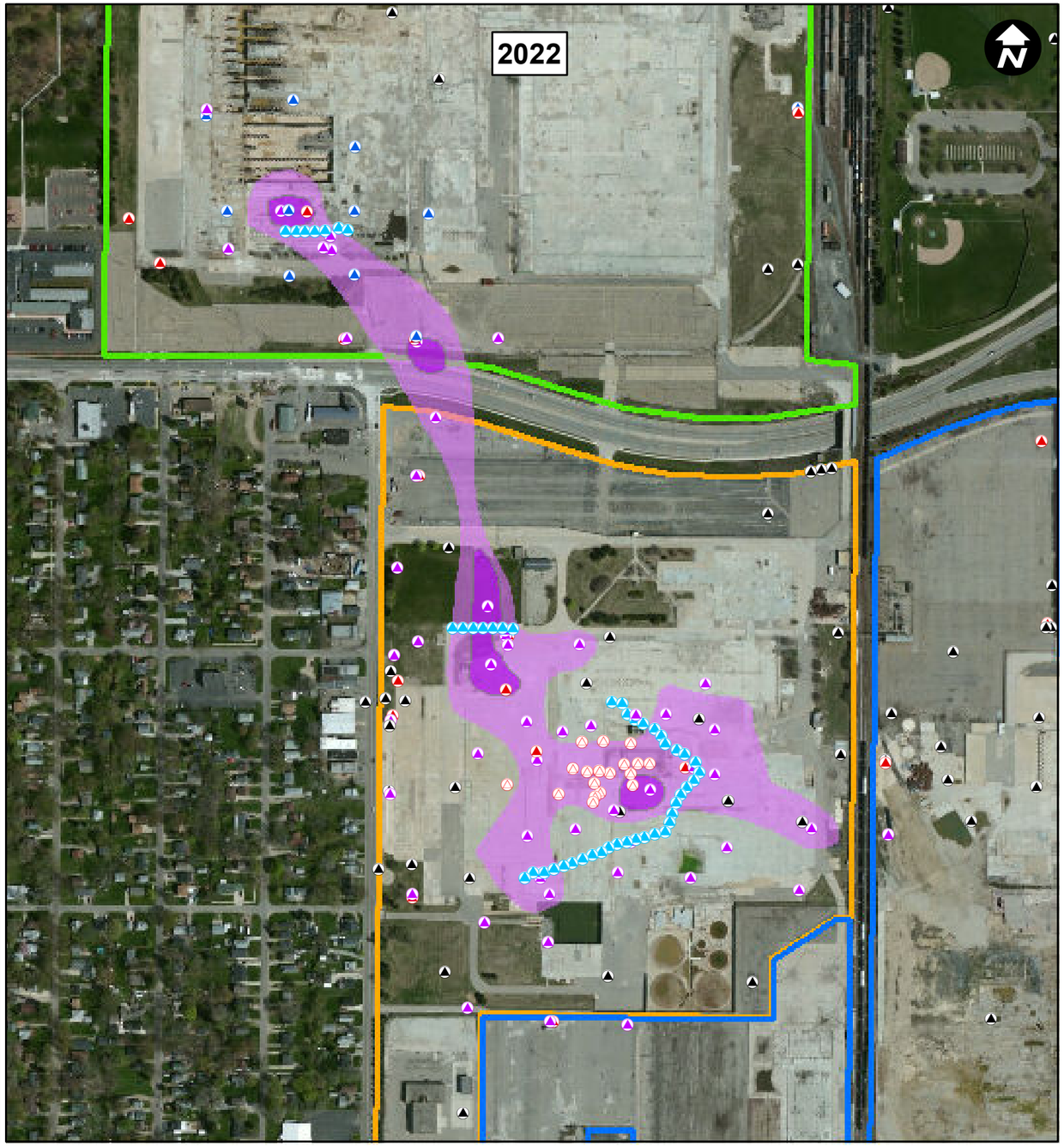
Figure 7
Plant 3 Average Plume Concentration and Average 12-Month Reduction of 1,4-D

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









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

NOTE:
1. IMAGERY OBTAINED FROM ESRI IMAGERY SERVICE.

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

LOWER 1,4-DIOXANE PLUME COMPARISON 2019 VS 2022

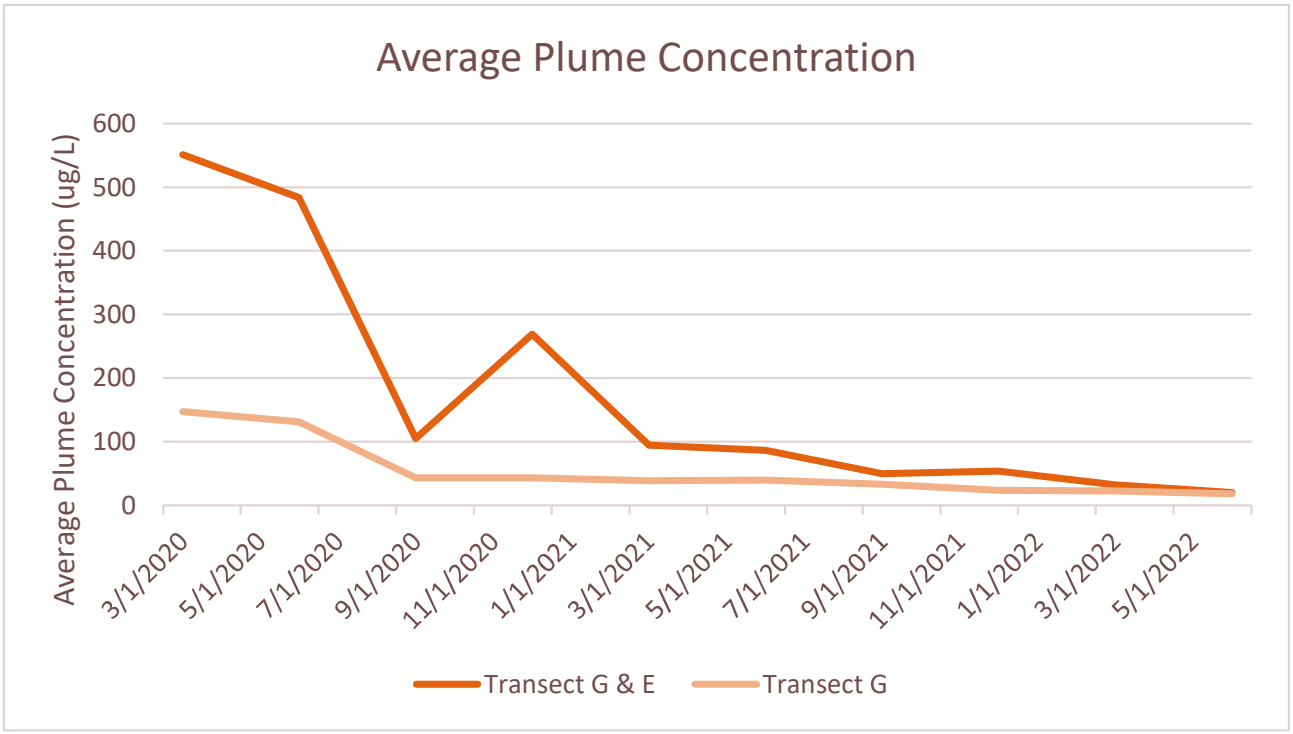
ARCADIS

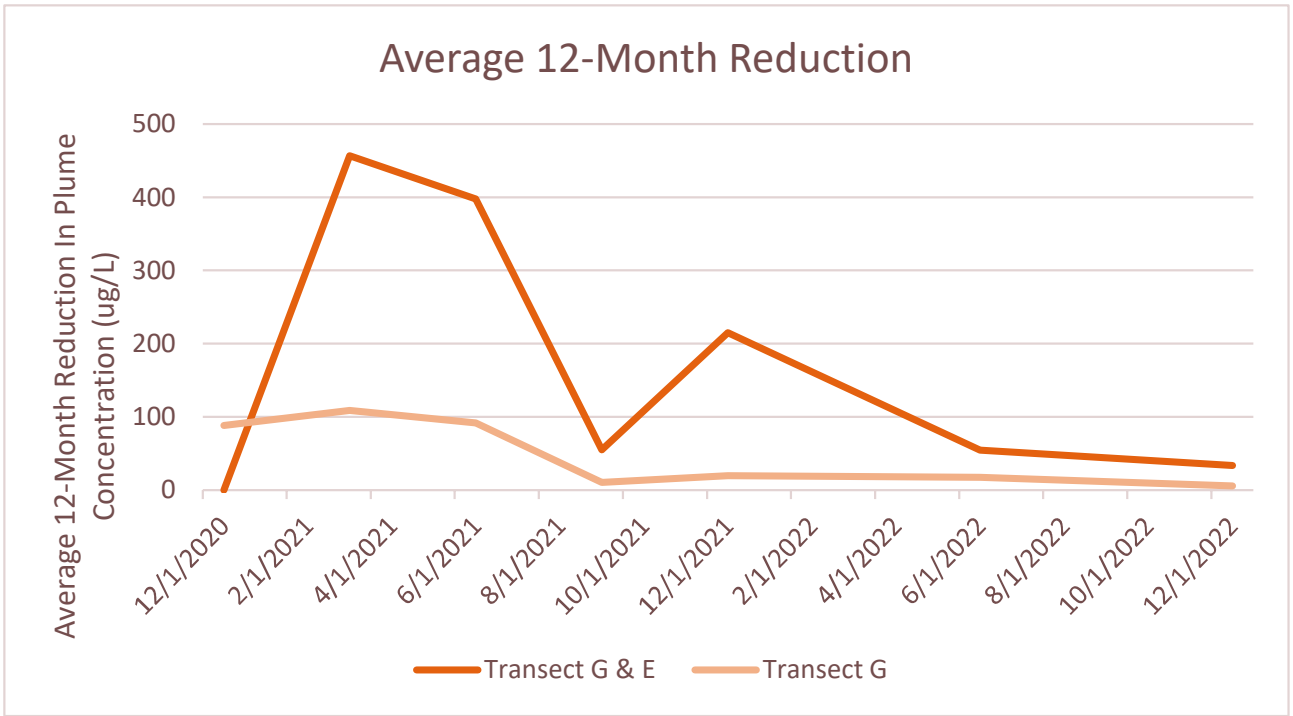
FIGURE 8

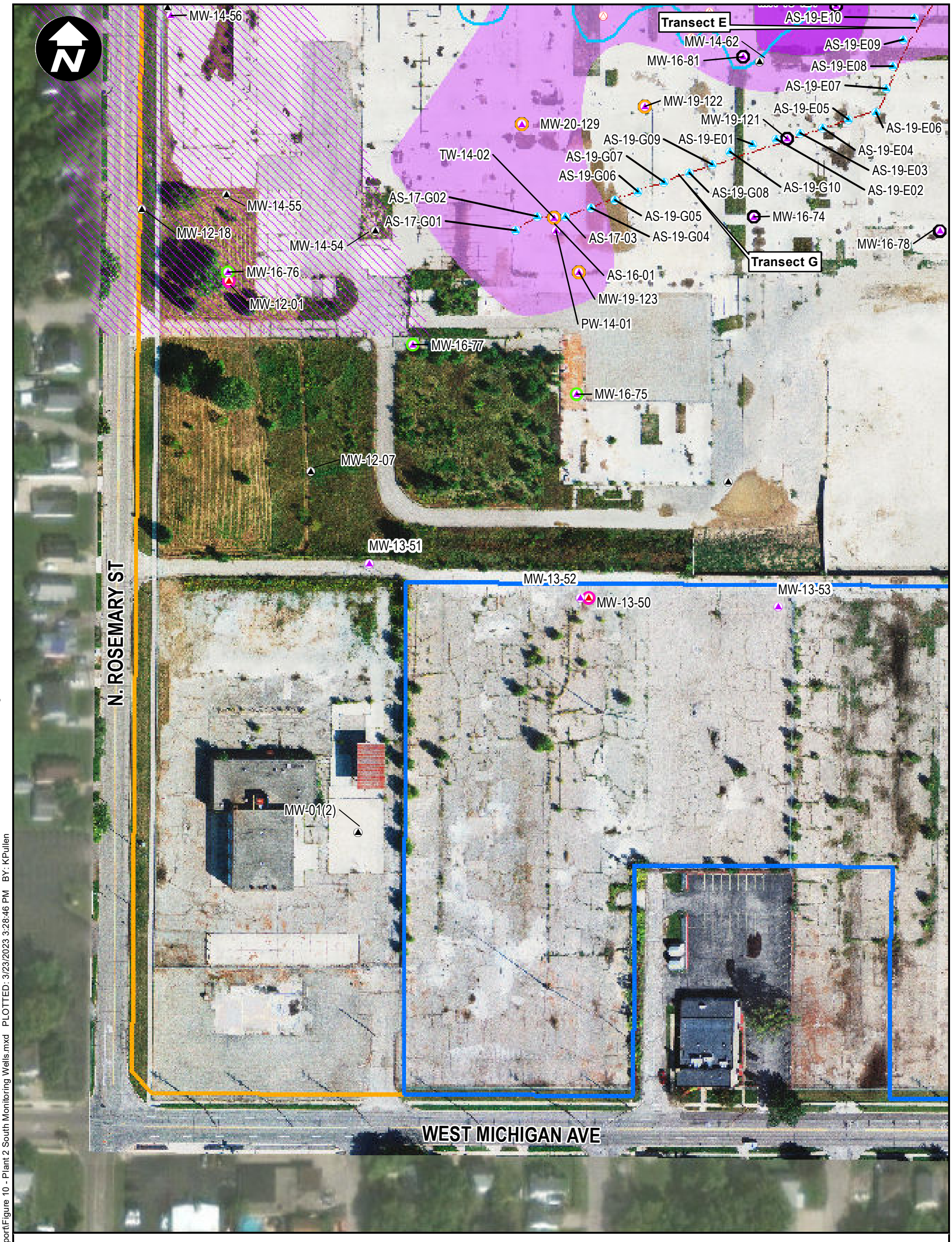
CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. VILLHAUER TR: PROJECT NUMBER: 30171056 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2023 Biosparge\Lower 1,4-Dioxane Plume Comparison 2019 vs 2022.mxd PLOTTED: 3/13/2023 4:33:17 PM BY: KPullen

Figure 9
Plant 2 Transect G & E Average Plume Concentration and Average 12-Month Reduction of 1,4-D

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







CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B0064479.2019 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2022_Biosparge\Completion Report\Figure 10 - Plant 2 South Monitoring Wells.mxd PLOTTED: 3/23/2023 3:28:46 PM BY: KPullen

WELLS
- BIOSPARGE
- PERCHED MONITORING WELL
- LNAPL MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- BIOSPARGE QUARTERLY PERFORMANCE MONITORING WELL
- BIOSPARGE/IGMP SEMI-ANNUAL PERFORMANCE MONITORING WELL
- IGMP ANNUAL MONITORING WELL
- IGMP BIENNUAL MONITORING WELL

- 1-INCH CONVEYANCE HOSE
- LOWER 1,4-DIOXANE PLUME > 72 µg/L
- LOWER 1,4-DIOXANE IMPACTS > DW CRITERIA (7.2 µg/L)
- FORMER ADAMS PLATING CO. LOWER 1,4-DIOXANE PLUME > DW CRITERIA

PLANT BOUNDARIES
- PLANT 2
- PLANT 6

0 100 200
SCALE IN FEET

DRAFT

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 2 SOUTH MONITORING WELLS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 10

Appendix A

Operation and Maintenance Logs

Inspection Date	January 7, 2022
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Cloudy, snow, teens

HMI and Control Panel

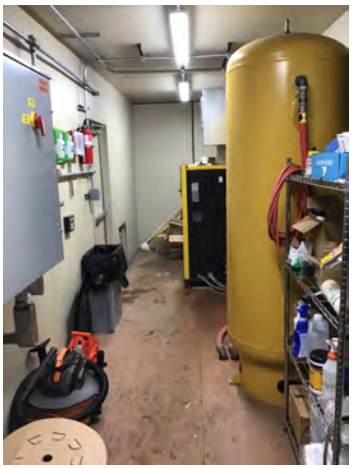
HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	5.993
PIT-101 (PSIG)	50.1
PIT-102 (PSIA)	64.6
FQI-101 (SLPM)	2003
PIT-201 (PSIA)	32.8
PIT-300 (PSIG)	17.5
FQI-201 (LPM)	0.211
AE-350 (%LEL)	18.4
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted time
UPS enabled?	No
Comments	Cleaned the auto drain screen

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, Take oil sample
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)	11202
Oil Pressure (PSIG)	114
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	10
PI-101 (PSIG)	130
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
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	26.65
MFC-101 standardized flow rate on display (SLPM)	2002
MFC-101 uncorrected flow rate on display (LPM)	455
Comments	Need labels on Alicat for A/B, removed trash from building

Non-XP room photo

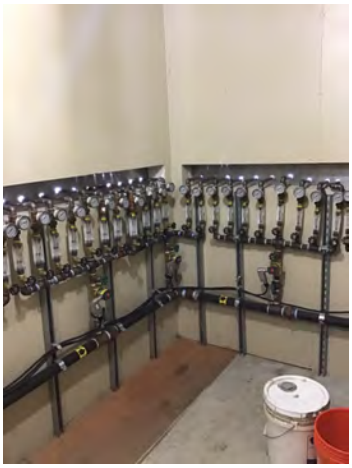



XP-Room

First Aid Kit Expiration Date	March 31, 2022
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	20.27
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)	2.64
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	17

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)	22
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	24
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	0
AS-19-E02 Manifold Flowrate (CFM)	0
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	5
AS-19-E08 Manifold Flowrate (CFM)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	18
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	10

AS-19-G05 Manifold Flowrate (CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	4.5
AS-19-E04 Manifold Pressure (PSIG)	1
AS-19-E04 Manifold Flowrate (CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	7
AS-19-E07 Manifold Flowrate (CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	10
AS-19-E10 Manifold Flowrate (CFM)	5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	2.5
AS-19-G07 Manifold Pressure (PSIG)	6
AS-19-G07 Manifold Flowrate (CFM)	4
AS-19-G10 Manifold Pressure (PSIG)	4
AS-19-G10 Manifold Flowrate (CFM)	7
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	7
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	5
AS-19-E12 Manifold Pressure (PSIG)	7
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	6
AS-19-F09 Manifold Pressure (PSIG)	5
AS-19-F09 Manifold Flowrate (CFM)	5
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	6
AS-19-F03 Manifold Pressure (PSIG)	6
AS-19-F03 Manifold Flowrate (CFM)	4

AS-19-B06 Manifold Pressure (PSIG)	25
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	6

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	3
AS-19-E11 Manifold Flowrate (CFM)	6
AS-19-F11 Manifold Pressure (PSIG)	4
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	2
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	8
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	9
AS-19-F02 Manifold Flowrate (CFM)	3
AS-19-B05 Manifold Pressure (PSIG)	4
AS-19-B05 Manifold Flowrate (CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	2
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	5
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	12
AS-19-F04 Manifold Flowrate (CFM)	1
AS-19-F01 Manifold Pressure (PSIG)	4
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	4
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	4
AS-19-B01 Manifold Flowrate (CFM)	2

Outdoors and General

Propane tank level (%)	45
Number of condensate drums outside	12

Drum Photo

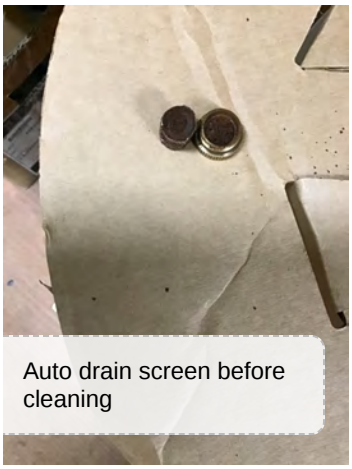
Electric Meter Reading (kWh)	229038
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

Car parking photos if near buildings

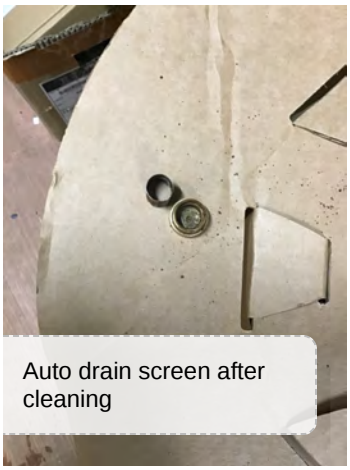
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment

System building photo

Photos



Auto drain screen before cleaning



Auto drain screen after cleaning

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Removed trash from building, turned on heat in both rooms, plugged in heating blankets, drain hoses for recirculating tanks, open compressor vent to 45 degrees, and pumped condensate into 3 drums. Labeled the 3 condensate drums.
Signature	 Signed 1/7/2022, 4:40:03 PM UTC
Departure Time	14:30

Inspection Date	February 4, 2022
Last Quarterly Event Date	December 4, 2020
Arrival Time	08:30
Personnel	Billy J Cobern
Weather	Mostly Cloudy, zero-low teens

HMI and Control Panel

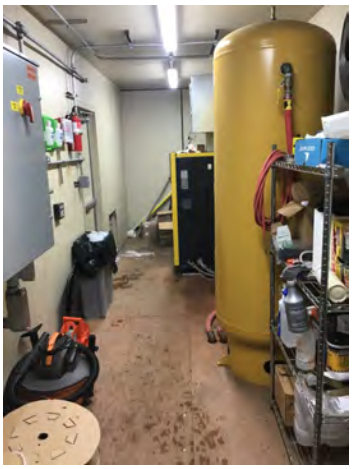
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	6.003
PIT-101 (PSIG)	51
PIT-102 (PSIA)	65.3
FQI-101 (SLPM)	1865
PIT-201 (PSIA)	72.1
PIT-300 (PSIG)	25.6
FQI-201 (LPM)	0
AE-350 (%LEL)	0
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted time
UPS enabled?	No
Comments	Cleaned the auto drain screen

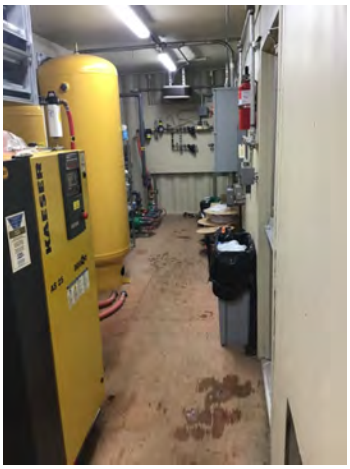
Non-XP Room

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, Take oil sample
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)	11828
Oil Pressure (PSIG)	123
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	27
PI-101 (PSIG)	130
PI-102 (PSIG)	110
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
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	19.68
MFC-101 standardized flow rate on display (SLPM)	1862
MFC-101 uncorrected flow rate on display (LPM)	412
Comments	Need labels on Alicat for A/B, removed trash from building

Non-XP room photo



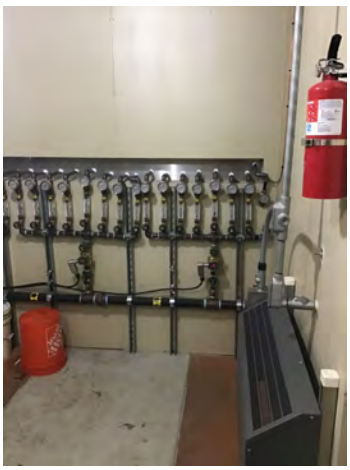


XP-Room

First Aid Kit Expiration Date	March 31, 2022
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)	58
PI-202 (PSIG)	50
MFC-201 temperature	3.48
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.56
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.56
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	24

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-500 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	AE-351 was not calibrated (off line)

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	23
AS-19-G01 Manifold Flowrate (CFM)	2
AS-19-G03 Manifold Pressure (PSIG)	24
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	32
AS-19-G09 Manifold Pressure (PSIG)	2
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	3
AS-19-E02 Manifold Flowrate (CFM)	1
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	3
AS-19-E08 Manifold Flowrate (CFM)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	18
AS-19-G02 Manifold Flowrate (CFM)	1
AS-19-G05 Manifold Pressure (PSIG)	10

AS-19-G05 Manifold Flowrate (CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	1
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	5
AS-19-E07 Manifold Flowrate (CFM)	3.5
AS-19-E10 Manifold Pressure (PSIG)	9
AS-19-E10 Manifold Flowrate (CFM)	5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	16
AS-19-G04 Manifold Flowrate (CFM)	2.5
AS-19-G07 Manifold Pressure (PSIG)	6
AS-19-G07 Manifold Flowrate (CFM)	4
AS-19-G10 Manifold Pressure (PSIG)	3
AS-19-G10 Manifold Flowrate (CFM)	7
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	7
AS-19-E06 Manifold Flowrate (CFM)	7
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	4
AS-19-E12 Manifold Pressure (PSIG)	6
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	6
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	5
AS-19-F06 Manifold Pressure (PSIG)	6
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	4
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	25
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	1
AS-19-E11 Manifold Flowrate (CFM)	6
AS-19-F11 Manifold Pressure (PSIG)	2
AS-19-F11 Manifold Flowrate (CFM)	2
AS-19-F08 Manifold Pressure (PSIG)	1
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	7
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	10
AS-19-F02 Manifold Flowrate (CFM)	3
AS-19-B05 Manifold Pressure (PSIG)	4
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	4
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	4
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	5
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	1
AS-19-F04 Manifold Flowrate (CFM)	4
AS-19-F01 Manifold Pressure (PSIG)	8
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	8
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	1

Outdoors and General

Propane tank level (%)	30
Number of condensate drums outside	12

Drum Photo

Electric Meter Reading (kWh)	242543
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Removed trash from building, turned on heat in both rooms, plugged in heating blankets, drain hoses for recirculating tanks, open compressor vent to 45 degrees, and pumped condensate into 3 drums. Labeled the 3 condensate drums.
Signature	 Signed 2/4/2022, 2:57:49 PM UTC
Departure Time	11:30

Inspection Date	March 4, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	13:30
Personnel	Billy J Cobern
Weather	Partly Cloudy, 30's

HMI and Control Panel

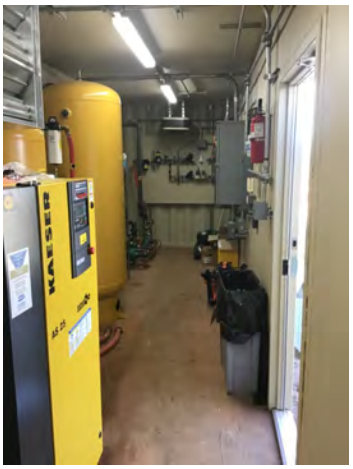
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	6.011
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.7
FQI-101 (SLPM)	1863
PIT-201 (PSIA)	72.1
PIT-300 (PSIG)	23.9
FQI-201 (LPM)	0.014
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	Cleaned the auto drain screen

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, Take oil sample
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)	12463
Oil Pressure (PSIG)	125
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	5
PI-101 (PSIG)	130
PI-102 (PSIG)	110
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
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	30.6
MFC-101 standardized flow rate on display (SLPM)	1861
MFC-101 uncorrected flow rate on display (LPM)	431
Comments	Need labels on Alicat for A/B, removed trash from building

Non-XP room photo



XP-Room

First Aid Kit Expiration Date	March 31, 2022
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)	49
MFC-201 temperature	34.28
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.65
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.16
PI-300 (PSIG)	27
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	18

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	21
AS-19-G01 Manifold Flowrate (CFM)	2
AS-19-G03 Manifold Pressure (PSIG)	22
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	2
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	0
AS-19-E02 Manifold Flowrate (CFM)	1
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	1
AS-19-E08 Manifold Flowrate (CFM)	5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	16
AS-19-G02 Manifold Flowrate (CFM)	2
AS-19-G05 Manifold Pressure (PSIG)	4

AS-19-G05 Manifold Flowrate (CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	1
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (CFM)	3.5
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	16
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	1
AS-19-G10 Manifold Flowrate (CFM)	7
AS-19-E03 Manifold Pressure (PSIG)	8
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	3
AS-19-E06 Manifold Flowrate (CFM)	4
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	4
AS-19-E12 Manifold Pressure (PSIG)	2
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	6
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	5
AS-19-F06 Manifold Pressure (PSIG)	6
AS-19-F06 Manifold Flowrate (CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	5
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	25
AS-19-B06 Manifold Flowrate (CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	8
AS-19-E11 Manifold Flowrate (CFM)	6
AS-19-F11 Manifold Pressure (PSIG)	10
AS-19-F11 Manifold Flowrate (CFM)	2
AS-19-F08 Manifold Pressure (PSIG)	7
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	5
AS-19-F05 Manifold Flowrate (CFM)	5
AS-19-F02 Manifold Pressure (PSIG)	9
AS-19-F02 Manifold Flowrate (CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	4
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	3
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

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

Outdoors and General

Propane tank level (%)	74
Number of condensate drums outside	10

Drum Photo

Electric Meter Reading (kWh)	256180
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	8 empty drums and 2 full drums
Signature	 Signed 3/4/2022, 7:00:35 PM UTC
Departure Time	14:30

Inspection Date	April 1, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	09:00
Personnel	Billy J Cobern
Weather	Cloudy, 30's

HMI and Control Panel

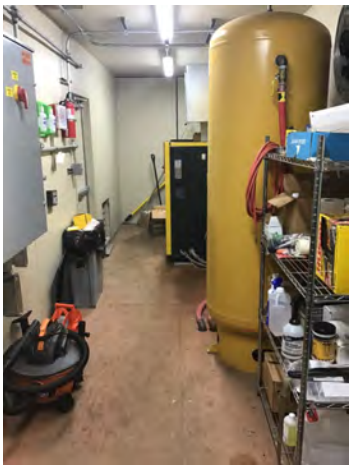
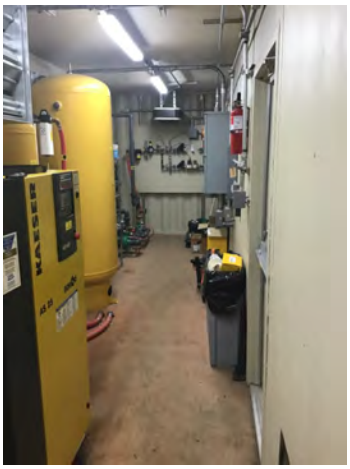
HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	5.582
PIT-101 (PSIG)	51
PIT-102 (PSIA)	64.6
FQI-101 (SLPM)	2002
PIT-201 (PSIA)	68
PIT-300 (PSIG)	17.2
FQI-201 (LPM)	0.027
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	Cleaned the auto drain screen, auto drain solenoid stuck open, valve at 50%

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, Take oil sample
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)	13085
Oil Pressure (PSIG)	119
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	25
PI-101 (PSIG)	123
PI-102 (PSIG)	110
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
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	17.95
MFC-101 standardized flow rate on display (SLPM)	2000
MFC-101 uncorrected flow rate on display (LPM)	444
Comments	Need labels on Alicat for A/B, removed trash from building

Non-XP room photo

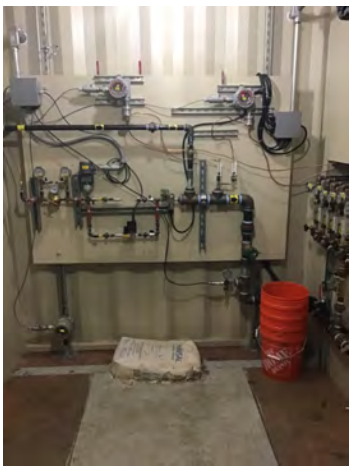
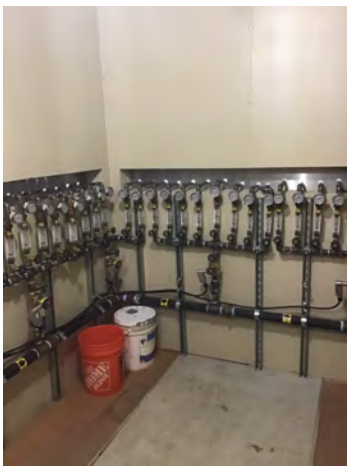




XP-Room

First Aid Kit Expiration Date	March 31, 2022
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)	50
MFC-201 temperature	32.71
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)	2.64
PI-300 (PSIG)	22
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	17

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	New first aid kit and eye wash have been ordered

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	22
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	23
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	2
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	0
AS-19-E02 Manifold Flowrate (CFM)	0
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	1
AS-19-E08 Manifold Flowrate (CFM)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	17
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	10

AS-19-G05 Manifold Flowrate (CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	2
AS-19-G08 Manifold Flowrate (CFM)	3
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	1
AS-19-E04 Manifold Flowrate (CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	6
AS-19-E07 Manifold Flowrate (CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	8
AS-19-E10 Manifold Flowrate (CFM)	5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	7
AS-19-G10 Manifold Flowrate (CFM)	6
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	8
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	4
AS-19-E12 Manifold Pressure (PSIG)	5
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	5
AS-19-F09 Manifold Flowrate (CFM)	5
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	6
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	24
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	4
AS-19-E11 Manifold Flowrate (CFM)	6
AS-19-F11 Manifold Pressure (PSIG)	4
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	2
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	6
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	15
AS-19-F02 Manifold Flowrate (CFM)	8
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	2

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	3
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	15
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	11
AS-19-F04 Manifold Flowrate (CFM)	1.5
AS-19-F01 Manifold Pressure (PSIG)	8
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	8
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	14
AS-19-B01 Manifold Flowrate (CFM)	0

Outdoors and General

Propane tank level (%)	61
Number of condensate drums outside	10

Drum Photo

Electric Meter Reading (kWh)	272819
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	8 empty drums and 2 drums with some liquid
Signature	 Signed 4/1/2022, 3:32:00 PM UTC
Departure Time	15:00

Inspection Date	May 4, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	09:00
Personnel	Billy J Cobern
Weather	Cloudy, 40's-50's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.007
PIT-101 (PSIG)	54.5
PIT-102 (PSIA)	68.6
FQI-101 (SLPM)	0
PIT-201 (PSIA)	67
PIT-300 (PSIG)	10.8
FQI-201 (LPM)	0.024
AE-350 (%LEL)	0.2
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	Cleaned the auto drain screen, auto drain solenoid stuck open, valve at 50%

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)	13809
Oil Pressure (PSIG)	120
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	40
PI-101 (PSIG)	121
PI-102 (PSIG)	118
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
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	24.63
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	Need labels on Alicat for A/B, pumped condensate into 3 drums (2 full, 1 at 10%), 22 empty drum, 2 full drums, and 1 partial drum

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	March 31, 2022
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)	54
MFC-201 temperature	32.32
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.59
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.51
PI-300 (PSIG)	27
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	15

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	New first aid kit and eye wash have been ordered

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	30
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	30
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	2
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	10
AS-19-E02 Manifold Flowrate (CFM)	4
AS-19-E05 Manifold Pressure (PSIG)	2
AS-19-E05 Manifold Flowrate (CFM)	3
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	3

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	22
AS-19-G02 Manifold Flowrate (CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	15

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

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	17
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	8
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	6
AS-19-G10 Manifold Flowrate (CFM)	8
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	7
AS-19-E09 Manifold Pressure (PSIG)	5
AS-19-E09 Manifold Flowrate (CFM)	3.5
AS-19-E12 Manifold Pressure (PSIG)	8
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4.5
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	1.5
AS-19-B03 Manifold Pressure (PSIG)	12
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3.5
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	8
AS-19-F08 Manifold Flowrate (CFM)	4
AS-19-F05 Manifold Pressure (PSIG)	11
AS-19-F05 Manifold Flowrate (CFM)	5
AS-19-F02 Manifold Pressure (PSIG)	15
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)	6
AS-19-B02 Manifold Flowrate (CFM)	3.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	4
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	6
AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	7
AS-19-B04 Manifold Flowrate (CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	0.5

Outdoors and General

Propane tank level (%)	55
Number of condensate drums outside	25

Drum Photo

Electric Meter Reading (kWh)	288413
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Pumped condensate into drums
Signature	 Signed 5/4/2022, 4:37:16 PM UTC
Departure Time	13:45

Inspection Date	June 3, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	11:30
Personnel	Billy J Cobern
Weather	Partly Cloudy, windy, 60's-70's

HMI and Control Panel

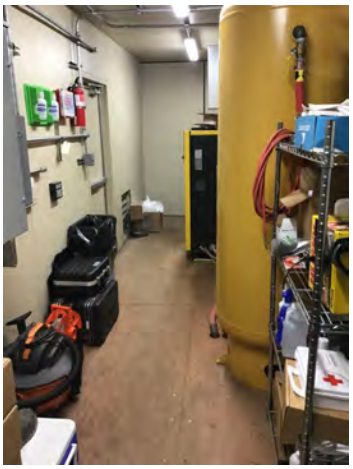
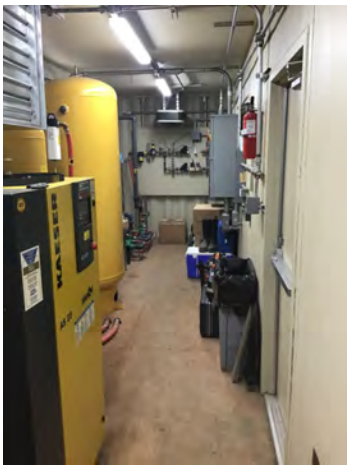
HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.008
PIT-101 (PSIG)	50.8
PIT-102 (PSIA)	64.4
FQI-101 (SLPM)	2003
PIT-201 (PSIA)	68
PIT-300 (PSIG)	18
FQI-201 (LPM)	0.025
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	Cleaned the auto drain screen, auto drain solenoid stuck open, valve at 50%

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?	No
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, Take oil sample
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)	14480
Oil Pressure (PSIG)	124
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	30
PI-101 (PSIG)	130
PI-102 (PSIG)	102
PI-103 (PSIG)	48
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), CF-101 Verify auto drain operational, PF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	Electric box Open panel to ensure there are no tripped circuit breakers, S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, PI-103 Verify pressure, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., AD-101 Verify the silencers are not clogged, AD-101 Verify the drying-and-regeneration cycle is normal, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., TCA-101 Inspect for debris sludge clean
Semiannual Non-XP Instrument Maintenance	
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-101B (newer)
MFC-101 compressed air temperature	27.69
MFC-101 standardized flow rate on display (SLPM)	2001
MFC-101 uncorrected flow rate on display (LPM)	460
Comments	Need labels on Alicat for A/B, pumped condensate into 3 drums (2 full, 1 at 10%), 22 empty drum, 2 full drums, and 1 partial drum

Non-XP room photo

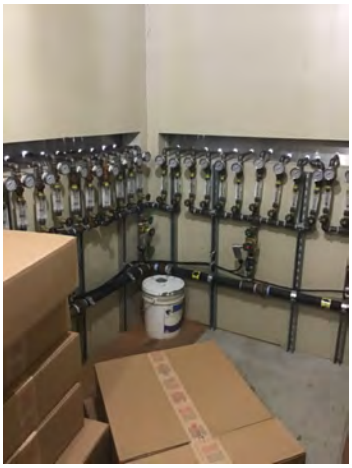



XP-Room

First Aid Kit Expiration Date	March 31, 2022
Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater turned on and verified to be operating?	No
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	70
PI-202 (PSIG)	50
MFC-201 temperature	33.03
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)	2.74
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, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click), FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI
Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	15

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-500 calibrated, AE-351 calibrated, AE-351 not calibrated.
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	New first aid kit and eye wash have been ordered, calibrated AE-500 and AE-350. AE-351 is off line.

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	25
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	25
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	15
AS-19-E02 Manifold Flowrate (CFM)	1
AS-19-E05 Manifold Pressure (PSIG)	1
AS-19-E05 Manifold Flowrate (CFM)	3
AS-19-E08 Manifold Pressure (PSIG)	5
AS-19-E08 Manifold Flowrate (CFM)	3

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (CFM)	1
AS-19-G05 Manifold Pressure (PSIG)	10

AS-19-G05 Manifold Flowrate (CFM)	4
AS-19-G08 Manifold Pressure (PSIG)	3
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	8
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)	15
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	6
AS-19-E03 Manifold Pressure (PSIG)	3
AS-19-E03 Manifold Flowrate (CFM)	7
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	8
AS-19-E09 Manifold Pressure (PSIG)	3
AS-19-E09 Manifold Flowrate (CFM)	3.5
AS-19-E12 Manifold Pressure (PSIG)	8
AS-19-E12 Manifold Flowrate (CFM)	3

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	6
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	6
AS-19-F06 Manifold Flowrate (CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	5.5

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	1.5
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	8
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	5
AS-19-F05 Manifold Flowrate (CFM)	5
AS-19-F02 Manifold Pressure (PSIG)	10
AS-19-F02 Manifold Flowrate (CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	3.5
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	3.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	2
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	7
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	1.5
AS-19-F01 Manifold Pressure (PSIG)	6
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	18
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	4
AS-19-B04 Manifold Flowrate (CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	8
AS-19-B01 Manifold Flowrate (CFM)	0.5

Outdoors and General

Propane tank level (%)	40
Number of condensate drums outside	3

Drum Photo


Electric Meter Reading (kWh)	302202
Last fire extinguisher certification date	
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Pumped condensate into drums
Signature	 Signed 6/3/2022, 4:03:34 PM UTC
Departure Time	12:30

Inspection Date	July 1, 2022
Last Quarterly Event Date	June 3, 2022
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Cloudy, humid, 70’s-80’s

HMI and Control Panel

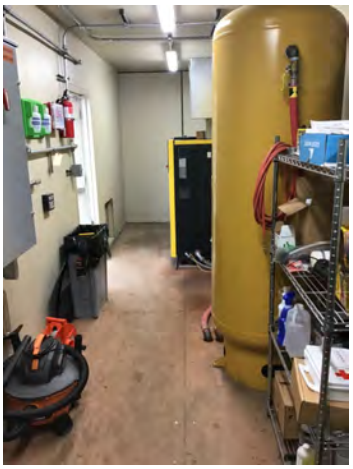
HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.011
PIT-101 (PSIG)	54.4
PIT-102 (PSIA)	68.5
FQI-101 (SLPM)	0
PIT-201 (PSIA)	68.3
PIT-300 (PSIG)	12.1
FQI-201 (LPM)	0.018
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	

Non-XP Room

Fire Extinguisher Check	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	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)	15089
Oil Pressure (PSIG)	112
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	80
The condensate drum needs to be transferred to an outdoor drum (use RED TAPED submersible pump)	Complete
PI-101 (PSIG)	120
PI-102 (PSIG)	120
PI-103 (PSIG)	52
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
Semiannual Non-XP Instrument Maintenance	
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	31.76
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	

Non-XP room photo

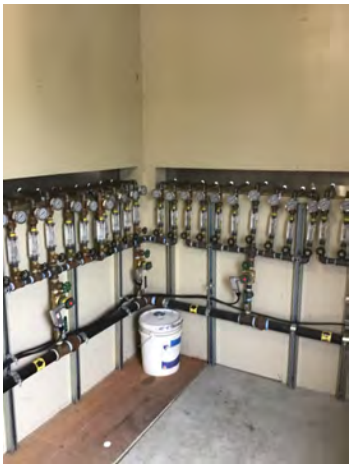


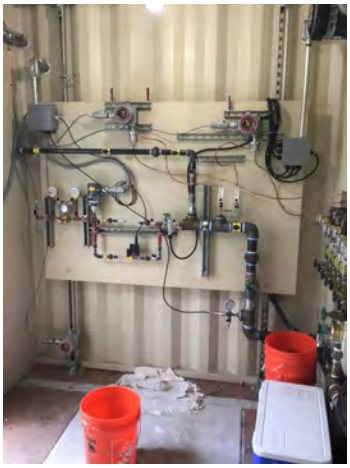

XP-Room

First Aid Kit Expiration Date	July 1, 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)	50
MFC-201 temperature	40.47
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.94
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	15

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	Pumped condensate into drums

XP-room photo





Zone 1

AS-19-G01 Manifold Pressure (PSIG)	30
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	30
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	5
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	10
AS-19-E02 Manifold Flowrate (CFM)	4
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	3.5
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	2.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (CFM)	2
AS-19-G05 Manifold Pressure (PSIG)	5

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

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	6.5
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	4
AS-19-E06 Manifold Flowrate (CFM)	8
AS-19-E09 Manifold Pressure (PSIG)	3
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	10
AS-19-E12 Manifold Flowrate (CFM)	3.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	6
AS-19-F09 Manifold Flowrate (CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	0.5
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	10
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	4
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	8
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	4
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	2
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	2
AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	5
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	30
Number of condensate drums outside	7

Drum Photo




Electric Meter Reading (kWh)	312936
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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?	No
Comments, questions, ruminations, suggestions for improvement?	Filled 4 condensate drums. Total is now 7
Signature	 Signed 7/1/2022, 12:40:54 PM UTC
Departure Time	10:25

Inspection Date	August 5, 2022
Last Quarterly Event Date	June 3, 2022
Arrival Time	10:00
Personnel	Billy J Cobern
Weather	Cloudy, humid, 70’s-80’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	0
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.8
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	17.3
PIT-300 (PSIG)	31.2
FQI-201 (LPM)	0.001
AE-350 (%LEL)	0
AE-351 (%LEL)	0
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	AE 351 & AE 500 disabled. Changed out Alicats

Non-XP Room

Fire Extinguisher Check	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	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)	15868
Oil Pressure (PSIG)	111
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	50
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
Semiannual Non-XP Instrument Maintenance	
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-101B (newer)
MFC-101 compressed air temperature	26.05
MFC-101 standardized flow rate on display (SLPM)	1862
MFC-101 uncorrected flow rate on display (LPM)	423
Comments	Changed Alicats

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 1, 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)	60
MFC-201 temperature	30.17
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.6
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.87
PI-300 (PSIG)	31
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	15

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	Pumped condensate into drums

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	30
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	30
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	5
AS-19-E02 Manifold Flowrate (CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	3
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (CFM)	1
AS-19-G05 Manifold Pressure (PSIG)	4

AS-19-G05 Manifold Flowrate (CFM)	5
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (CFM)	2

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	4
AS-19-G07 Manifold Pressure (PSIG)	8
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	7
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	8
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	6
AS-19-E09 Manifold Pressure (PSIG)	5
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	15
AS-19-E12 Manifold Flowrate (CFM)	2

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	5
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	6
AS-19-F03 Manifold Pressure (PSIG)	5
AS-19-F03 Manifold Flowrate (CFM)	6

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	0.5
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

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

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	2
AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	6
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	79
Number of condensate drums outside	7

Drum Photo

Electric Meter Reading (kWh)	326279
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	
Checked wellheads for leaks/hissing?	
Comments on car parkers and site accessibility:	

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?	No
Comments, questions, ruminations, suggestions for improvement?	7 condensate drums and 6 empty drums. Walked the transects and no leaks, damage, or unusual noises were observed. Placed 1 empty drum outside fence.
Signature	 Signed 8/5/2022, 5:26:44 PM UTC
Departure Time	13:45

Inspection Date	September 1, 2022
Last Quarterly Event Date	June 3, 2022
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Partly Cloudy 60’s-80’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	0
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.8
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	17.3
PIT-300 (PSIG)	31.2
FQI-201 (LPM)	0.001
AE-350 (%LEL)	0
AE-351 (%LEL)	0
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	AE 351 & AE 500 disabled.

Non-XP Room

Fire Extinguisher Check	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	Cooler: Change filter mat, Control Cabinet: Change filter mat, Take oil sample
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	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)	16455
Oil Pressure (PSIG)	124
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	100
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
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-101B (newer)
MFC-101 compressed air temperature	24.64
MFC-101 standardized flow rate on display (SLPM)	2002
MFC-101 uncorrected flow rate on display (LPM)	451

Comments	Exhaust fan not working upon arrival. Auto drain to wet receiver tank not working. Only about 50 gallons of water recovered in the condensate tank since last visit. Trident air dryer not working. Determined that GFCI outlet that they all plug into is not working. SOLA surge suppressor to the PLC is in Service mode. Pumped 150 gallons of condensate from the wet and dry receiver tanks into condensate tank. Pumped condensate into 4 drums.

Non-XP room photo

GFCI #5 not working

SOLA surge suppressor in Service mode

XP-Room

First Aid Kit Expiration Date	July 1, 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)	50
MFC-201 temperature	25.57
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)	2.42
PI-300 (PSIG)	22
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)., FQI-351/352 verify rate
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	19
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-351 calibrated, AE-500 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	Pumped condensate into drums

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	18
AS-19-G01 Manifold Flowrate (CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	2
AS-19-E02 Manifold Pressure (PSIG)	9
AS-19-E02 Manifold Flowrate (CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	1
AS-19-E05 Manifold Flowrate (CFM)	2
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	1

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	8
AS-19-G05 Manifold Flowrate (CFM)	5
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	11
AS-19-E10 Manifold Flowrate (CFM)	2

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	10
AS-19-G04 Manifold Flowrate (CFM)	6
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (CFM)	5
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	7
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	7
AS-19-E06 Manifold Pressure (PSIG)	4
AS-19-E06 Manifold Flowrate (CFM)	8
AS-19-E09 Manifold Pressure (PSIG)	5
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	11
AS-19-E12 Manifold Flowrate (CFM)	2

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	3
AS-19-F09 Manifold Pressure (PSIG)	10

AS-19-F09 Manifold Flowrate (CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	9
AS-19-F06 Manifold Flowrate (CFM)	4
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)	8
AS-19-B03 Manifold Flowrate (CFM)	4.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	8
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	5
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	8
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	4
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	2
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	5
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	2
AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	2

AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	5
AS-19-B01 Manifold Flowrate (CFM)	1

Outdoors and General

Propane tank level (%)	70
Number of condensate drums outside	4

Drum Photo

Electric Meter Reading (kWh)	337869
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	All intact
Comments on car parkers and site accessibility:	They still drive too fast

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?	No
Comments, questions, ruminations, suggestions for improvement?	Generated 4 condensate drums
Signature	Signed 9/1/2022, 2:16:55 PM UTC
Departure Time	14:45

Inspection Date	October 3, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	12:30
Personnel	Billy J Cobern
Weather	Partly Cloudy 40’s-60’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	5.996
PIT-101 (PSIG)	51.2
PIT-102 (PSIA)	65.4
FQI-101 (SLPM)	1859
PIT-201 (PSIA)	68.8
PIT-300 (PSIG)	17.9
FQI-201 (LPM)	0.211
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	AE 351 & AE 500 disabled.

Non-XP Room

Fire Extinguisher Check	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?	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)	17032
Oil Pressure (PSIG)	109
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	50
PI-101 (PSIG)	130
PI-102 (PSIG)	100
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
Semiannual Non-XP Instrument Maintenance	
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-101B (newer)
MFC-101 compressed air temperature	18.16
MFC-101 standardized flow rate on display (SLPM)	18.58
MFC-101 uncorrected flow rate on display (LPM)	408
Comments	Cleaned auto drain screen several times. Released 25 gallons of water from the wet receiver tank into the condensate tank. The screen kept plugging.

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	July 1, 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)	50
MFC-201 temperature	22.4
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)	2.63
PI-300 (PSIG)	22
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)., FQI-351/352 verify rate
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	17

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	Pumped condensate into drums

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	28
AS-19-G01 Manifold Flowrate (CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	28
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	8
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	2
AS-19-E02 Manifold Pressure (PSIG)	8
AS-19-E02 Manifold Flowrate (CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	3.5
AS-19-E08 Manifold Pressure (PSIG)	2
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	20
AS-19-G02 Manifold Flowrate (CFM)	0.5
AS-19-G05 Manifold Pressure (PSIG)	10

AS-19-G05 Manifold Flowrate (CFM)	4
AS-19-G08 Manifold Pressure (PSIG)	2
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	8
AS-19-E10 Manifold Flowrate (CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	4
AS-19-G10 Manifold Pressure (PSIG)	8
AS-19-G10 Manifold Flowrate (CFM)	5
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	6
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	7
AS-19-E09 Manifold Pressure (PSIG)	3
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	10
AS-19-E12 Manifold Flowrate (CFM)	3

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	2
AS-19-F09 Manifold Pressure (PSIG)	4
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)	5
AS-19-F03 Manifold Flowrate (CFM)	5

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

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	2
AS-19-F11 Manifold Pressure (PSIG)	4
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	5
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	8
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	10
AS-19-F02 Manifold Flowrate (CFM)	4
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	4
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	1
AS-19-F01 Manifold Pressure (PSIG)	4
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	8
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	7
AS-19-B04 Manifold Flowrate (CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	11
AS-19-B01 Manifold Flowrate (CFM)	0.5

Outdoors and General

Propane tank level (%)	50
Number of condensate drums outside	4
Drum Photo	
Electric Meter Reading (kWh)	348873
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	All intact
Comments on car parkers and site accessibility:	They still drive too fast

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?	No
Comments, questions, ruminations, suggestions for improvement?	Generated 4 condensate drums
Signature	 Signed 10/3/2022, 5:56:42 PM UTC
Departure Time	15:45

Inspection Date	November 4, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	09:00
Personnel	Billy J Cobern
Weather	Partly Cloudy 40’s-60’s

HMI and Control Panel

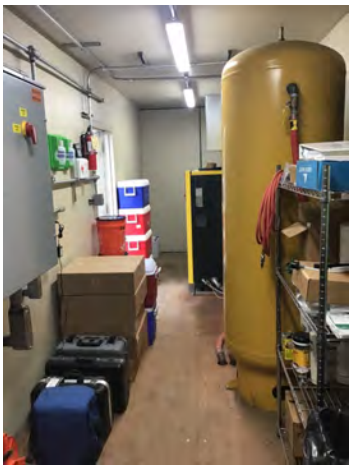
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	5.996
PIT-101 (PSIG)	51
PIT-102 (PSIA)	65.2
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	71.3
PIT-300 (PSIG)	30.5
FQI-201 (LPM)	0.033
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	AE 351 & AE 500 disabled.

Non-XP Room

Fire Extinguisher Check	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?	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)	17754
Oil Pressure (PSIG)	121
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	25
PI-101 (PSIG)	125
PI-102 (PSIG)	105
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
Semiannual Non-XP Instrument Maintenance	
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-101B (newer)
MFC-101 compressed air temperature	21.6
MFC-101 standardized flow rate on display (SLPM)	1858
MFC-101 uncorrected flow rate on display (LPM)	414
Comments	Cleaned auto drain screen. Turned on heater.

Non-XP room photo

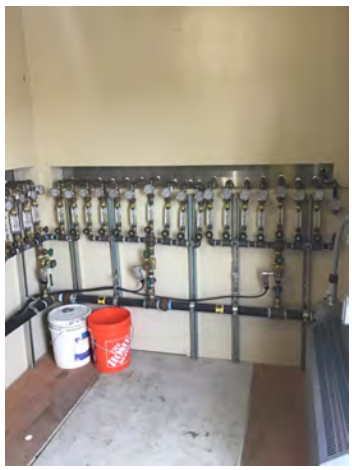


XP-Room

First Aid Kit Expiration Date	July 1, 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)	58
MFC-201 temperature	33.11
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.61
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.37
PI-300 (PSIG)	32
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)., FQI-351/352 verify rate
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	15

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	Turned heater to 70 and verified operation.

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	28
AS-19-G01 Manifold Flowrate (CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	30
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	8
AS-19-G06 Manifold Flowrate (CFM)	5
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	2
AS-19-E02 Manifold Pressure (PSIG)	0
AS-19-E02 Manifold Flowrate (CFM)	2
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	2
AS-19-E08 Manifold Pressure (PSIG)	1
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	21
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	9

AS-19-G05 Manifold Flowrate (CFM)	4
AS-19-G08 Manifold Pressure (PSIG)	3
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	13
AS-19-E10 Manifold Flowrate (CFM)	2

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	14
AS-19-G04 Manifold Flowrate (CFM)	4
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	4
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	5
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	7
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	7.5
AS-19-E09 Manifold Pressure (PSIG)	8
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	15
AS-19-E12 Manifold Flowrate (CFM)	1.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	7
AS-19-F12 Manifold Flowrate (CFM)	2
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	6
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	6
AS-19-F03 Manifold Flowrate (CFM)	5.5

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	3
AS-19-E11 Manifold Flowrate (CFM)	2
AS-19-F11 Manifold Pressure (PSIG)	9
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	10
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	6
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	10
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	2
AS-19-F10 Manifold Flowrate (CFM)	2
AS-19-F07 Manifold Pressure (PSIG)	11
AS-19-F07 Manifold Flowrate (CFM)	2
AS-19-F04 Manifold Pressure (PSIG)	12
AS-19-F04 Manifold Flowrate (CFM)	1
AS-19-F01 Manifold Pressure (PSIG)	2
AS-19-F01 Manifold Flowrate (CFM)	2.5
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	2
AS-19-B04 Manifold Pressure (PSIG)	10
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	8
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	40
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	362564
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	All wells appear to be intact. Orange barrels, chains, fencing is beyond repair.
Comments on car parkers and site accessibility:	Had to have Precision move cars away from gate on Monday.
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?	No
Comments, questions, ruminations, suggestions for improvement?	14 empty drums inside fenced enclosure.
Signature	 Signed 11/4/2022, 2:24:14 PM UTC
Departure Time	10:30

Inspection Date	December 2, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	09:45
Personnel	Billy J Cobern
Weather	Cloudy 30's-40's

HMI and Control Panel

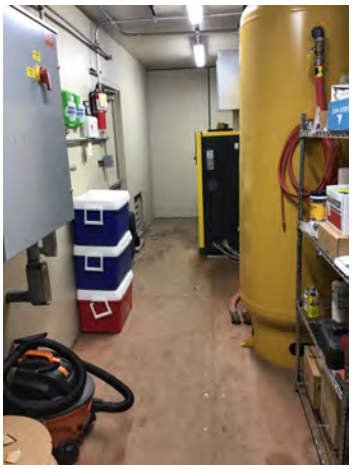
HMI display functioning (not frozen)?	Yes
Current zone	Zone 2 and 5
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	6
PIT-101 (PSIG)	51
PIT-102 (PSIA)	65.1
FQI-101 (SLPM)	2002
PIT-201 (PSIA)	81.1
PIT-300 (PSIG)	18
FQI-201 (LPM)	0.087
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted time
UPS enabled?	Yes
Comments	AE 351 & AE 500 disabled.

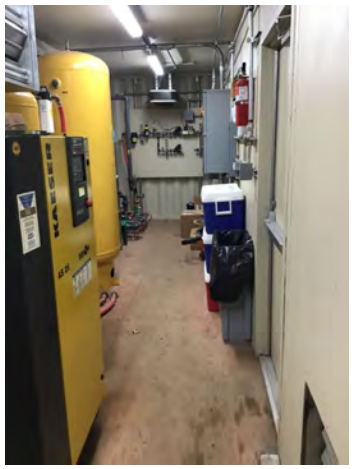
Non-XP Room

Fire Extinguisher Check	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	Cooler: Change filter mat, Control Cabinet: Change filter mat, Take oil sample, No oil sample
Semiannual Compressor Maintenance	N/A
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)	18398
Oil Pressure (PSIG)	126
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	50
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	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
Semiannual Non-XP Instrument Maintenance	N/A
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-101B (newer)
MFC-101 compressed air temperature	24.22
MFC-101 standardized flow rate on display (SLPM)	2001
MFC-101 uncorrected flow rate on display (LPM)	451
Comments	Cleaned auto drain screen.

Non-XP room photo





XP-Room

First Aid Kit Expiration Date	July 1, 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)	75
PI-202 (PSIG)	50
MFC-201 temperature	25.01
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)	2.76
PI-300 (PSIG)	20
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)., FQI-351/352 verify rate
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	N/A
AE-500 Reading	0
AE-350 reading during propane sparge cycle	17

AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-351 calibrated, AE-500 calibrated, AE-351 and AE-500 are off line and we're not calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	N/A

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	28
AS-19-G01 Manifold Flowrate (CFM)	0.5
AS-19-G03 Manifold Pressure (PSIG)	30
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	4
AS-19-E02 Manifold Flowrate (CFM)	4
AS-19-E05 Manifold Pressure (PSIG)	0
AS-19-E05 Manifold Flowrate (CFM)	2
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	2

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	21
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	10

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

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (CFM)	4
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	5
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	7
AS-19-E06 Manifold Pressure (PSIG)	4
AS-19-E06 Manifold Flowrate (CFM)	8
AS-19-E09 Manifold Pressure (PSIG)	4
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	8
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	2
AS-19-F09 Manifold Pressure (PSIG)	5
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (CFM)	5

AS-19-B06 Manifold Pressure (PSIG)	30
AS-19-B06 Manifold Flowrate (CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	9
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	2
AS-19-F11 Manifold Pressure (PSIG)	5
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	6
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	5
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	10
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	8
AS-19-B05 Manifold Flowrate (CFM)	3
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	1
AS-19-F10 Manifold Flowrate (CFM)	1
AS-19-F07 Manifold Pressure (PSIG)	3
AS-19-F07 Manifold Flowrate (CFM)	0
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	8
AS-19-F01 Manifold Flowrate (CFM)	2
AS-19-B07 Manifold Pressure (PSIG)	4
AS-19-B07 Manifold Flowrate (CFM)	3.5
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	2
AS-19-B01 Manifold Pressure (PSIG)	8
AS-19-B01 Manifold Flowrate (CFM)	12

Outdoors and General

Propane tank level (%)	25
Number of condensate drums outside	0

Drum Photo

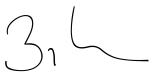
Electric Meter Reading (kWh)	380279
Last fire extinguisher certification date	July 1, 2022
Walked hose corridors and fixed fallen barrels?	Yes
Checked wellheads for leaks/hissing?	Yes
Comments on wellheads:	All wells appear to be intact. Orange barrels, chains, fencing is beyond repair.
Comments on car parkers and site accessibility:	Ok

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?	No
Comments, questions, ruminations, suggestions for improvement?	11 empty drums inside fenced enclosure.
Signature	 Signed 12/2/2022, 4:23:20 PM UTC
Departure Time	11:45

Inspection Date	January 7, 2022
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Cloudy, snow, cold

HMI and Control Panel

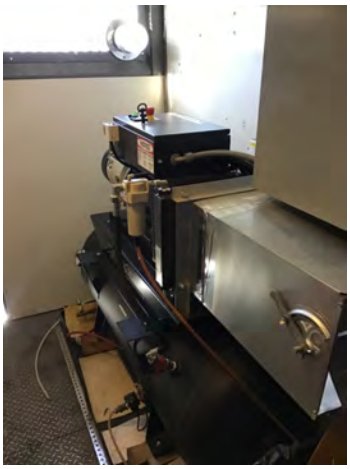
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	48.2
PIT-102 (PSIA)	27.1
FQI-101 (SLPM)	300.3
FQI-201 (SLPM)	0
PIT-202 (PSIA)	46.5
FE-301 (LPM)	300.4
AE-350 (%LEL)	0
PIT-300 (PSIG)	14.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Set time, but could not adjust minutes
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Replaced AE-401 LEL sensor and calibrated

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	1044605
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	1
Number of air filters remaining	2
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	204
Motor Current while loading (amps)	14.61
Motor RPMs while loading	1796
VFD thermal state	56
VFD line voltage in (while compressor is loading)	228.5
Wet receiver tank loading pressure (PI-101)	88
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	29
PI-102 (PSIG)	50
PI-103 (PSIG)	49
Trident Desiccant Dryer Pressure (PSIG)	62
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel
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)	69.28
MFC-101 standardized flow rate on display (SLPM)	299.2
MFC-101 uncorrected flow rate on display (LPM)	150.5
Comments	

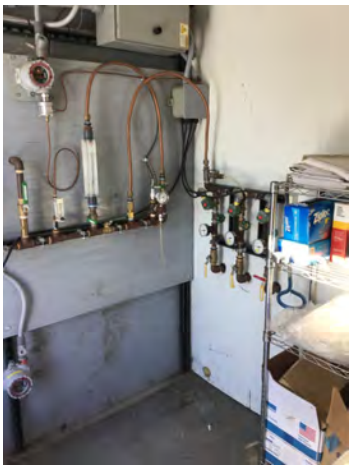
Non-XP room photo



Classified Room

First Aid Kit Expiration Date	August 31, 2021
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	Completed at last visit and not used
PI-201 (PSIG)	69
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	71.78
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.599
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.303
PI-300 (PSIG)	12
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	9
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	11
Quarterly LEL Meter Calibration	AE-401 calibrated, AE-350 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	Sensor replaced AE-401

XP-room photo



Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	7
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	4
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	96552
Electric meter power draw (kW) while compressor is on	10.66
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	

Comments on car parkers and site accessibility:	
Car parking photos if near buildings	
Last fire extinguisher certification date	
Quarterly Building Maintenance Tasks	
System building photo	
Photos	
Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 1/7/2022, 6:39:16 PM UTC
Departure Time	14:30

Inspection Date	February 4, 2022
Last Quarterly Event Date	December 4, 2020
Arrival Time	11:30
Personnel	Billy J Cobern
Weather	Mostly Cloudy, zero-teens

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	49.1
PIT-102 (PSIA)	28.3
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	0
PIT-202 (PSIA)	27.5
FE-301 (LPM)	299.7
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.5
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Can not adjust minutes
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	1092056
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	1
Number of air filters remaining	2
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	207
Motor Current while loading (amps)	14.64
Motor RPMs while loading	1800
VFD thermal state	63
VFD line voltage in (while compressor is loading)	229.1
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	29
PI-102 (PSIG)	50
PI-103 (PSIG)	49
Trident Desiccant Dryer Pressure (PSIG)	55
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	75
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)	70.09
MFC-101 standardized flow rate on display (SLPM)	299.8
MFC-101 uncorrected flow rate on display (LPM)	147.5
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 31, 2021
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)	48
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	43.41
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.599
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.275
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	11
Quarterly LEL Meter Calibration	AE-401 calibrated, AE-350 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	Sensor replaced

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	8
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	11
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	4
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	102282
Electric meter power draw (kW) while compressor is on	10.21
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	
Comments on car parkers and site accessibility:	
Car parking photos if near buildings	
Last fire extinguisher certification date	
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 2/4/2022, 6:22:07 PM UTC
Departure Time	14:30

Error

```
Error: ejs:1
 >> 1| <% _initialize(typeof initialize != 'undefined' ? initialize : null); global._ECHO = _ECHO; %><%
    2| DATA.config.advanced = true;
    3|
    4| const REPORT_CONFIG = {

HTTP 504: <html>

<head><title>504 Gateway Time-out</title></head>

<body>

<center><h1>504 Gateway Time-out</h1></center>

</body>

</html>
```

Inspection Date	March 4, 2022
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:35
Personnel	Billy J Cobern
Weather	Partly Cloudy 20’s-30’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)	49.1
PIT-102 (PSIA)	27.7
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	28.9
FE-301 (LPM)	300.1
AE-350 (%LEL)	0
PIT-300 (PSIG)	17.4
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Can not adjust minutes
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	11469400
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2, None of these were done
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	2
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	217
Motor Current while loading (amps)	14.69
Motor RPMs while loading	1800
VFD thermal state	53
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	29.5
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	60
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel

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), Did not open the air dryers
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	75
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)	57.51
MFC-101 standardized flow rate on display (SLPM)	300.5
MFC-101 uncorrected flow rate on display (LPM)	142.5
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 31, 2021
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)	48
MFC-201 temperature (Fahrenheit)	65.3
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.289
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.289

PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	11
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	9
Quarterly LEL Meter Calibration	AE-350 calibrated, Installed new sensor AE-350
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	Sensor replaced in AE 350

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	7
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	3
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	108633
Electric meter power draw (kW) while compressor is on	10.69
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	
Comments on car parkers and site accessibility:	
Car parking photos if near buildings	
Last fire extinguisher certification date	
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?	

Signature	 Signed 3/4/2022, 6:08:07 PM UTC
Departure Time	13:15

Inspection Date	April 1, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	12:30
Personnel	Billy J Cobern
Weather	Cloudy 20's-30'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)	49.3
PIT-102 (PSIA)	29.4
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	30.6
FE-301 (LPM)	300.7
AE-350 (%LEL)	6.9
PIT-300 (PSIG)	17.4
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Can not adjust minutes
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Started Zone 1 to collect 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	1192704
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2, None of these were done

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	2
Compressor Audio	2 Audio Files
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	219
Motor Current while loading (amps)	7.05
Motor RPMs while loading	1800
VFD thermal state	46
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	30.5
PI-102 (PSIG)	52
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	60
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel
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), Did not open the air dryers
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	75
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)	72.09
MFC-101 standardized flow rate on display (SLPM)	300.33

MFC-101 uncorrected flow rate on display (LPM)	144.27
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 31, 2021
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)	70
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	79.92
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.292
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.292
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	14
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	9
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)	12
AS-19-A02 Wellhead Pressure (PSIG)	9
AS-19-A03 Wellhead Pressure (PSIG)	15
AS-19-A04 Wellhead Pressure (PSIG)	12
AS-19-A05 Wellhead Pressure (PSIG)	15
AS-19-A06 Wellhead Pressure (PSIG)	4
AS-19-A07 Wellhead Pressure (PSIG)	11
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	114678
Electric meter power draw (kW) while compressor is on	10.62
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	
Comments on car parkers and site accessibility:	

Car parking photos if near buildings

Last fire extinguisher certification date	
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?	
Signature	Signed 4/1/2022, 4:59:35 PM UTC
Departure Time	15:00

Inspection Date	May 4, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	14:00
Personnel	Billy J Cobern
Weather	Cloudy 50'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)	21.5
PIT-102 (PSIA)	29.1
FQI-101 (SLPM)	299.7
FQI-201 (SLPM)	0
PIT-202 (PSIA)	21.4
FE-301 (LPM)	300.1
AE-350 (%LEL)	0
PIT-300 (PSIG)	16.5
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Can not adjust minutes
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	1249120
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2, None of these were done

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	2
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	219
Motor Current while loading (amps)	14.77
Motor RPMs while loading	1800
VFD thermal state	65
VFD line voltage in (while compressor is loading)	225
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	34
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	52
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel
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), Did not open the air dryers
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
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)	70.39
MFC-101 standardized flow rate on display (SLPM)	300.32

MFC-101 uncorrected flow rate on display (LPM)	143.64
Comments	Pumped condensate into drum

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 31, 2021
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)	85
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	76.51
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.29
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.29
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	12
PI-303 Z3 (PSIG)	5
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	9
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)	15
AS-19-A02 Wellhead Pressure (PSIG)	0
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	15
AS-19-A05 Wellhead Pressure (PSIG)	0
AS-19-A06 Wellhead Pressure (PSIG)	12
AS-19-A07 Wellhead Pressure (PSIG)	15
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	119383
Electric meter power draw (kW) while compressor is on	7.97
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	
Comments on car parkers and site accessibility:	

Car parking photos if near buildings

Last fire extinguisher certification date	
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?	
Signature	Signed 5/4/2022, 6:19:22 PM UTC
Departure Time	15:00

Inspection Date	June 3, 2022
Last Quarterly Event Date	March 4, 2022
Arrival Time	12:45
Personnel	Billy J Cobern
Weather	Partly Cloudy, windy, 60's-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)	21
PIT-102 (PSIA)	27.4
FQI-101 (SLPM)	299.7
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.1
FE-301 (LPM)	299.4
AE-350 (%LEL)	0
PIT-300 (PSIG)	14.9
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Can not adjust minutes
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?	No
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	13021780
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2, None of these were done

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	2
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	221
Motor Current while loading (amps)	14.55
Motor RPMs while loading	1800
VFD thermal state	64
VFD line voltage in (while compressor is loading)	225
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	10
PI-102 (PSIG)	20
PI-103 (PSIG)	20
Trident Desiccant Dryer Pressure (PSIG)	52
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, 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, PF-101 drained manually, Breaker panel surge protector green light on, Make sure there are no tripped breakers in the breaker panel
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), Did not open the air dryers
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
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)	78.6
MFC-101 standardized flow rate on display (SLPM)	300.12

MFC-101 uncorrected flow rate on display (LPM)	151.25
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 31, 2021
Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater turned on and verified to be operating?	No
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	125
PI-202 (PSIG)	49
MFC-201 temperature (Fahrenheit)	83.88
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.306
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.3
PI-300 (PSIG)	11
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	0
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	9
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	

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	1

Drum Photo

Electric Meter Reading (kWh)	122864
Electric meter power draw (kW) while compressor is on	6.61

Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	
Comments on car parkers and site accessibility:	
Car parking photos if near buildings	
Last fire extinguisher certification date	
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?	
Signature	 Signed 6/3/2022, 6:01:25 PM UTC
Departure Time	14:30

Inspection Date	July 1, 2022
Last Quarterly Event Date	June 3, 2022
Arrival Time	10:29
Personnel	Billy J Cobern
Weather	Cloudy, 70's-80's

HMI and Control Panel

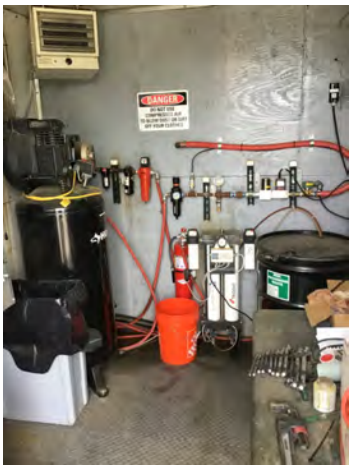
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	21.3
PIT-102 (PSIA)	27.5
FQI-101 (SLPM)	299.7
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	27.6
FE-301 (LPM)	300
AE-350 (%LEL)	0
PIT-300 (PSIG)	15
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
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	1353099
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

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	204
Motor Current while loading (amps)	7.05
Motor RPMs while loading	1800
VFD thermal state	45
VFD line voltage in (while compressor is loading)	204
Wet receiver tank loading pressure (PI-101)	75
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	20
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	75
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)	80.94
MFC-101 standardized flow rate on display (SLPM)	3000
MFC-101 uncorrected flow rate on display (LPM)	151.7
Comments	

Non-XP room photo



Classified Room

First Aid Kit Expiration Date	July 1, 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)	125
PI-202 (PSIG)	47
MFC-201 temperature (Fahrenheit)	88.83
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.306
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.306
PI-300 (PSIG)	11
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	8
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)	12
AS-19-A02 Wellhead Pressure (PSIG)	14
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	13
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	1

Drum Photo

Electric Meter Reading (kWh)	124641
Electric meter power draw (kW) while compressor is on	4.99
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	

Comments on car parkers and site accessibility:	

Car parking photos if near buildings

Last fire extinguisher certification date	
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?	
Signature	 Signed 7/1/2022, 3:36:34 PM UTC
Departure Time	11:45

Inspection Date	August 5, 2022
Last Quarterly Event Date	June 3, 2022
Arrival Time	14:15
Personnel	Billy J Cobern
Weather	Cloudy, 80'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)	21.1
PIT-102 (PSIA)	27
FQI-101 (SLPM)	299.9
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	26.8
FE-301 (LPM)	301.5
AE-350 (%LEL)	5.6
PIT-300 (PSIG)	14.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
Comments	Changed Alicats

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	14192250
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

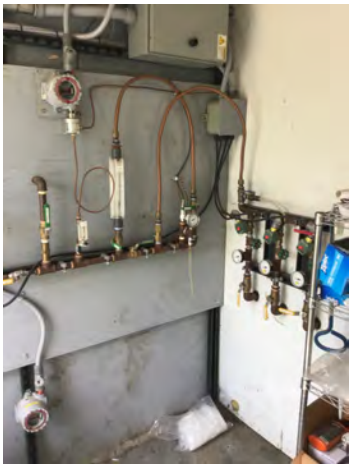
Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	No
Number of routine maintenance kits remaining	0
Number of air filters remaining	0
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	209
Motor Current while loading (amps)	7.01
Motor RPMs while loading	1800
VFD thermal state	45
VFD line voltage in (while compressor is loading)	211
Wet receiver tank loading pressure (PI-101)	75
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	38
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	75
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)	84.87
MFC-101 standardized flow rate on display (SLPM)	3000
MFC-101 uncorrected flow rate on display (LPM)	156.5
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 1, 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)	140
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	89.76
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)	0.314
PI-300 (PSIG)	5
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	11
PI-303 Z3 (PSIG)	11
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	5
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	Changed Alicats

XP-room photo



Outdoors and General

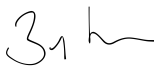
AS-19-A01 Wellhead Pressure (PSIG)	12
AS-19-A02 Wellhead Pressure (PSIG)	11
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	127235
Electric meter power draw (kW) while compressor is on	5.01
Walked hose corridors and fixed fallen barrels?	
Listened for leaks/hissing at wellheads?	

Comments on car parkers and site accessibility:	
Car parking photos if near buildings	
Last fire extinguisher certification date	
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?	
Signature	 Signed 8/5/2022, 7:27:45 PM UTC
Departure Time	16:00

Inspection Date	September 1, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Partly Cloudy 60’s-80’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)	20.9
PIT-102 (PSIA)	29
FQI-101 (SLPM)	301.3
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	28.3
FE-301 (LPM)	302.1
AE-350 (%LEL)	6.2
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?	Yes
Comments	Air Components on site for annual compressor maintenance

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	1443270
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	No
Oil sample taken?	Yes
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	219
Motor Current while loading (amps)	6.98
Motor RPMs while loading	1800
VFD thermal state	45
VFD line voltage in (while compressor is loading)	218
Wet receiver tank loading pressure (PI-101)	75
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	50
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	82.51
MFC-101 standardized flow rate on display (SLPM)	300

MFC-101 uncorrected flow rate on display (LPM)	152.4
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 1, 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	Tanks were not changed. Still at 80%
PI-201 (PSIG)	150
PI-202 (PSIG)	48
MFC-201 temperature (Fahrenheit)	88.52
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)	0.309
PI-300 (PSIG)	11
PI-301 Z1 (PSIG)	11
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	11
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	6
Quarterly LEL Meter Calibration	AE-350 calibrated, 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)	15
AS-19-A03 Wellhead Pressure (PSIG)	11
AS-19-A04 Wellhead Pressure (PSIG)	12
AS-19-A05 Wellhead Pressure (PSIG)	10
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	2

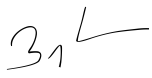
Drum Photo

Electric Meter Reading (kWh)	128172
Electric meter power draw (kW) while compressor is on	5.04

Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	Intact
Comments on car parkers and site accessibility:	Good
Car parking photos if near buildings	
Last fire extinguisher certification date	August 1, 2022
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?	No
Comments, questions, ruminations, suggestions for improvement?	Transferred 45 gallons of condensate into 55 gallon drum.
Signature	 Signed 9/1/2022, 4:56:56 PM UTC
Departure Time	14:45

Inspection Date	October 3, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	16:00
Personnel	Billy J Cobern
Weather	Partly Cloudy 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)	21.5
PIT-102 (PSIA)	28.8
FQI-101 (SLPM)	301.3
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	28.3
FE-301 (LPM)	301.2
AE-350 (%LEL)	4.5
PIT-300 (PSIG)	15.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
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	1504330
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	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	219
Motor Current while loading (amps)	14.45
Motor RPMs while loading	1800
VFD thermal state	40
VFD line voltage in (while compressor is loading)	218
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	16
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	77.76
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	151.9
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 1, 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)	100
PI-202 (PSIG)	49
MFC-201 temperature (Fahrenheit)	82.42
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)	0.306
PI-300 (PSIG)	11
PI-301 Z1 (PSIG)	11
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	11
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	6
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)	10
AS-19-A02 Wellhead Pressure (PSIG)	13
AS-19-A03 Wellhead Pressure (PSIG)	10
AS-19-A04 Wellhead Pressure (PSIG)	12
AS-19-A05 Wellhead Pressure (PSIG)	10
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	2

Drum Photo

Electric Meter Reading (kWh)	130379
Electric meter power draw (kW) while compressor is on	5.37
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	Intact
Comments on car parkers and site accessibility:	Good
Car parking photos if near buildings	
Last fire extinguisher certification date	August 1, 2022
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 10/3/2022, 8:53:24 PM UTC
Departure Time	17:00

Inspection Date	November 4, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Partly Cloudy 60's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest, Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	21.9
PIT-102 (PSIA)	29.5
FQI-101 (SLPM)	300.6
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	29.4
FE-301 (LPM)	300.4
AE-350 (%LEL)	4.2
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?	Yes
Comments	System was off 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	1547555
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	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)	14.41
Motor RPMs while loading	1800
VFD thermal state	40
VFD line voltage in (while compressor is loading)	220
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	19
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	73.29
MFC-101 standardized flow rate on display (SLPM)	299.9
MFC-101 uncorrected flow rate on display (LPM)	141.8
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	July 1, 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)	100
PI-202 (PSIG)	49
MFC-201 temperature (Fahrenheit)	78.46
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.599
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.287
PI-300 (PSIG)	16
PI-301 Z1 (PSIG)	15
PI-302 Z2 (PSIG)	0
PI-303 Z3 (PSIG)	0
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	4
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)	3
AS-19-A02 Wellhead Pressure (PSIG)	15
AS-19-A03 Wellhead Pressure (PSIG)	3
AS-19-A04 Wellhead Pressure (PSIG)	15
AS-19-A05 Wellhead Pressure (PSIG)	3
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	0
Number of condensate drums outside	0

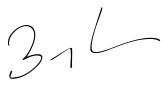
Drum Photo

Electric Meter Reading (kWh)	132038
Electric meter power draw (kW) while compressor is on	7.64
Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes

Wellhead comments:	Intact
Comments on car parkers and site accessibility:	Good
Car parking photos if near buildings	
Last fire extinguisher certification date	August 1, 2022
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 11/4/2022, 4:31:04 PM UTC
Departure Time	13:00

Inspection Date	December 2, 2022
Last Quarterly Event Date	September 1, 2022
Arrival Time	11:45
Personnel	Billy J Cobern
Weather	Cloud, windy, 30's-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)	20.5
PIT-102 (PSIA)	26.8
FQI-101 (SLPM)	299.1
FQI-201 (SLPM)	0.6
PIT-202 (PSIA)	26.9
FE-301 (LPM)	300.4
AE-350 (%LEL)	5.6
PIT-300 (PSIG)	14.3
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted
XP fan set to AUTO?	Yes
UPS enabled?	Yes
Comments	Set time.

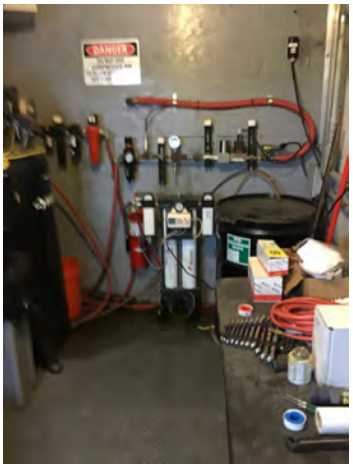
Non-classified Room

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	1602217
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, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2, Completed during annual

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	221
Motor Current while loading (amps)	14.22
Motor RPMs while loading	1800
VFD thermal state	40
VFD line voltage in (while compressor is loading)	220
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	20
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	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, 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)	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)	58.23
MFC-101 standardized flow rate on display (SLPM)	300.3

MFC-101 uncorrected flow rate on display (LPM)	147.5
Comments	Adjusted hours, but not minutes

Non-XP room photo



Classified Room

First Aid Kit Expiration Date	July 1, 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)	85
PI-202 (PSIG)	49
MFC-201 temperature (Fahrenheit)	82.29
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)	0.307
PI-300 (PSIG)	11
PI-301 Z1 (PSIG)	11
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	11
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	7
Quarterly LEL Meter Calibration	AE-350 calibrated, 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)	10
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)	10
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)	135400
Electric meter power draw (kW) while compressor is on	10.48

Walked hose corridors and fixed fallen barrels?	Yes
Listened for leaks/hissing at wellheads?	Yes
Wellhead comments:	Intact
Comments on car parkers and site accessibility:	Good
Car parking photos if near buildings	
Last fire extinguisher certification date	August 1, 2022
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

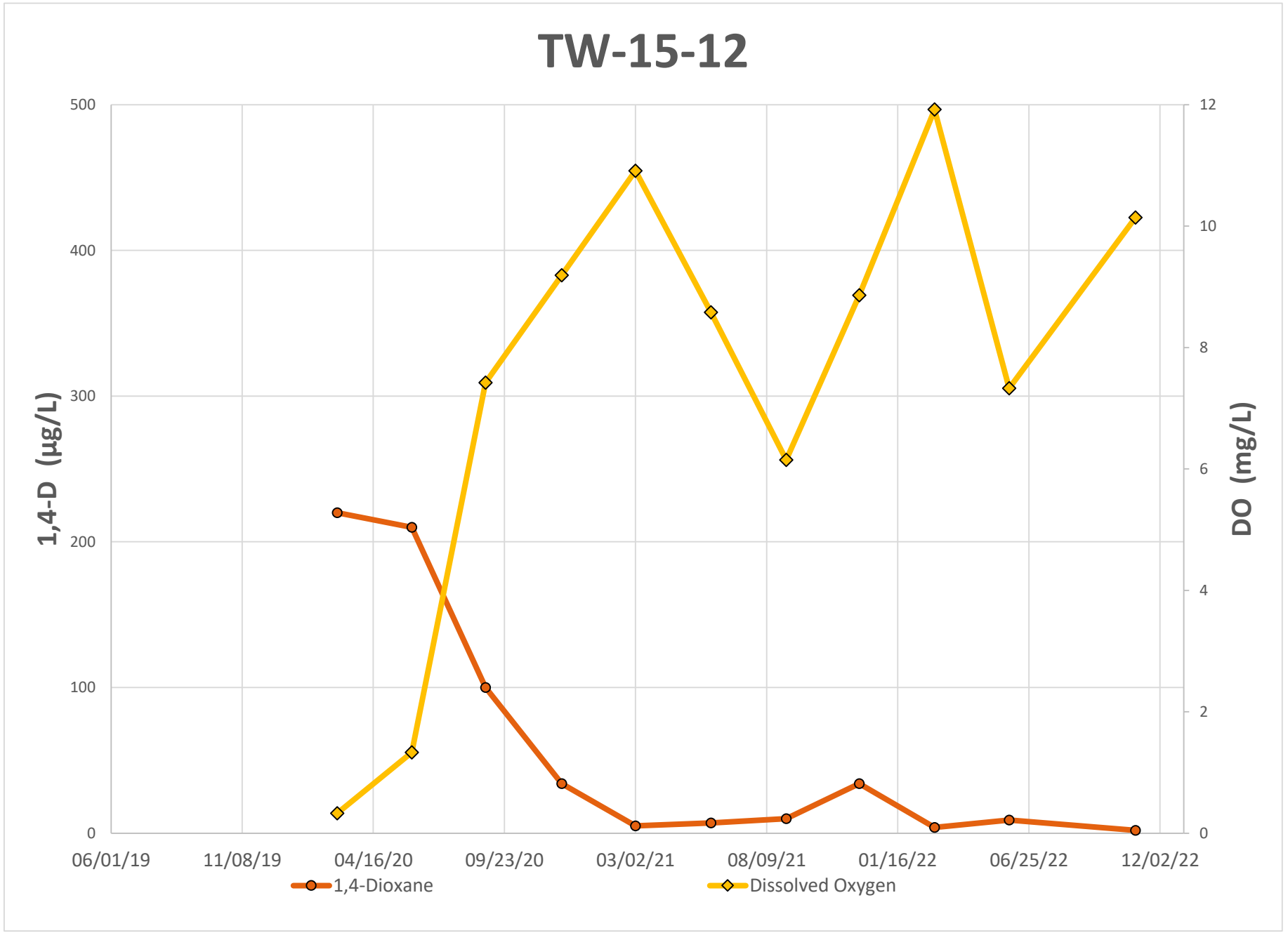
Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 12/2/2022, 5:20:45 PM UTC
Departure Time	13:30

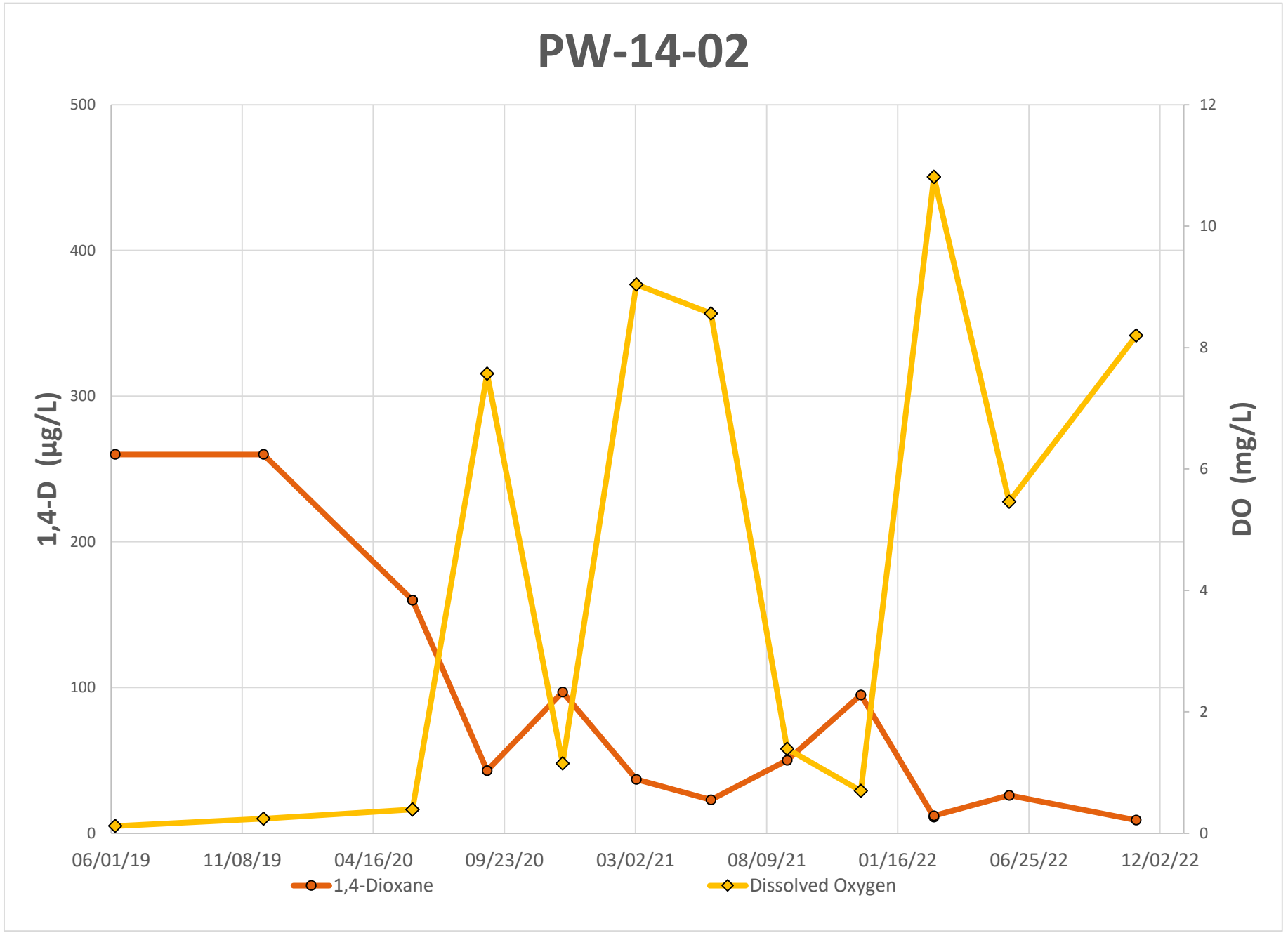
Appendix B

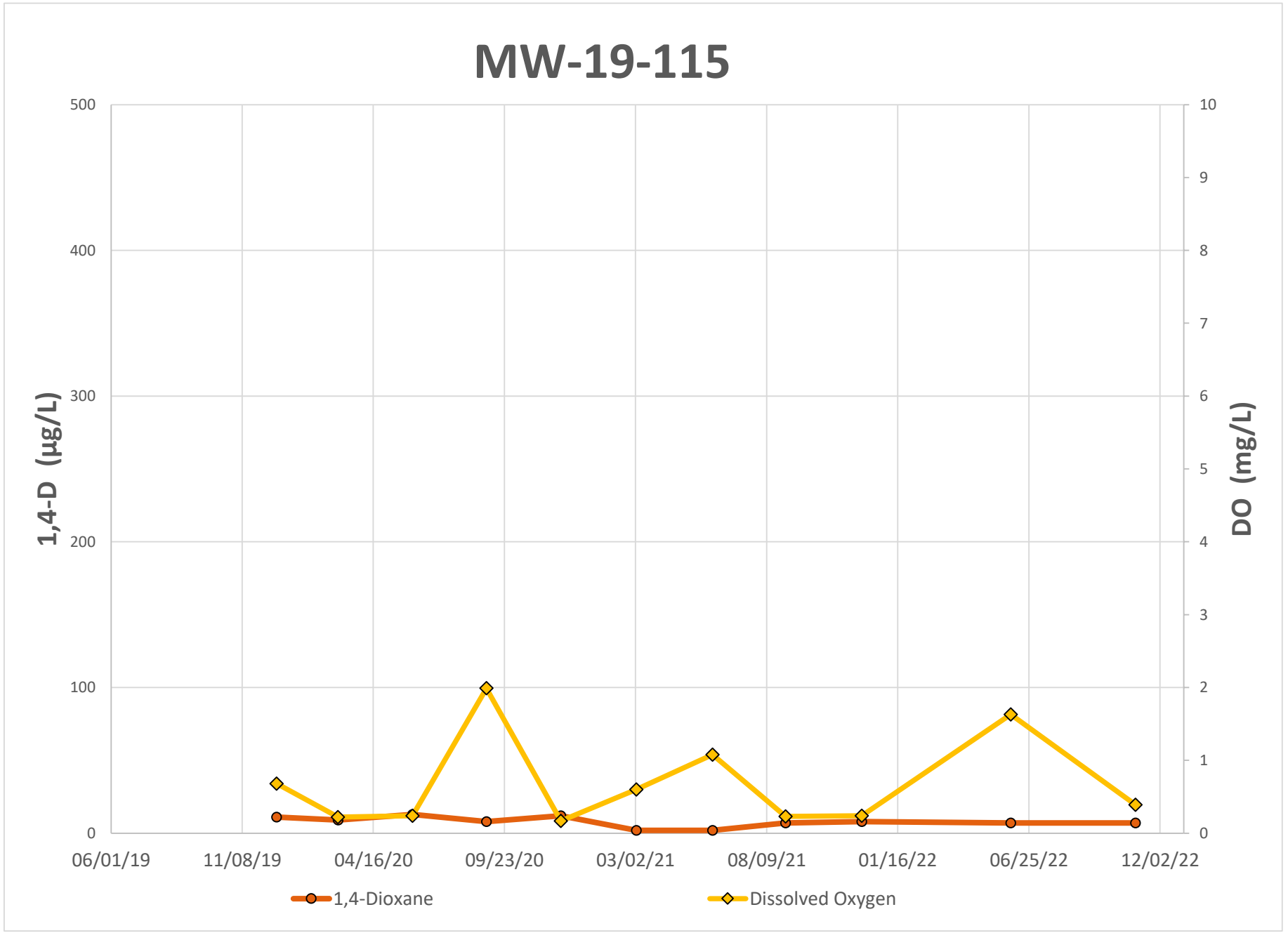
Performance Graphs

Plant 2 Transect B ROI Well
Performance Graph

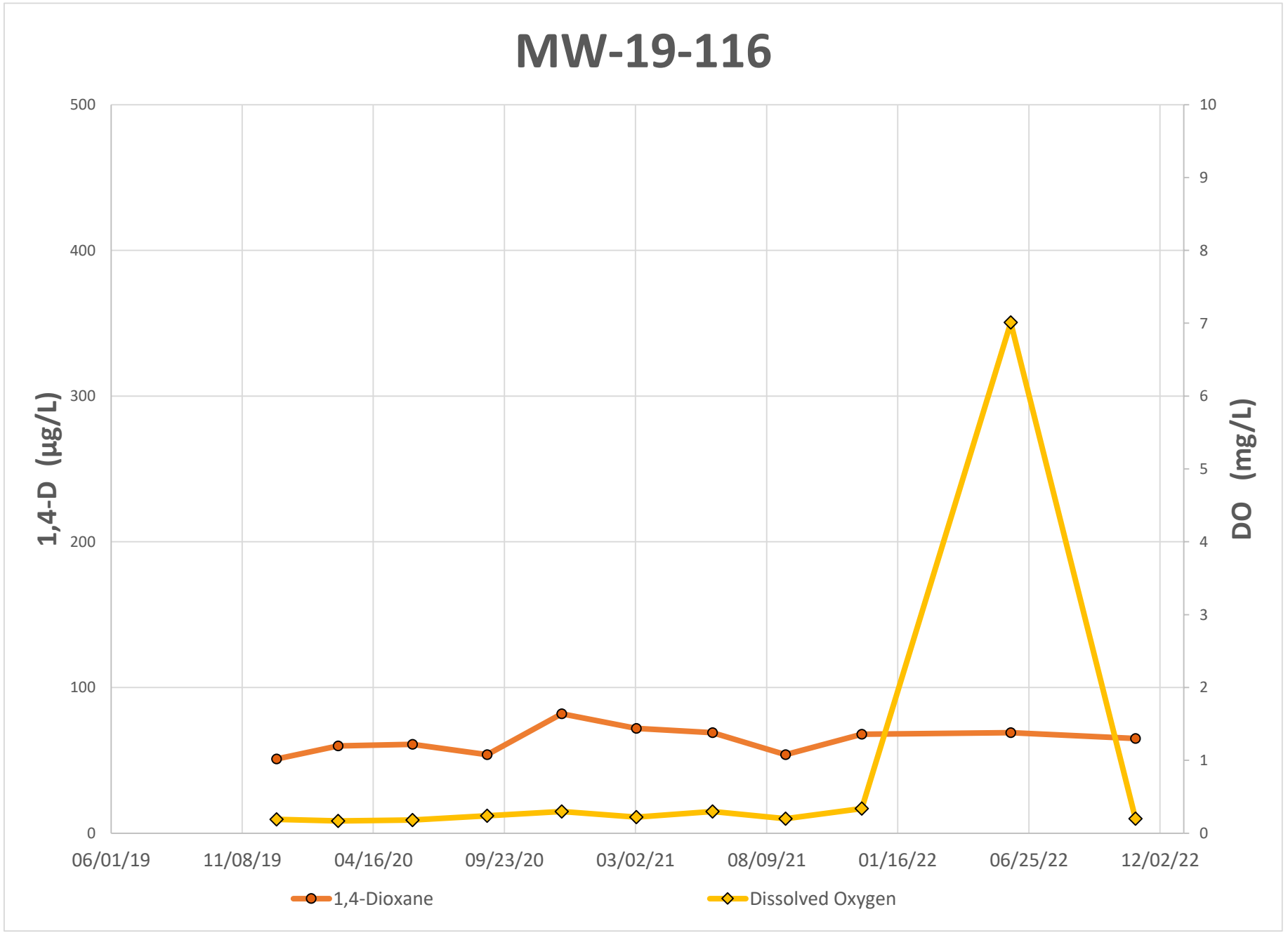


Plant 2 Transect B Downgradient Well 50 ft
Performance Graph

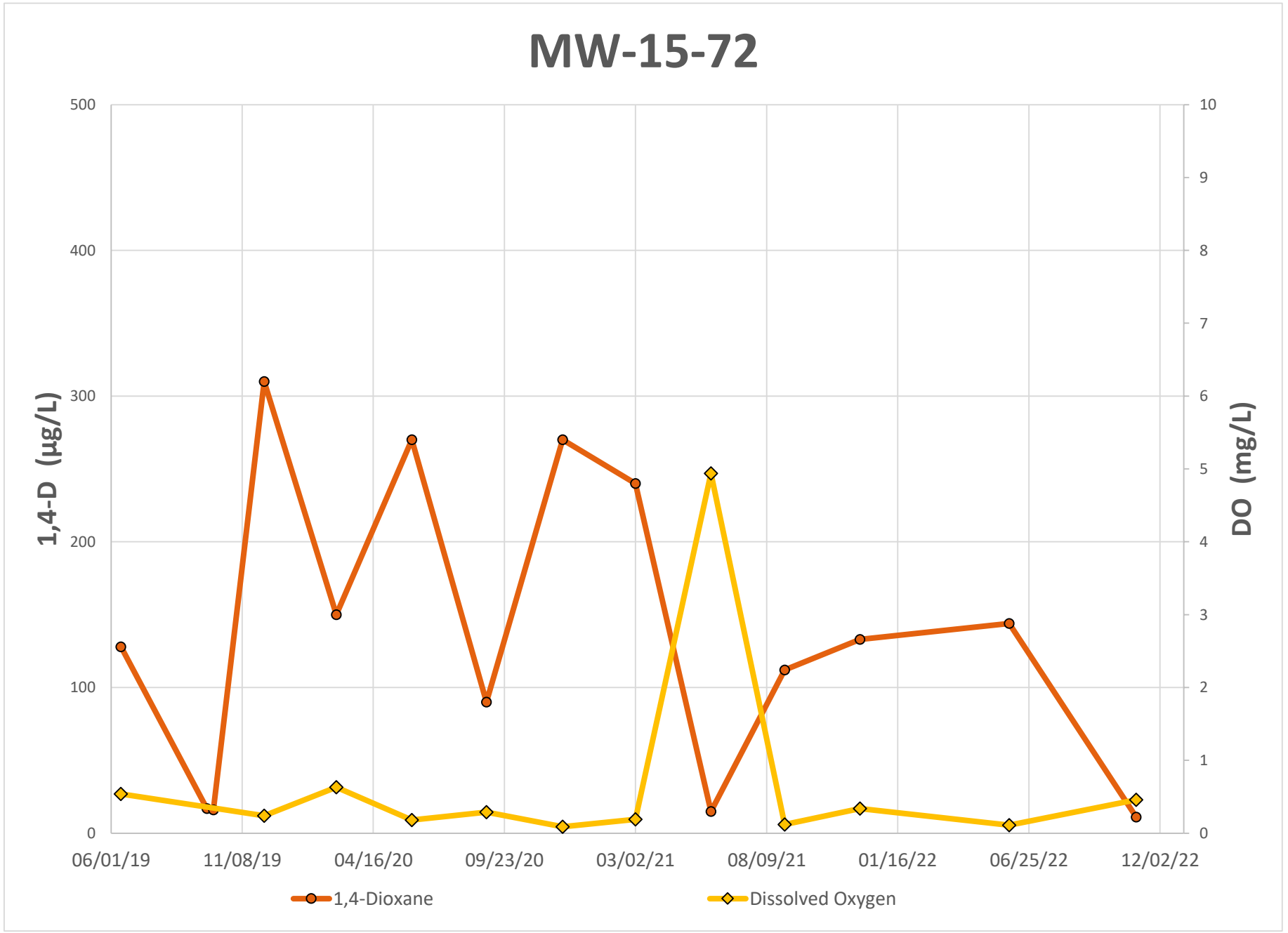



MW-19-115
1,4-D (µg/L)
DO (mg/L)
500
400
300
200
100
0
10
9
8
7
6
5
4
3
2
1
0
06/01/19
11/08/19
04/16/20
09/23/20
03/02/21
08/09/21
01/16/22
06/25/22
12/02/22
1,4-Dioxane
Dissolved Oxygen

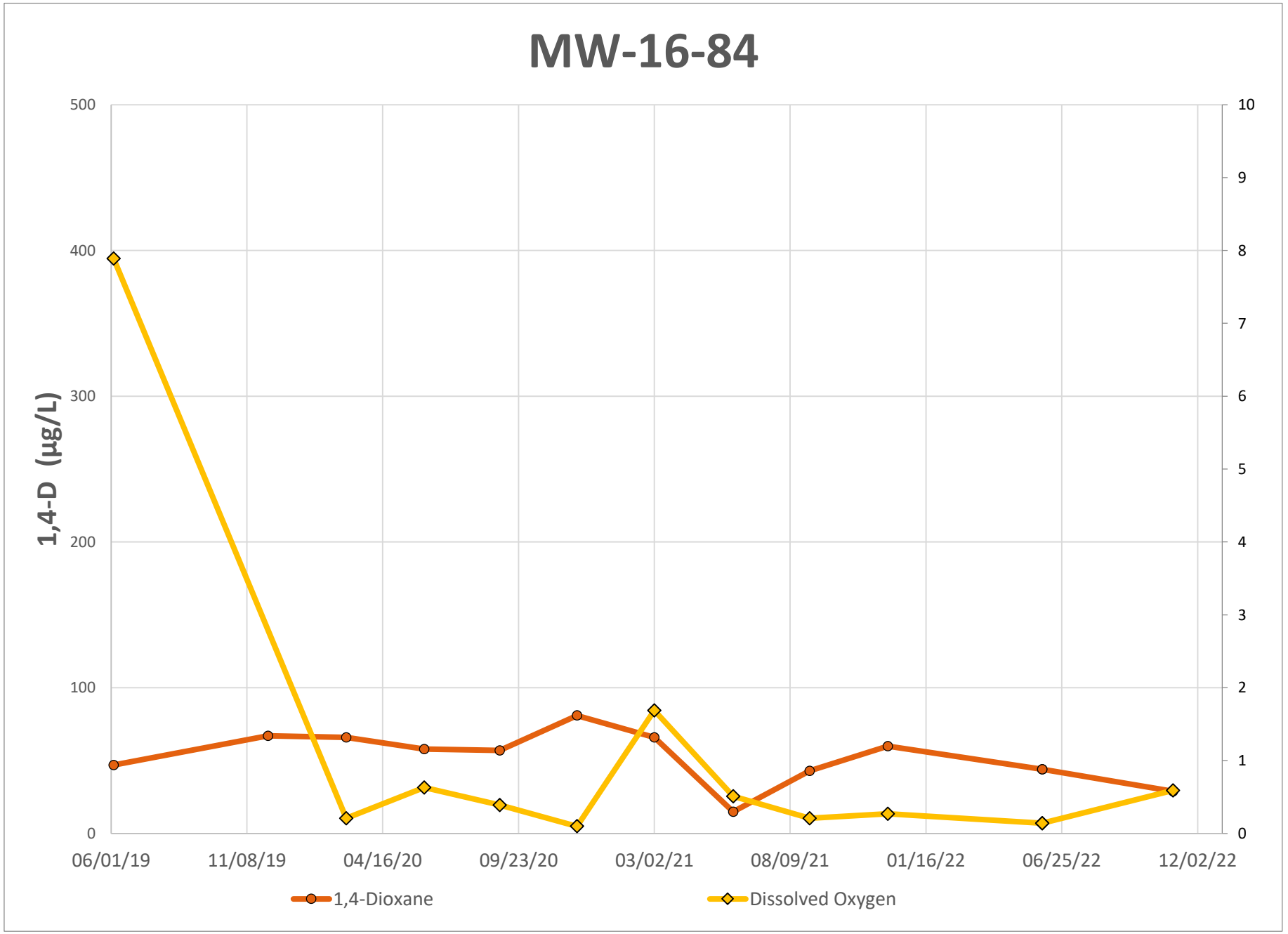
Plant 2 Transect C Monitoring Well Performance Graph



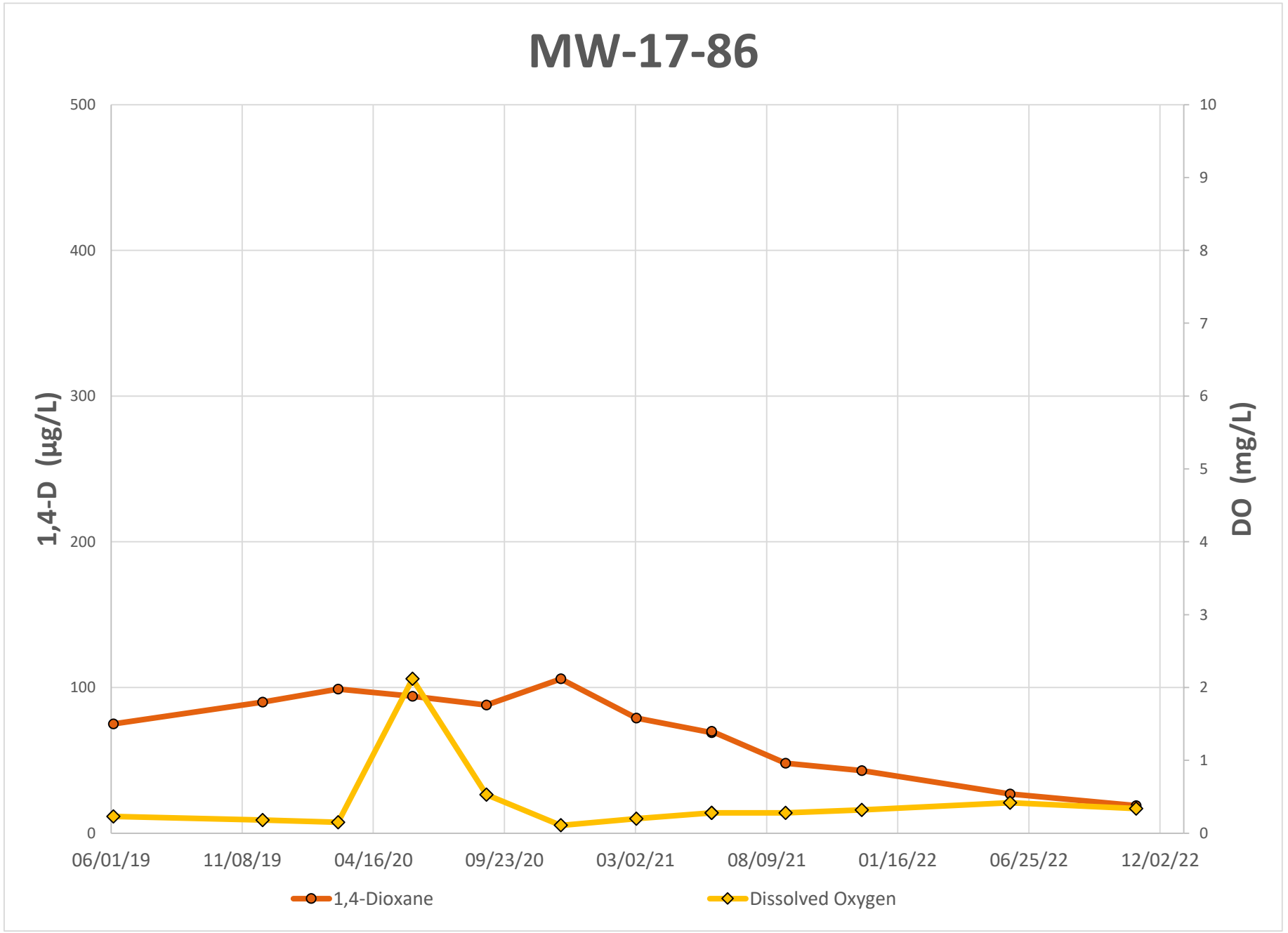
Plant 2 Transect C Monitoring Well
Performance Graph



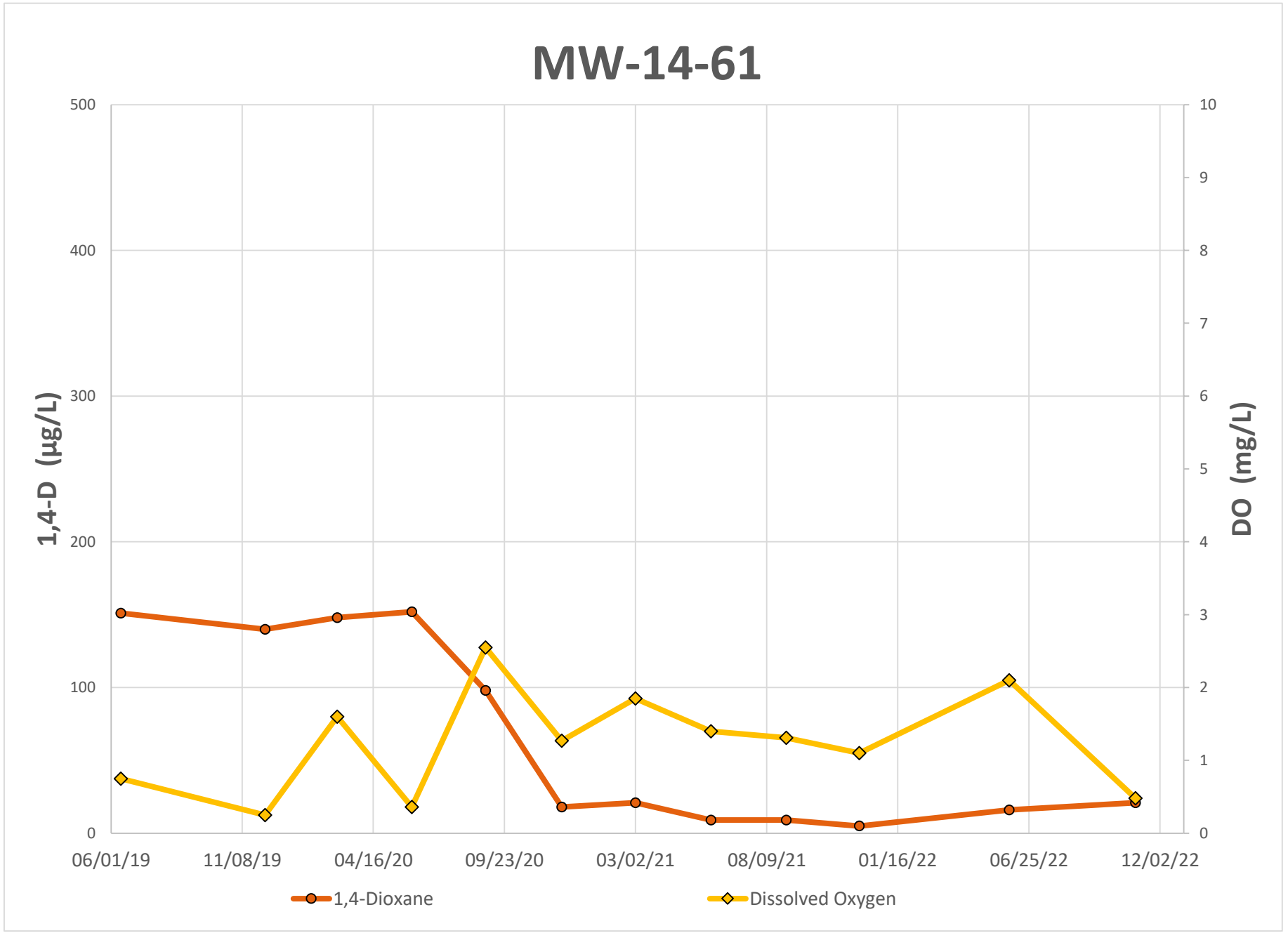
Plant 2 Transect F Downgradient Well 50 ft
Performance Graph



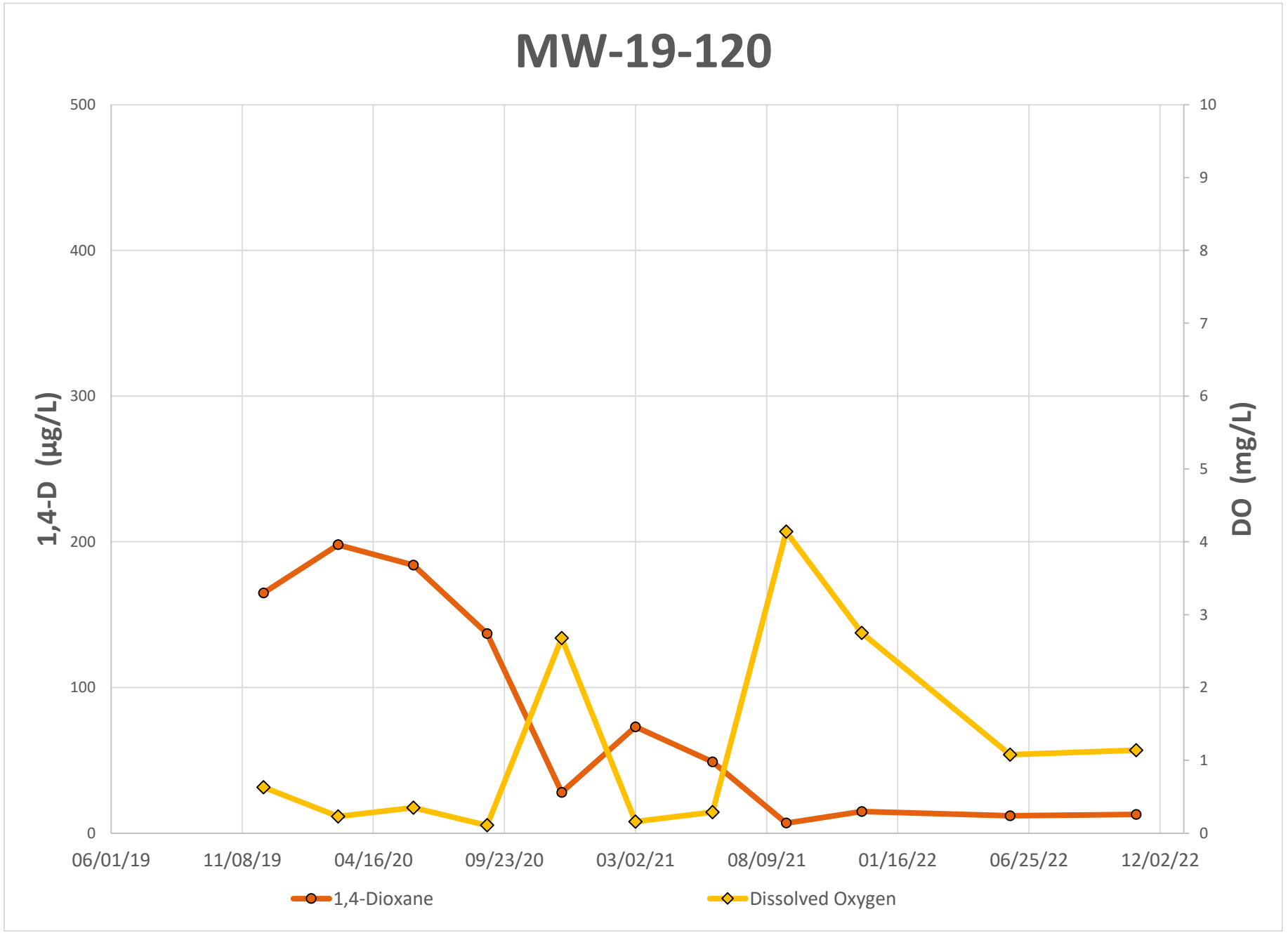
Plant 2 Transect F Downgradient Well 100 ft
Performance Graph



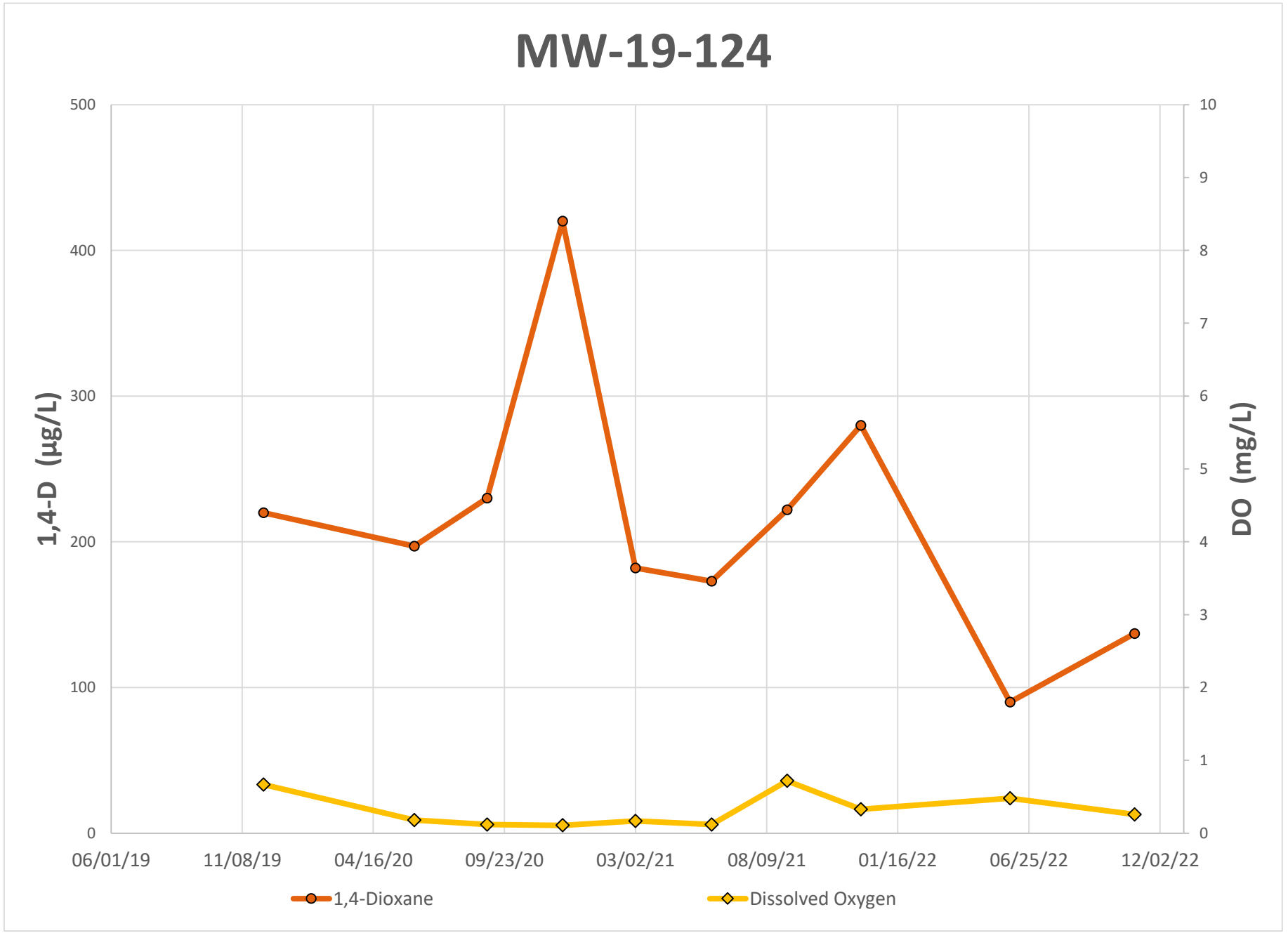
Plant 2 Transect F ROI Well Performance Graph



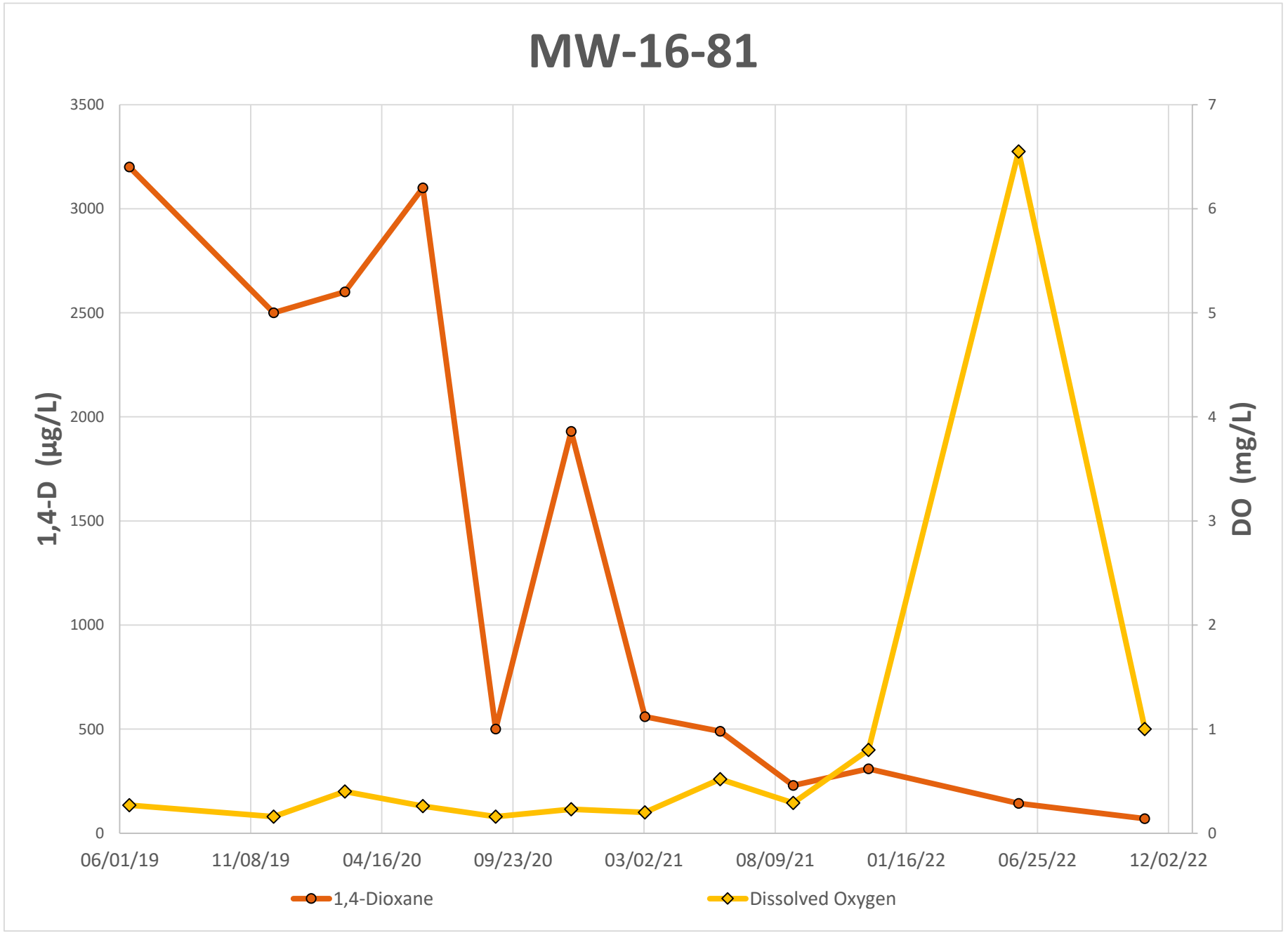
Plant 2 Transect E Downgradient Well 40 ft
Performance Graph



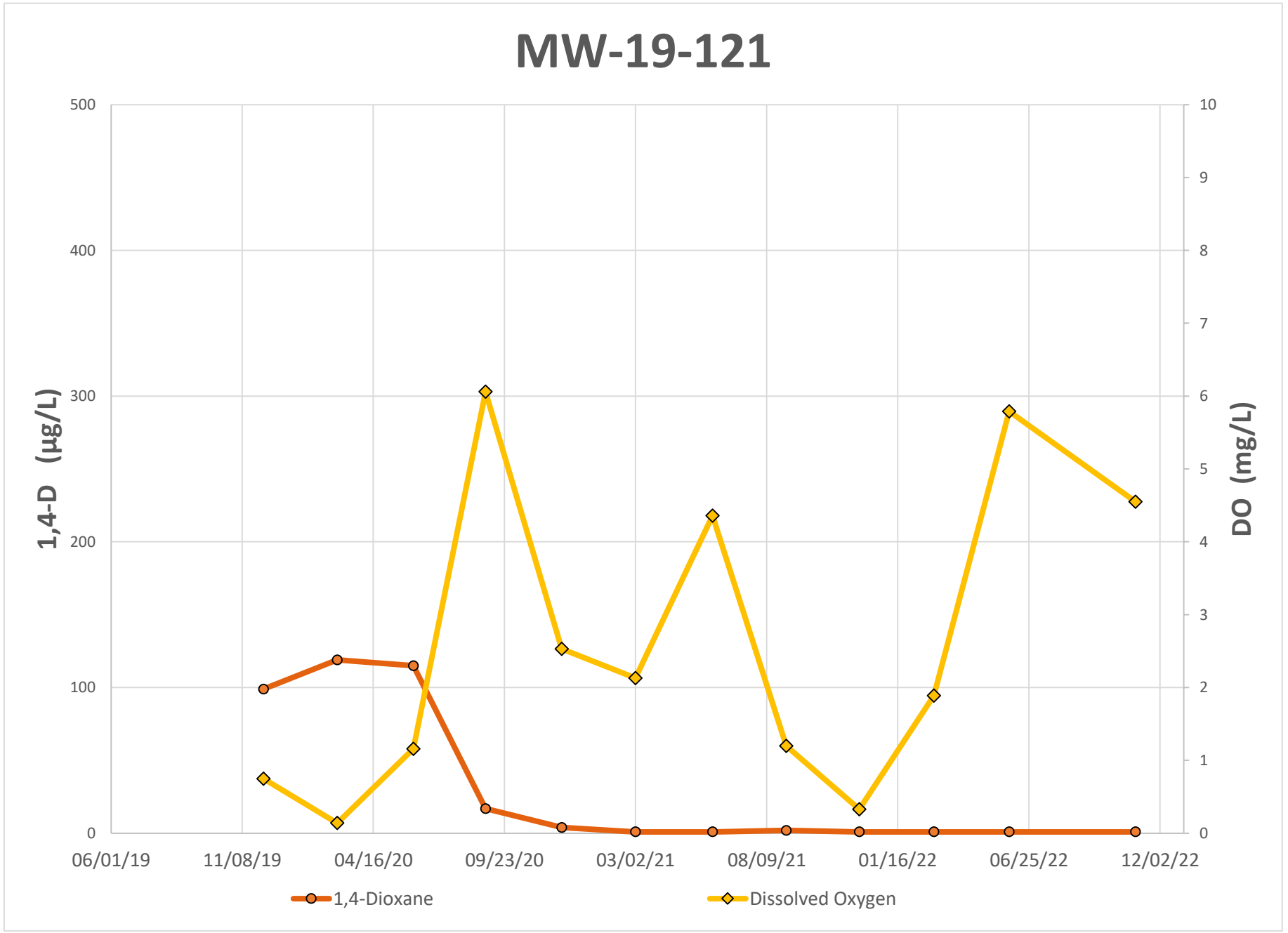
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



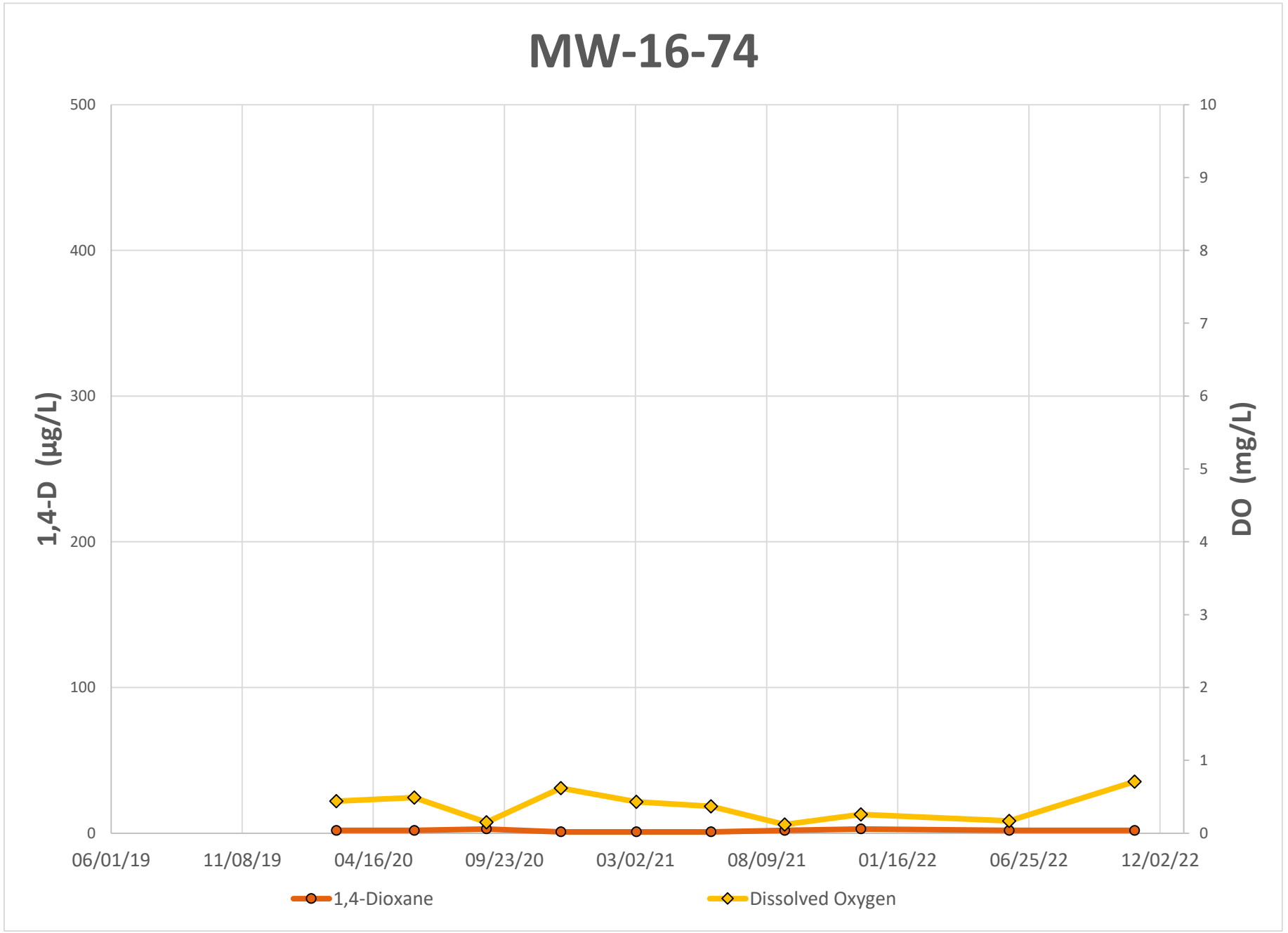
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



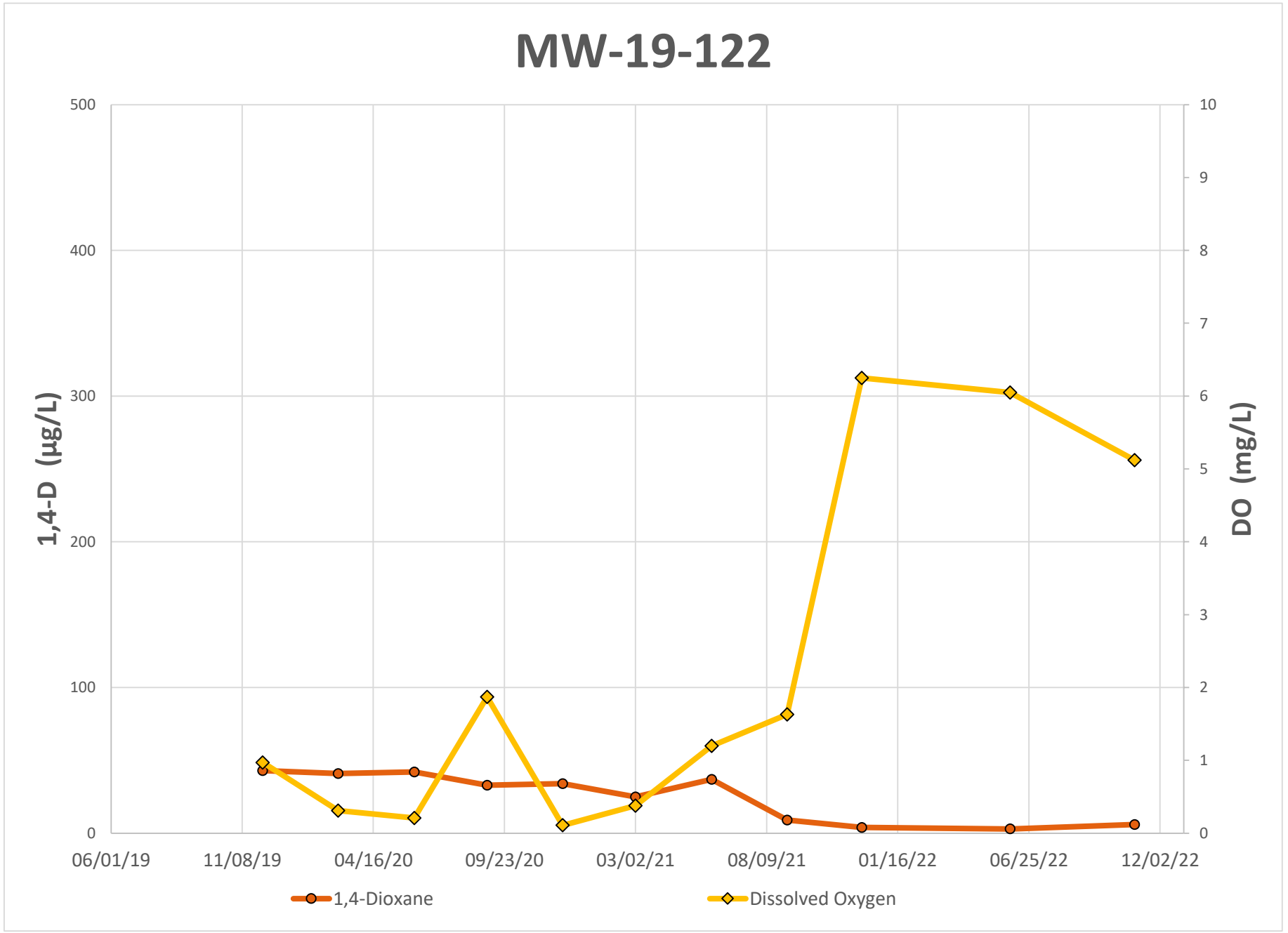
Plant 2 Transect E ROI Well
Performance Graph



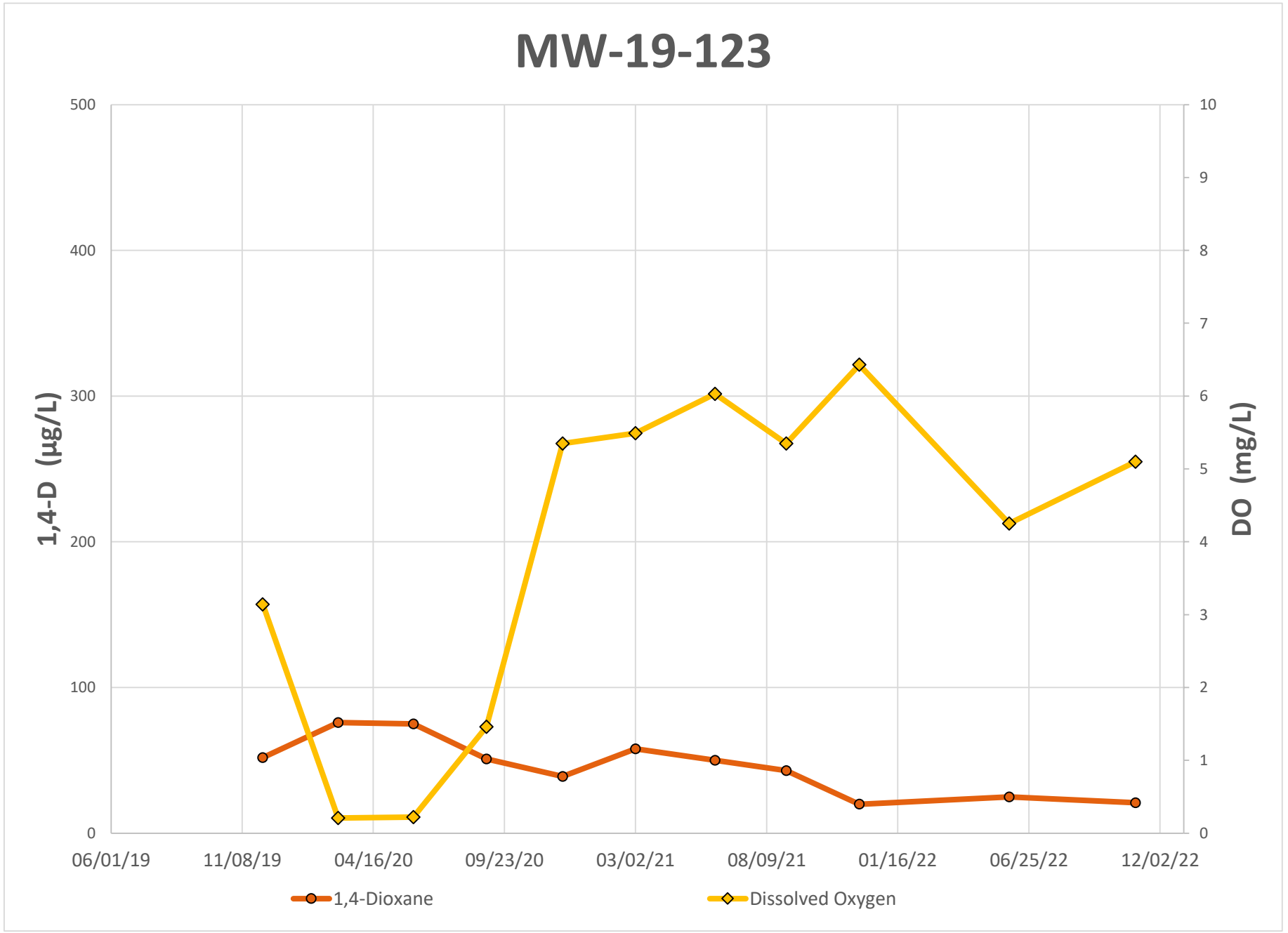
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



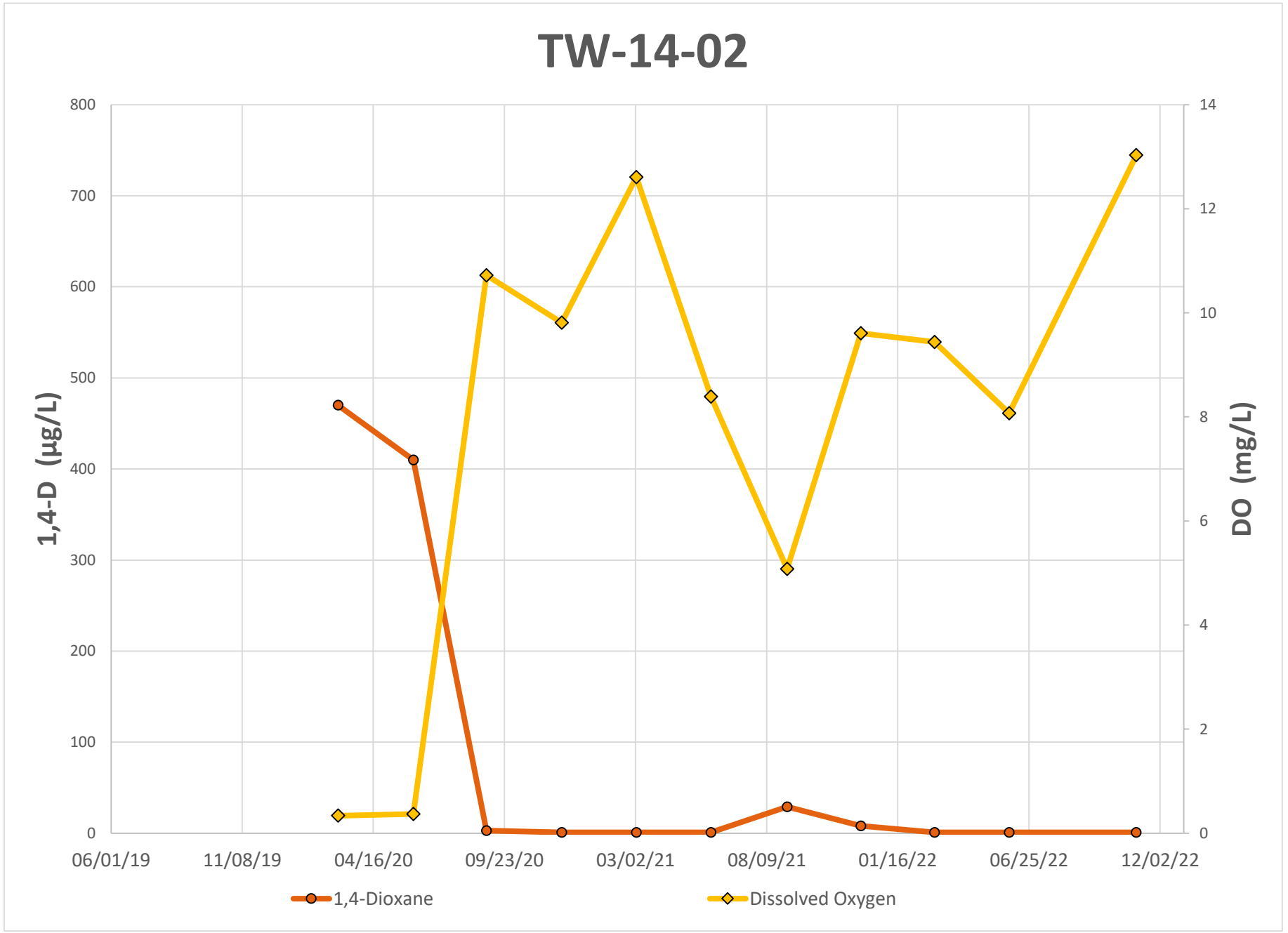
Plant 2 Transect G Upgradient Well 60 ft
Performance Graph



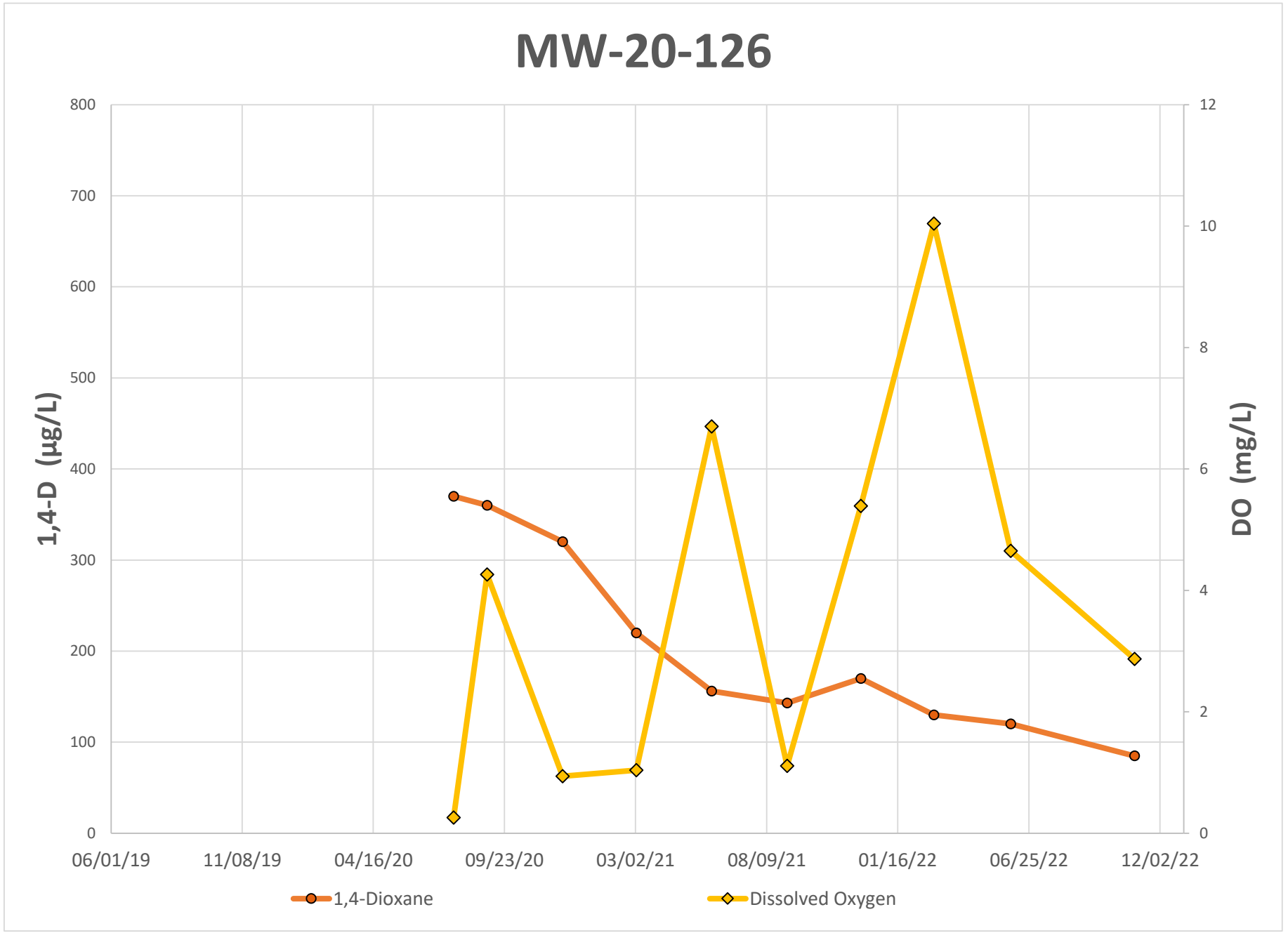
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



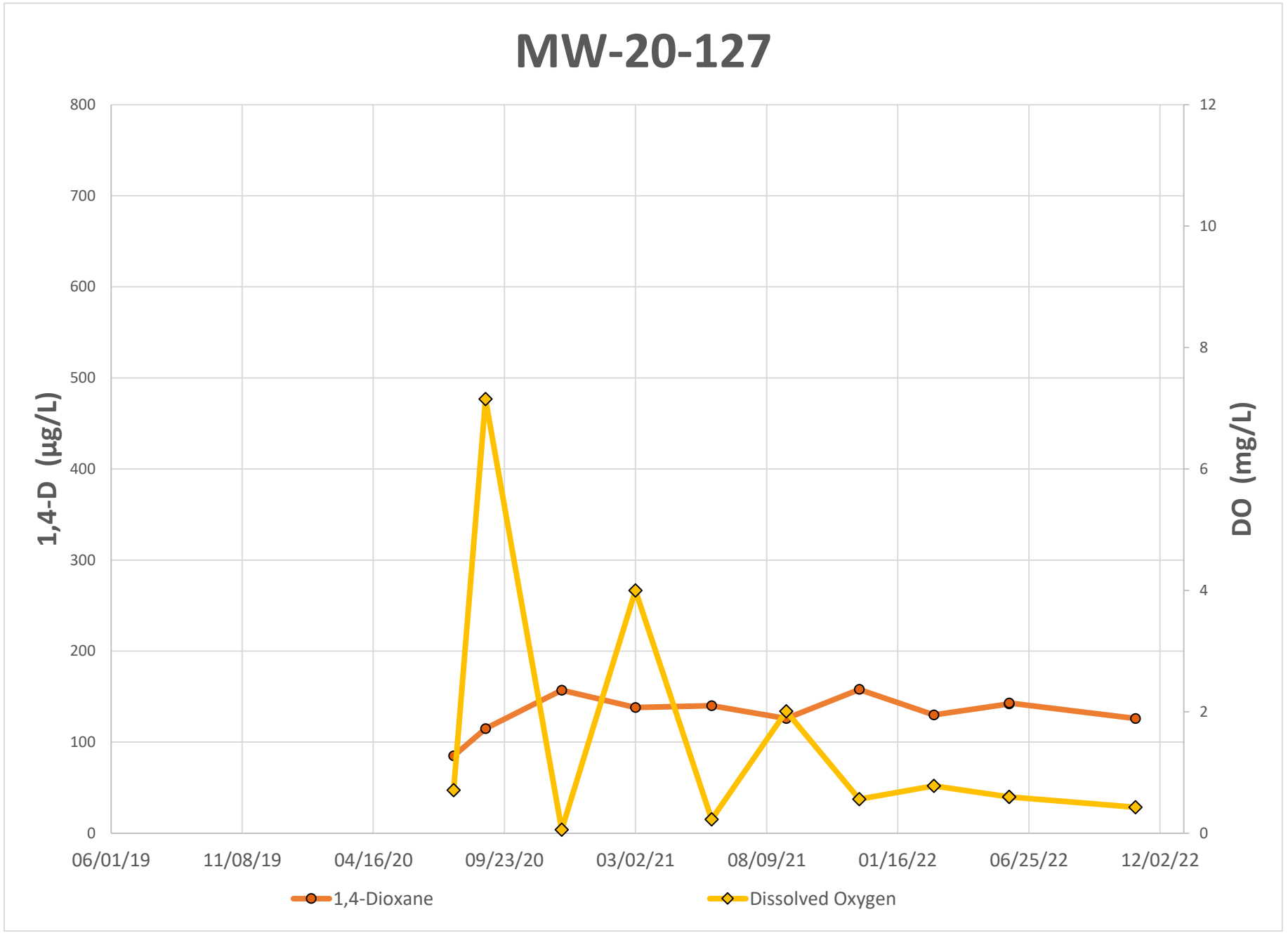
Plant 2 Transect G ROI Well
Performance Graph



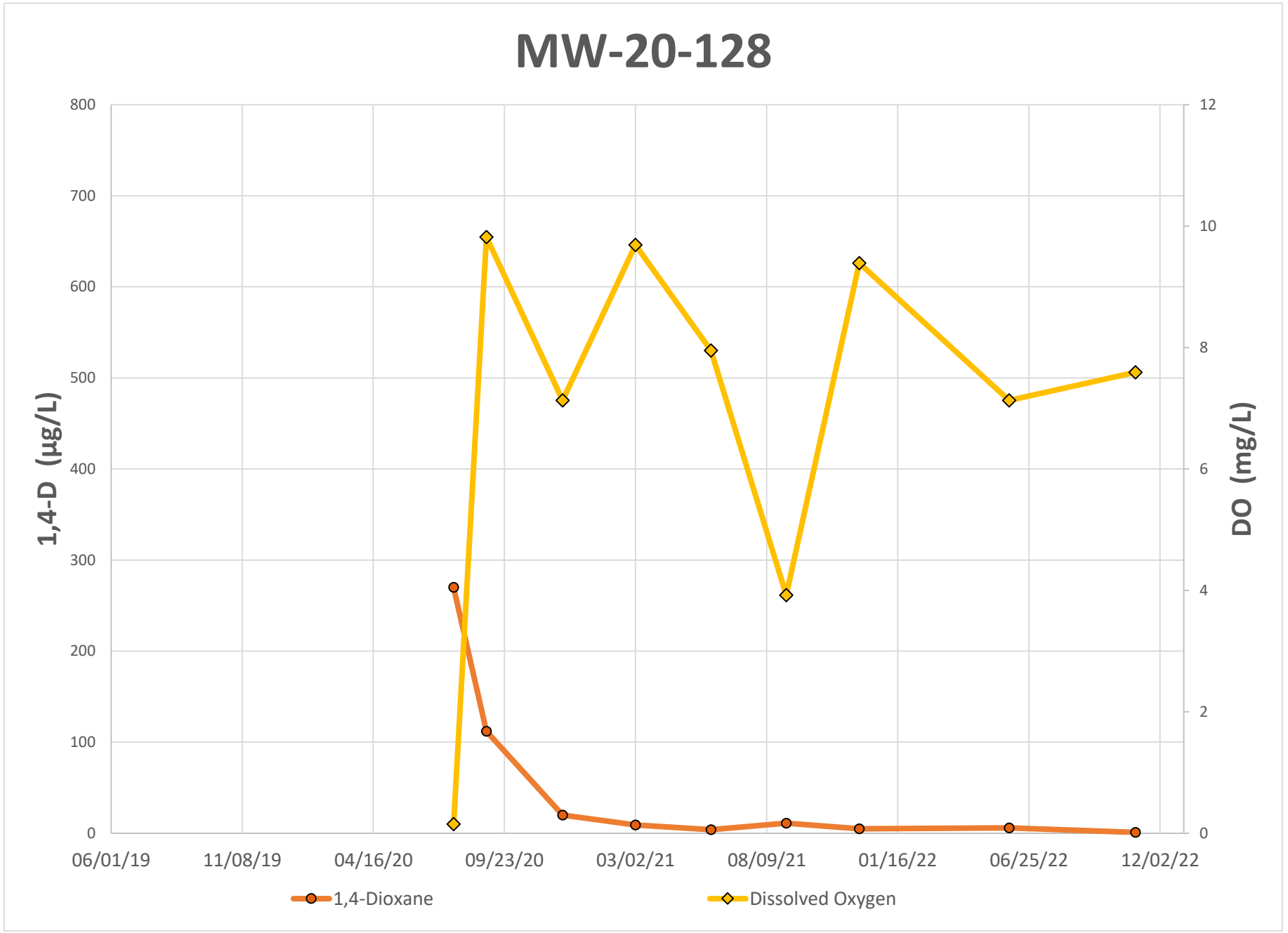
Plant 2 Transect B Upgradient Well 40 ft
Performance Graph



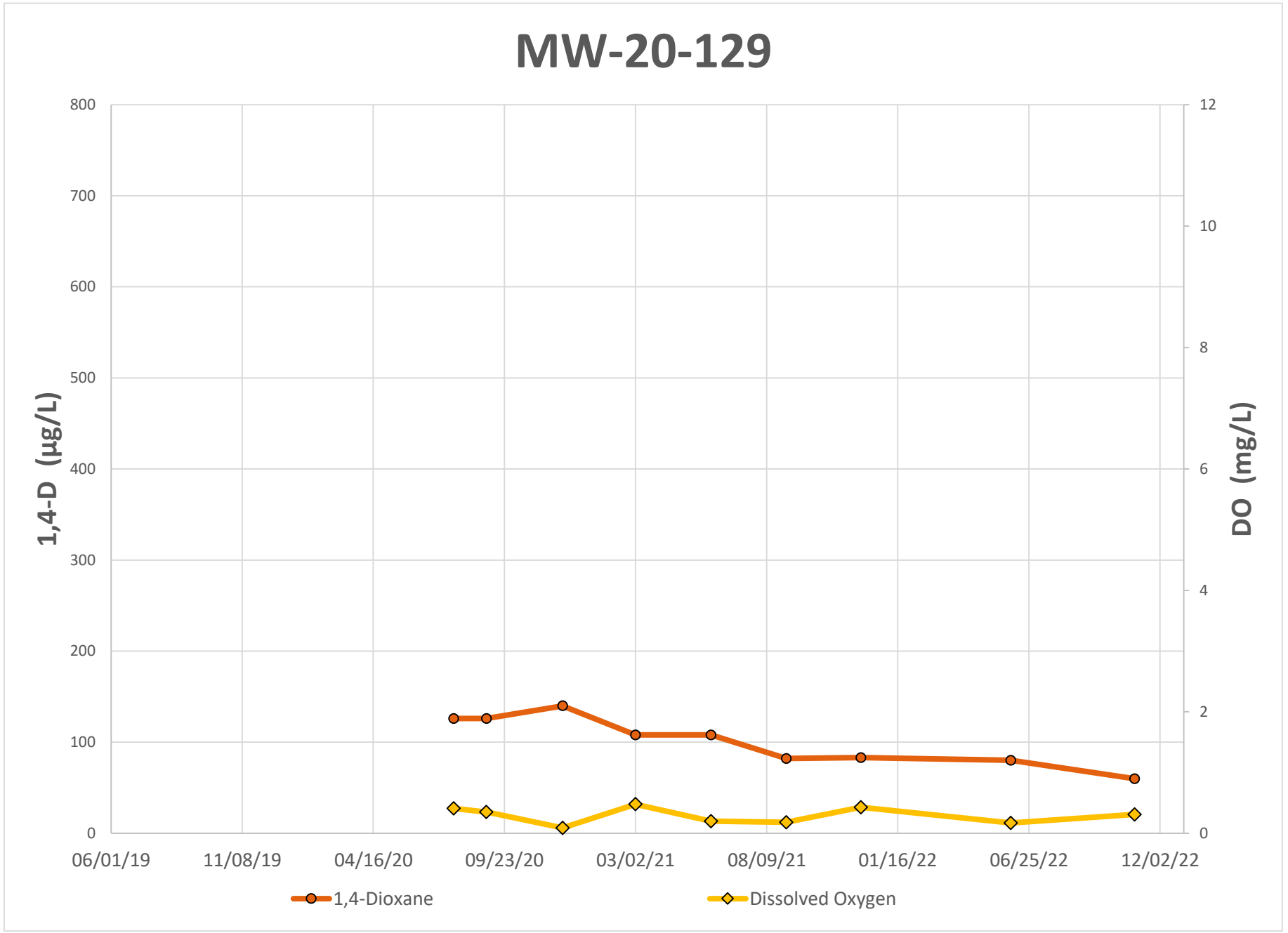
Plant 2 Transect B Downgradient Well 100 ft
Performance Graph



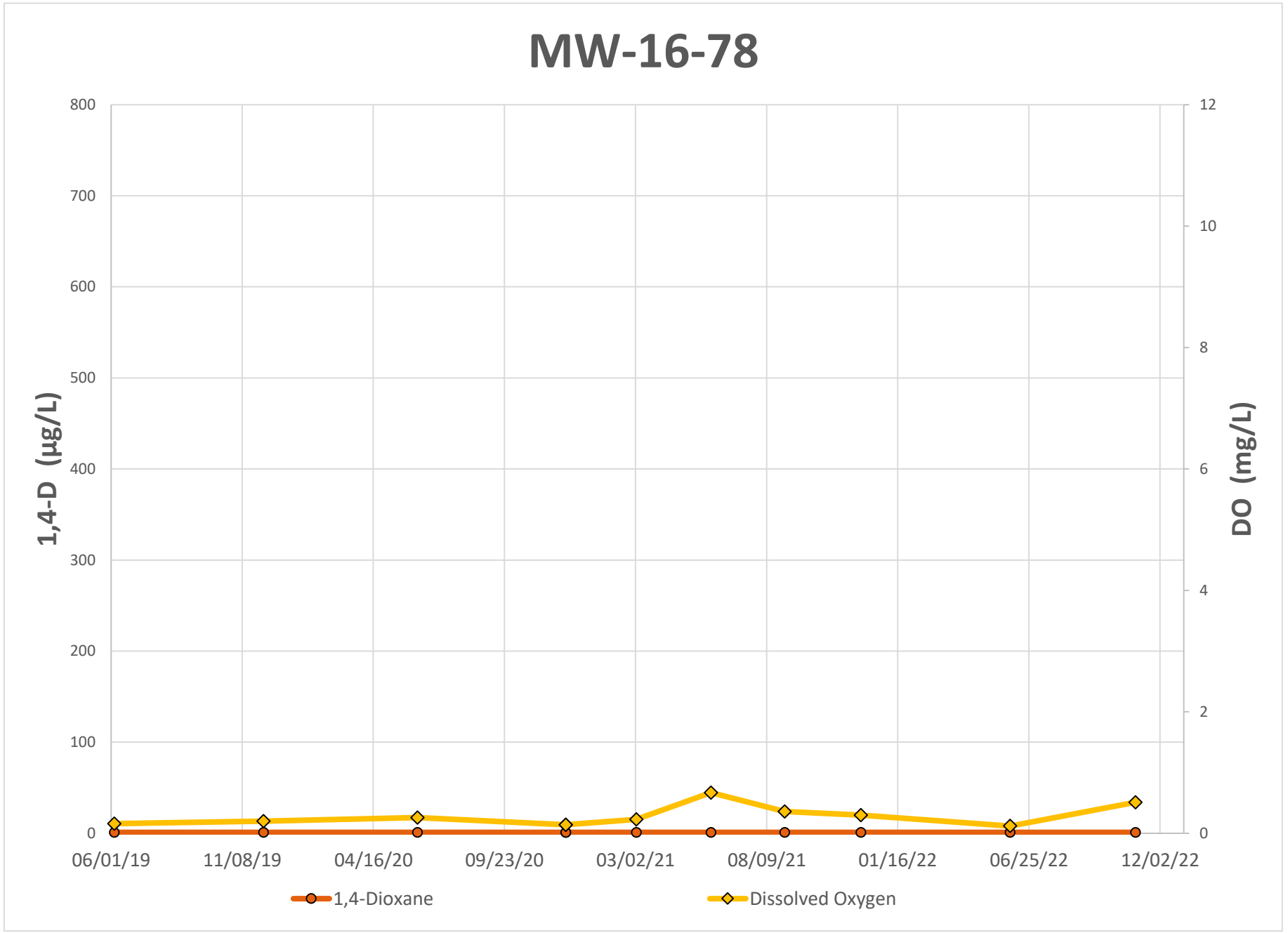
Plant 2 Transect F ROI Well
Performance Graph



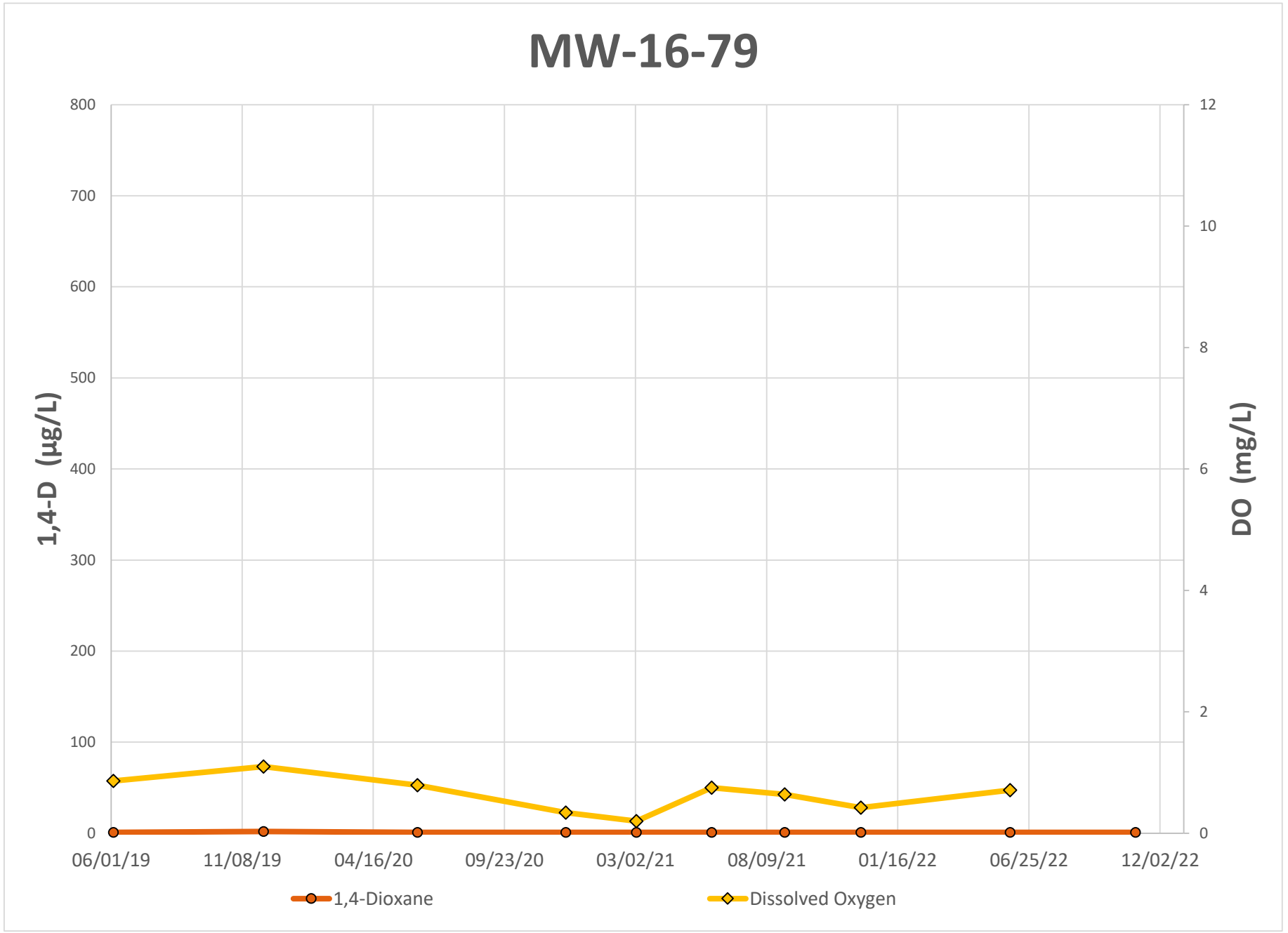
Plant 2 Transect G Upgradient Well 100 ft
Performance Graph



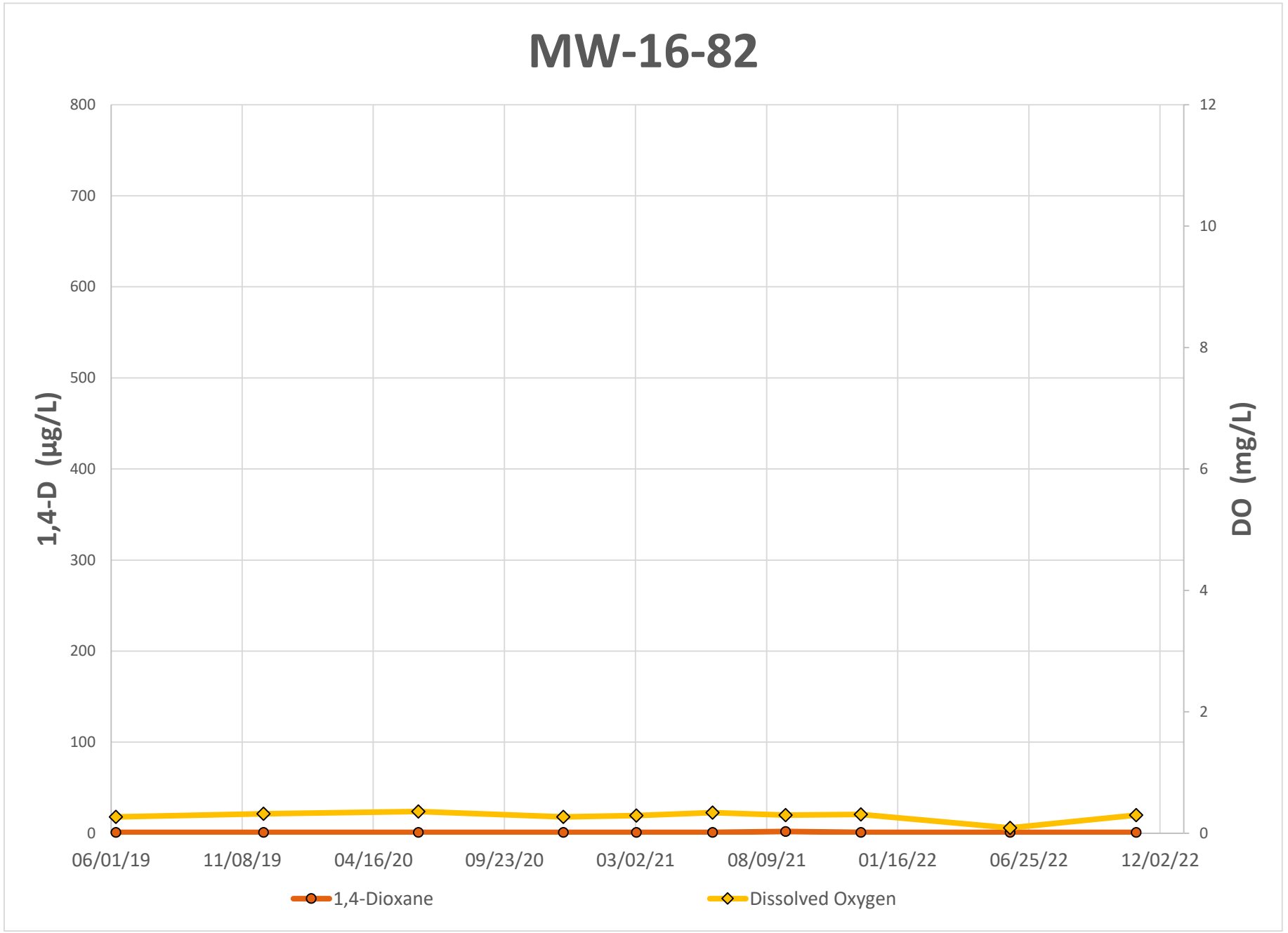
Plant 2 Transect E Downgradient Well 150 ft
Performance Graph



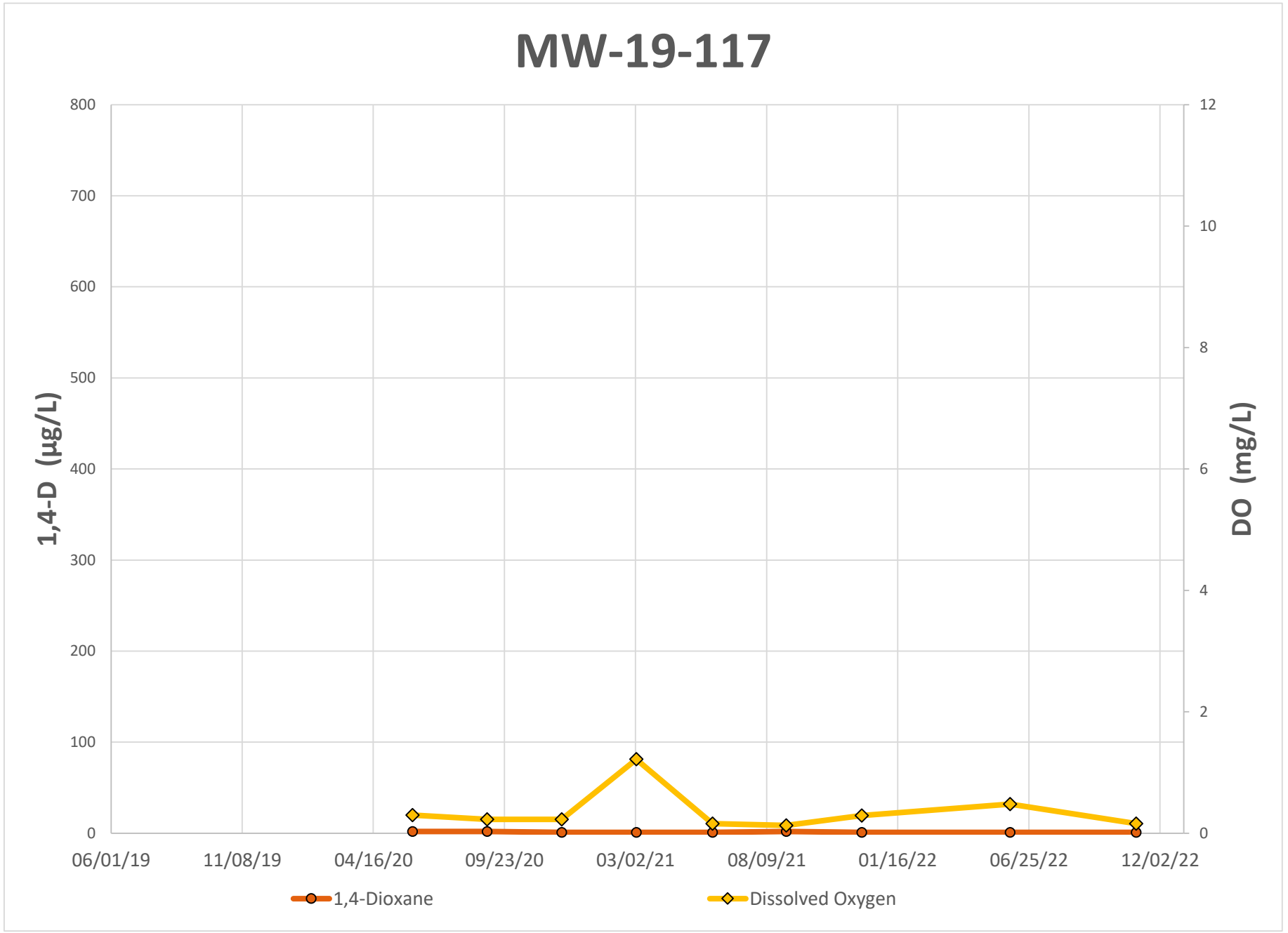
Plant 2 Transect E Downgradient Well 200 ft
Performance Graph



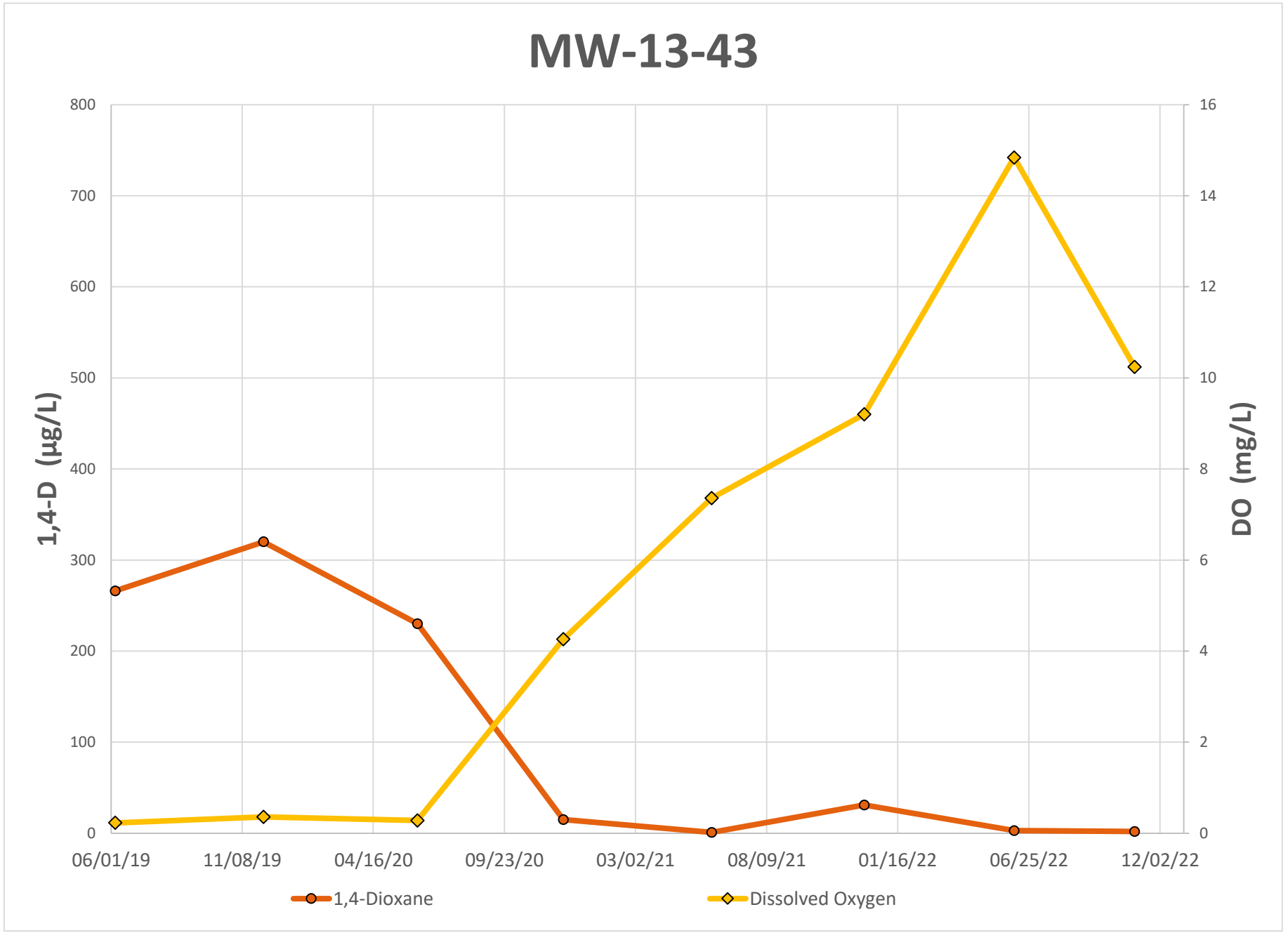
Plant 2 Transect G Upgradient Well 140 ft
Performance Graph



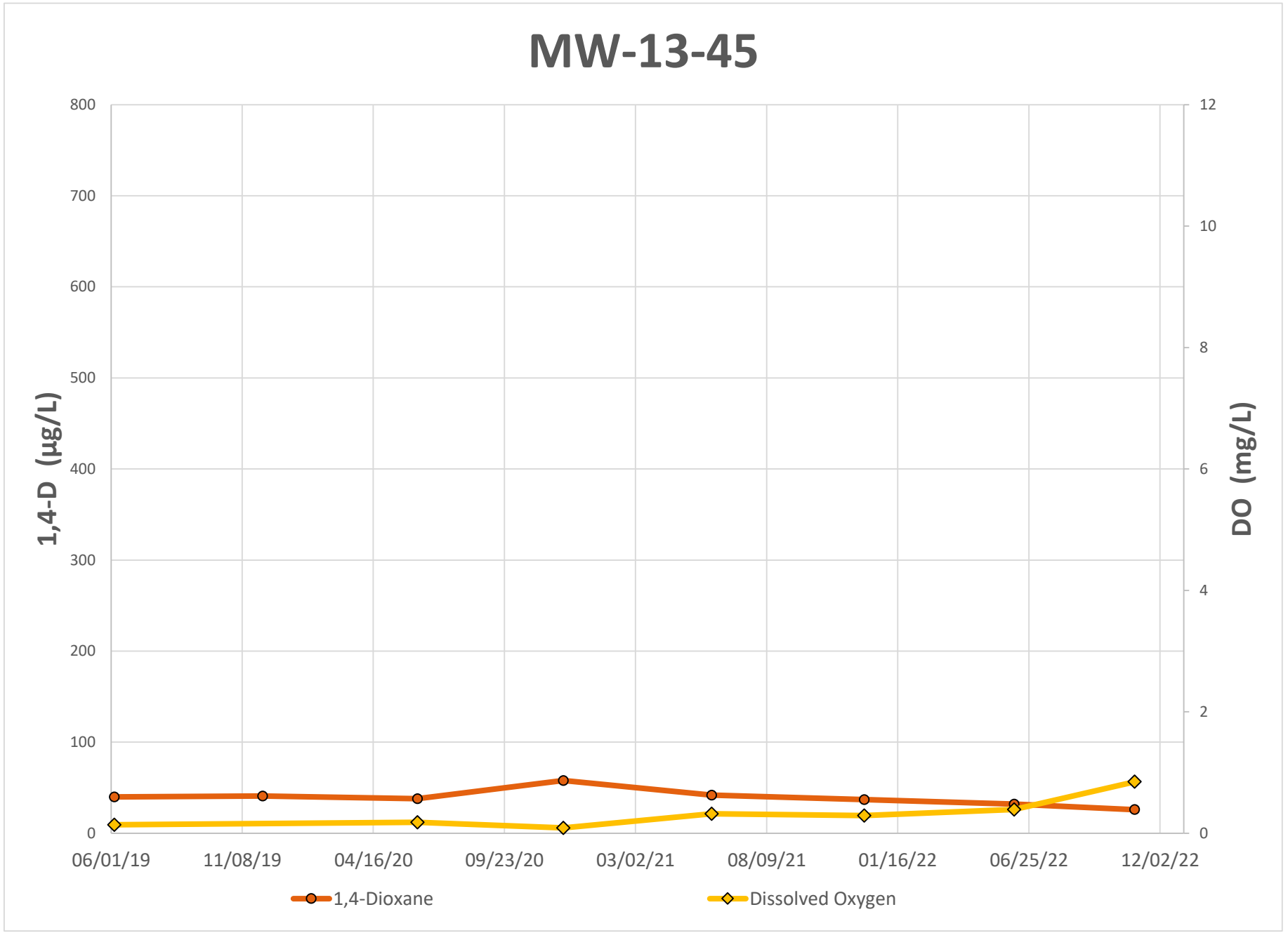
Plant 2 Transect C Monitoring Well
Performance Graph



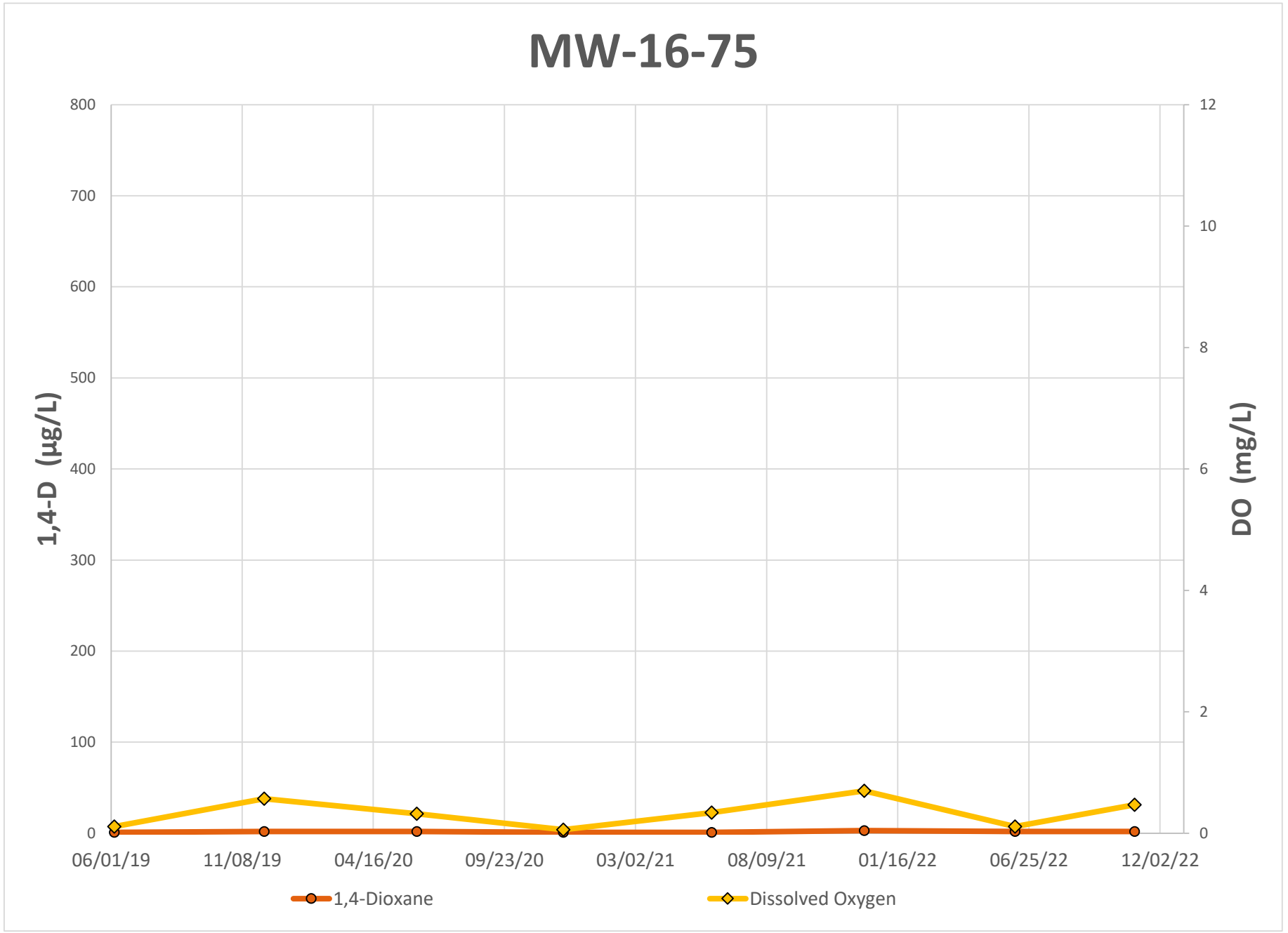
Plant 2 Transect B ROI Well
Performance Graph

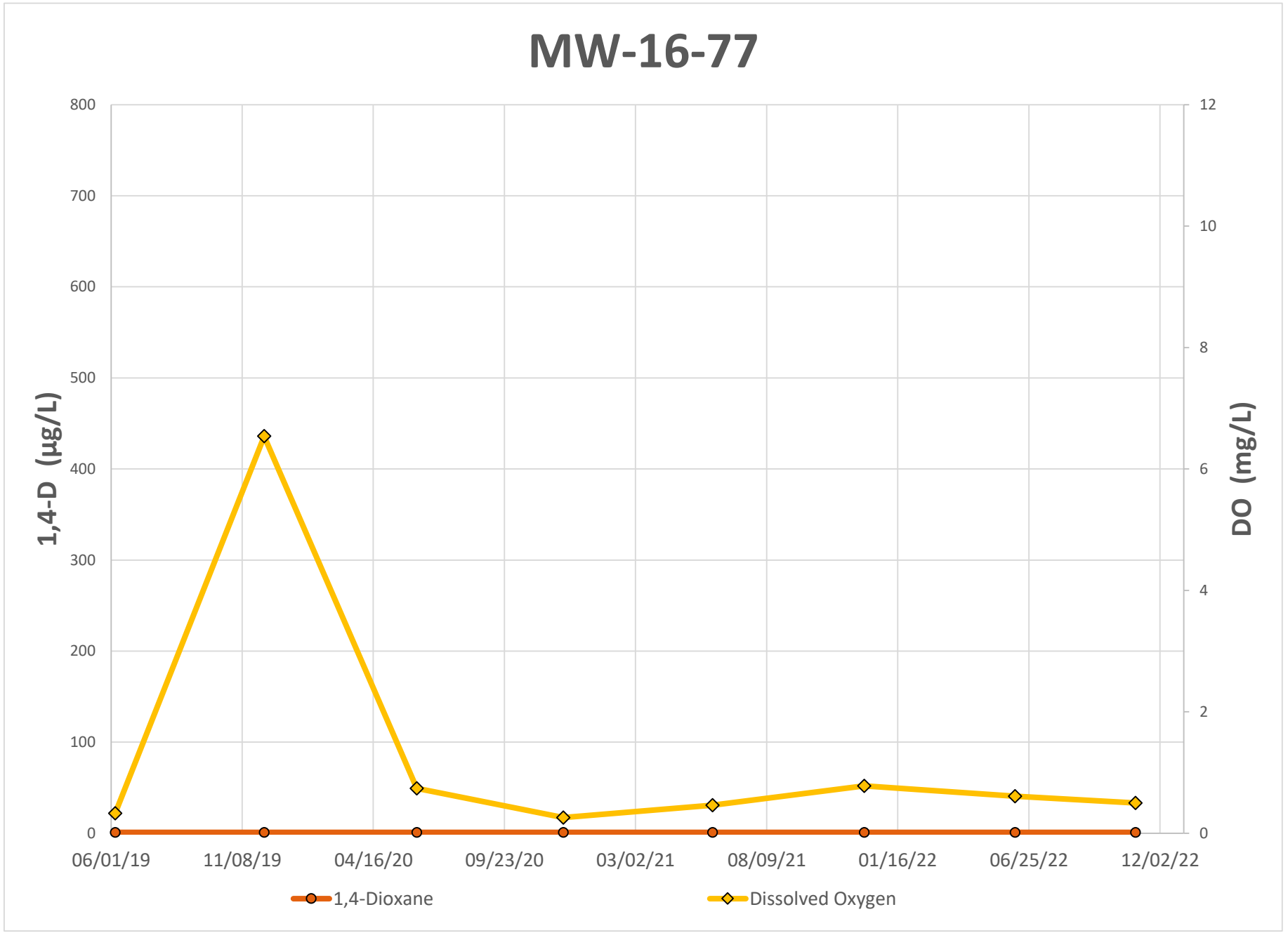


Plant 2 Transect B Cross-Gradient Well 200 ft
Performance Graph

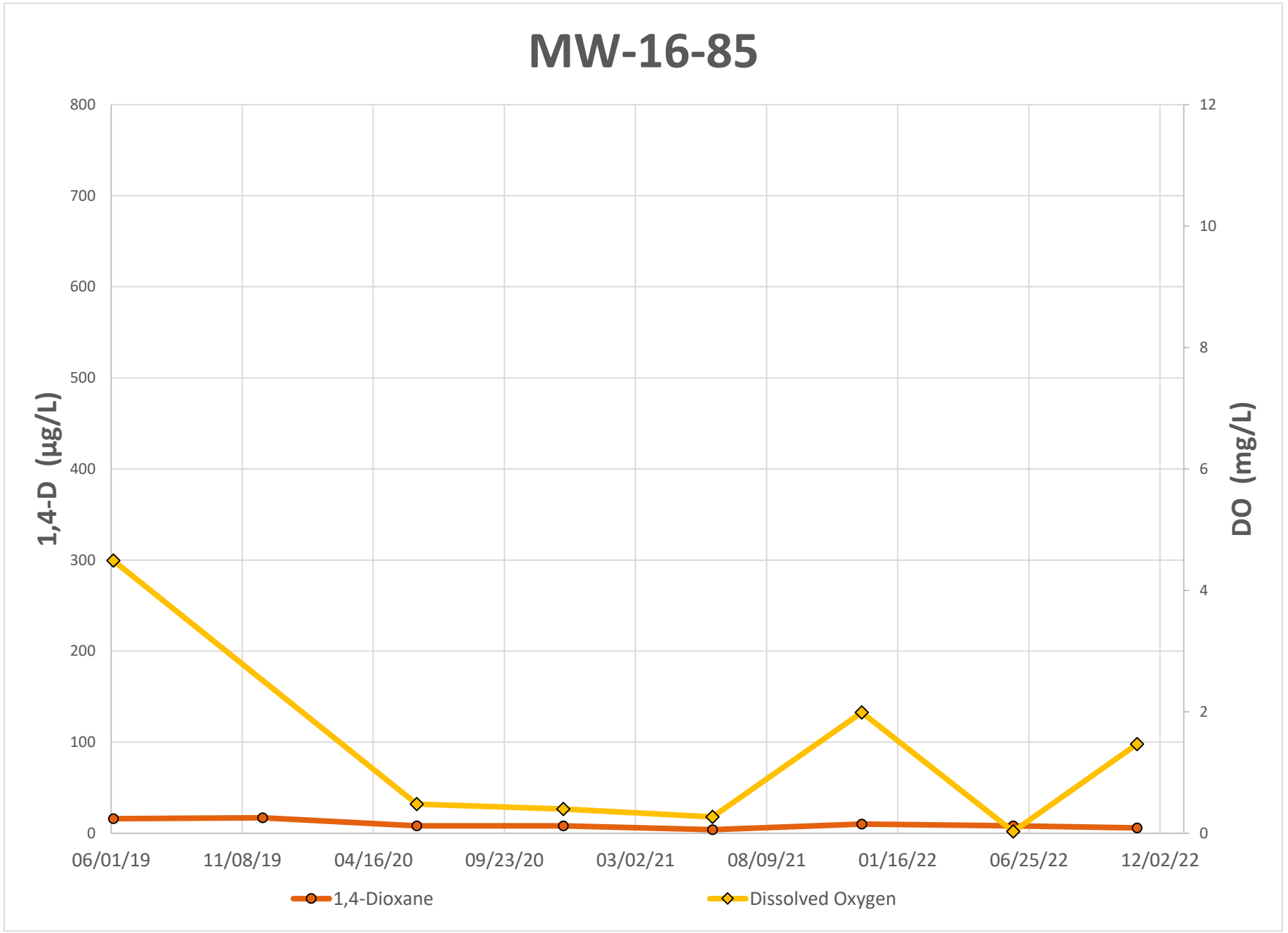


Plant 2 Transect G Downgradient Well 200 ft
Performance Graph

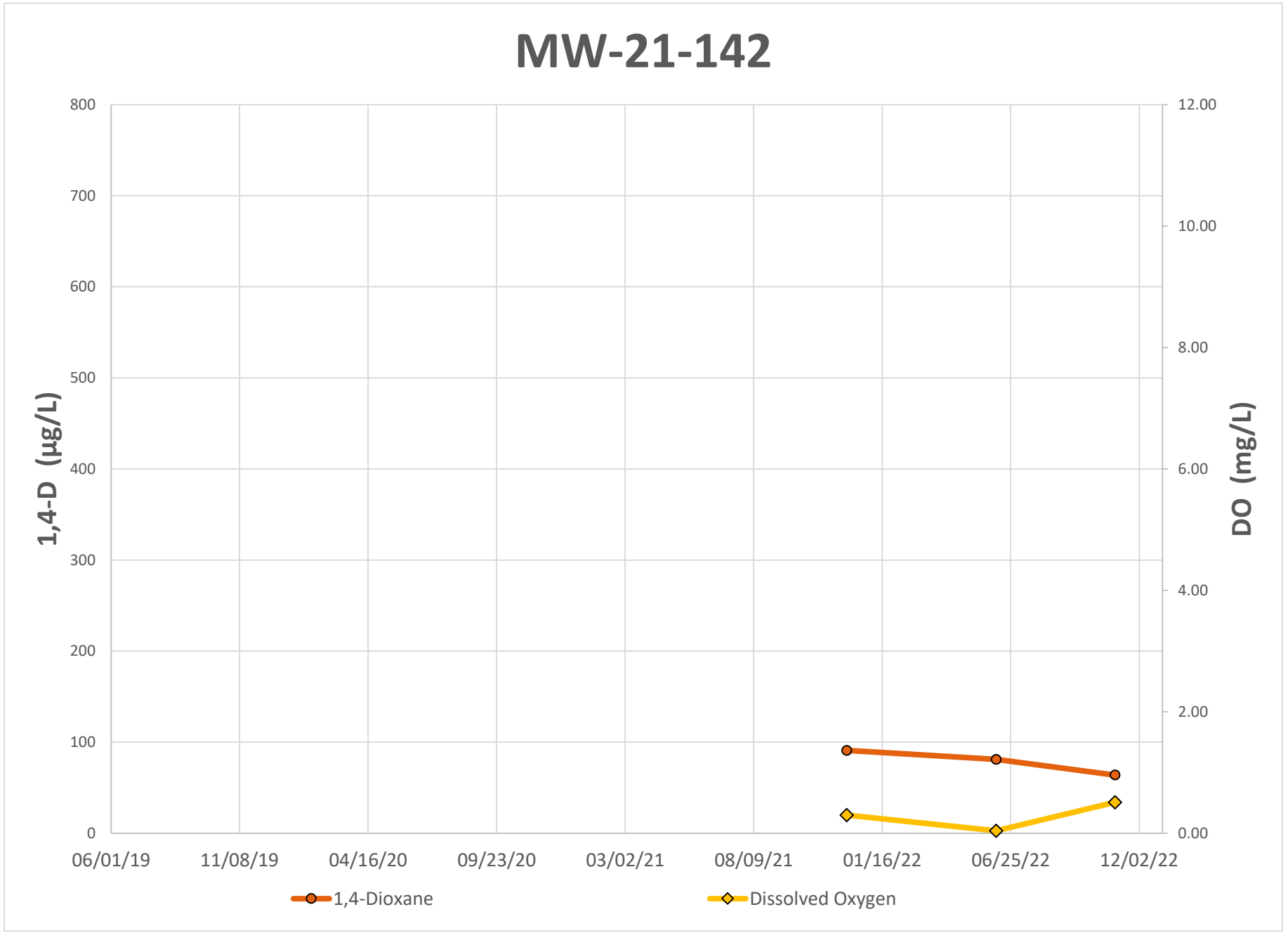



MW-16-77
800
700
600
500
400
300
200
100
0
1,4-D (µg/L)
12
10
8
6
4
2
0
DO (mg/L)
06/01/19
11/08/19
04/16/20
09/23/20
03/02/21
08/09/21
01/16/22
06/25/22
12/02/22
1,4-Dioxane
Dissolved Oxygen

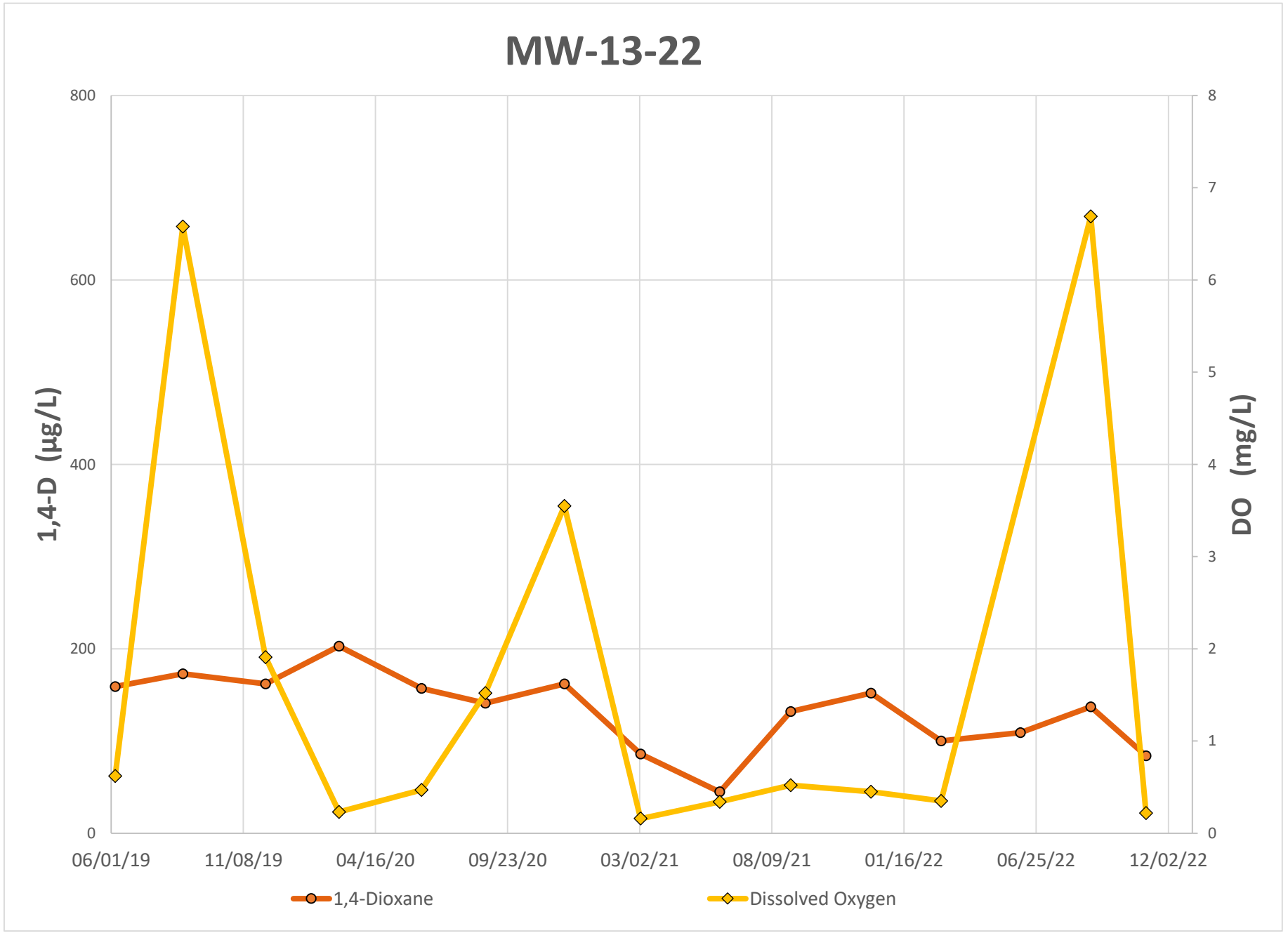
Plant 2 Transect F Downgradient Well 170 ft
Performance Graph

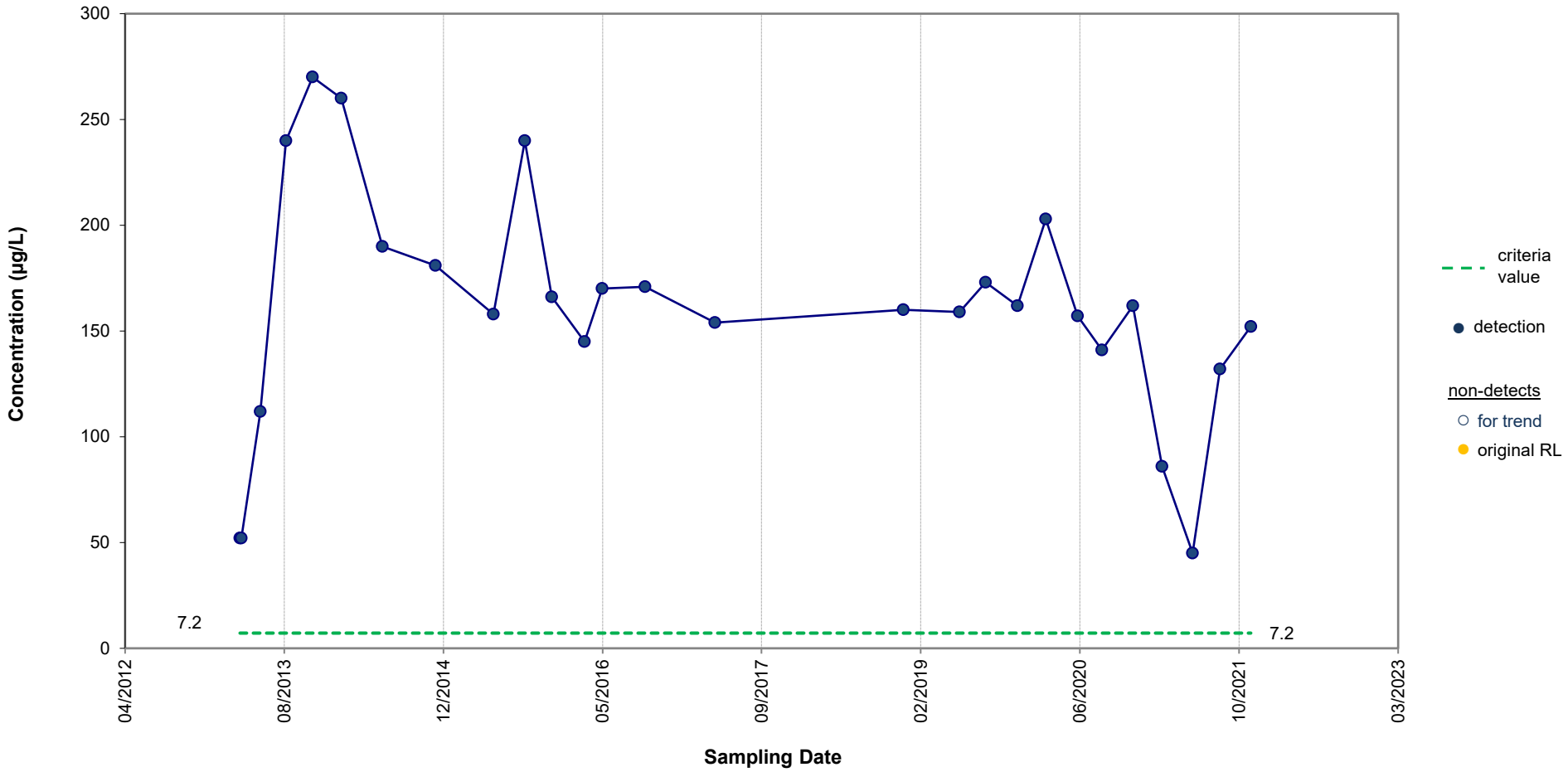


Plant 2 Transect B Upgradient Well 650 ft
Performance Graph



Plant 3 Transect A Upgradient Well 50 ft
Performance Graph





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

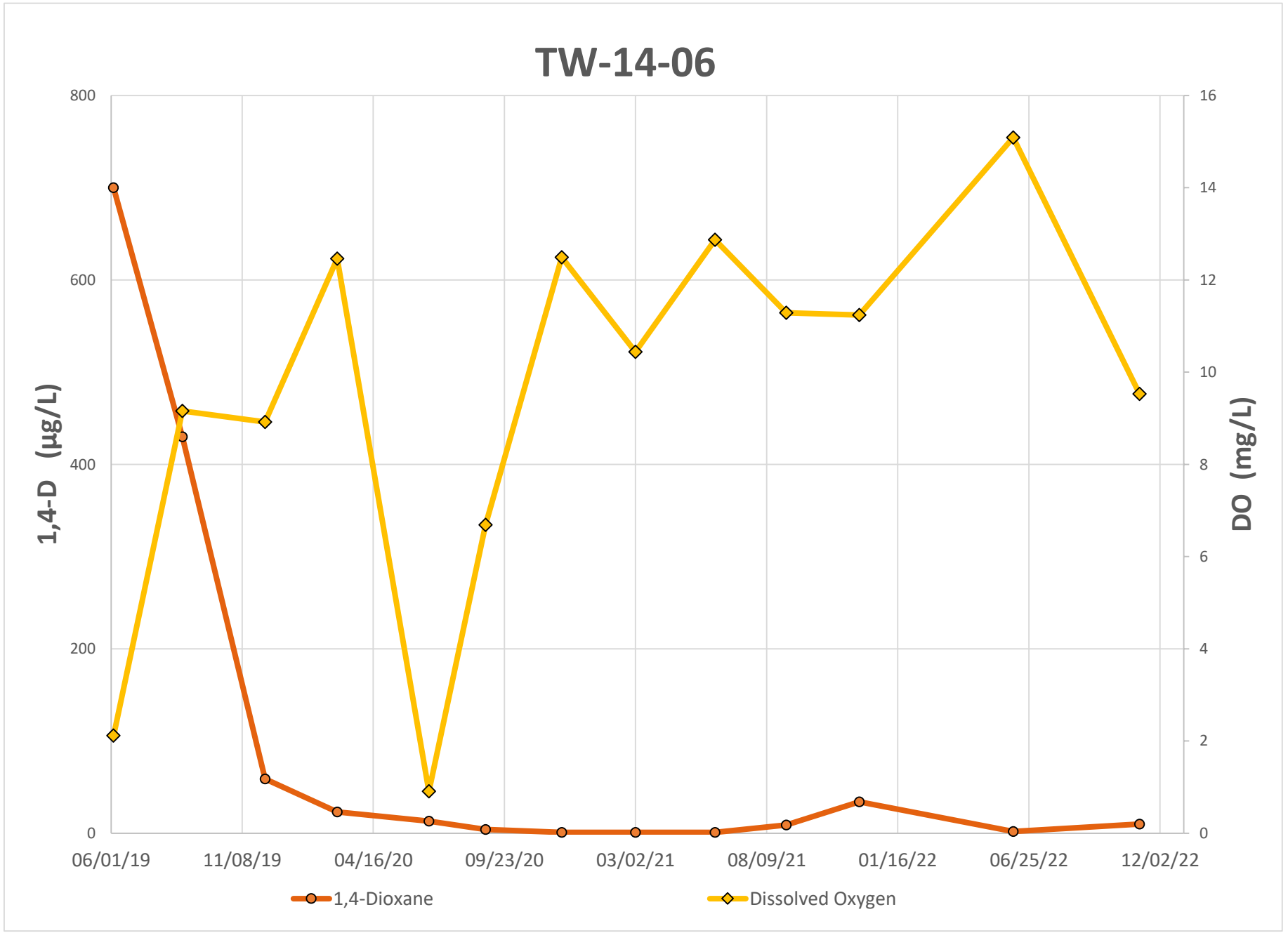
p value = 0.04 Note: p value < 0.1 indicates a statistically significant trend (90% Confidence Interval).

ARCADIS

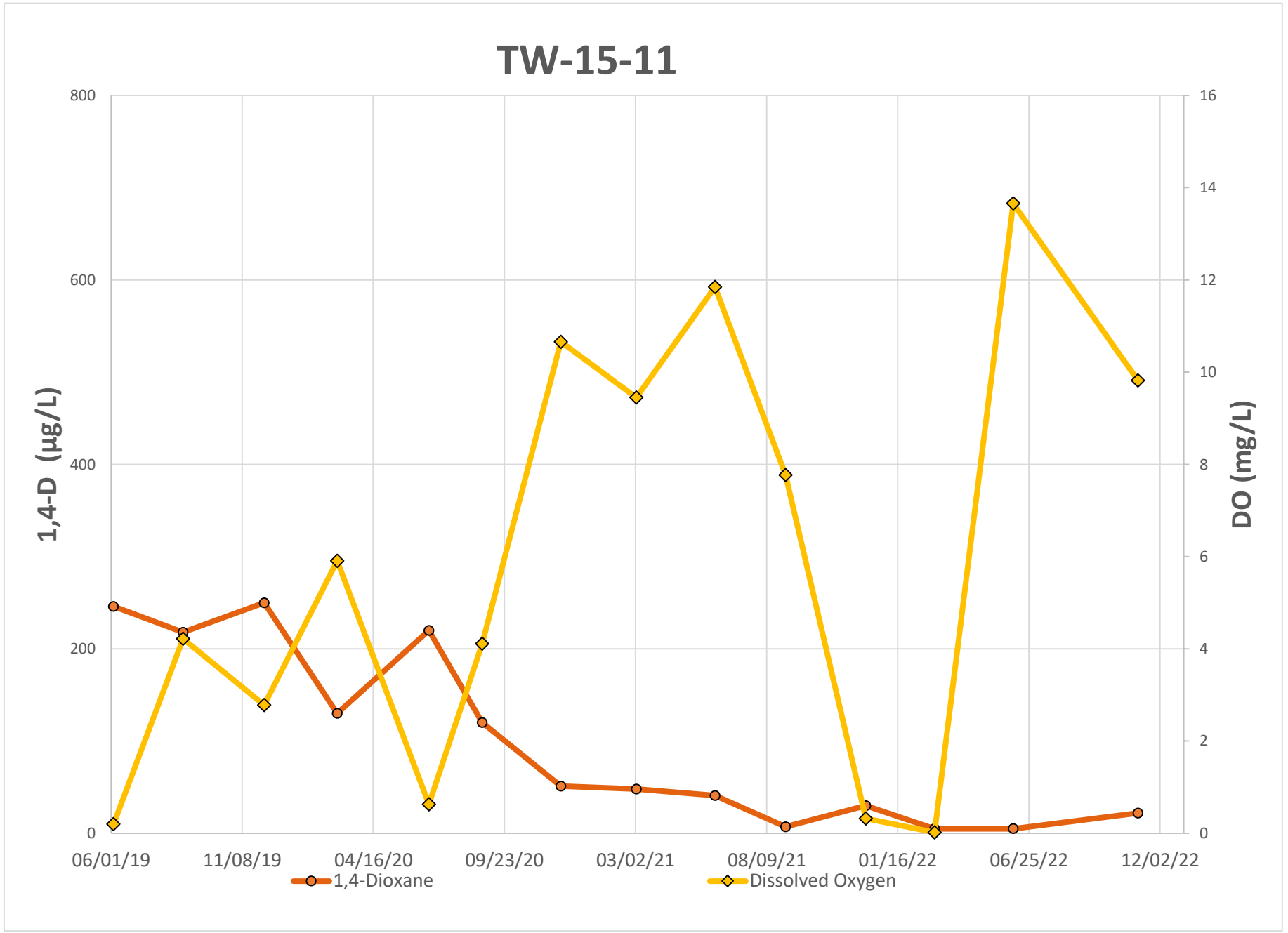
Concentration Plot: MW-13-22, 1,4-Dioxane

RACER Trust Plants 2, 3, and 6 - Lansing, Michigan

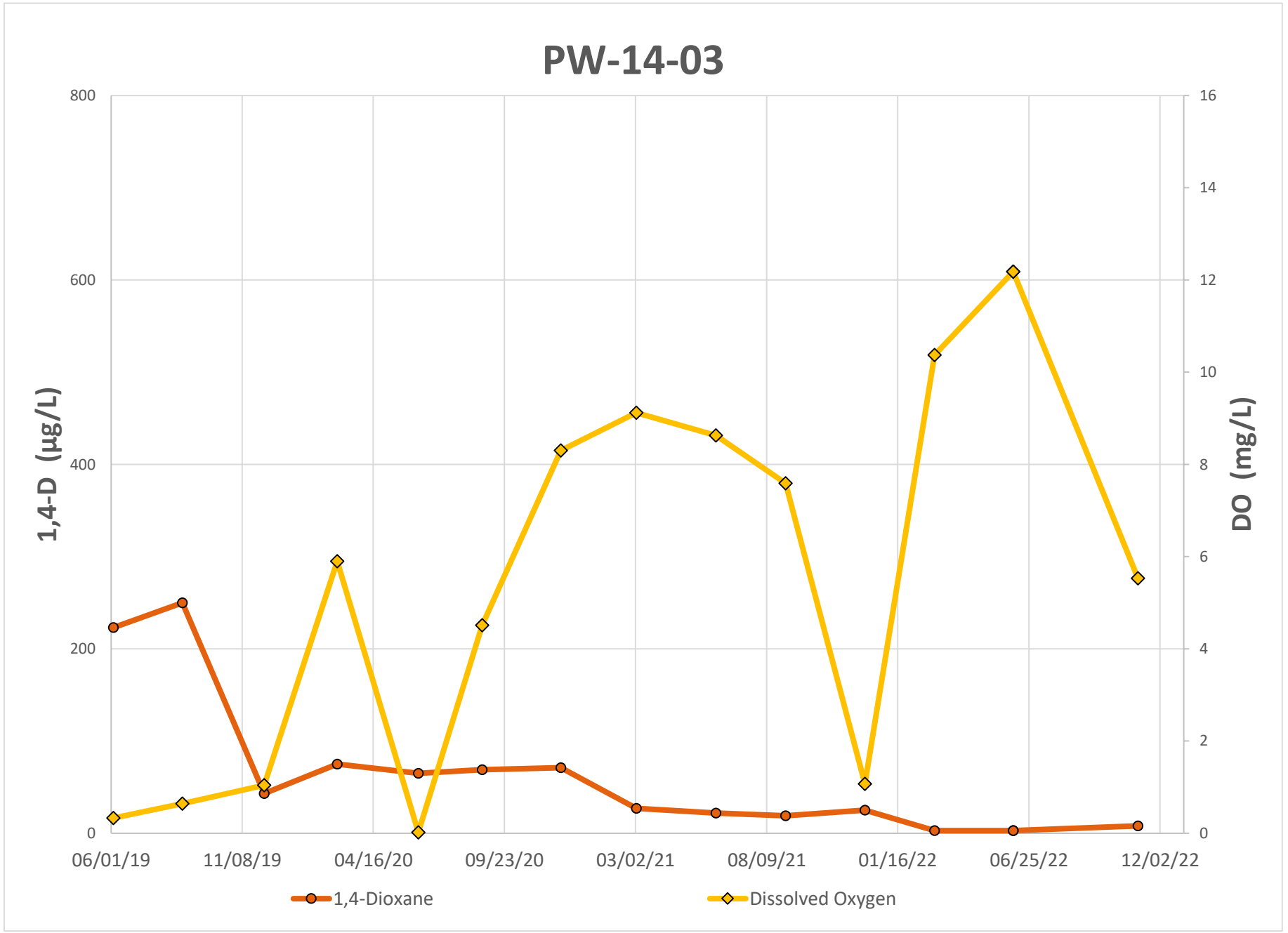
Plant 3 Transect A ROI Well Performance Graph



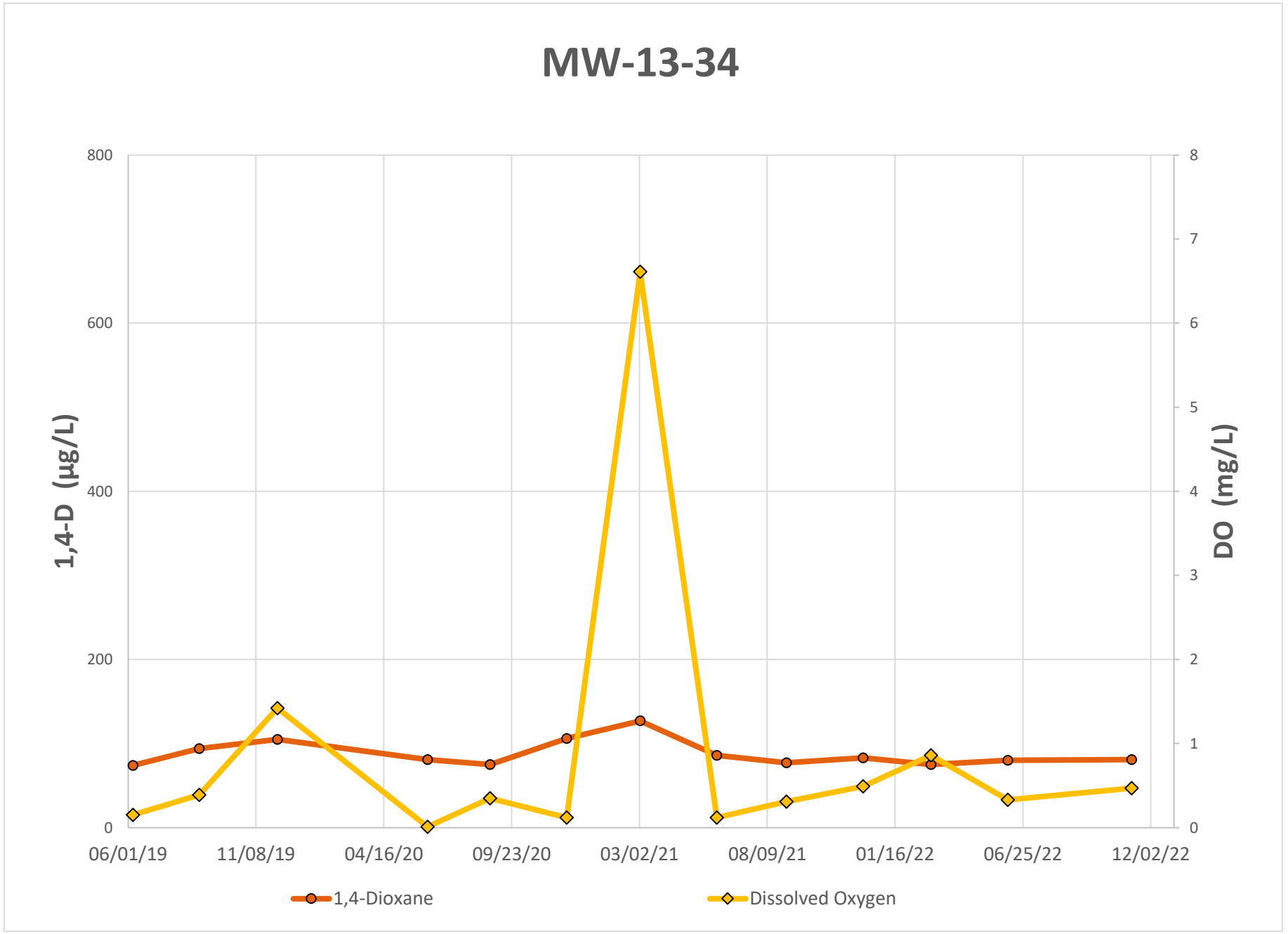
Plant 3 Transect A Downgradient Well 35 ft
Performance Graph



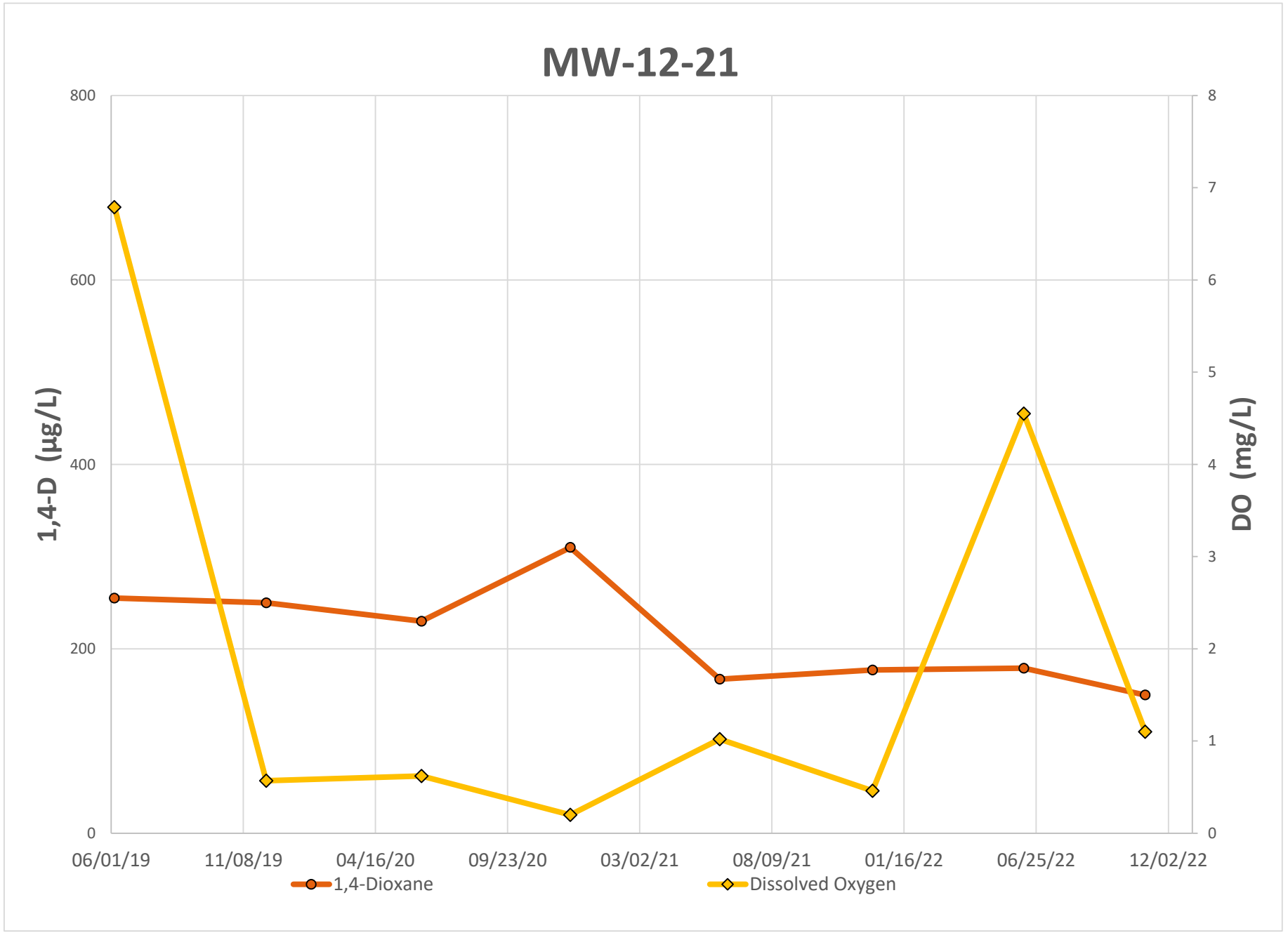
Plant 3 Transect A Downgradient Well 40 ft
Performance Graph

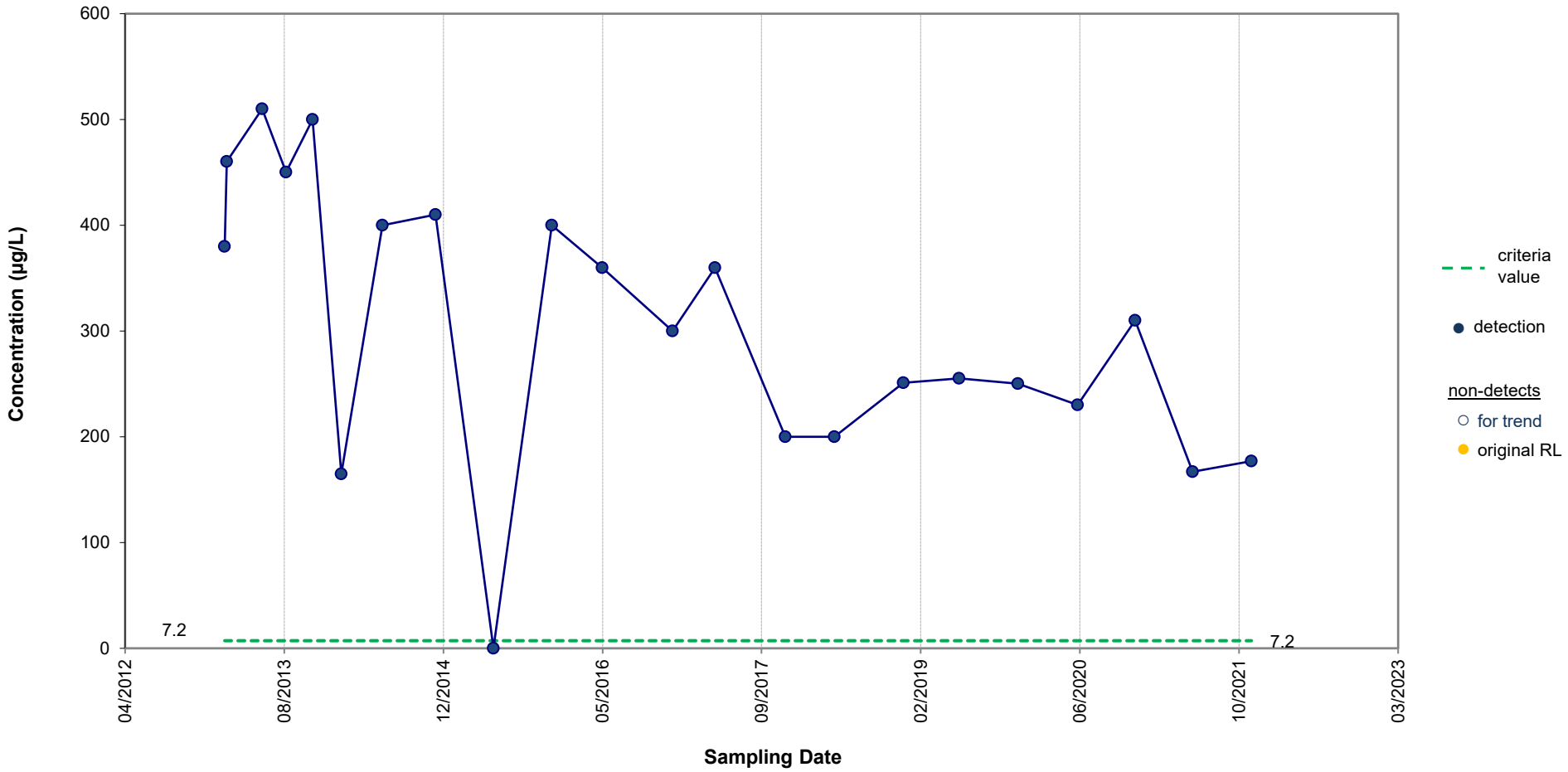


Plant 3 Transect A Downgradient Well 460 ft
Performance Graph



Plant 3 Transect A Well
Performance Graph





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 Interval).

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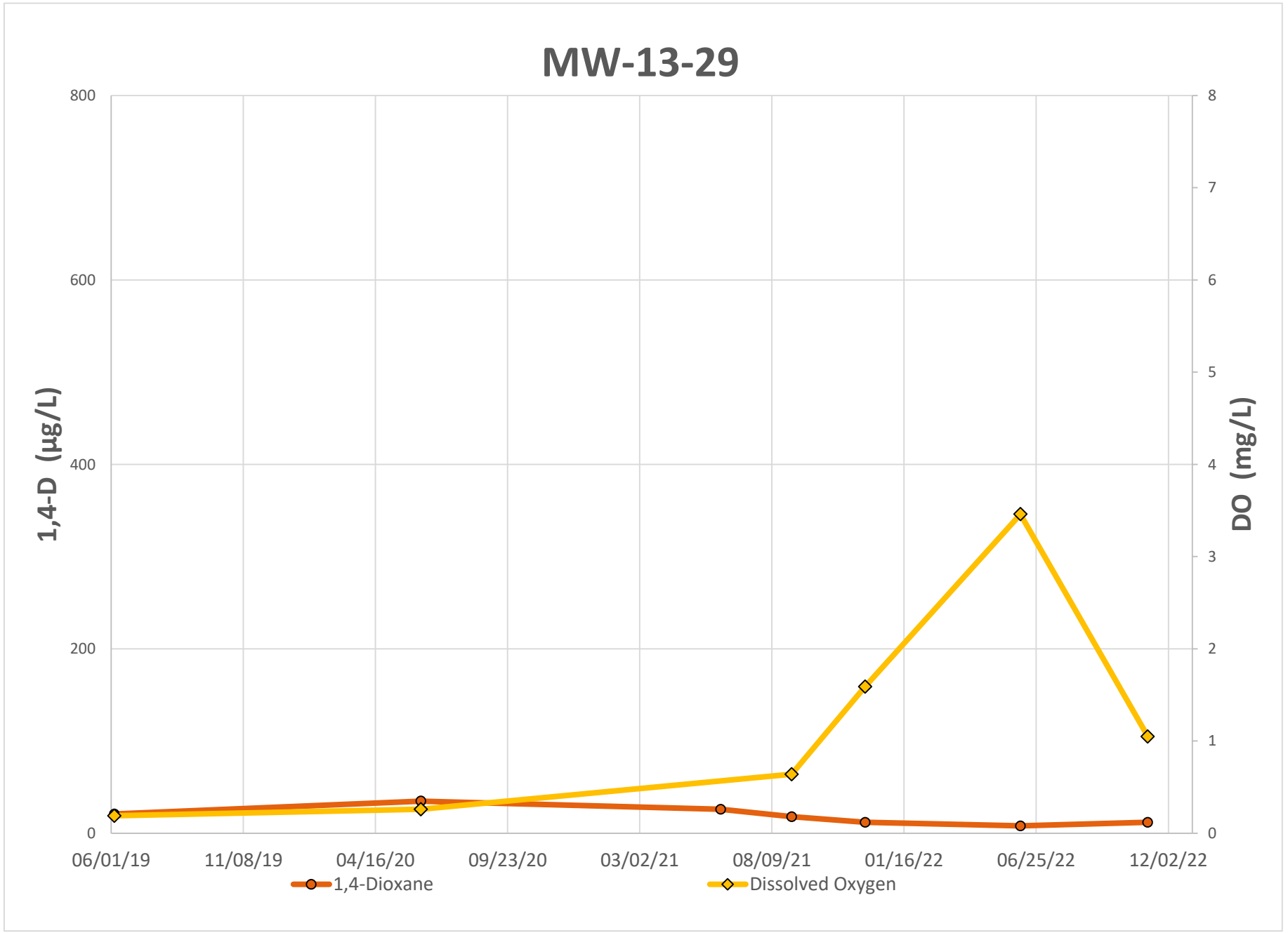
Concentration Plot: MW-12-21, 1,4-Dioxane

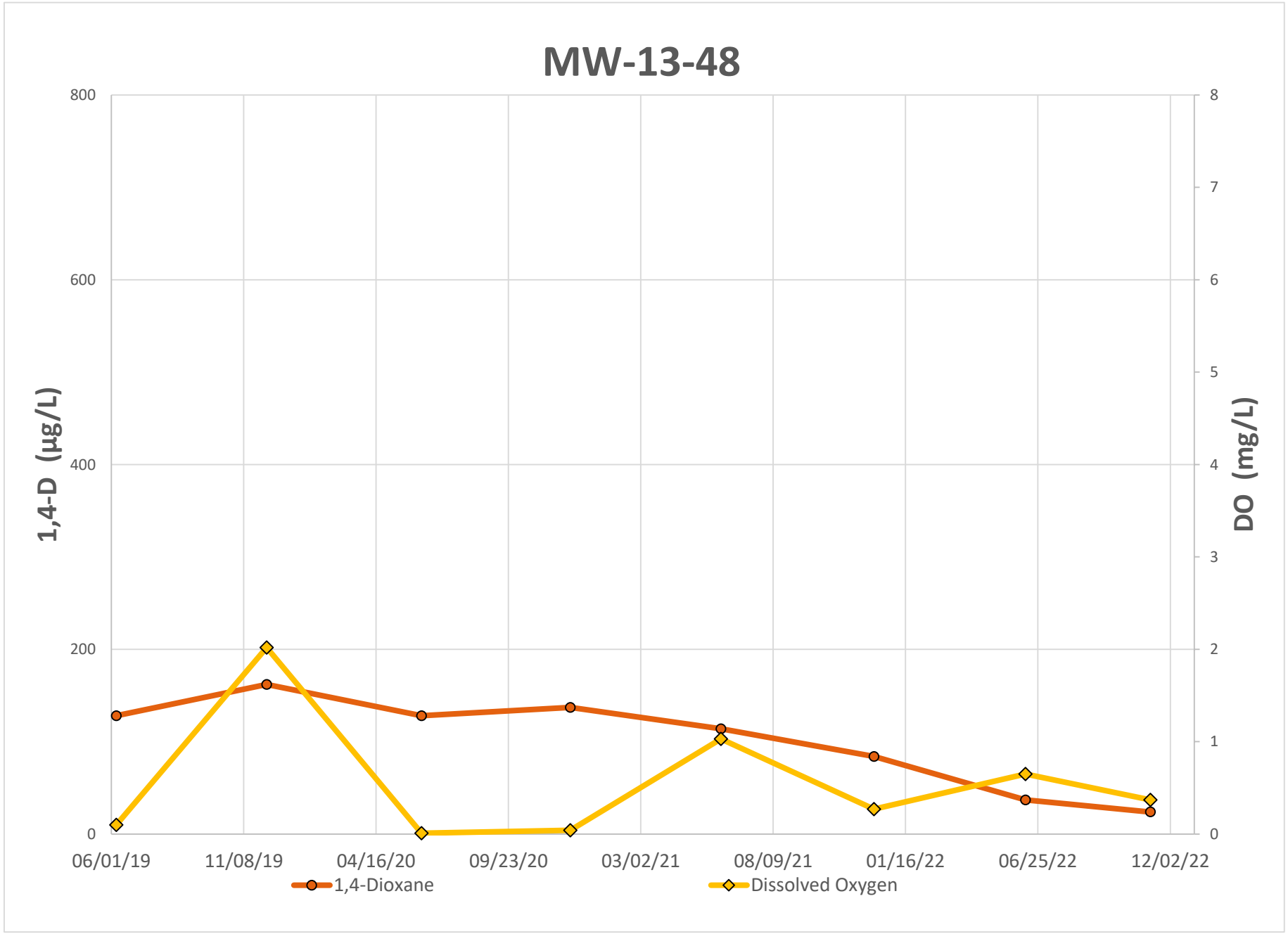
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan

Plant 3 Transect A Well
Performance Graph



Plant 3 Transect A Well
Performance Graph

ARCADIS



Appendix C

Treatment Cost Evaluation

Appendix C
Biosparge Performance Cost Tracking

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

Total annual O&M cost for both systems =	$200,000
Plant 2 (80%)	$160,000
Plant 3 (20%)	$40,000

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

Year	Months of Operation	Yearly Operation Price	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L)
2019*	7	$23,333	157	$149
2020	12	$40,000	46	$870
2021	12	$40,000	13	$3,077
2022	12	$40,000	25	$1,600

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

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)
2019*	7	$23,333	108	$216
2020	12	$40,000	51	$784
2021	12	$40,000	29	$1,379
2022	12	$40,000	19	$2,105

*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)	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L)	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L)
2020*	5	$66,667	54	$211	215	$121	40	$732
2021	12	$160,000	38	$719	215	$290	38	$1,849
2022	12	$160,000	59	$463	34	$1,834	27	$2,602

*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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