Revitalizing Auto Communities Environmental Response (RACER) Trust

Lower 1,4-Dioxane Biosparge Progress Report

Lansing Industrial Land

Lansing, Michigan

April 2022

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Revitalizing Auto Communities Environmental Response (RACER) Trust

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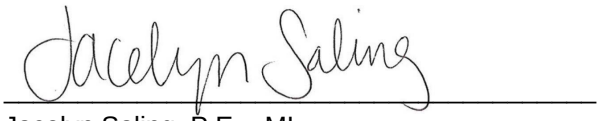

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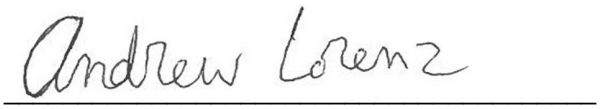

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Acronyms and Abbreviations

%	Percent
µg/L	Micrograms per Liter
ACFM	Actual Cubic Feet Per Minute
Arcadis	Arcadis of Michigan, LLC
DO	Dissolved Oxygen
EGLE	Michigan Department of Environment, Great Lakes, and Energy
LEL	Lower Explosive Limit
O&M	Operations and Maintenance
psi	Pounds per Square Inch
RACER Trust	Revitalizing Auto Communities Environmental Response Trust
ROI	Radius of Influence
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 Lansing Industrial Site Land (Site) in Lansing, Michigan, to address 1,4-dioxane impacts in the weathered bedrock. Two treatment systems, encompassing forty-one (41) biosparge wells on Plant 2 and seven (7) wells on Plant 3, comprise the biosparge system. The system was designed to inject air and propane to facilitate co-metabolic biodegradation of 1,4-dioxane. This report will serve as a recurring update on the system operations, performance, and recommendations for system optimization. This report covers operations of the biosparge systems for 2021.

1.1 Corrective Action Objectives

The long-term objectives of the biosparge system are:

- Continued protection of the municipal drinking water supply wells by preventing Site-related 1,4-dioxane impacted groundwater from migrating off-Site laterally in the weathered bedrock zone at concentrations greater than 7.2 ug/L and
- Reducing the potential for migration of 1,4-dioxane downward substantially into less weathered bedrock.

The short-term objective of the biosparge system is to reduce concentrations of 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:

- 1,4-dioxane concentration trends for 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 show stable to decreasing trends utilizing 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 require extra ordinary efforts, (i.e. the system reaches a point of diminishing returns). Evaluation of the point of diminishing returns is detailed in Section 3.2 of this report. It is recognized that it may be appropriate to update the diminishing return evaluation process, in collaboration with EGLE, over the course of the operation of the biosparge system. Information gained during the operation and monitoring will allow for better operation and evaluation over time; or,
- The short and long-term objectives have been met.

2 Biosparge System Operations and Maintenance

2.1 Operations Summary

The Plant 3 system had 88% operational uptime during 2021. The Plant 3 system was down approximately 3% of that time due to routine maintenance activities and approximately 9% of that time due to non-routine maintenance activities. The Plant 2 system had 89% operational uptime during 2021. The Plant 2 system was down approximately 3% of that time due to routine maintenance activities and approximately 8% of that time due to non-routine maintenance activities. Both systems had minimal downtime, mostly for various routine and non-routine maintenance activities, including lower explosive limit (LEL) calibration and maintenance, local power outages, and nutrient injections. These activities are detailed further in Sections 2.2 and 2.3.

System operation in 2021 is consistent with system operation in 2020, specifically:

- Air flow rates were maintained at 3 to 5 actual cubic feet per minute (ACFM) per biosparge well using the gate vales installed on the manifolds.
- Wells were grouped into three sparge zones which alternate sparging, with a one-hour system rest cycle; any given biosparge well receives one hour of air sparging followed by 3 hours of rest.
- Propane dosage for both Plant 2 and 3 systems was dosed at 15 to 20 percent (%) LEL propane, two hours total per day per well, in one half hour increments.
- Most of the wells maintained a wellhead pressure of 8-12 pounds per square inch (psi), with the exception of three former pilot wells (AS-17-G01, AS-17-G02, and AS-17-G03) at Transect G as well as one well in Transect B (AS-19-B06) at 15-20 psi. Recommendations associated with these three wells are in Section 4.

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

2.2 Routine O&M

Operations and maintenance (O&M) visits were conducted monthly in 2021 and include 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 change outs occurred once a month. At the Plant 2 system, propane was delivered on an as-needed basis, approximately quarterly. Other routine O&M included compressor maintenance, equipment calibration, and nutrient injections. Both compressors were serviced quarterly in 2021 per the manufacturer recommendations. Nutrient injections were performed twice to maintain optimal conditions for biodegradation, in April 2021 and September 2021. 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 rest of the routine maintenance shutdowns. **Appendix A** contains the 2021 O&M logs.

2.3 Non-Routine O&M

2.3.1 Plant 2

The following non-routine maintenance was completed at the Plant 2 biosparge system in 2021:

- Six power outages requiring manual restart of the system.
- Cold outdoor temperatures between January and February triggered LEL shut down alarms.
- Condensate buildup in wet receiver tank in July caused the system to shut down due to small rust particles forming. This caused the auto drain strainer and particulate filter to clog with rust particles. Adapters have been added to the bottom of the wet receiver tank to manually drain the condensate if needed, and monthly cleaning of the auto drain strainer has been added as an O&M task.
- The redundant in-line LEL meters readings began drifting apart, causing a system warning alarm in August. Programming and operational changes were made in September so only one in-line LEL meter is placed in operation while the other is disabled. A new in-line LEL sensor was installed during this time as well.
- Programming changes were applied to the Plant 2 system in December to have the option to place the LEL sensors in maintenance mode whenever they need to be replaced. This allows the system to bypass shutdown alarms to continue to sparge both air and propane while waiting for new sensors to arrive.
- Elevated wellhead pressure trends were observed in four biosparge wells at Plant 2 in the fourth quarter of 2021. Elevated pressures could be an early indication of fouling of the well screen that could eventually affect the achievable flow rate into the formation. Six other wells were exhibiting diminishing dissolved oxygen (DO) concentrations and increases in 1,4-dioxane in nearby radius of influence (ROI) wells. Arcadis inspected the wells and began preparations for well rehabilitation activities in early 2022.

2.3.2 Plant 3

The following non-routine maintenance was completed at the Plant 3 biosparge system in 2021:

- 13 power outages requiring manual system restart.
- As the calibration window was ending for the ambient LEL sensor in October, the sensor triggered a shutdown alarm. The LEL sensor was recalibrated and put back in service.
- In November, a failed ambient LEL sensor caused the system to shut down during fourth quarter groundwater sampling activities. Programming changes were applied to the Plant 3 system in December to have the option to place the LEL sensors in maintenance mode while waiting for a replacement sensor. The LEL sensor has been subsequently replaced.
- One well showed diminishing DO concentrations and increases in 1,4-dioxane in nearby ROI wells. After inspecting this well Arcadis developed a corrective action plan and began preparing for well rehabilitation activities to be completed in early 2022.

3 Performance Monitoring Results

System performance is monitored using the established performance monitoring well network across the site. **Figure 1** presents the Plant 2 performance monitoring network and **Figure 2** presents the Plant 3 performance monitoring network. 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 at performance monitoring wells. Performance monitoring data including 1,4-dioxane, DO, and nutrients is summarized on **Table 1**.

Note, an additional biosparge performance monitoring well was installed in November 2021 (Monitoring Well MW-21-142). This well is located on the northern edge of Plant 2, upgradient of transect B and downgradient of transect A (**Figure 4**). This well was sampled in December 2021 and will continue to be sampled quarterly for at least one year. Results from the new monitoring well are included in **Table 1** and will be shown on **Figure 4** once a trend is established.

Full results for groundwater sampling events, including laboratory reports and data tables for constituents other than 1,4-dioxane, DO, and nutrients, are contained in the 2019 Annual Groundwater Report (Arcadis 2020), the 2020 Annual Groundwater Report (Arcadis 2021), and the upcoming 2021 Annual Groundwater Report.

3.1 Performance Evaluation

The biosparge system will be operated until the goals described in the Corrective Action Objective section 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 met.

Plant 3 results since system startup are shown in **Figure 3** and **Appendix B**.

- Upgradient wells: In the upgradient weathered bedrock well, MW-13-22, concentrations in 2021 decreased in the first two quarters and then returned to 2020 averages by the end of the year. While the decrease in weathered bedrock was not sustained for the entire year, results do suggest natural flushing of groundwater entering the Plant 3 biosparge treatment transect is occurring during portions of the year. The upgradient deep overburden well, MW-12-21, has shown a decreasing trend since system start up indicating that mass stored in the lower permeability deep overburden continues to reduce its contribution to the more permeable weathered bedrock transport zone.
- Radius of influence wells: Results demonstrate sustained treatment within the ROI of transect A.
- Downgradient wells: Weathered bedrock monitoring wells 50 to 60 feet beyond transect A are showing treatment. The next farthest downgradient weathered bedrock well, MW-13-34, approximately 460 feet from transect A, has not yet shown a decreasing trend. Of note, the two deep overburden wells, MW-13-29 and MW-13-48, located 140 to 350 downgradient of the treatment transect have shown a decreasing trend since system start up, indicating that mass stored in the lower permeability deep overburden is reducing and its contribution to the more permeable weathered bedrock transport zone continues to decrease. Based on performance monitoring results and news of treatment at TW-15-11 and PW-14-03, the groundwater velocity range is 45 to 473 feet per year, which is generally consistent with the basis of design range for groundwater velocity of 70 to 540 feet per year.

Plant 2 results since system startup are shown in **Figures 4** through **6** and **Appendix B**.

- Upgradient wells: Most concentrations are below pre-startup levels with the exception of MW-19-124, which shows a seasonal trend with highest concentrations observed in fourth quarter.
- Radius of influence: Results continue to demonstrate treatment within the ROI of all transects.
- Downgradient wells: All downgradient wells are showing treatment or were non-detect/low concentration when installed before the system was started up and continue to be non-detect/low concentration. Weathered bedrock wells 50 to 120 feet downgradient of the Plant 2 treatment transects show decreasing trends with the exception of MW-20-127, located approximately 110 feet from Transect B. Based on downgradient performance monitoring and news of arrival at PW-14-02 and MW-17-86, the estimated groundwater velocity is 85 to 400 feet per year, generally higher than the basis of design groundwater velocity range of 20 to 150 feet per year. This would suggest faster downgradient flushing than originally estimated.

No additional statistical evaluations have been completed for the purposes of this report beyond the trend graphs presented. Statistical evaluations may be utilized in the future to support recommendations related to operational changes (i.e. shutting down transects or portions of a transect), if deemed necessary.

3.2 Diminishing Returns 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 assessing four main lines of evidence:

1. Upgradient well trends to evaluate the stability and magnitude of concentrations of 1,4-dioxane entering the biosparge system requiring treatment.
2. Average plume concentration evaluation to assess the trend of overall reductions in average plume concentration year over year (i.e. 12-month reductions) to determine if ongoing treatment is meaningful.
3. Comparison of the 12-month 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.

In order to evaluate these lines of evidence, biosparge performance monitoring wells were grouped based on transect and proximity to allow for evaluation of localized system effectiveness, one group for Plant 3 and 3 groups for Plant 2. An average concentration for each group of wells is calculated after each sampling event. A 12-month reduction in 1,4-dioxane concentration is calculated by subtracting the current average plume concentration from the average plume concertation 12-months prior. **Table 2** presents the average plume concentrations and 12-month reduction values for Plant 3 and three groups for Plant 2 of the 1,4-dioxane plume. For the third line of evidence listed, the maximum 12-month reduction in 1,4-dioxane observed during the first three years of operation will serve as the reference reduction value (RRV).

The sections below summarize the progress each plant is making toward reaching the point of diminishing returns to date.

3.2.1 Plant 3

Trends in wells upgradient of the Plant 3 treatment transect are an important consideration for evaluating the point of diminishing returns. As noted, significant decreases in weathered bedrock concentrations upgradient of the treatment transect at MW-13-22 were observed in first and second quarter 2021. While the decreases were not sustained for the entire year, results do suggest natural attenuation and flushing of groundwater is occurring

seasonally. The upgradient deep overburden well, MW-12-21, has shown a decreasing trend since system start up indicating that mass stored in the lower permeability deep overburden continues to reduce its contribution to the more permeable weathered bedrock transport zone.

Before start-up of the biosparge system in July of 2019, the average plume concentration at Plant 3 was 280 ug/L. In 2021, the average plume concentration ranged from 39 to 65 µg/L, a 76 to 86% reduction over baseline. In fourth quarter 2021, the average plume concentration was 13 µ/L lower than the average plume concentration in fourth quarter 2020. While year over year reductions in average plume concentrations are still occurring at Plant 3, they are becoming less significant over time.

For Plant 3, the RRV is 173 µ/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 2, the 12- month reduction has been less than 34.6 µg/L in the third and fourth quarters of 2021.

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 utilizing the annual operations and maintenance cost and the annual average reduction of 1,4-dioxane. **Exhibit 1** below summarizes the approximate cost per 1 µg/L of 1,4-dioxane treated. Back up calculation details are included in **Appendix C.**

Exhibit 1: Plant 3 Operations Cost per µg/L treated

Year	Annual Average Reduction in Plume Concentration (µg/L)	Unit Treatment Cost ($ per ug/L)
2019*	157	$149
2020	46	$1,425
2021	13	$2,990

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

As of the end of 2021, the Plant 3 system has been operating for 2.5 years and is showing signs of reaching the point of diminishing returns based on the upgradient well trends, the average plume concentration reductions, and the financial assessment.

3.2.2 Plant 2

The monitoring well upgradient of the northern most Plant 2 transect (Transect B), MW-20-126, has had a decreasing trend since system start up. Dissolved oxygen measured in this well suggest that it may be influenced by the biosparge system. The data from the new well MW-21-142 will be utilized as an upgradient well for Transect B in future evaluations.

Before startup of the biosparge system in August of 2020, the average plume concentration in northern Plant 2 (B Transect) was 220 µg/L. In 2021, the average plume concentration ranged from 82 to 114 µg/L, a 48 to 63% reduction over baseline. In fourth quarter 2021, the average plume concentration was 38 µg/L lower than the average plume concentration in fourth quarter 2020.

For Transects D, E, F and G upgradient concentrations are below pre-startup levels with the exception of MW-19-124, which shows a seasonal trend with highest concentrations observed in fourth quarter.

The average plume concentration in northern Plant 2 (Transect B) prior to startup of the biosparge system was 220 µg/L. In 2021, the average plume concentration ranged from 82 to 114 µg/L, a 48% to 63% reduction over baseline. In fourth quarter 2021, the average plume concentration was 38 µg/L lower than the average plume concentration in fourth quarter 2020. 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 has not yet been achieved at the Plant 2 northern transect.

The average plume concentration in southern Plant 2 (G and E Transects) prior to startup of the biosparge system was 551 µg/L. In 2021, the average plume concentration ranged from 50 to 94 µg/L, a 83 to 91% reduction over baseline. In fourth quarter 2021, the average plume concentration was 215 µg/L lower than the average plume concentration in fourth quarter 2020. The current RRV for the Plant 2 southern transect is 457 µg/L. The point of diminishing returns has been defined as when the 12-month reduction is less than 20% of the RRV, or 91.4 µg/L. As shown in Table 2, the 12- month reduction was less than 91.4 µg/L in the third quarter of 2021.

In eastern Plant 2 (E and F Transects), the average plume concentration before startup of the biosparge system was 128 µg/L. The average plume concentration ranged from 46 to 62 µg/L in 2021, a 52 to 62% reduction over baseline. The average plume concentration was 38 µg/L lower in fourth quarter 2021 than the average plume concentration in fourth quarter 2020. The current RRV for the Plant 2 eastern transect is 91 µg/L. The point of diminishing returns has been defined as when the 12-month reduction is less than 20% of the RRV, or 18.2 µg/L. As shown in Table 2, this target has not yet been achieved at the Plant 2 eastern transect.

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 utilizing the annual operations and maintenance cost and the annual average reduction of 1,4-dioxane. **Exhibit 2** below summarizes the approximate cost per 1 µg/L of 1,4-dioxane treated.

Exhibit 2: Plant 2 Operations Cost per µg/L treated

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

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

4 Recommendations

There are no recommended changes to the biosparge system operations in the short term. Both the Plant 2 and 3 systems are showing signs of reaching the point of diminishing returns based on the upgradient well trends, the average plume concentration reductions, and the financial assessment. RACER will continue to track these metrics in 2022 and communicate the progress to EGLE in meetings and in future biosparge annual reports.

Increased wellhead pressure and diminishing performance at the three former pilot test wells (AS-17-G01, AS-17-G02 and AS-17-G03) and one Transect B well (AS-19-B06) were observed in 2021. Seven other wells exhibited diminishing DO concentrations and increases in 1,4-dioxane in nearby ROI wells. Increased wellhead pressures, diminishing DO concentrations, and increases in 1,4-dioxane warrants rehabilitation of these wells, which is scheduled in early 2022. Details related to the rehabilitation will be provided in the 2022 Annual Biosparge Report.

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 did not suggest that this transect needs to be installed at this time. This area will continue to be monitored and if the additional transect is not warranted after two years of operation of the Plant 2 system, it will be recommended that the blank casings that are currently installed be abandoned.

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. As performance monitoring data is collected and evaluated, actions will be recommended to EGLE as appropriate. Operational adjustments will be proposed in annual update reports if future performance monitoring results justify them. A 5-year review will be completed for the biosparge system to document all recommendations, proposals, and concurrences with EGLE over the previous 5-years of operation. The first 5-year review is planned for first quarter 2026.

5 References

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

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

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

Tables

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-13-43	2	06/06/19	0.23	NA	NA	NA	266
		12/04/19	0.36	NA	NA	NA	320
		06/09/20	0.28	NA	NA	NA	230
		12/04/20	4.26	NA	NA	NA	15
		06/03/21	7.36	NA	NA	NA	1
		12/06/21	9.20	NA	NA	NA	31
MW-13-45	2	06/05/19	0.14	NA	NA	NA	40
		12/03/19	-	NA	NA	NA	41
		06/09/20	0.18	NA	NA	NA	38
		12/04/20	0.09	NA	NA	NA	58
		06/03/21	0.32	NA	NA	NA	42
		12/06/21	0.29	NA	NA	NA	37
MW-14-61	2	06/13/19	0.75	NA	NA	NA	151
		12/06/19	0.25	NA	NA	NA	140
		03/03/20	1.6	<0.5	0.6	0.07	148
		06/02/20	0.36	<0.5	0.8	0.05	152
		08/31/20	2.55	<0.5	0.5	0.03	98
		12/02/20	1.27	<0.5	0.3	0.15	18
		03/02/21	1.85	<0.5	1	0.76	21
		06/02/21	1.4	<0.5	0.2	0.23	9
		09/02/21	1.31	<0.5	0.1	0.09	9
DUP-01		09/02/21	1.31	<0.5	0.1	0.08	8
		11/30/21	1.1	NA	0.2	0.14	5
DUP-01		11/30/21	1.1	NA	0.2	0.12	7
MW-15-72	2	05/16/16	0.11	NA	NA	NA	190 Y a
		09/09/16	NA	NA	NA	NA	NA
		11/11/16	4.31	NA	NA	NA	NA
		12/07/16	3.3	NA	NA	NA	NA
		12/29/16	4.85	NA	NA	NA	NA
		01/31/17	1.95	NA	NA	NA	NA
		04/26/17	0.23	NA	NA	NA	240 Y [320 Y]
		12/07/17	1.67	NA	NA	NA	290a
		01/10/18	0.27	NA	NA	NA	NA
		02/14/18	0.21	NA	NA	NA	230a
		03/08/18	0.4	NA	NA	NA	324a
		04/09/18	0.19	NA	NA	NA	220a
		05/08/18	0.25	NA	NA	NA	260a
		09/05/18	0.06	NA	NA	NA	240a
		12/05/18	0.3	NA	NA	NA	290a
		02/27/19	0.68	NA	NA	NA	28a
		06/13/19	0.54	NA	NA	NA	128
		09/26/19	NA	NA	NA	NA	17
		10/04/19	NA	NA	NA	NA	16
		12/05/19	0.24	NA	NA	NA	310
		03/02/20	0.63	NA	NA	NA	150
		06/02/20	0.18	NA	NA	NA	270
		09/01/20	0.29	NA	NA	NA	90

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-15-72	2	12/03/20	0.09	NA	NA	NA	270
		03/02/21	0.19	NA	NA	NA	240
		06/02/21	4.94	NA	NA	NA	15
		08/31/21	0.12	NA	NA	NA	112
		12/01/21	0.34	NA	NA	NA	133
MW-16-74	2	03/02/20	0.44	NA	NA	NA	2
		06/05/20	0.49	NA	NA	NA	2
		09/01/20	0.15	NA	NA	NA	3
		12/01/20	0.62	NA	NA	NA	1
		03/03/21	0.43	NA	NA	NA	1
		06/02/21	0.37	NA	NA	NA	1
		08/31/21	0.12	NA	NA	NA	2
		12/02/21	0.26	NA	NA	NA	3
MW-16-75	2	06/05/19	0.11	NA	NA	NA	1
		12/05/19	0.57	NA	NA	NA	2
		06/08/20	0.32	NA	NA	NA	2
		12/04/20	0.06	NA	NA	NA	1
		06/03/21	0.34	NA	NA	NA	1
		12/06/21	0.7	NA	NA	NA	3
MW-16-77	2	06/06/19	0.33	NA	NA	NA	1
		12/05/19	6.54	NA	NA	NA	1
		06/08/20	0.74	NA	NA	NA	1
		12/04/20	0.26	NA	NA	NA	1
		06/04/21	0.46	NA	NA	NA	1
		12/06/21	0.78	NA	NA	NA	1
MW-16-78	2	06/05/19	0.16	NA	NA	NA	1
		12/04/19	0.2	NA	NA	NA	1
		06/09/20	0.26	NA	NA	NA	1
		12/07/20	0.14	NA	NA	NA	1
DUP-05		12/07/20	0.14	NA	NA	NA	1
		03/03/21	0.23	NA	NA	NA	1
		06/02/21	0.67	NA	NA	NA	1
		08/31/21	0.36	NA	NA	NA	1
		12/02/21	0.3	NA	NA	NA	1
MW-16-79	2	06/04/19	0.86	NA	NA	NA	1
		12/04/19	1.1	NA	NA	NA	2
		06/09/20	0.79	NA	NA	NA	1
		12/07/20	0.34	NA	NA	NA	1
		03/03/21	0.2	NA	NA	NA	1
		06/03/21	0.75	NA	NA	NA	1
		08/31/21	0.64	NA	NA	NA	1
		12/02/21	0.42	NA	NA	NA	1

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-16-81	2	06/13/19	0.27	NA	NA	NA	3200
		12/06/19	0.16	NA	NA	NA	2500
		03/02/20	0.4	NA	NA	NA	2600
DUP-01		03/02/20	0.4	NA	NA	NA	2700
		06/05/20	0.26	NA	NA	NA	3100
DUP-02		06/05/20	0.26	NA	NA	NA	2700
		09/02/20	0.16	NA	NA	NA	500
DUP-02		09/02/20	0.16	NA	NA	NA	590
		12/03/20	0.23	NA	NA	NA	1930
DUP-02		12/03/20	0.23	NA	NA	NA	1070
		03/03/21	0.20	NA	NA	NA	560
DUP-02		03/03/21	0.20	NA	NA	NA	570
		06/03/21	0.52	NA	NA	NA	490
DUP-02		06/03/21	0.52	NA	NA	NA	500
		08/31/21	0.29	NA	NA	NA	230
		12/01/21	0.8	NA	NA	NA	310
MW-16-82	2	06/07/19	0.27	NA	NA	NA	1
		12/04/19	0.32	NA	NA	NA	1
		06/10/20	0.36	NA	NA	NA	1
		12/04/20	0.27	NA	NA	NA	1
		03/03/21	0.29	NA	NA	NA	1
		06/04/21	0.34	NA	NA	NA	1
		09/01/21	0.3	NA	NA	NA	2
		12/02/21	0.31	NA	NA	NA	1
MW-16-84	2	06/04/19	7.89	NA	NA	NA	47
		12/03/19	NA	NA	NA	NA	67
		03/04/20	0.21	NA	NA	NA	66
		06/04/20	0.63	NA	NA	NA	58
DUP-03		06/04/20	0.63	NA	NA	NA	58
		09/01/20	0.39	NA	NA	NA	57
		12/01/20	0.1	NA	NA	NA	81
		03/02/21	1.69	<0.5	0.5	0.06	66
		06/03/21	0.51	<0.5	0.4	0.09	15
		09/01/21	0.21	NA	NA	NA	43
		12/02/21	0.27	NA	NA	NA	60
MW-16-85	2	06/04/19	4.49	NA	NA	NA	16
		12/03/19	NA	NA	NA	NA	17
		06/08/20	0.48	NA	NA	NA	8
		12/04/20	0.4	NA	NA	NA	8
		06/04/21	0.27	NA	NA	NA	4
		12/03/21	1.99	NA	NA	NA	10

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-17-86	2	06/04/19	0.23	NA	NA	NA	75
		12/03/19	0.18	NA	NA	NA	90
		03/04/20	0.15	NA	NA	NA	99
		06/03/20	2.12	NA	NA	NA	94
		09/01/20	0.53	NA	NA	NA	88
	2	12/01/20	0.11	NA	NA	NA	106
		03/03/21	0.2	NA	NA	NA	79
		06/03/21	0.28	NA	NA	NA	69
DUP-01		06/03/21	0.28	NA	NA	NA	70
		09/01/21	0.28	NA	NA	NA	48
		12/03/21	0.32	NA	NA	NA	43
MW-19-115	2	12/20/19	0.68	NA	NA	NA	11
		03/04/20	0.22	NA	NA	NA	9
		06/03/20	0.24	NA	NA	NA	13
		09/01/20	1.99	NA	NA	NA	8
		12/01/20	0.17	NA	NA	NA	12
		03/03/21	0.6	NA	NA	NA	2
		06/04/21	1.08	NA	NA	NA	2
		09/01/21	0.23	NA	NA	NA	7
		12/03/21	0.24	NA	NA	NA	8
MW-19-116	2	12/20/19	0.19	NA	NA	NA	51
		03/04/20	0.17	NA	NA	NA	60
		06/03/20	0.18	NA	NA	NA	61
		09/02/20	0.24	NA	NA	NA	54
DUP-01		09/02/20	0.24	NA	NA	NA	55
		12/02/20	0.3	NA	NA	NA	82
DUP-01		12/02/20	0.3	NA	NA	NA	83
		03/03/21	0.22	NA	NA	NA	72
DUP-01		03/03/21	0.22	NA	NA	NA	71
		06/04/21	0.3	NA	NA	NA	69
		09/01/21	0.2	NA	NA	NA	54
DUP-02		09/01/21	0.2	NA	NA	NA	58
		12/03/21	0.34	NA	NA	NA	68
DUP-02		12/03/21	0.34	NA	NA	NA	73
MW-19-117	2	06/03/20	0.3	NA	NA	NA	2
		09/02/20	0.23	NA	NA	NA	2
		12/02/20	0.23	NA	NA	NA	1
		03/03/21	1.22	NA	NA	NA	1
		06/04/21	0.16	NA	NA	NA	1
		09/02/21	0.13	NA	NA	NA	2
		12/03/21	0.29	NA	NA	NA	1

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-19-120	2	12/04/19	0.63	NA	NA	NA	165
		03/04/20	0.23	NA	NA	NA	198
		06/04/20	0.35	NA	NA	NA	184
		09/02/20	0.11	NA	NA	NA	137
		12/02/20	2.68	NA	NA	NA	28
		03/02/21	0.16	<0.5	0.5	0.02	73
		06/04/21	0.29	<0.5	0.4	0.02	49
		09/02/21	4.14	NA	NA	NA	7
		12/03/21	2.75	NA	NA	NA	15
MW-19-121	2	12/04/19	0.75	NA	NA	NA	99
		03/03/20	0.14	<0.5	0.7	0.1	119
		06/04/20	1.16	<0.5	0.8	0.14	115
		08/31/20	6.06	<0.5	0.9	0.06	17
		12/02/20	2.53	8.2	0.5	1.74	4
		03/02/21	2.13	2.2	0.4	0.87	1
		06/04/21	4.36	8.8	0.3	1.66	1
		09/02/21	1.2	7.6	0.2	0.89	2
		11/30/21	0.33	NA	0.1	11.3	1
MW-19-122	2	12/03/19	0.97	NA	NA	NA	43
		03/04/20	0.31	NA	NA	NA	41
DUP-02		03/04/20	0.31	NA	NA	NA	41
		06/05/20	0.21	NA	NA	NA	42
		09/02/20	1.87	NA	NA	NA	33
		12/03/20	0.11	NA	NA	NA	34
		03/02/21	0.38	NA	NA	NA	25
		06/03/21	1.2	NA	NA	NA	37
		09/03/21	1.63	NA	NA	NA	9
		12/03/21	6.25	NA	NA	NA	4
MW-19-123	2	12/03/19	3.14	NA	NA	NA	52
		03/04/20	0.21	NA	NA	NA	76
		06/04/20	0.22	NA	NA	NA	75
		09/01/20	1.46	NA	NA	NA	51
		12/03/20	5.35	NA	NA	NA	39
		03/02/21	5.49	<0.5	0.3	0.03	58
		06/07/21	6.03	<0.5	0.3	0.03	50
		09/02/21	5.35	<0.5	0.2	0.01	43
		11/30/21	6.43	NA	0.1	0.02	20
MW-19-124	2	12/04/19	0.67	NA	NA	NA	220
		06/05/20	0.18	NA	NA	NA	197
		09/02/20	0.12	NA	NA	NA	230
		12/03/20	0.11	NA	NA	NA	420
		03/02/21	0.17	NA	NA	NA	182
		06/03/21	0.12	NA	NA	NA	173
		09/03/21	0.72	NA	NA	NA	222
		12/02/21	0.33	NA	NA	NA	280

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-20-126	2	07/23/20	0.26	NA	NA	NA	370
		09/02/20	4.26	NA	NA	NA	360
		12/03/20	0.94	NA	NA	NA	320
		03/03/21	1.04	NA	NA	NA	220
		06/03/21	6.7	NA	NA	NA	156
		09/03/21	1.11	NA	NA	NA	143
		12/02/21	5.39	NA	NA	NA	170
MW-20-127	2	07/23/20	0.71	NA	NA	NA	85
		08/31/20	7.15	<0.5	0.8	0.04	115
		12/02/20	0.06	<0.5	0.7	0.16	157
MW-20-127	2	03/02/21	4	<0.5	0.7	0.08	138
		06/03/21	0.23	<0.5	0.8	0.06	140
		09/02/21	2.01	<0.5	0.5	0.09	126
		11/30/21	0.56	NA	0.5	0.09	158
MW-20-128	2	07/23/20	0.15	<0.5	0.6	0.09	270
		09/01/20	9.82	NA	NA	NA	112
		12/03/20	7.13	NA	NA	NA	20
		03/02/21	9.69	<0.5	1.4	0.43	9
		06/02/21	7.95	0.7	6.1	1	4
		09/02/21	3.92	<0.5	0.2	0.04	11
		11/30/21	9.39	NA	2.1	0.7	5
MW-20-129	2	07/23/20	0.41	NA	NA	NA	126
		09/01/20	0.35	NA	NA	NA	126
		12/03/20	0.09	NA	NA	NA	140
		03/02/21	0.48	NA	NA	NA	108
		06/02/21	0.2	NA	NA	NA	108
		09/02/21	0.18	NA	NA	NA	82
		12/02/21	0.43	NA	NA	NA	83
MW-21-142	2	12/03/21	0.3	NA	NA	NA	91
PW-14-02	2	06/06/19	0.12	NA	NA	NA	260
		12/04/19	0.24	NA	NA	NA	260
		06/03/20	0.39	NA	NA	NA	160
DUP-04		06/03/20	0.39	NA	NA	NA	160
		09/02/20	7.57	NA	NA	NA	43
		12/03/20	1.15	NA	NA	NA	97
		03/03/21	9.04	NA	NA	NA	37
		06/02/21	8.56	NA	NA	NA	23
		09/03/21	1.39	NA	NA	NA	50
		12/02/21	0.7	NA	NA	NA	95
TW-14-02	2	03/04/20	0.34	NA	NA	NA	470
		06/04/20	0.37	NA	NA	NA	410
		09/01/20	10.72	NA	NA	NA	3
		12/02/20	9.81	NA	NA	NA	1
		03/03/21	12.61	NA	NA	NA	1
		06/02/21	8.39	NA	NA	NA	1
		09/03/21	5.08	NA	NA	NA	29
		12/02/21	9.61	NA	NA	NA	8

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
TW-15-12	2	03/03/20	0.33	<0.5	0.4	0.03	220
		06/02/20	1.33	<0.5	0.9	0.31	210
		08/31/20	7.42	<0.5	1.0	0.45	100
		12/02/20	9.19	<0.5	2.0	0.76	34
		03/02/21	10.91	<0.5	0.4	0.15	5
		06/02/21	8.58	<0.5	0.4	0.14	7
		09/02/21	6.15	<0.5	0.2	0.03	10
		11/30/21	8.86	NA	0.1	0.02	34
MW-12-21	3	06/05/19	6.79	NA	NA	NA	255
		12/06/19	0.57	NA	NA	NA	250
		06/11/20	0.62	NA	NA	NA	230
		12/08/20	0.2	NA	NA	NA	310
		06/07/21	1.02	NA	NA	NA	167
DUP-07		06/07/21	1.02	NA	NA	NA	171
		12/09/21	0.46	NA	NA	NA	177
MW-13-22	3	06/06/19	0.62	NA	NA	NA	159
		08/27/19	6.58	<0.5	1.0	0.39	173
		12/05/19	1.91	NA	NA	NA	162
		03/03/20	0.23	NA	NA	NA	203
		06/11/20	0.47	NA	NA	NA	157
		08/27/20	1.52	NA	NA	NA	141
		12/01/20	3.55	NA	NA	NA	162
		03/03/21	0.16	NA	NA	NA	86
		06/07/21	0.34	NA	NA	NA	45
		09/01/21	0.52	NA	NA	NA	132
		12/07/21	0.45	NA	NA	NA	152
MW-13-29	3	06/05/19	0.19	NA	NA	NA	21
		06/10/20	0.26	NA	NA	NA	35
		06/08/21	-	<0.5	0.7	0.06	26
		09/02/21	0.64	<0.5	0.4	0.01	18
		11/30/21	1.59	NA	0.4	0.06	12
MW-13-34	3	06/07/19	0.15	NA	NA	NA	74
		08/29/19	0.39	NA	NA	NA	94
		12/05/19	1.42	NA	NA	NA	105
		06/10/20	0.01	NA	NA	NA	81
		08/27/20	0.35	NA	NA	NA	75
		12/01/20	0.12	NA	NA	NA	106
		03/03/21	6.61	NA	NA	NA	127
		06/07/21	0.12	NA	NA	NA	86
		09/02/21	0.31	NA	NA	NA	77
		12/07/21	0.49	NA	NA	NA	83

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
MW-13-48	3	06/07/19	0.1	NA	NA	NA	128
		12/06/19	2.02	NA	NA	NA	162
		06/10/20	0.01	NA	NA	NA	128
		12/07/20	0.04	NA	NA	NA	137
DUP-07		12/07/20	0.04	NA	NA	NA	137
		06/07/21	1.03	NA	NA	NA	114
		12/09/21	0.27	NA	NA	NA	84
PW-14-03	3	06/04/19	0.33	<0.09	1.3	0.08	223
		08/27/19	0.64	<0.5	1.2	0.14	250
DUP-01		08/27/19	0.64	<0.5	1.1	0.11	245
		12/05/19	1.04	NA	NA	NA	43
		03/03/20	5.9	NA	NA	NA	75
		06/10/20	0.02	NA	NA	NA	65
PW-14-03	3	08/27/20	4.51	NA	NA	NA	69
		12/01/20	8.3	NA	NA	NA	71
		03/03/21	9.12	NA	NA	NA	27
		06/08/21	8.63	NA	NA	NA	22
		09/01/21	7.59	NA	NA	NA	19
		12/07/21	1.07	NA	NA	NA	25
TW-14-06	3	06/04/19	2.12	<0.09	2.4	1.0	700
		08/27/19	9.16	<0.5	9.1	14.0	430
		12/06/19	8.92	<0.5	1.5	1.0	59
DUP-06		12/06/19	8.92	NA	NA	NA	61
		03/03/20	12.46	<0.5	22.4	29.0	23
		06/23/20	0.91	<0.5	2.7	1.6	13
		08/31/20	6.69	<0.5	2.4	1.6	4
DUP-03		08/31/20	6.69	<0.5	2.2	1.1	4
		12/02/20	12.49	<0.5	18	22.0	1
DUP-03		12/02/20	12.49	<0.5	19.1	24.0	1
		03/02/21	10.44	<0.5	8.6	10.8	1
DUP-03		03/02/21	10.44	<0.5	8.4	8.3	1
		06/07/21	12.87	<0.5	8.2	14.0	1
DUP-03		06/07/21	12.87	<0.5	7	9.3	1
		09/02/21	11.29	<0.5	4.7	2.9	9
DUP-03		09/02/21	11.29	<0.5	4.7	1.9	8
		11/30/21	11.24	NA	7.5	4.0	34
DUP-03		11/30/21	11.24	NA	7.7	6.0	36

Table 1
Biosparge Performance Monitoring Summary

MI Rule 57 SW (DEQ2017)
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

Location ID	Plant	Date Collected	Field Parameters	Results			
			Dissolved Oxygen	Nitrate-N	Total Kjeldahl Nitrogen	Total Phosphorus	1,4-Dioxane
		Units	mg/L	mg/L	mg/L	mg/L	µg/L
TW-15-11	3	06/04/19	0.2	<0.09	0.90	0.07	246
		08/28/19	4.22	<0.5	0.40	0.07	218
		12/05/19	2.78	NA	NA	NA	250
		03/03/20	5.91	NA	NA	NA	130
		06/23/20	0.63	NA	NA	NA	220
		08/27/20	4.11	NA	NA	NA	120
		12/01/20	10.66	NA	NA	NA	51
		03/03/21	9.45	NA	NA	NA	48
		06/07/21	11.85	NA	NA	NA	41
		09/01/21	7.77	NA	NA	NA	7
		12/08/21	0.32	NA	NA	NA	30

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

Table 2
Biosparge Performance Tracking

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

Plant 3 (Transect A)

		Well 1,4-Dioxane					Average (µg/L)	Average 12-month Reduction (µg/L)*
		MW-13-22	TW-14-06	TW-15-11	PW-14-03	MW-13-34		
Descriptor		UG	ROI	DG	DG	DG		
Distance (ft)		66	14	48	56	460		
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***

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
Bold and Italic = below 20% of the RRV

Table 2
Biosparge Performance Tracking

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

Plant 2 North (Transect B)

		Well 1,4-Dioxane				Average (µg/L)	Average 12-month Reduction (µg/L)*
		TW-15-12	PW-14-02	MW-20-127	MW-20-126		
Descriptor		ROI	DG	DG	UG		
Distance (ft)		8	54	102	66		
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

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
Bold and Italic = below 20% of the RRV

Table 2
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								Average (µg/L)	Average 12-month Reduction (µg/L)*
		TW-14-02	MW-19-123	MW-16-74	MW-19-121	MW-20-129	MW-19-122	MW-16-78	MW-16-81		
Descriptor		ROI	DG	DG	ROI	UG	UG	DG	UG		
Distance (ft)		2	70	75	2	121	92	174	120		
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

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
Bold and Italic = below 20% of the RRV

Table 2
Biosparge Performance Tracking

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

Plant 2 East (Transect E & F)

		Well 1,4-Dioxane (µg/L)								
Descriptor		MW-14-61	MW-19-120	MW-20-128	MW-16-84	MW-17-86	MW-19-124	MW-16-79	Average (µg/L)	Average 12-month Reduction (µg/L)*
Distance (ft)		ROI 13	ROI 44	ROI 17	DG 69	DG 115	UG 99	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

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
Bold and Italic = below 20% of the RRV

Figures

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 3
- PLANT 6

0 150 300

SCALE IN FEET

DRAFT

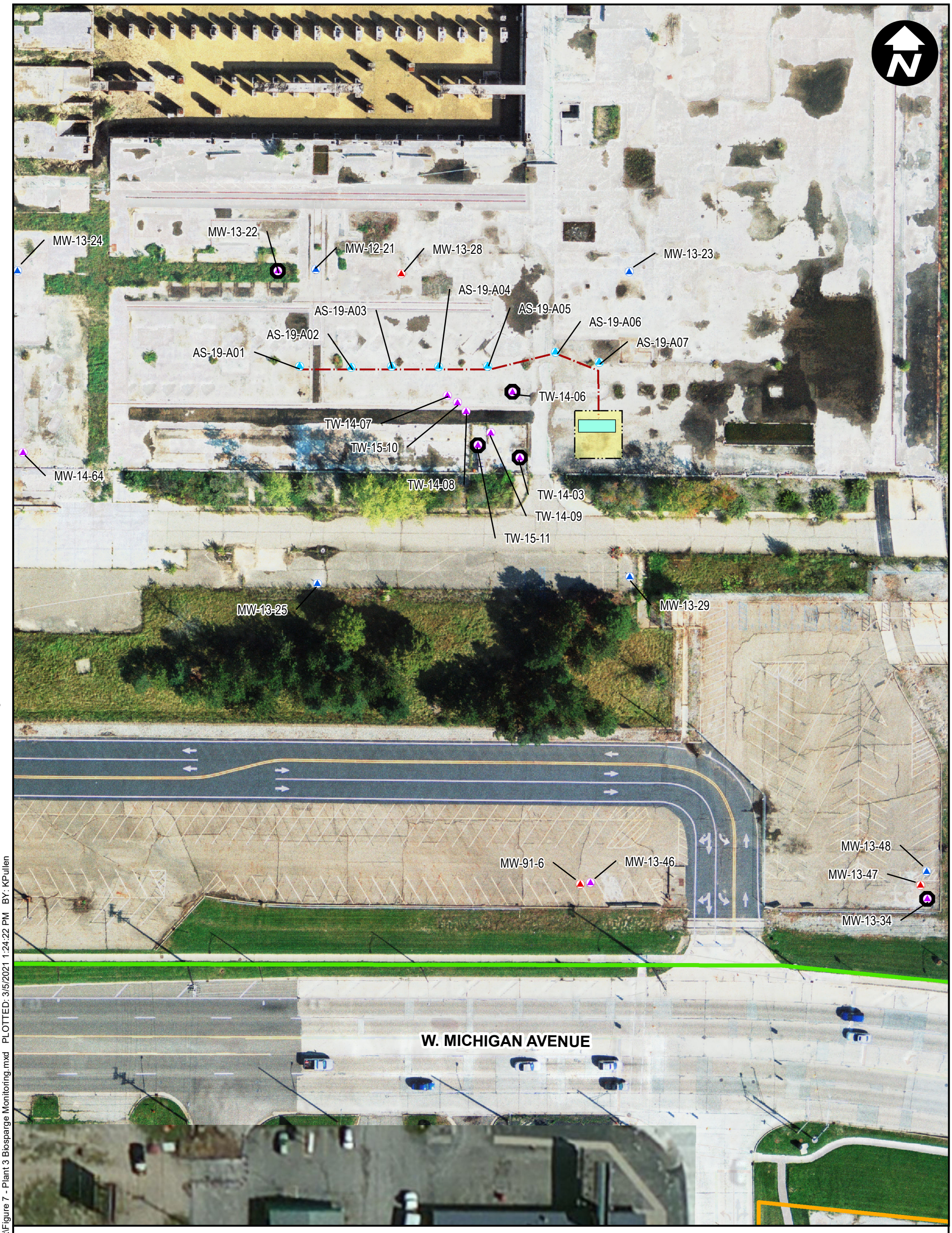
RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 2 BIOSPARGE SYSTEM PERFORMANCE MONITORING PLAN

ARCADIS Design & Consultancy for natural and built assets

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\2020_Biosparge\Completion Report\Figure 6 - Plant 2 Biosparge Performance Monitoring.mxd PLOTTED: 3/5/2021 2:51:25 PM BY: KPullen



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

0 50 100

SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

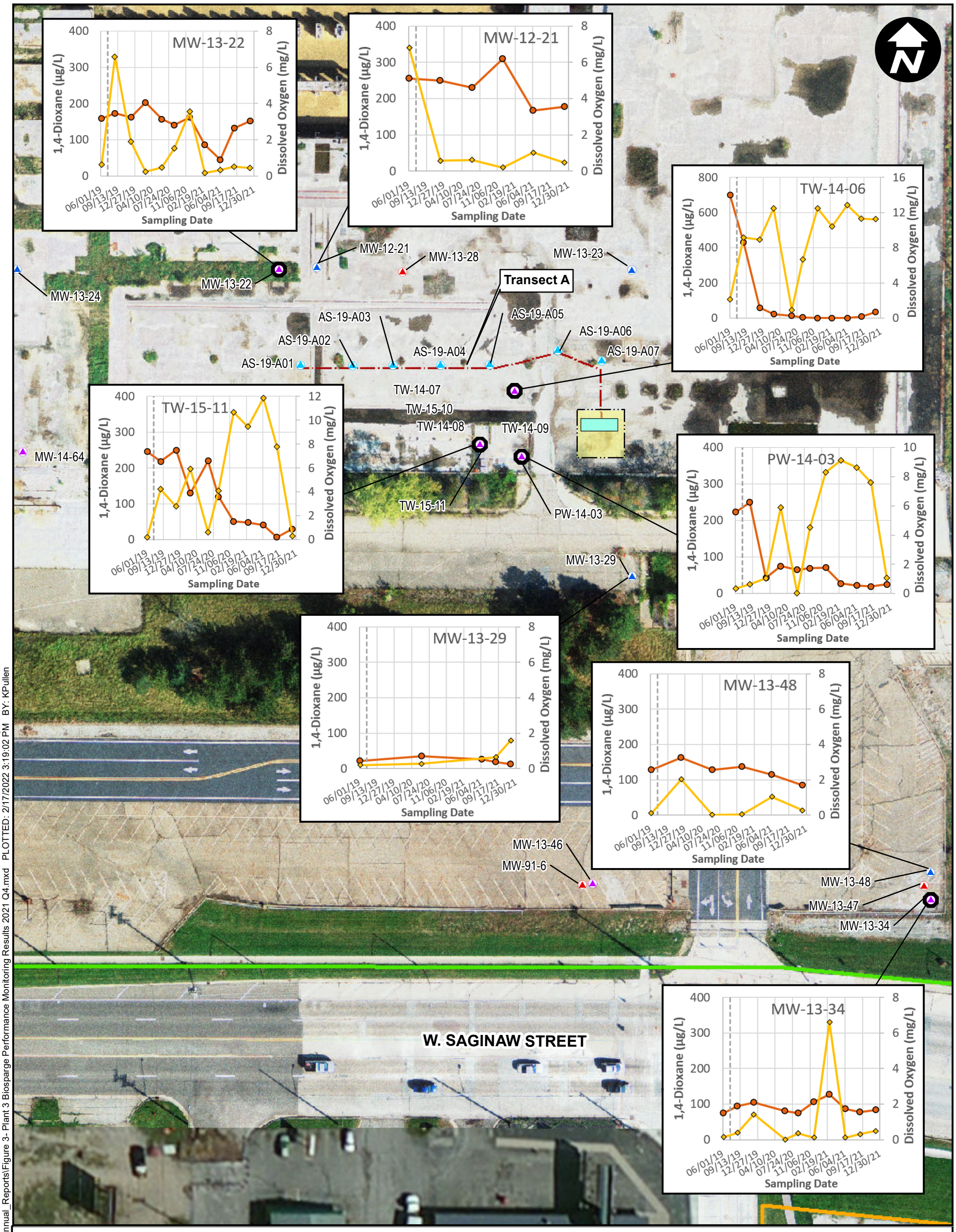
PLANT 3 BIOSPARGE SYSTEM PERFORMANCE MONITORING PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

DRAFT

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 7 - Plant 3 Biosparge Monitoring.mxd PLOTTED: 3/5/2021 1:24:22 PM BY: KPullen



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30075941.04700 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021 Biosparge\Quarterly Results\Annual_Reports\Figure 3- Plant 3 Biosparge Performance Monitoring Results 2021 Q4.mxd PLOTTED: 2/17/2022 3:19:02 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

0 50 100

SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 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

P2-MW-03

MW-20-126

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-13-43

MW-13-44

MW-13-45

PW-14-02

MW-20-127

MW-19

MW-14-58

MW-17-87

MW-16-83

MW-19-115

MW-15-72

MW-19-116

MW-19-117

MW-12-05R

MW-16-82

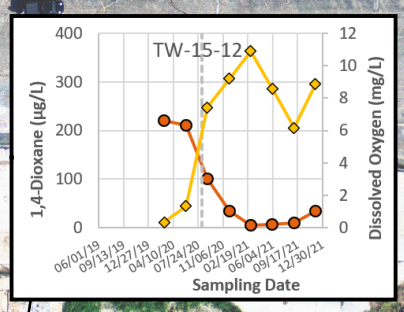
PSP-F12

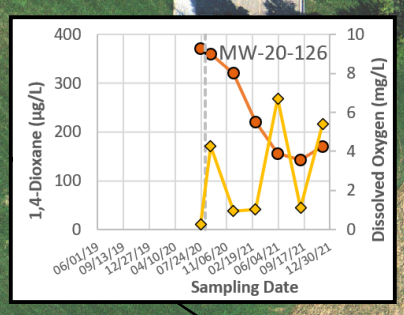
CSP-F01

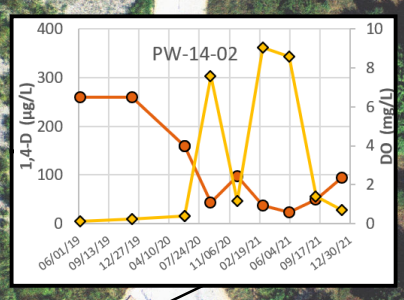
ASP-F03

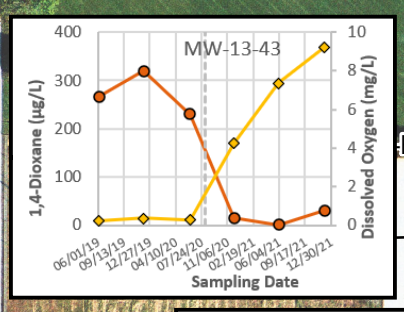
ASP-F02

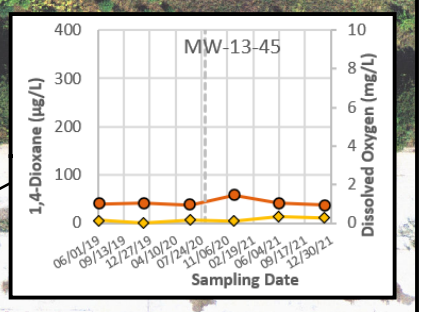
ASP-F01

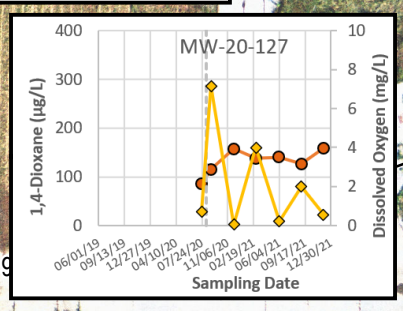


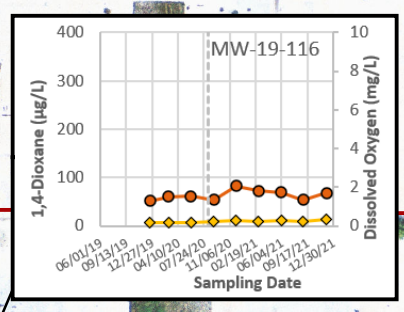


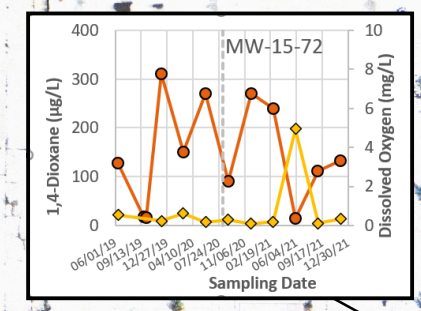


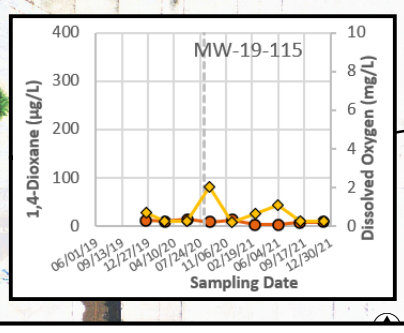


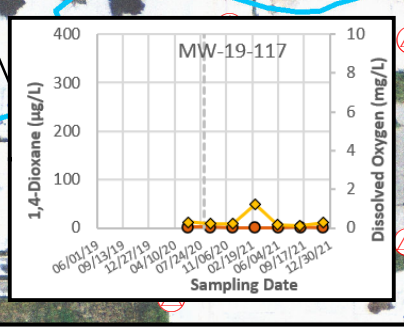












LEGEND

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

0 90 180

SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 NORTH BIOSPARGE PERFORMANCE MONITORING RESULTS

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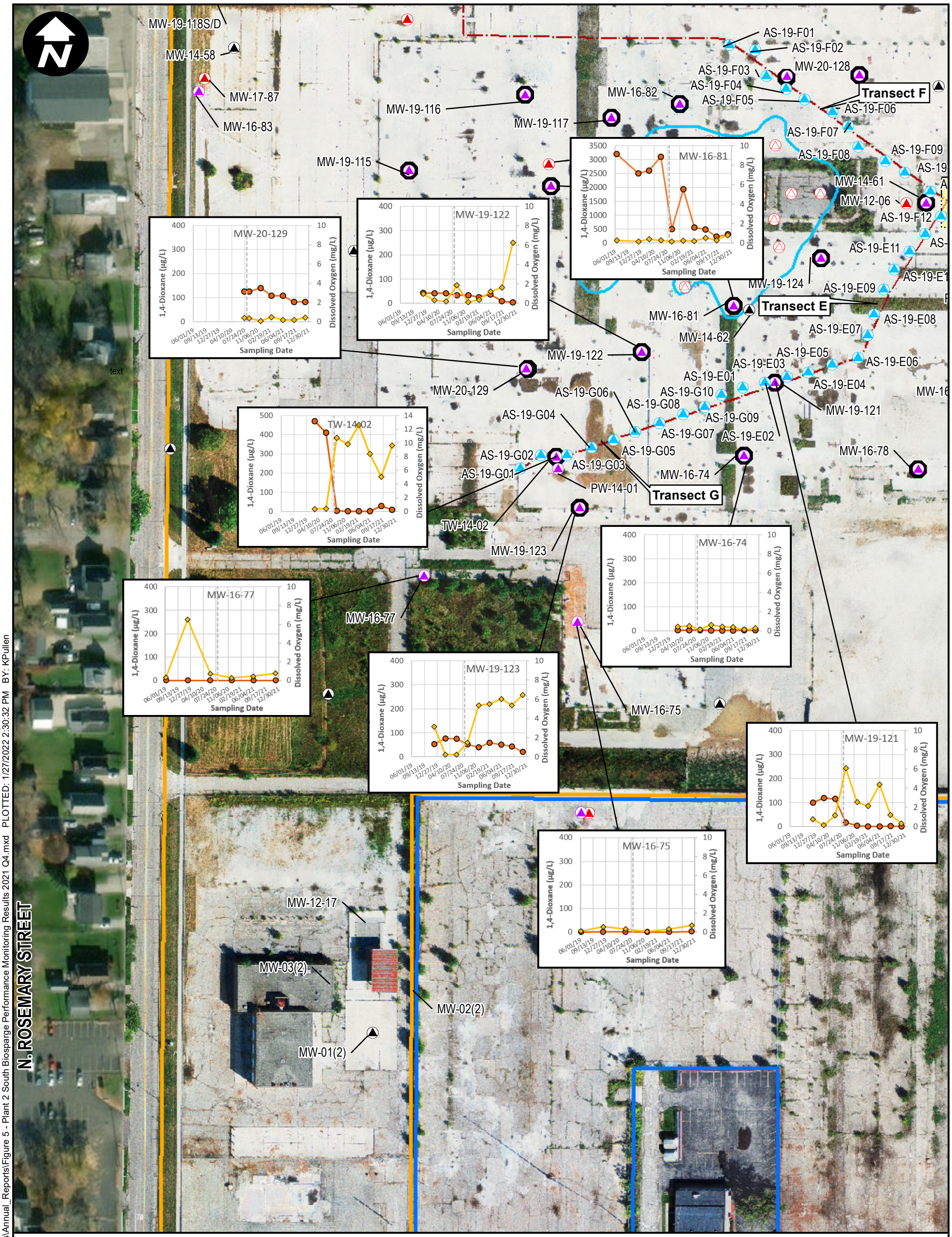
FIGURE 4

CITY: Novi DIV: ENV PIC: J. BARRETT PM: T.LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30075941.04700 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021 Biosparge\Quarterly Results\Figure 2 - Plant 2 North Biosparge Performance Monitoring Results 2021 Q4.mxd PLOTTED: 4/15/2022 10:37:29 AM BY: KPullen



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T. LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30075941.04700 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021 Biosparge\Quarterly Results\Annual_Reports\Figure 5 - Plant 2 South Biosparge Performance Monitoring Results 2021 Q4.mxd PLOTTED: 1/27/2022 2:30:32 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

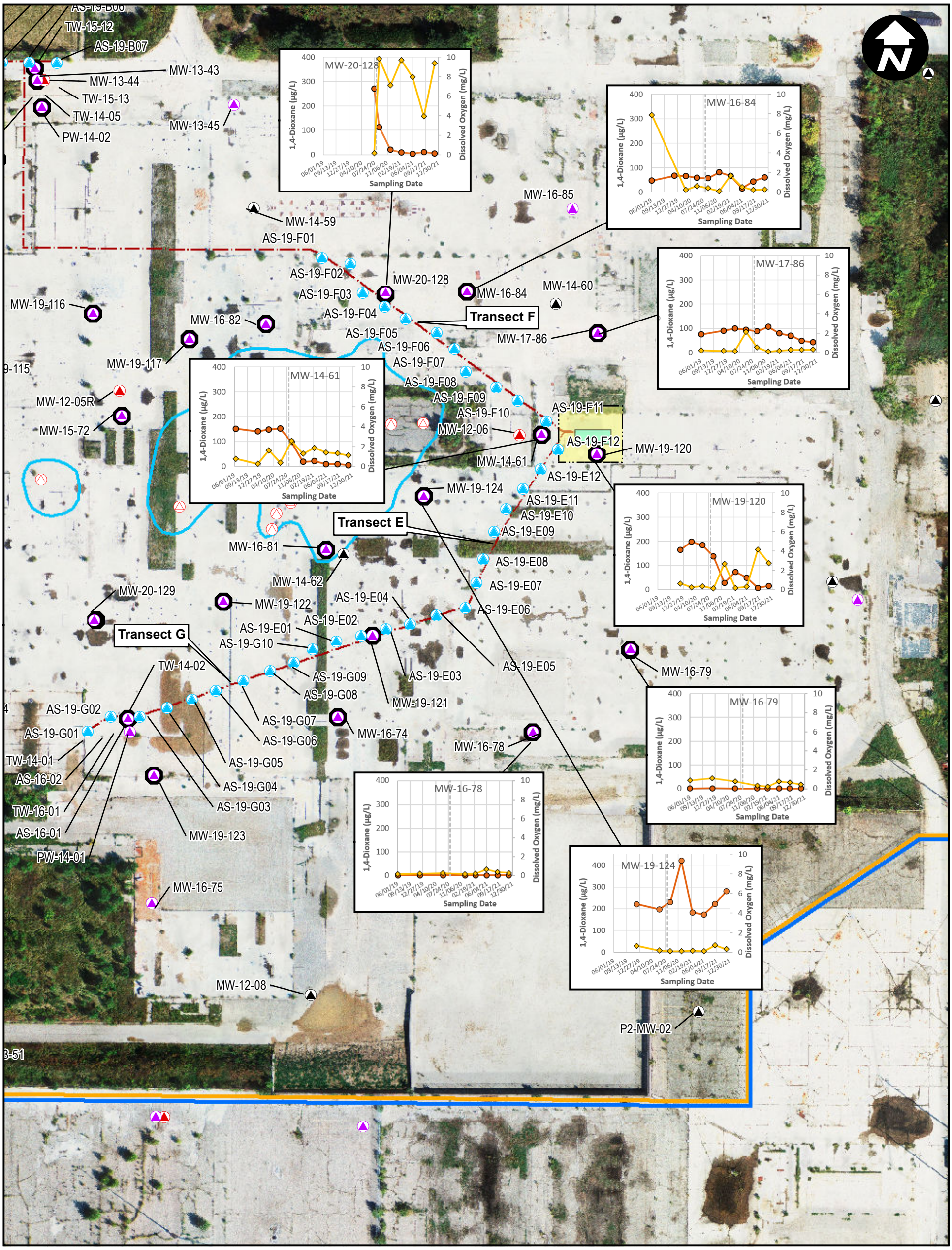
0 120 240
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 SOUTH BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE 5



CITY: Novi DIV: ENV PIC: J. BARRETT PM: T.LINDER TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: 30075941.04700 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021 Biosparge\Quarterly Results\Annual_Reports\Figure 6 - Plant 2 East Biosparge Performance Monitoring Results 2021 Q4.mxd PLOTTED: 1/27/2022 2:33:28 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

0 100 200
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 CENTRAL/EAST BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE
6

Appendix A

O&M Logs

Inspection Date	January 8, 2021
Last Quarterly Event Date	
Arrival Time	08:20
Personnel	Anyssa Mandich, Eric Feenstra
Weather	Cloudy, 26°

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6, Zone 1 and 4
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	7.967
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.9
FQI-101 (SLPM)	2001
PIT-201 (PSIA)	62.8
PIT-300 (PSIG)	28.6
FQI-201 (LPM)	0.766
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	

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	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	3319
Oil Pressure (PSIG)	150
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	75
The condensate drum needs to be transferred to an outdoor drum (use RED TAPED submersible pump)	Complete
PI-101 (PSIG)	120
PI-102 (PSIG)	106
PI-103 (PSIG)	47
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers
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	26.44
MFC-101 standardized flow rate on display (SLPM)	1860
MFC-101 uncorrected flow rate on display (LPM)	424
Comments	Cycle switched to 1 and 4 during readings

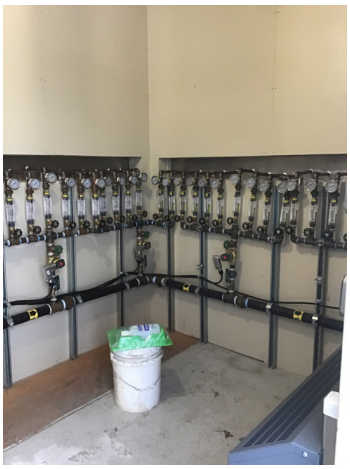
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	March 1, 2022
Fire Extinguisher Check	Needle in the green?, No deformation?, All moving parts appear intact?
Heater turned on and verified to be operating?	Yes
Fan turned on and verified to be operating?	Yes
PI-201 (PSIG)	68
PI-202 (PSIG)	54
MFC-201 temperature	28.8
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.97
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.21
PI-300 (PSIG)	23
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)

Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Remind the TM the newer propane Alicat needs to be sent in for annual recalibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	16
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	17
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	8
AS-19-G06 Manifold Flowrate (CFM)	3
AS-19-G09 Manifold Pressure (PSIG)	3
AS-19-G09 Manifold Flowrate (CFM)	2.5
AS-19-E02 Manifold Pressure (PSIG)	10
AS-19-E02 Manifold Flowrate (CFM)	2.5
AS-19-E05 Manifold Pressure (PSIG)	3
AS-19-E05 Manifold Flowrate (CFM)	2
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	1.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	3
AS-19-G02 Manifold Flowrate (CFM)	1.5
AS-19-G05 Manifold Pressure (PSIG)	12
AS-19-G05 Manifold Flowrate (CFM)	2.5
AS-19-G08 Manifold Pressure (PSIG)	4
AS-19-G08 Manifold Flowrate (CFM)	1.5
AS-19-E01 Manifold Pressure (PSIG)	4
AS-19-E01 Manifold Flowrate (CFM)	3.5
AS-19-E04 Manifold Pressure (PSIG)	4
AS-19-E04 Manifold Flowrate (CFM)	2.5
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	13
AS-19-E10 Manifold Flowrate (CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	3
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	7
AS-19-G07 Manifold Flowrate (CFM)	2
AS-19-G10 Manifold Pressure (PSIG)	3
AS-19-G10 Manifold Flowrate (CFM)	3.5
AS-19-E03 Manifold Pressure (PSIG)	6
AS-19-E03 Manifold Flowrate (CFM)	3.5
AS-19-E06 Manifold Pressure (PSIG)	7
AS-19-E06 Manifold Flowrate (CFM)	2
AS-19-E09 Manifold Pressure (PSIG)	7
AS-19-E09 Manifold Flowrate (CFM)	3.5
AS-19-E12 Manifold Pressure (PSIG)	8
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	1.5
AS-19-F09 Manifold Pressure (PSIG)	7

AS-19-F09 Manifold Flowrate (CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	9
AS-19-F06 Manifold Flowrate (CFM)	2.5
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	3
AS-19-B06 Manifold Pressure (PSIG)	20
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	8
AS-19-B03 Manifold Flowrate (CFM)	3.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	5
AS-19-E11 Manifold Flowrate (CFM)	2.5
AS-19-F11 Manifold Pressure (PSIG)	6
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	6
AS-19-F08 Manifold Flowrate (CFM)	3.5
AS-19-F05 Manifold Pressure (PSIG)	8
AS-19-F05 Manifold Flowrate (CFM)	3.5
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)	4.5
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	7
AS-19-F10 Manifold Flowrate (CFM)	3.5
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	4.5
AS-19-F04 Manifold Pressure (PSIG)	8
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	10
AS-19-F01 Manifold Flowrate (CFM)	4
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (CFM)	3.5

AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	7
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	70
Number of condensate drums outside	5

Drum Photo

Electric Meter Reading (kWh)	67600
Last fire extinguisher certification date	
Monthly Outdoor Maintenance Tasks	PR-201 Check pressure on regulator, PSH-201 Check settings, ENC198 Check electric meter at the property boundary pole to track overall electrical usage
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	11 empty drums left
Signature	 Signed 1/8/2021, 9:24:59 AM EST
Departure Time	11:00

Inspection Date	February 3, 2021
Last Quarterly Event Date	
Arrival Time	09:10
Personnel	Anyssa Mandich
Weather	Sunny, 23°

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.411
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.6
FQI-101 (SLPM)	1863
PIT-201 (PSIA)	97.7
PIT-300 (PSIG)	19.4
FQI-201 (LPM)	0.481
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?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File

Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	3884
Oil Pressure (PSIG)	150
Wet receiver tank loading pressure (PI-101)	122
Wet receiver tank unloading pressure (PI-101)	112
How full is the condensate drum? (Percentage)	20
PI-101 (PSIG)	120
PI-102 (PSIG)	112
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), 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.
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	21.18
MFC-101 standardized flow rate on display (SLPM)	1863
MFC-101 uncorrected flow rate on display (LPM)	418
Comments	We need to order our annual maintenance kit soon. Trash was removed from system building.

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	March 1, 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)	66
PI-202 (PSIG)	45
MFC-201 temperature	23.18
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	5.97
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	2.54
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, 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	21
AE-351 reading during propane sparge cycle	20
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-351 calibrated
Swap Alicats and send in the newer MFC-201 in for annual recalibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	AE-509 will need calibration in March. 350 and 351 were calibrated due to LEL alarm troubleshooting

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	18
AS-19-G01 Manifold Flowrate (CFM)	2
AS-19-G03 Manifold Pressure (PSIG)	18
AS-19-G03 Manifold Flowrate (CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	8
AS-19-G06 Manifold Flowrate (CFM)	4.5
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	8
AS-19-E02 Manifold Flowrate (CFM)	4

AS-19-E05 Manifold Pressure (PSIG)	3
AS-19-E05 Manifold Flowrate (CFM)	4
AS-19-E08 Manifold Pressure (PSIG)	4
AS-19-E08 Manifold Flowrate (CFM)	4.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	3
AS-19-G02 Manifold Flowrate (CFM)	2.5
AS-19-G05 Manifold Pressure (PSIG)	13
AS-19-G05 Manifold Flowrate (CFM)	3.5
AS-19-G08 Manifold Pressure (PSIG)	5
AS-19-G08 Manifold Flowrate (CFM)	3.5
AS-19-E01 Manifold Pressure (PSIG)	5
AS-19-E01 Manifold Flowrate (CFM)	5
AS-19-E04 Manifold Pressure (PSIG)	5
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (CFM)	4.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	3
AS-19-G04 Manifold Flowrate (CFM)	4
AS-19-G07 Manifold Pressure (PSIG)	6
AS-19-G07 Manifold Flowrate (CFM)	2
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	5
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	8
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	6
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	8
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	7
AS-19-F12 Manifold Flowrate (CFM)	4
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)	3.5
AS-19-F03 Manifold Pressure (PSIG)	6
AS-19-F03 Manifold Flowrate (CFM)	3.5
AS-19-B06 Manifold Pressure (PSIG)	19
AS-19-B06 Manifold Flowrate (CFM)	2.5
AS-19-B03 Manifold Pressure (PSIG)	8
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	5
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	2.5
AS-19-F08 Manifold Pressure (PSIG)	7
AS-19-F08 Manifold Flowrate (CFM)	3.5
AS-19-F05 Manifold Pressure (PSIG)	9
AS-19-F05 Manifold Flowrate (CFM)	3.5
AS-19-F02 Manifold Pressure (PSIG)	12
AS-19-F02 Manifold Flowrate (CFM)	2.5
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	4.5
AS-19-B02 Manifold Pressure (PSIG)	8
AS-19-B02 Manifold Flowrate (CFM)	2.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	10
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	16
AS-19-F07 Manifold Flowrate (CFM)	3.5
AS-19-F04 Manifold Pressure (PSIG)	16

AS-19-F04 Manifold Flowrate (CFM)	1.5
AS-19-F01 Manifold Pressure (PSIG)	10
AS-19-F01 Manifold Flowrate (CFM)	4.5
AS-19-B07 Manifold Pressure (PSIG)	12
AS-19-B07 Manifold Flowrate (CFM)	4
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	4
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	60
Number of condensate drums outside	5

Drum Photo

Electric Meter Reading (kWh)	78892
Last fire extinguisher certification date	
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?	Need annual maintenance kit
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 2/3/2021, 10:05:50 AM EST
Departure Time	10:15

Inspection Date	March 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	08:10
Personnel	Billy J Cobern, Eric Feenstra
Weather	Partly Cloudy, windy, 20's-30's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	6.0102
PIT-101 (PSIG)	55
PIT-102 (PSIA)	69.2
FQI-101 (SLPM)	0
PIT-201 (PSIA)	74.6
PIT-300 (PSIG)	12.9
FQI-201 (LPM)	0
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	Corrected
UPS enabled?	No
Comments	UPS on bypass

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Mounted
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, Condensate drain oily on the outside
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Take oil sample, Not required
Semiannual Compressor Maintenance	Not required
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File

Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	4420
Oil Pressure (PSIG)	118
Wet receiver tank loading pressure (PI-101)	110
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	15
PI-101 (PSIG)	124
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, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, TCA-101 adjusted the Terminator drain valve for more frequent evacuation
Semiannual Non-XP Instrument Maintenance	Not required
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, Not required
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	15
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	Device matched HMI

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	March 1, 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)	60
MFC-201 temperature	76
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)	2.27
PI-300 (PSIG)	0
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	Not required

AE-500 Reading	0
AE-350 reading during propane sparge cycle	23
AE-351 reading during propane sparge cycle	21
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-351 calibrated, AE-500 calibrated, Not required
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	20
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	4
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)	3
AS-19-E08 Manifold Flowrate (CFM)	3.5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0

AS-19-G02 Manifold Flowrate (CFM)	3
AS-19-G05 Manifold Pressure (PSIG)	12
AS-19-G05 Manifold Flowrate (CFM)	2.5
AS-19-G08 Manifold Pressure (PSIG)	2
AS-19-G08 Manifold Flowrate (CFM)	2
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)	3
AS-19-E07 Manifold Pressure (PSIG)	10
AS-19-E07 Manifold Flowrate (CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	11
AS-19-E10 Manifold Flowrate (CFM)	4.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	2
AS-19-G04 Manifold Flowrate (CFM)	4
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (CFM)	3
AS-19-G10 Manifold Pressure (PSIG)	2
AS-19-G10 Manifold Flowrate (CFM)	3.5
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	5
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	4
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)	8
AS-19-F12 Manifold Flowrate (CFM)	3.5
AS-19-F09 Manifold Pressure (PSIG)	7
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)	4
AS-19-B06 Manifold Pressure (PSIG)	6
AS-19-B06 Manifold Flowrate (CFM)	4
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)	3
AS-19-F11 Manifold Pressure (PSIG)	5
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	4
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)	6
AS-19-F02 Manifold Flowrate (CFM)	3.5
AS-19-B05 Manifold Pressure (PSIG)	9
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)	9
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	11
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	11
AS-19-F04 Manifold Flowrate (CFM)	2.5
AS-19-F01 Manifold Pressure (PSIG)	8
AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	11
AS-19-B07 Manifold Flowrate (CFM)	4
AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	12

AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	50
Number of condensate drums outside	4

Drum Photo

Electric Meter Reading (kWh)	92968
Last fire extinguisher certification date	August 1, 2020
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?	
Signature	 Signed 3/4/2021, 9:42:15 AM EST
Departure Time	10:00

Inspection Date	April 2, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	11:15
Personnel	Billy J Cobern
Weather	Partly Cloudy, 30's-40'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)	50.9
PIT-102 (PSIA)	65
FQI-101 (SLPM)	70.7
PIT-201 (PSIA)	46.1
PIT-300 (PSIG)	31
FQI-201 (LPM)	0
AE-350 (%LEL)	2.9
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Corrected
UPS enabled?	No
Comments	UPS on bypass

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?, Mounted
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, Condensate drain oily on the outside
Quarterly Compressor Maintenance	Cooler: Change filter mat, Control Cabinet: Change filter mat, Take oil sample, Not required
Semiannual Compressor Maintenance	Not required
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File

Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	5069
Oil Pressure (PSIG)	110
Wet receiver tank loading pressure (PI-101)	110
Wet receiver tank unloading pressure (PI-101)	125
How full is the condensate drum? (Percentage)	40
PI-101 (PSIG)	120
PI-102 (PSIG)	115
PI-103 (PSIG)	49
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), PF-101 Verify auto drain operational, CF-101 Verify auto drain operational, TCA-102 Check for moisture, PR-101 Verify pressure
Monthly Non-XP Instrument Maintenance	TCA-101 Inspect for debris sludge clean, Tote Transfer contents of condensate drum into outdoor drum when it is 2/3 full. It will fill up quickly during humid summer months., AD-101 Verify the drying-and-regeneration cycle is normal, AD-101 Verify the silencers are not clogged, AD-101 Inspect and determine the state of the desiccant. Brown (oil-polluted) or dusty desiccant needs to be replaced., PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, MFC-101 / PIT-102 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well., S-101 Actuate valves and ensure they are working properly (turn on and off and listen for the click), Electric box Open panel to ensure there are no tripped circuit breakers, TCA-101 adjusted the Terminator drain valve for more frequent evacuation
Semiannual Non-XP Instrument Maintenance	Not required
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, Not required
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	17.4
MFC-101 standardized flow rate on display (SLPM)	2002
MFC-101 uncorrected flow rate on display (LPM)	442
Comments	Set date and time

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	March 1, 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)	55
MFC-201 temperature	71
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0
PI-300 (PSIG)	34
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	Not required

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

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	20
AS-19-G01 Manifold Flowrate (CFM)	3
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	1
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	11
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)	0

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)	2
AS-19-G08 Manifold Flowrate (CFM)	3
AS-19-E01 Manifold Pressure (PSIG)	2
AS-19-E01 Manifold Flowrate (CFM)	4.5
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	4
AS-19-E07 Manifold Flowrate (CFM)	4
AS-19-E10 Manifold Pressure (PSIG)	9
AS-19-E10 Manifold Flowrate (CFM)	5.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	0
AS-19-G04 Manifold Flowrate (CFM)	5
AS-19-G07 Manifold Pressure (PSIG)	4
AS-19-G07 Manifold Flowrate (CFM)	3
AS-19-G10 Manifold Pressure (PSIG)	2
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	3
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	5
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	3.5
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	3

AS-19-F03 Manifold Pressure (PSIG)	6
AS-19-F03 Manifold Flowrate (CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	22
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	12
AS-19-B03 Manifold Flowrate (CFM)	3.5

Zone 5

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

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	7
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	8
AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (CFM)	3
AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	12

AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	40
Number of condensate drums outside	5

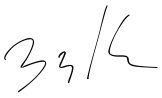
Drum Photo

Electric Meter Reading (kWh)	75999
Last fire extinguisher certification date	August 1, 2020
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?	
Signature	 Signed 4/2/2021, 12:48:52 PM EDT
Departure Time	13:15

Inspection Date	May 4, 2021
Last Quarterly Event Date	
Arrival Time	11:07
Personnel	Anyssa Mandich
Weather	Cloudy, 56°

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	6
PIT-101 (PSIG)	50.5
PIT-102 (PSIA)	64.3
FQI-101 (SLPM)	2003
PIT-201 (PSIA)	64.4
PIT-300 (PSIG)	33
FQI-201 (LPM)	6
AE-350 (%LEL)	8
AE-351 (%LEL)	7
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File

Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	5768
Oil Pressure (PSIG)	160
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	125
PI-102 (PSIG)	115
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	
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	25.54
MFC-101 standardized flow rate on display (SLPM)	2000
MFC-101 uncorrected flow rate on display (LPM)	457
Comments	Need labels on Alicat for A/B

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)	54
MFC-201 temperature	32.87
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	3
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.91
PI-300 (PSIG)	34
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	8
AE-351 reading during propane sparge cycle	7
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)	12
AS-19-G01 Manifold Flowrate (CFM)	5
AS-19-G03 Manifold Pressure (PSIG)	15
AS-19-G03 Manifold Flowrate (CFM)	3
AS-19-G06 Manifold Pressure (PSIG)	6
AS-19-G06 Manifold Flowrate (CFM)	3.5
AS-19-G09 Manifold Pressure (PSIG)	6
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	8
AS-19-E02 Manifold Flowrate (CFM)	4.5
AS-19-E05 Manifold Pressure (PSIG)	4
AS-19-E05 Manifold Flowrate (CFM)	3

AS-19-E08 Manifold Pressure (PSIG)	6
AS-19-E08 Manifold Flowrate (CFM)	3

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	3
AS-19-G02 Manifold Flowrate (CFM)	1.5
AS-19-G05 Manifold Pressure (PSIG)	8
AS-19-G05 Manifold Flowrate (CFM)	4
AS-19-G08 Manifold Pressure (PSIG)	4
AS-19-G08 Manifold Flowrate (CFM)	2.5
AS-19-E01 Manifold Pressure (PSIG)	4
AS-19-E01 Manifold Flowrate (CFM)	4.5
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)	3
AS-19-E10 Manifold Pressure (PSIG)	14
AS-19-E10 Manifold Flowrate (CFM)	3.5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	3
AS-19-G04 Manifold Flowrate (CFM)	5
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	2.5
AS-19-G10 Manifold Pressure (PSIG)	4
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	4
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	6
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	6
AS-19-E09 Manifold Flowrate (CFM)	2
AS-19-E12 Manifold Pressure (PSIG)	7
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	13
AS-19-F12 Manifold Flowrate (CFM)	4.5
AS-19-F09 Manifold Pressure (PSIG)	8
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)	3.5
AS-19-B06 Manifold Pressure (PSIG)	21
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4.5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	4
AS-19-E11 Manifold Flowrate (CFM)	3.5
AS-19-F11 Manifold Pressure (PSIG)	7
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)	6
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	6
AS-19-F02 Manifold Flowrate (CFM)	3.5
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	6
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	6
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	11
AS-19-F04 Manifold Flowrate (CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	8

AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (CFM)	3.5
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	12
AS-19-B01 Manifold Flowrate (CFM)	3.5

Outdoors and General

Propane tank level (%)	78
Number of condensate drums outside	21

Drum Photo

Electric Meter Reading (kWh)	121311
Last fire extinguisher certification date	
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?	More filters. See photo
Comments, questions, ruminations, suggestions for improvement?	Filled 2 drums 2/3 full
Signature	Signed 5/4/2021, 12:28:09 PM EDT
Departure Time	12:30

Inspection Date	June 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	08:30
Personnel	Billy J Cobern
Weather	Mostly Cloudy 60's-80'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
PIT-101 (PSIG)	50.5
PIT-102 (PSIA)	64.5
FQI-101 (SLPM)	1863
PIT-201 (PSIA)	66.7
PIT-300 (PSIG)	22.7
FQI-201 (LPM)	0
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0.1
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Bi-Weekly Compressor Maintenance	Check the cooling oil level, Cooler: Check the Filter Mat, Control cabinet: Check Filter Mat, Check the condensate drain
Quarterly Compressor Maintenance	
Semiannual Compressor Maintenance	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	1 Audio File

Number of air filters remaining	0
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	6469
Oil Pressure (PSIG)	160
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	25
PI-101 (PSIG)	125
PI-102 (PSIG)	115
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	
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	29.86
MFC-101 standardized flow rate on display (SLPM)	1862
MFC-101 uncorrected flow rate on display (LPM)	432
Comments	Need labels on Alicat for A/B

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)	68
PI-202 (PSIG)	52
MFC-201 temperature	37.71
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	2.99
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	1.25
PI-300 (PSIG)	24
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, 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	9
AE-351 reading during propane sparge cycle	8
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)	20
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	8
AS-19-G06 Manifold Flowrate (CFM)	4.5
AS-19-G09 Manifold Pressure (PSIG)	3
AS-19-G09 Manifold Flowrate (CFM)	3.5
AS-19-E02 Manifold Pressure (PSIG)	3
AS-19-E02 Manifold Flowrate (CFM)	3.5
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)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	1
AS-19-G02 Manifold Flowrate (CFM)	1.5
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)	2
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)	5
AS-19-E07 Manifold Flowrate (CFM)	3.5
AS-19-E10 Manifold Pressure (PSIG)	8
AS-19-E10 Manifold Flowrate (CFM)	5

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	2
AS-19-G04 Manifold Flowrate (CFM)	5
AS-19-G07 Manifold Pressure (PSIG)	3
AS-19-G07 Manifold Flowrate (CFM)	2.5
AS-19-G10 Manifold Pressure (PSIG)	2
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	4.5
AS-19-E06 Manifold Pressure (PSIG)	2
AS-19-E06 Manifold Flowrate (CFM)	3.5
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	6
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4.5
AS-19-F09 Manifold Pressure (PSIG)	10
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	5
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	18
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	8.5
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	2
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)	5
AS-19-F02 Manifold Pressure (PSIG)	4
AS-19-F02 Manifold Flowrate (CFM)	3
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)	4
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	6
AS-19-F07 Manifold Flowrate (CFM)	5
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	8

AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	10
AS-19-B07 Manifold Flowrate (CFM)	3.5
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	3.5
AS-19-B01 Manifold Pressure (PSIG)	11
AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

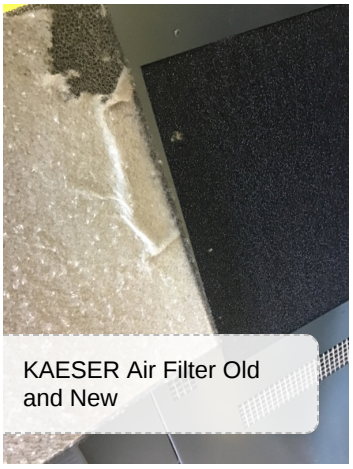
Propane tank level (%)	70
Number of condensate drums outside	18

Drum Photo

Electric Meter Reading (kWh)	136259
Last fire extinguisher certification date	
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



KAESER Air Filter Old and New

Videos	
Any equipment that needs to be ordered?	Used last air filter
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 6/4/2021, 9:39:08 AM EDT
Departure Time	11:45

Inspection Date	July 8, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	09:15
Personnel	Billy J Cobern
Weather	Cloudy, Rainy, 60's-80's

HMI and Control Panel

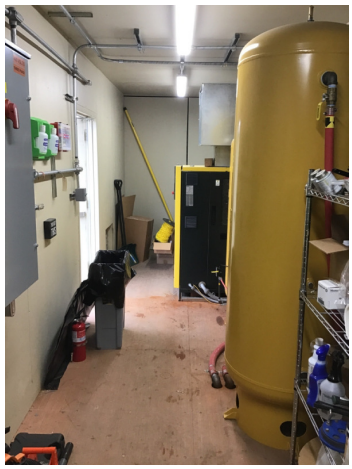
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	6
PIT-101 (PSIG)	10.3
PIT-102 (PSIA)	21.6
FQI-101 (SLPM)	1101
PIT-201 (PSIA)	24.8
PIT-300 (PSIG)	10.9
FQI-201 (LPM)	0
AE-350 (%LEL)	19.6
AE-351 (%LEL)	18.5
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	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	
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)	7270
Oil Pressure (PSIG)	127
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	5
PI-101 (PSIG)	125
PI-102 (PSIG)	20
PI-103 (PSIG)	10
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	24.07
MFC-101 standardized flow rate on display (SLPM)	1156
MFC-101 uncorrected flow rate on display (LPM)	568
Comments	Need labels on Alicat for A/B

Non-XP room photo

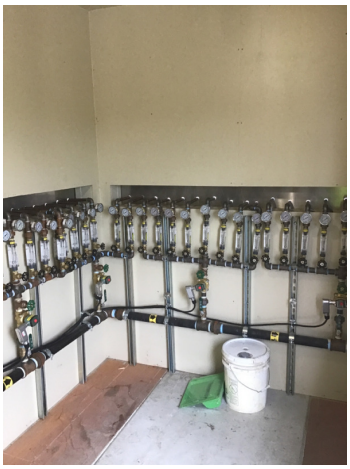


XP-Room

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)	69
PI-202 (PSIG)	50
MFC-201 temperature	31.06
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.81
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.61
PI-300 (PSIG)	6
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	21
AE-351 reading during propane sparge cycle	21
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)	20
AS-19-G01 Manifold Flowrate (CFM)	2
AS-19-G03 Manifold Pressure (PSIG)	20
AS-19-G03 Manifold Flowrate (CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	9
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	10
AS-19-E02 Manifold Flowrate (CFM)	2
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)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	1
AS-19-G02 Manifold Flowrate (CFM)	1.5
AS-19-G05 Manifold Pressure (PSIG)	10
AS-19-G05 Manifold Flowrate (CFM)	1
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	1
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	3.5
AS-19-E04 Manifold Pressure (PSIG)	1
AS-19-E04 Manifold Flowrate (CFM)	2.5
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	9
AS-19-E10 Manifold Flowrate (CFM)	3

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	1
AS-19-G04 Manifold Flowrate (CFM)	3
AS-19-G07 Manifold Pressure (PSIG)	1
AS-19-G07 Manifold Flowrate (CFM)	1.5
AS-19-G10 Manifold Pressure (PSIG)	1
AS-19-G10 Manifold Flowrate (CFM)	2
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	2.5
AS-19-E06 Manifold Pressure (PSIG)	1
AS-19-E06 Manifold Flowrate (CFM)	1.5
AS-19-E09 Manifold Pressure (PSIG)	1
AS-19-E09 Manifold Flowrate (CFM)	1.5
AS-19-E12 Manifold Pressure (PSIG)	2
AS-19-E12 Manifold Flowrate (CFM)	1

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	14
AS-19-F12 Manifold Flowrate (CFM)	4.5
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	3.5
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	3
AS-19-F03 Manifold Pressure (PSIG)	5
AS-19-F03 Manifold Flowrate (CFM)	2.5
AS-19-B06 Manifold Pressure (PSIG)	14
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	8
AS-19-B03 Manifold Flowrate (CFM)	2

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	4
AS-19-E11 Manifold Flowrate (CFM)	2
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	1.5
AS-19-F08 Manifold Pressure (PSIG)	2
AS-19-F08 Manifold Flowrate (CFM)	4
AS-19-F05 Manifold Pressure (PSIG)	4
AS-19-F05 Manifold Flowrate (CFM)	1
AS-19-F02 Manifold Pressure (PSIG)	1
AS-19-F02 Manifold Flowrate (CFM)	2
AS-19-B05 Manifold Pressure (PSIG)	3
AS-19-B05 Manifold Flowrate (CFM)	1.5
AS-19-B02 Manifold Pressure (PSIG)	1
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)	5
AS-19-F07 Manifold Flowrate (CFM)	2.5
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	10
AS-19-F01 Manifold Pressure (PSIG)	0.5

AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	1
AS-19-B07 Manifold Flowrate (CFM)	1
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	1
AS-19-B01 Manifold Pressure (PSIG)	1
AS-19-B01 Manifold Flowrate (CFM)	1.5

Outdoors and General

Propane tank level (%)	60
Number of condensate drums outside	16

Drum Photo

Electric Meter Reading (kWh)	151667
Last fire extinguisher certification date	
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?	Used last air filter
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 7/8/2021, 10:12:26 AM EDT
Departure Time	13:15

Inspection Date	August 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:45
Personnel	Billy J Cobern
Weather	Partly Cloudy, 60's-80's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	6
PIT-101 (PSIG)	50.3
PIT-102 (PSIA)	64.4
FQI-101 (SLPM)	2001
PIT-201 (PSIA)	47.5
PIT-300 (PSIG)	32.4
FQI-201 (LPM)	0.212
AE-350 (%LEL)	17.7
AE-351 (%LEL)	16.7
AE-500 (%LEL)	0
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	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	Condensate drain: Change the service unit, Display: Sigma Control 2: Maintain the drive belt, Display: Sigma Control 2: Change the air filter
Is the annual compressor inspection happening during this event?	Yes

Annual Compressor Inspection	Display Sigma Control 2: Change the oil filter, Check The safety Valve, Check the overheating safety function, Check the Emergency Stop, Refrigerated Dryer: check pressure monitor, Check the cooler for leaks, Maintain the heat recovery system, Check the electrical connections are tight, Replace drive belt, Biennial: Display Sigma Control 2: Change the oil separator cartridge
Compressor Audio	1 Audio File
Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	7746
Oil Pressure (PSIG)	121
Wet receiver tank loading pressure (PI-101)	130
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	45
PI-101 (PSIG)	120
PI-102 (PSIG)	88
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	
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer)
MFC-101 compressed air temperature	29.17
MFC-101 standardized flow rate on display (SLPM)	2000
MFC-101 uncorrected flow rate on display (LPM)	463
Comments	Need labels on Alicat for A/B

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)	68
PI-202 (PSIG)	52
MFC-201 temperature	32.48
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)	1.9
PI-300 (PSIG)	34
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	16
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	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	21
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	21
AS-19-G03 Manifold Flowrate (CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	6
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	5
AS-19-E02 Manifold Flowrate (CFM)	3
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)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	1
AS-19-G02 Manifold Flowrate (CFM)	3

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)	2
AS-19-E01 Manifold Pressure (PSIG)	1
AS-19-E01 Manifold Flowrate (CFM)	3
AS-19-E04 Manifold Pressure (PSIG)	3
AS-19-E04 Manifold Flowrate (CFM)	2.5
AS-19-E07 Manifold Pressure (PSIG)	6
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)	1
AS-19-G04 Manifold Flowrate (CFM)	6
AS-19-G07 Manifold Pressure (PSIG)	1
AS-19-G07 Manifold Flowrate (CFM)	3
AS-19-G10 Manifold Pressure (PSIG)	1
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	1
AS-19-E06 Manifold Flowrate (CFM)	4
AS-19-E09 Manifold Pressure (PSIG)	1
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	4
AS-19-E12 Manifold Flowrate (CFM)	2.5

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
AS-19-F12 Manifold Flowrate (CFM)	6
AS-19-F09 Manifold Pressure (PSIG)	5
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)	22

AS-19-F03 Manifold Flowrate (CFM)	1
AS-19-B06 Manifold Pressure (PSIG)	10
AS-19-B06 Manifold Flowrate (CFM)	5
AS-19-B03 Manifold Pressure (PSIG)	8
AS-19-B03 Manifold Flowrate (CFM)	1

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	4
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	4
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)	6
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)	5
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	9
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (CFM)	3
AS-19-F01 Manifold Pressure (PSIG)	11
AS-19-F01 Manifold Flowrate (CFM)	4
AS-19-B07 Manifold Pressure (PSIG)	11
AS-19-B07 Manifold Flowrate (CFM)	4
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	6
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	0

Outdoors and General

Propane tank level (%)	60
Number of condensate drums outside	23

Drum Photo

Electric Meter Reading (kWh)	158379
Last fire extinguisher certification date	
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?	Used last air filter
Comments, questions, ruminations, suggestions for improvement?	

Signature	 Signed 8/4/2021, 11:32:48 AM EDT
Departure Time	13:15

Inspection Date	September 3, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	09:40
Personnel	Billy J Cobern
Weather	Partly Cloudy, 50's-70's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	6
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.4
FQI-101 (SLPM)	2000
PIT-201 (PSIA)	48.2
PIT-300 (PSIG)	32.9
FQI-201 (LPM)	0.212
AE-350 (%LEL)	17.2
AE-351 (%LEL)	15.8
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	No
Comments	

Non-XP Room

Fire Extinguisher Check	Needle in the green?, All moving parts appear intact?, No deformation?
Heater set to turn on and operation verified?	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	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	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	8444
Oil Pressure (PSIG)	109
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	5
PI-101 (PSIG)	120
PI-102 (PSIG)	90
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	19.9
MFC-101 standardized flow rate on display (SLPM)	2001
MFC-101 uncorrected flow rate on display (LPM)	446
Comments	Need labels on Alicat for A/B

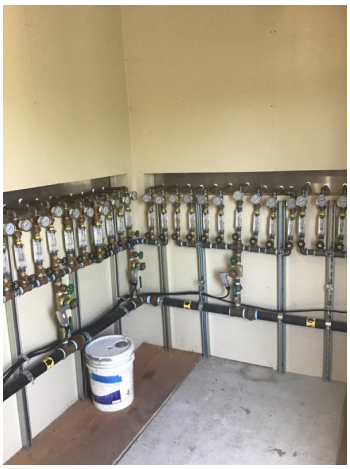
Non-XP room photo

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)	51
MFC-201 temperature	23.43
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)	1.84
PI-300 (PSIG)	35
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	16
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer)
Comments	Filled 5 drums with condensate from the poly tank.

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	21
AS-19-G01 Manifold Flowrate (CFM)	1
AS-19-G03 Manifold Pressure (PSIG)	23
AS-19-G03 Manifold Flowrate (CFM)	1.5
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	6
AS-19-G09 Manifold Pressure (PSIG)	4
AS-19-G09 Manifold Flowrate (CFM)	4
AS-19-E02 Manifold Pressure (PSIG)	4
AS-19-E02 Manifold Flowrate (CFM)	1
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)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	1
AS-19-G02 Manifold Flowrate (CFM)	2.5
AS-19-G05 Manifold Pressure (PSIG)	8
AS-19-G05 Manifold Flowrate (CFM)	4.5
AS-19-G08 Manifold Pressure (PSIG)	1
AS-19-G08 Manifold Flowrate (CFM)	2.5
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)	3
AS-19-E10 Manifold Pressure (PSIG)	15
AS-19-E10 Manifold Flowrate (CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	1
AS-19-G04 Manifold Flowrate (CFM)	7
AS-19-G07 Manifold Pressure (PSIG)	1
AS-19-G07 Manifold Flowrate (CFM)	1
AS-19-G10 Manifold Pressure (PSIG)	1
AS-19-G10 Manifold Flowrate (CFM)	4
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	1
AS-19-E06 Manifold Flowrate (CFM)	3.5
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)	6
AS-19-F09 Manifold Pressure (PSIG)	5
AS-19-F09 Manifold Flowrate (CFM)	4
AS-19-F06 Manifold Pressure (PSIG)	7
AS-19-F06 Manifold Flowrate (CFM)	5
AS-19-F03 Manifold Pressure (PSIG)	8
AS-19-F03 Manifold Flowrate (CFM)	4
AS-19-B06 Manifold Pressure (PSIG)	22
AS-19-B06 Manifold Flowrate (CFM)	2
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	8
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)	5
AS-19-F08 Manifold Flowrate (CFM)	3
AS-19-F05 Manifold Pressure (PSIG)	10
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	15
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	10
AS-19-B05 Manifold Flowrate (CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	2
AS-19-B02 Manifold Flowrate (CFM)	3.5

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	8
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	15
AS-19-F04 Manifold Flowrate (CFM)	3.5
AS-19-F01 Manifold Pressure (PSIG)	8

AS-19-F01 Manifold Flowrate (CFM)	6
AS-19-B07 Manifold Pressure (PSIG)	15
AS-19-B07 Manifold Flowrate (CFM)	4
AS-19-B04 Manifold Pressure (PSIG)	5
AS-19-B04 Manifold Flowrate (CFM)	7
AS-19-B01 Manifold Pressure (PSIG)	11
AS-19-B01 Manifold Flowrate (CFM)	3

Outdoors and General

Propane tank level (%)	49
Number of condensate drums outside	9

Drum Photo


9 full condensate drums


10 empty drums

Electric Meter Reading (kWh)	171459
Last fire extinguisher certification date	
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?	Walked the lines and didn't see anymore fence posts in the line trenches.
Signature	Signed 9/3/2021, 11:21:25 AM EDT
Departure Time	13:45

Inspection Date	October 1, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	08:00
Personnel	Billy J Cobern
Weather	Partly Cloudy, 50's-70's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	6
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	65
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	38.2
PIT-300 (PSIG)	23
FQI-201 (LPM)	0.198
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	Verified
UPS enabled?	No
Comments	Wet receiver tank auto drain leaking upon arrival. Replaced auto drain.

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	Condensate drain: Change the service unit, Display: Sigma Control 2: Maintain the drive belt, Display: Sigma Control 2: Change the air filter
Is the annual compressor inspection happening during this event?	Yes

Annual Compressor Inspection	Display Sigma Control 2: Change the oil filter, Check The safety Valve, Check the overheating safety function, Check the Emergency Stop, Refrigerated Dryer: check pressure monitor, Check the cooler for leaks, Maintain the heat recovery system, Check the electrical connections are tight, Replace drive belt, Biennial: Display Sigma Control 2: Change the oil separator cartridge
Compressor Audio	1 Audio File
Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	9069
Oil Pressure (PSIG)	112
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	100
How full is the condensate drum? (Percentage)	40
PI-101 (PSIG)	125
PI-102 (PSIG)	108
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	20.5
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

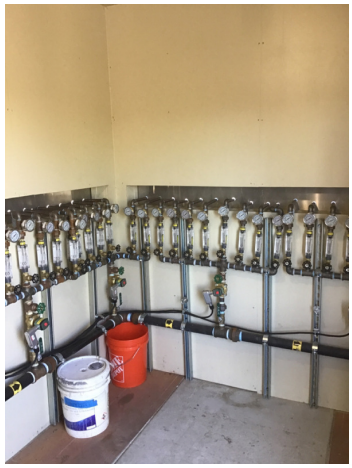
Non-XP room photo

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)	48
MFC-201 temperature	32.38
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)	2.04
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	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)	20
AS-19-G01 Manifold Flowrate (CFM)	3
AS-19-G03 Manifold Pressure (PSIG)	22
AS-19-G03 Manifold Flowrate (CFM)	0.5
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	7
AS-19-G09 Manifold Pressure (PSIG)	1
AS-19-G09 Manifold Flowrate (CFM)	3
AS-19-E02 Manifold Pressure (PSIG)	3
AS-19-E02 Manifold Flowrate (CFM)	0
AS-19-E05 Manifold Pressure (PSIG)	1
AS-19-E05 Manifold Flowrate (CFM)	3.5
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)	2
AS-19-G08 Manifold Flowrate (CFM)	2
AS-19-E01 Manifold Pressure (PSIG)	2
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	2
AS-19-E04 Manifold Flowrate (CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	8
AS-19-E07 Manifold Flowrate (CFM)	3.5
AS-19-E10 Manifold Pressure (PSIG)	11
AS-19-E10 Manifold Flowrate (CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	12
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)	2
AS-19-G10 Manifold Flowrate (CFM)	3
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	4
AS-19-E06 Manifold Pressure (PSIG)	3
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	5
AS-19-E12 Manifold Flowrate (CFM)	2

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	15
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	4
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)	4
AS-19-B06 Manifold Pressure (PSIG)	0
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)	5
AS-19-E11 Manifold Flowrate (CFM)	5.5
AS-19-F11 Manifold Pressure (PSIG)	5
AS-19-F11 Manifold Flowrate (CFM)	2.5
AS-19-F08 Manifold Pressure (PSIG)	4
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)	10
AS-19-F02 Manifold Flowrate (CFM)	6
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)	4
AS-19-F10 Manifold Flowrate (CFM)	4
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	10
AS-19-F04 Manifold Flowrate (CFM)	2.5
AS-19-F01 Manifold Pressure (PSIG)	6
AS-19-F01 Manifold Flowrate (CFM)	4
AS-19-B07 Manifold Pressure (PSIG)	9
AS-19-B07 Manifold Flowrate (CFM)	3
AS-19-B04 Manifold Pressure (PSIG)	9
AS-19-B04 Manifold Flowrate (CFM)	6
AS-19-B01 Manifold Pressure (PSIG)	15
AS-19-B01 Manifold Flowrate (CFM)	2

Outdoors and General

Propane tank level (%)	34
Number of condensate drums outside	9

Drum Photo


Electric Meter Reading (kWh)	183739
Last fire extinguisher certification date	
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?	Walked the lines and didn't see anymore fence posts in the line trenches.

Signature	 Signed 10/1/2021, 10:13:29 AM EDT
Departure Time	12:45

Inspection Date	November 2, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	08:30
Personnel	Billy J Cobern
Weather	Cloudy, 30's-40's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	5.992
PIT-101 (PSIG)	50.6
PIT-102 (PSIA)	65.3
FQI-101 (SLPM)	1857
PIT-201 (PSIA)	67
PIT-300 (PSIG)	29
FQI-201 (LPM)	0.012
AE-350 (%LEL)	15.3
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	

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)	9792
Oil Pressure (PSIG)	116
Wet receiver tank loading pressure (PI-101)	127
Wet receiver tank unloading pressure (PI-101)	110
How full is the condensate drum? (Percentage)	45
PI-101 (PSIG)	125
PI-102 (PSIG)	115
PI-103 (PSIG)	49
Are the trident desiccant dryer meters green?	Yes
Bi-Weekly Non-XP Instrument Maintenance	TCA-101 Verify draining, S-101 Verify autodrain is functioning (makes a loud noise when it turns on and water drains into the condensate drum), 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	13.33
MFC-101 standardized flow rate on display (SLPM)	18.59
MFC-101 uncorrected flow rate on display (LPM)	403
Comments	Need labels on Alicat for A/B, removed trash from building

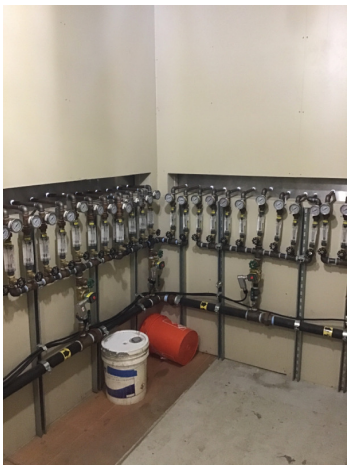
Non-XP room photo


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)	47
MFC-201 temperature	29.86
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)	1.88
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	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	

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)	2
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)	0
AS-19-E02 Manifold Flowrate (CFM)	0
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)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	15
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)	4
AS-19-G08 Manifold Flowrate (CFM)	7
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)	3
AS-19-E07 Manifold Pressure (PSIG)	5
AS-19-E07 Manifold Flowrate (CFM)	3
AS-19-E10 Manifold Pressure (PSIG)	9
AS-19-E10 Manifold Flowrate (CFM)	4

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	15
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	6
AS-19-G07 Manifold Flowrate (CFM)	2.5
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	10
AS-19-E03 Manifold Pressure (PSIG)	2
AS-19-E03 Manifold Flowrate (CFM)	3
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	11
AS-19-E09 Manifold Pressure (PSIG)	2
AS-19-E09 Manifold Flowrate (CFM)	2
AS-19-E12 Manifold Pressure (PSIG)	5
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)	5
AS-19-F09 Manifold Flowrate (CFM)	5
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	5.5
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)	1
AS-19-B03 Manifold Pressure (PSIG)	9
AS-19-B03 Manifold Flowrate (CFM)	5

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	4
AS-19-E11 Manifold Flowrate (CFM)	5
AS-19-F11 Manifold Pressure (PSIG)	2
AS-19-F11 Manifold Flowrate (CFM)	2
AS-19-F08 Manifold Pressure (PSIG)	2
AS-19-F08 Manifold Flowrate (CFM)	2
AS-19-F05 Manifold Pressure (PSIG)	6
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	9
AS-19-F02 Manifold Flowrate (CFM)	5
AS-19-B05 Manifold Pressure (PSIG)	7
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)	3
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)	1
AS-19-F01 Manifold Pressure (PSIG)	4

AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	5
AS-19-B07 Manifold Flowrate (CFM)	3
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)	2

Outdoors and General

Propane tank level (%)	70
Number of condensate drums outside	3

Drum Photo

Electric Meter Reading (kWh)	198598
Last fire extinguisher certification date	
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 11/2/2021, 9:46:07 AM EDT
Departure Time	11:15

Inspection Date	December 3, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	07:45
Personnel	Billy J Cobern
Weather	Cloudy, snow, 30's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	5.571
PIT-101 (PSIG)	51.3
PIT-102 (PSIA)	65.3
FQI-101 (SLPM)	1860
PIT-201 (PSIA)	72.1
PIT-300 (PSIG)	30.1
FQI-201 (LPM)	0.197
AE-350 (%LEL)	15
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	All zones set to gas. HMI was frozen cycled power to it and it's normal now.

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)	10489
Oil Pressure (PSIG)	113
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)	125
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	13.98
MFC-101 standardized flow rate on display (SLPM)	1859
MFC-101 uncorrected flow rate on display (LPM)	404
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)	60
MFC-201 temperature	29.88
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)	1.81
PI-300 (PSIG)	32
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, 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	16
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)	10
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	14
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	7
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	5
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)	5

AS-19-E08 Manifold Pressure (PSIG)	3
AS-19-E08 Manifold Flowrate (CFM)	5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	15
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)	7
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	0
AS-19-E04 Manifold Flowrate (CFM)	3
AS-19-E07 Manifold Pressure (PSIG)	5
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)	12
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	5
AS-19-G07 Manifold Flowrate (CFM)	3
AS-19-G10 Manifold Pressure (PSIG)	5
AS-19-G10 Manifold Flowrate (CFM)	10
AS-19-E03 Manifold Pressure (PSIG)	0
AS-19-E03 Manifold Flowrate (CFM)	3
AS-19-E06 Manifold Pressure (PSIG)	10
AS-19-E06 Manifold Flowrate (CFM)	12
AS-19-E09 Manifold Pressure (PSIG)	0
AS-19-E09 Manifold Flowrate (CFM)	2
AS-19-E12 Manifold Pressure (PSIG)	3
AS-19-E12 Manifold Flowrate (CFM)	2

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	8
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)	5
AS-19-F03 Manifold Pressure (PSIG)	5
AS-19-F03 Manifold Flowrate (CFM)	5
AS-19-B06 Manifold Pressure (PSIG)	0
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	6

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	1
AS-19-E11 Manifold Flowrate (CFM)	6
AS-19-F11 Manifold Pressure (PSIG)	3
AS-19-F11 Manifold Flowrate (CFM)	3
AS-19-F08 Manifold Pressure (PSIG)	1
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)	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)	2
AS-19-B02 Manifold Flowrate (CFM)	3

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	4
AS-19-F10 Manifold Flowrate (CFM)	3
AS-19-F07 Manifold Pressure (PSIG)	8
AS-19-F07 Manifold Flowrate (CFM)	3
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)	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)	5
AS-19-B01 Manifold Flowrate (CFM)	2

Outdoors and General

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

Drum Photo

Electric Meter Reading (kWh)	214198
Last fire extinguisher certification date	
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 12/3/2021, 9:34:39 AM EST
Departure Time	11:30

Inspection Date	January 8, 2021
Last Quarterly Event Date	
Arrival Time	11:07
Personnel	Anyssa Mandich, Eric Feenstra
Weather	Cloudy, 30°

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)	31.03
FQI-101 (SLPM)	300.1
FQI-201 (SLPM)	0
PIT-202 (PSIA)	16.5
FE-301 (LPM)	299.7
AE-350 (%LEL)	0
PIT-300 (PSIG)	16.4
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	3266
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	Not needed

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	206
Motor Current while loading (amps)	14.84
Motor RPMs while loading	1800
VFD thermal state	20
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	25
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	5
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	PF-102 needle green, PF-101 drained manually, System depressurized to drain filter chambers, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, Verify the desiccant dryer is cycling properly, CF-102 needle green, 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-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	51.82
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	136
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	August 1, 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)	62
MFC-201 temperature (Fahrenheit)	56.01
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)	0.275
PI-300 (PSIG)	15
PI-301 Z1 (PSIG)	14
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	9
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	

Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	16
AS-19-A02 Wellhead Pressure (PSIG)	7
AS-19-A03 Wellhead Pressure (PSIG)	14
AS-19-A04 Wellhead Pressure (PSIG)	15
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	13
AS-19-A07 Wellhead Pressure (PSIG)	15
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	11582
Electric meter power draw (kW) while compressor is on	10.52
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 1/8/2021, 12:50:23 PM EST
Departure Time	13:00

Inspection Date	February 3, 2021
Last Quarterly Event Date	
Arrival Time	10:20
Personnel	Anyssa Mandich
Weather	Sunny, 23°

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)	48.8
PIT-102 (PSIA)	28.5
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	0
PIT-202 (PSIA)	27.3
FE-301 (LPM)	300
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.7
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	380784
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
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)	14.55
Motor RPMs while loading	1800
VFD thermal state	16
VFD line voltage in (while compressor is loading)	230
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	31
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	5
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)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	52.47
MFC-101 standardized flow rate on display (SLPM)	299.5
MFC-101 uncorrected flow rate on display (LPM)	139.7
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)	60
MFC-201 temperature (Fahrenheit)	77.22
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)	0.291
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	14
PI-303 Z3 (PSIG)	6
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	
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)	3
AS-19-A03 Wellhead Pressure (PSIG)	10
AS-19-A04 Wellhead Pressure (PSIG)	14
AS-19-A05 Wellhead Pressure (PSIG)	11
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	13
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	48394
Electric meter power draw (kW) while compressor is on	10.46

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 2/3/2021, 11:55:35 AM EST
Departure Time	12:00

Inspection Date	March 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:30
Personnel	Billy J Cobern, Eric Feenstra
Weather	Cloudy 20's-30'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)	48.5
PIT-102 (PSIA)	28.6
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	0
PIT-202 (PSIA)	26.2
FE-301 (LPM)	300.1
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.9
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	UPS set to bypass

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	440404
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
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, Not required
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	208
Motor Current while loading (amps)	14.75
Motor RPMs while loading	1800
VFD thermal state	68
VFD line voltage in (while compressor is loading)	233
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	32
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	4
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), Not required
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	65.14
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	141

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)	75
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	73.58
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)	0.246
PI-300 (PSIG)	19
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	11
PI-303 Z3 (PSIG)	18
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-350 calibrated, AE-401 calibrated, Not required
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)	114
AS-19-A02 Wellhead Pressure (PSIG)	12
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	14
AS-19-A05 Wellhead Pressure (PSIG)	11
AS-19-A06 Wellhead Pressure (PSIG)	7
AS-19-A07 Wellhead Pressure (PSIG)	12
Number of condensate drums outside	0

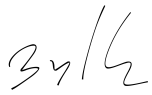
Drum Photo

Electric Meter Reading (kWh)	52442
Electric meter power draw (kW) while compressor is on	10.51
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?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 3/4/2021, 11:06:03 AM EST
Departure Time	12:00

Inspection Date	April 2, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	13:15
Personnel	Billy J Cobern
Weather	Partly Cloudy, 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)	49.6
PIT-102 (PSIA)	28.3
FQI-101 (SLPM)	299.4
FQI-201 (SLPM)	0
PIT-202 (PSIA)	27.3
FE-301 (LPM)	299.8
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.4
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Adjusted
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	UPS set to bypass

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	495454
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
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, Not required
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	208
Motor Current while loading (amps)	14.77
Motor RPMs while loading	1800
VFD thermal state	68
VFD line voltage in (while compressor is loading)	233
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	2
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	4.5
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), Not required
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)	63.5
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	142

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)	75
PI-202 (PSIG)	52
MFC-201 temperature (Fahrenheit)	75.02
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0
PI-300 (PSIG)	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	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated, Not required
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)	10
AS-19-A02 Wellhead Pressure (PSIG)	9
AS-19-A03 Wellhead Pressure (PSIG)	14
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	2

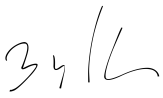
Drum Photo

Electric Meter Reading (kWh)	55708
Electric meter power draw (kW) while compressor is on	7.25
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?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 4/2/2021, 1:45:53 PM EDT
Departure Time	13:45

Inspection Date	May 4, 2021
Last Quarterly Event Date	
Arrival Time	09:15
Personnel	Anyssa Mandich
Weather	Cloudy, 52

HMI and Control Panel

HMI display functioning (not frozen)?	No
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	49.4
PIT-102 (PSIA)	30.4
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	27.9
FE-301 (LPM)	300
AE-350 (%LEL)	0
PIT-300 (PSIG)	16.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	HMI was frozen. Cycled power and it fixed itself.

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	561276
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	208
Motor Current while loading (amps)	14.58
Motor RPMs while loading	1800
VFD thermal state	28
VFD line voltage in (while compressor is loading)	233.7
Wet receiver tank loading pressure (PI-101)	80
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	7
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	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	60
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	67.14
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	142
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)	115
PI-202 (PSIG)	58
MFC-201 temperature (Fahrenheit)	66.96
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)	0.28
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	14
PI-303 Z3 (PSIG)	9
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)	15
AS-19-A02 Wellhead Pressure (PSIG)	5
AS-19-A03 Wellhead Pressure (PSIG)	8
AS-19-A04 Wellhead Pressure (PSIG)	15
AS-19-A05 Wellhead Pressure (PSIG)	9
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	14
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	59432
Electric meter power draw (kW) while compressor is on	6.73

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 5/4/2021, 10:53:46 AM EDT
Departure Time	11:00

Inspection Date	June 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Mostly Cloudy 60's-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)	54
PIT-102 (PSIA)	64.3
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	28.3
FE-301 (LPM)	3.2
AE-350 (%LEL)	0
PIT-300 (PSIG)	54.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	Zone scheduling was not showing upon arrival. Shut off and turned on power to reset

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	625882
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	230
Motor Current while loading (amps)	14.68
Motor RPMs while loading	1800
VFD thermal state	42
VFD line voltage in (while compressor is loading)	233.7
Wet receiver tank loading pressure (PI-101)	75
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	13
PI-102 (PSIG)	51
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	
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)	86.77
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	142
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)	120
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	92.97
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)	0.28
PI-300 (PSIG)	15
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	14
Monthly XP Instrumentation Checks	Propane pressure switch set to 85PSI, Zone solenoids actuating properly, Manual flow meter checked against alicat flow rate (divide LPM by 28 for SCFM), LEL vent line flow set between 1 and 3 LPM
AE-401 Reading	0
AE-350 reading during propane sparge cycle	11
Quarterly LEL Meter Calibration	

Which propane Alicat is in use (upon leaving system)?	MFC-201A (older, use February through August)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	14
AS-19-A02 Wellhead Pressure (PSIG)	12
AS-19-A03 Wellhead Pressure (PSIG)	14
AS-19-A04 Wellhead Pressure (PSIG)	13
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	7
AS-19-A07 Wellhead Pressure (PSIG)	12
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	63177
Electric meter power draw (kW) while compressor is on	6.64
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 6/4/2021, 11:28:21 AM EDT
Departure Time	11:30

Inspection Date	July 8, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	09:15
Personnel	Billy J Cobern
Weather	Cloudy, rain 60's-80's

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)	48.9
PIT-102 (PSIA)	29.2
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	24.7
FE-301 (LPM)	299.7
AE-350 (%LEL)	0
PIT-300 (PSIG)	16.6
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	No
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	687735
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	239
Motor Current while loading (amps)	13.8
Motor RPMs while loading	1750
VFD thermal state	42
VFD line voltage in (while compressor is loading)	233.7
Wet receiver tank loading pressure (PI-101)	75
Wet receiver tank unloading pressure (PI-101)	65
How full is the condensate drum? (Gallons)	32.5
PI-102 (PSIG)	50
PI-103 (PSIG)	49
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	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	70
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older, use February through August)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	86.94
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	142
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)	25
PI-202 (PSIG)	25
MFC-201 temperature (Fahrenheit)	82.89
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0
PI-300 (PSIG)	50
PI-301 Z1 (PSIG)	10
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	10
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	

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)	10
AS-19-A02 Wellhead Pressure (PSIG)	7
AS-19-A03 Wellhead Pressure (PSIG)	11
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	11
AS-19-A06 Wellhead Pressure (PSIG)	3
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	2

Drum Photo

Electric Meter Reading (kWh)	67163
Electric meter power draw (kW) while compressor is on	6.64

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 7/8/2021, 12:17:07 PM EDT
Departure Time	13:15

Inspection Date	August 4, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	00:35
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)	49.5
PIT-102 (PSIA)	27.8
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	26.3
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?	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	742312
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	206
Motor Current while loading (amps)	14.68
Motor RPMs while loading	1800
VFD thermal state	42
VFD line voltage in (while compressor is loading)	233.7
Wet receiver tank loading pressure (PI-101)	70
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	15
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)	85.78
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	153
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)	50
MFC-201 temperature (Fahrenheit)	87.39
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)	10
PI-301 Z1 (PSIG)	12
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	10
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	

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)	7
AS-19-A03 Wellhead Pressure (PSIG)	14
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	13
AS-19-A06 Wellhead Pressure (PSIG)	3
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	70502
Electric meter power draw (kW) while compressor is on	6.65

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 8/4/2021, 1:17:05 PM EDT
Departure Time	14:15

Inspection Date	September 3, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	11:30
Personnel	Billy J Cobern
Weather	Partly Cloudy,50’s-70’s

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)	48.6
PIT-102 (PSIA)	28.2
FQI-101 (SLPM)	300.3
FQI-201 (SLPM)	0
PIT-202 (PSIA)	27.7
FE-301 (LPM)	300.3
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.5
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	No
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	802192
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)	14.52
Motor RPMs while loading	1800
VFD thermal state	42
VFD line voltage in (while compressor is loading)	232.1
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	38
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)	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)	82.51
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	148.8
Comments	Pumped 38 gallons of condensate from the inside drum to an outside 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?	No
Fan turned on and verified to be operating?	Yes
Swap out the propane tanks	Complete
PI-201 (PSIG)	115
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	85.89
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)	0.3
PI-300 (PSIG)	12
PI-301 Z1 (PSIG)	13
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	8
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	

Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	Both propane tanks were completely empty upon arrival

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	3
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	13
AS-19-A06 Wellhead Pressure (PSIG)	1
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	74235
Electric meter power draw (kW) while compressor is on	6.65

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 9/3/2021, 12:42:15 PM EDT
Departure Time	13:00

Inspection Date	October 1, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Partly Cloudy,50’s-70’s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	48.2
PIT-102 (PSIA)	27.5
FQI-101 (SLPM)	301.1
FQI-201 (SLPM)	0
PIT-202 (PSIA)	26.1
FE-301 (LPM)	300.3
AE-350 (%LEL)	0
PIT-300 (PSIG)	14.7
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	853124
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	227
Motor Current while loading (amps)	14.9
Motor RPMs while loading	1800
VFD thermal state	64
VFD line voltage in (while compressor is loading)	234.2
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	13
PI-102 (PSIG)	51
PI-103 (PSIG)	49
Trident Desiccant Dryer Pressure (PSIG)	69
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)	75.85
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	149.9
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)	100
PI-202 (PSIG)	50
MFC-201 temperature (Fahrenheit)	95.29
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)	0.302
PI-300 (PSIG)	11
PI-301 Z1 (PSIG)	8
PI-302 Z2 (PSIG)	10
PI-303 Z3 (PSIG)	6
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	

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)	10
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)	5
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	74346
Electric meter power draw (kW) while compressor is on	7.49

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?	Closed AO6 and pressure at AO2 climbed to 53 psi. I reopened AO6, allowed the pressure to stabilize, and closed AO2. AO2 remains closed.
Signature	 Signed 10/1/2021, 10:51:01 AM EDT
Departure Time	11:45

Inspection Date	November 2, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	11:20
Personnel	Billy J Cobern
Weather	Cloudy, 30's-40's

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)	48.6
PIT-102 (PSIA)	28.2
FQI-101 (SLPM)	300.3
FQI-201 (SLPM)	0
PIT-202 (PSIA)	26.3
FE-301 (LPM)	300.3
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.4
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	No
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	918016
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	227
Motor Current while loading (amps)	14.87
Motor RPMs while loading	1800
VFD thermal state	66
VFD line voltage in (while compressor is loading)	234.2
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	26
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	69
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)	68.18
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	144.5
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)	70
PI-202 (PSIG)	55
MFC-201 temperature (Fahrenheit)	67.23
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)	0.295
PI-300 (PSIG)	10
PI-301 Z1 (PSIG)	13
PI-302 Z2 (PSIG)	9
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	10
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)	0
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	13
AS-19-A06 Wellhead Pressure (PSIG)	5
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1
Drum Photo	
Electric Meter Reading (kWh)	81634
Electric meter power draw (kW) while compressor is on	10.3
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?	Valves on the 2 mixing tanks were already cracked open.

Signature	 Signed 11/2/2021, 1:12:57 PM EDT
Departure Time	13:15

Inspection Date	December 3, 2021
Last Quarterly Event Date	December 4, 2020
Arrival Time	09:45
Personnel	Billy J Cobern
Weather	Cloudy, snow, 30'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)	55.5
PIT-102 (PSIA)	13.4
FQI-101 (SLPM)	0
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.2
FE-301 (LPM)	0
AE-350 (%LEL)	0
PIT-300 (PSIG)	0.2
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	System is down AE-401 LEL sensor failed

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	978504
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	225
Motor Current while loading (amps)	14.9
Motor RPMs while loading	1802
VFD thermal state	29
VFD line voltage in (while compressor is loading)	234.2
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	60
How full is the condensate drum? (Gallons)	27
PI-102 (PSIG)	58
PI-103 (PSIG)	55
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)	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)	75.38
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	System down

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)	50
MFC-201 temperature (Fahrenheit)	78.58
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0
PI-300 (PSIG)	0
PI-301 Z1 (PSIG)	0
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	0
Quarterly LEL Meter Calibration	

Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	LEL 401 failed

XP-room photo

Outdoors and General

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

Drum Photo

Electric Meter Reading (kWh)	88670
Electric meter power draw (kW) while compressor is on	10.66

Last fire extinguisher certification date	
Quarterly Building Maintenance Tasks	

System building photo

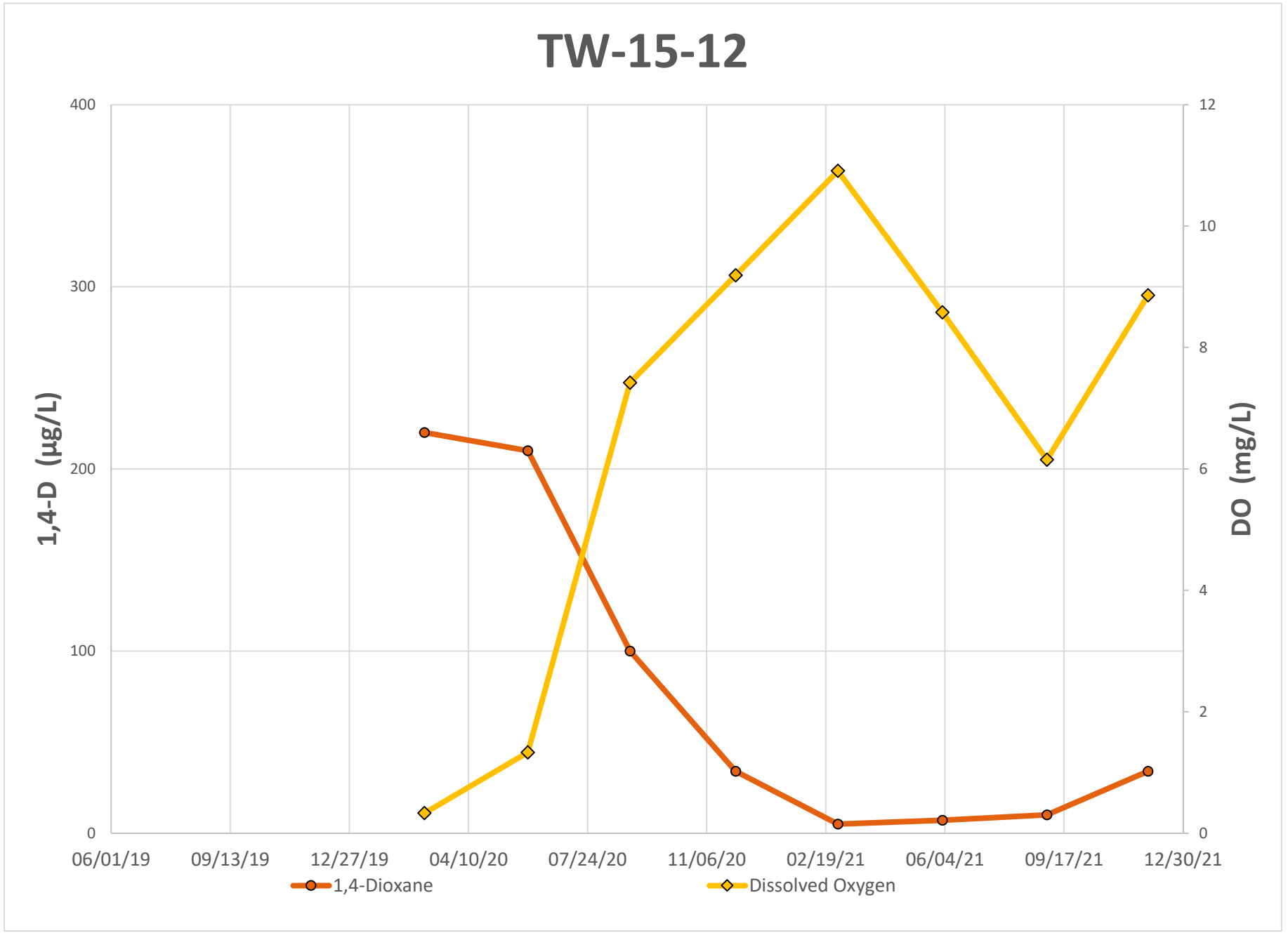
Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 12/3/2021, 10:17:58 AM EST
Departure Time	11:00

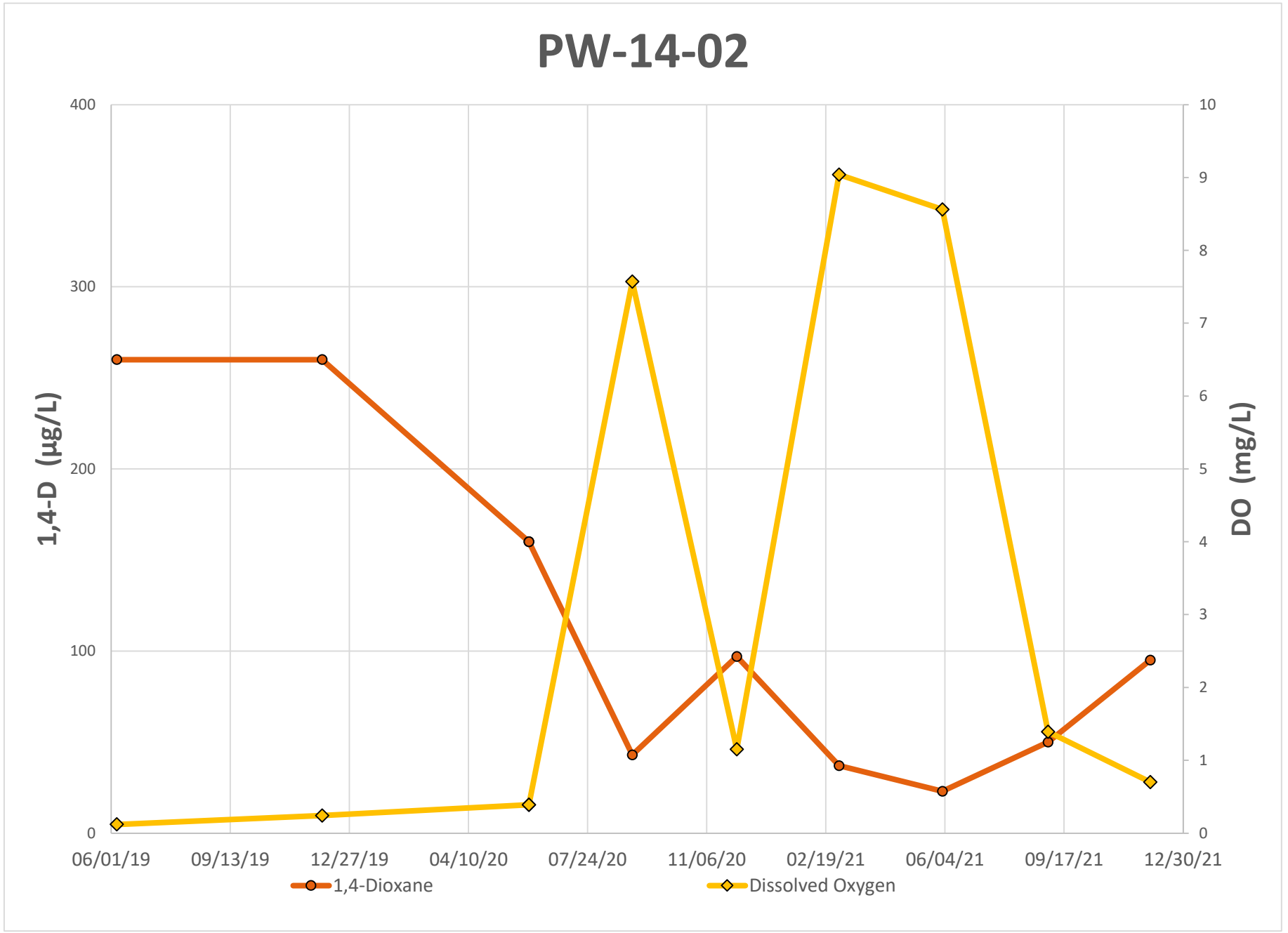
Appendix B

Performance Graphs

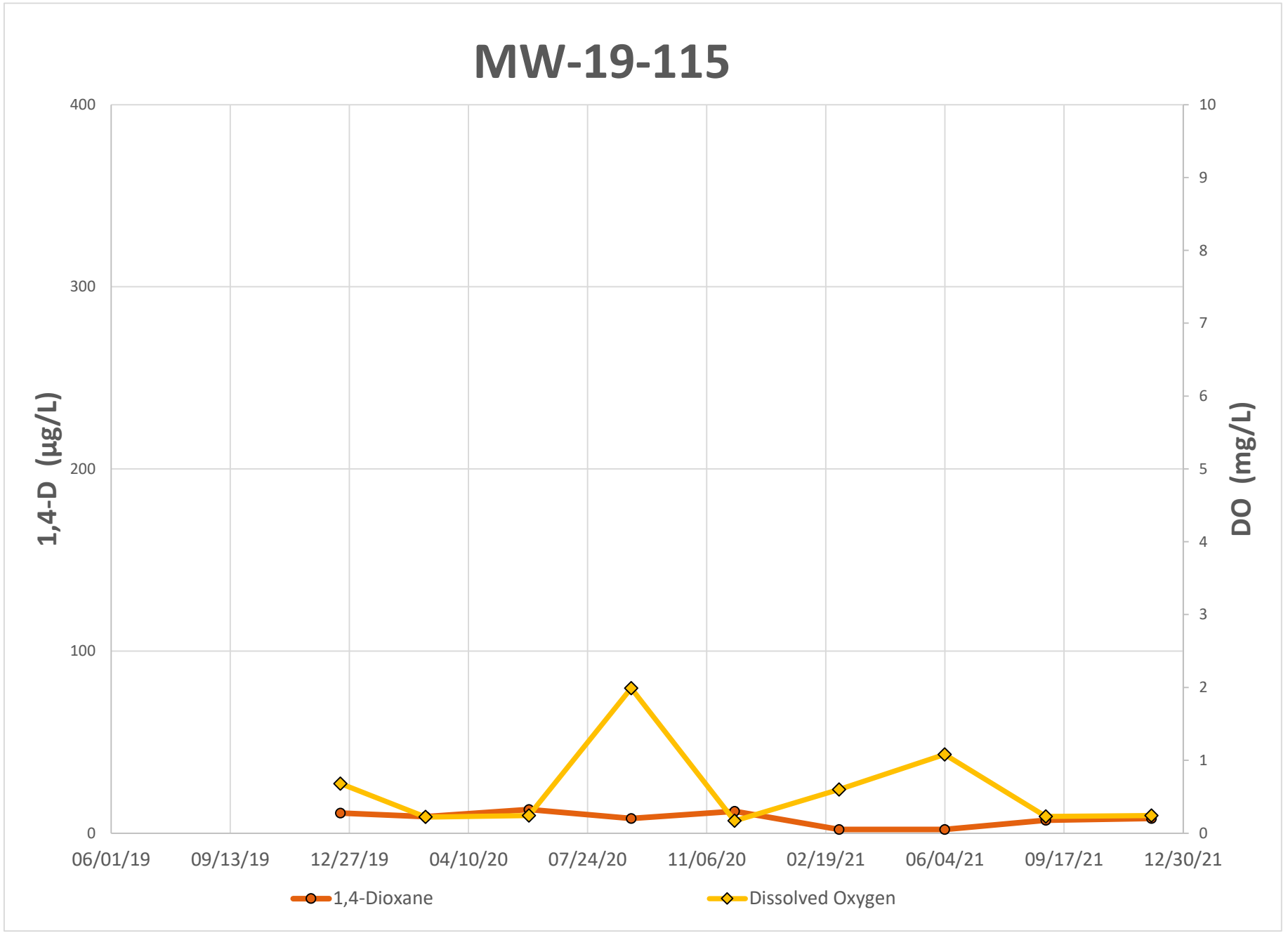
Plant 2 Transect B ROI Well
Performance Graph



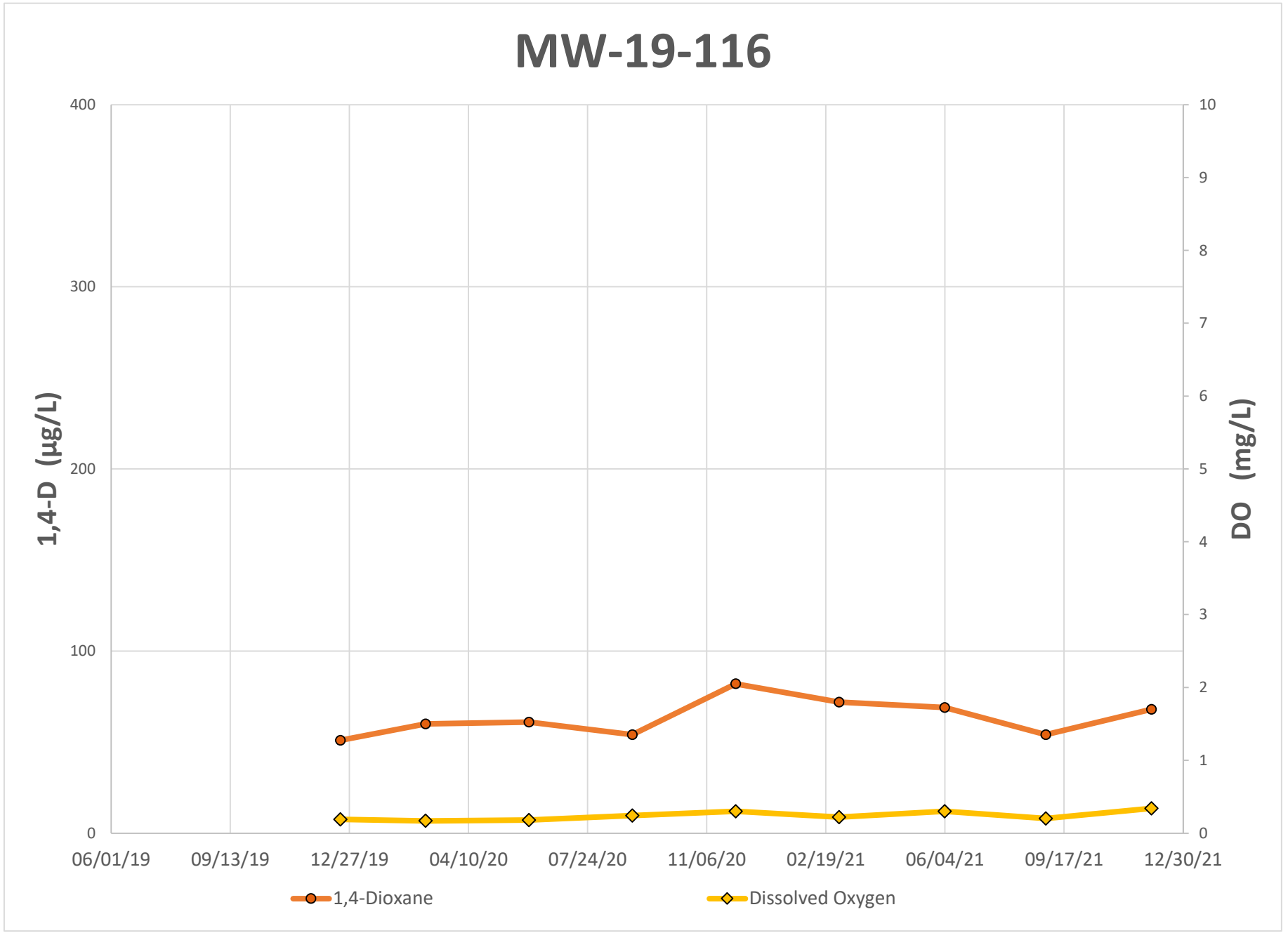
Plant 2 Transect B Downgradient Well 50 ft
Performance Graph



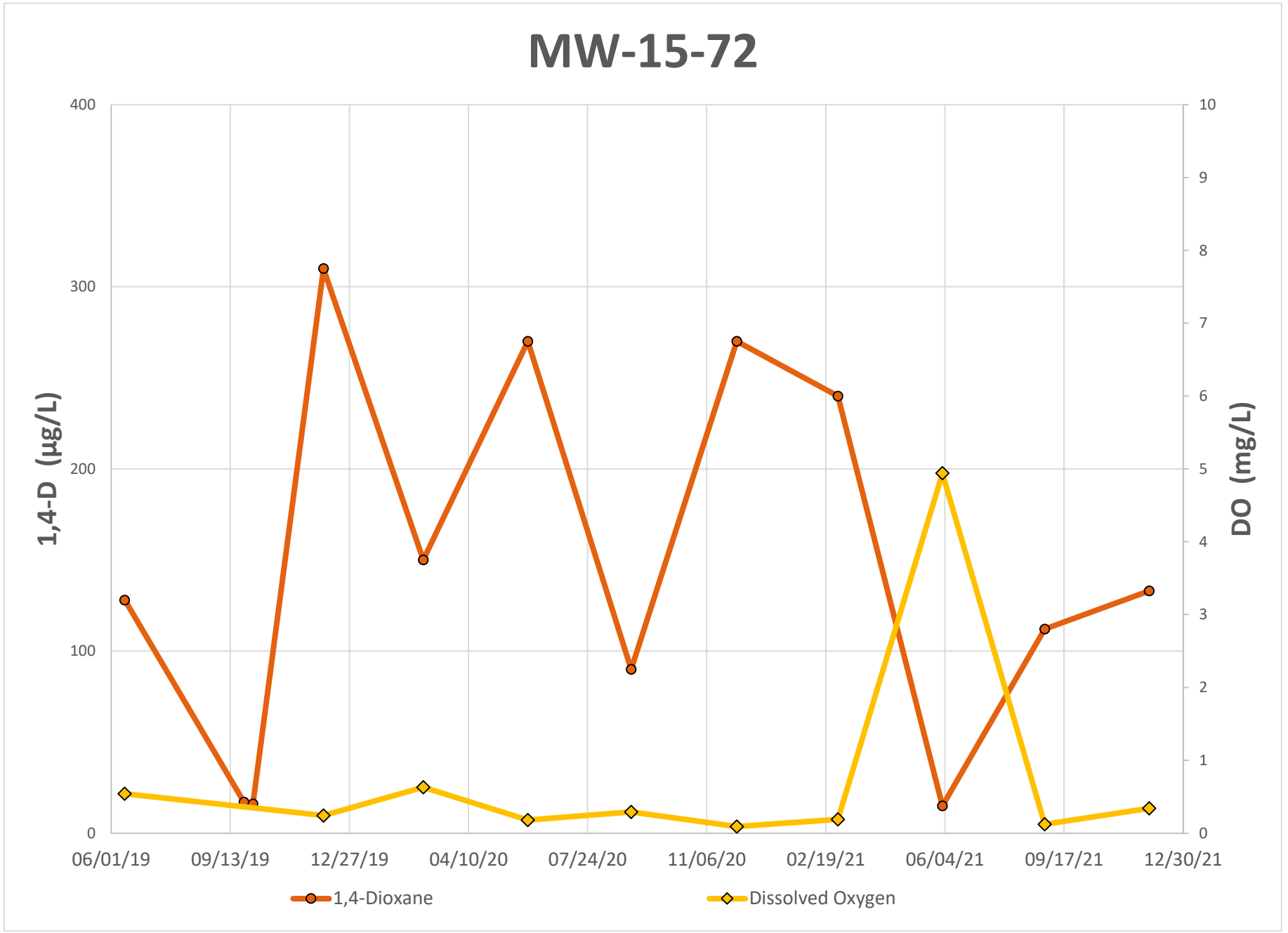
Plant 2 Transect C Monitoring Well
Performance Graph



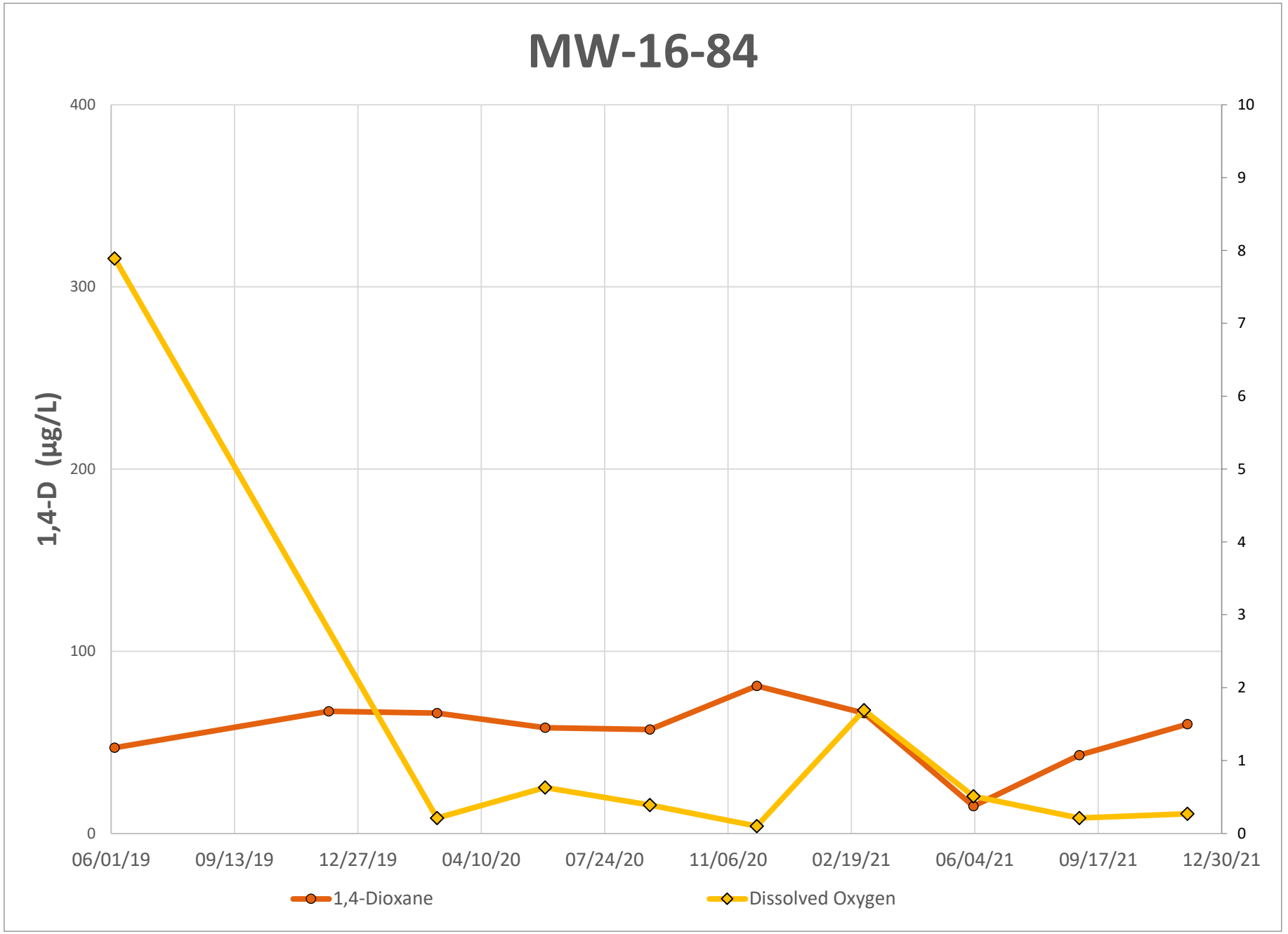
Plant 2 Transect C Monitoring Well
Performance Graph



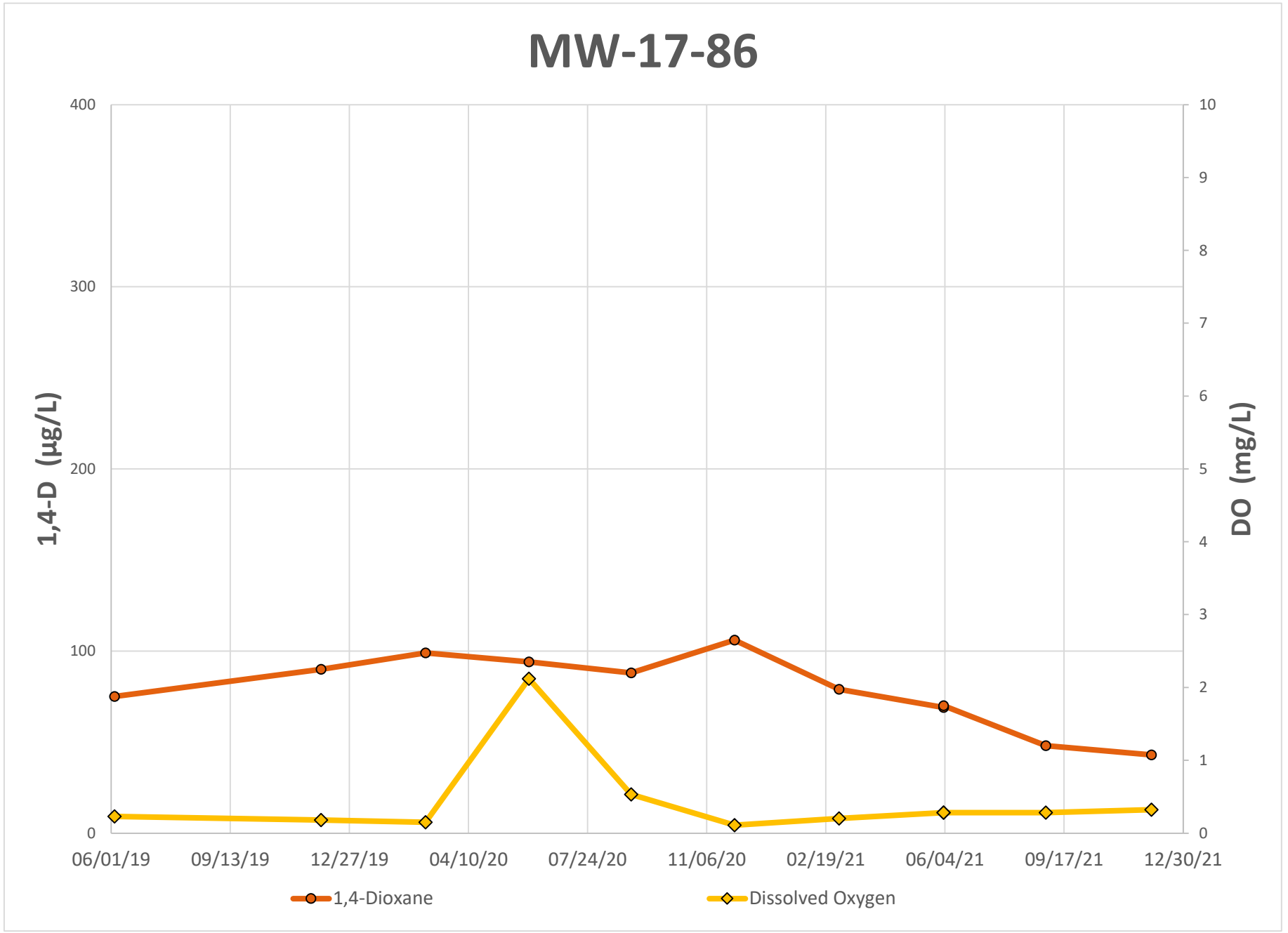
Plant 2 Transect C Monitoring Well
Performance Graph



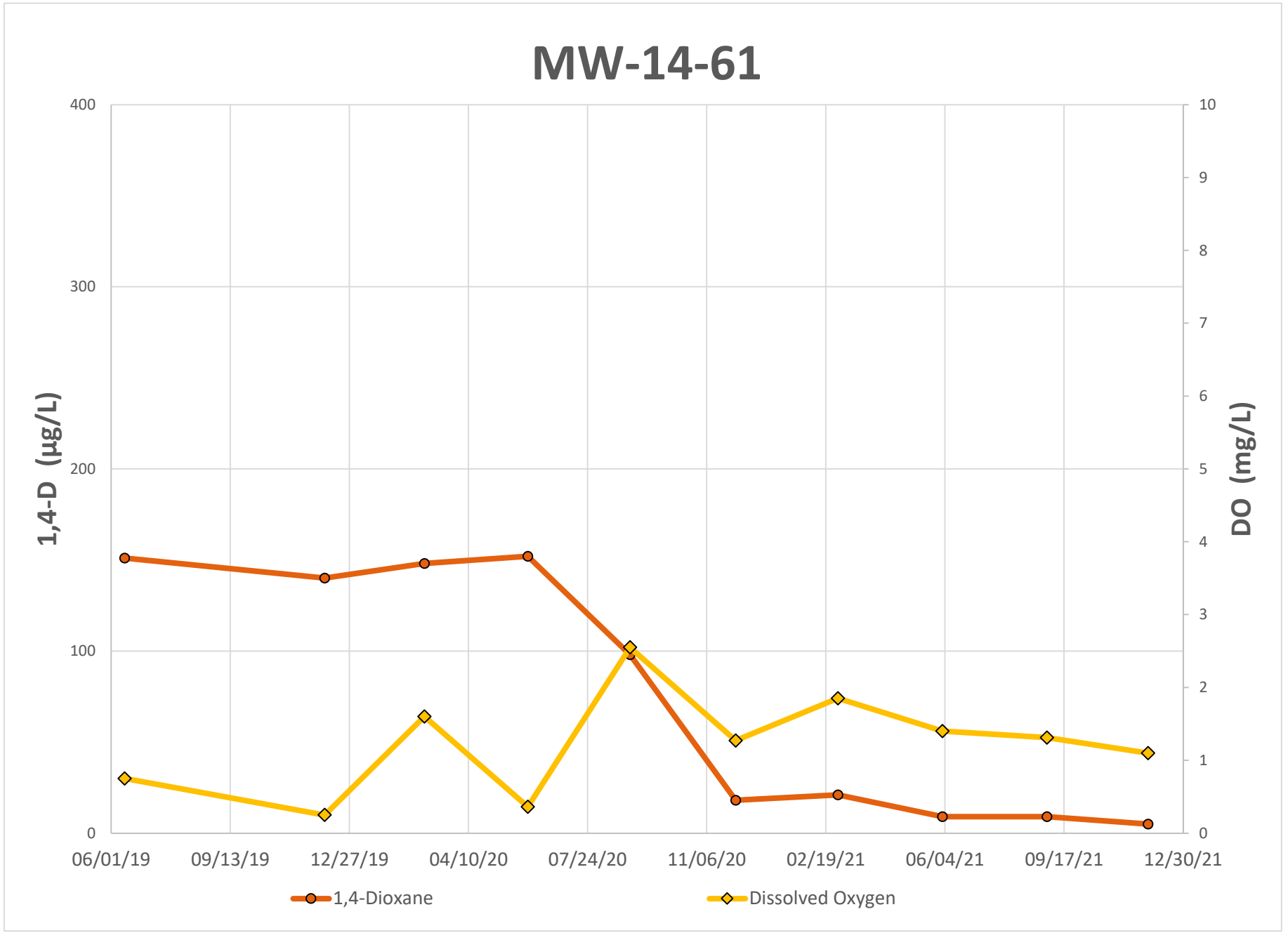
Plant 2 Transect F Downgradient Well 50 ft
Performance Graph



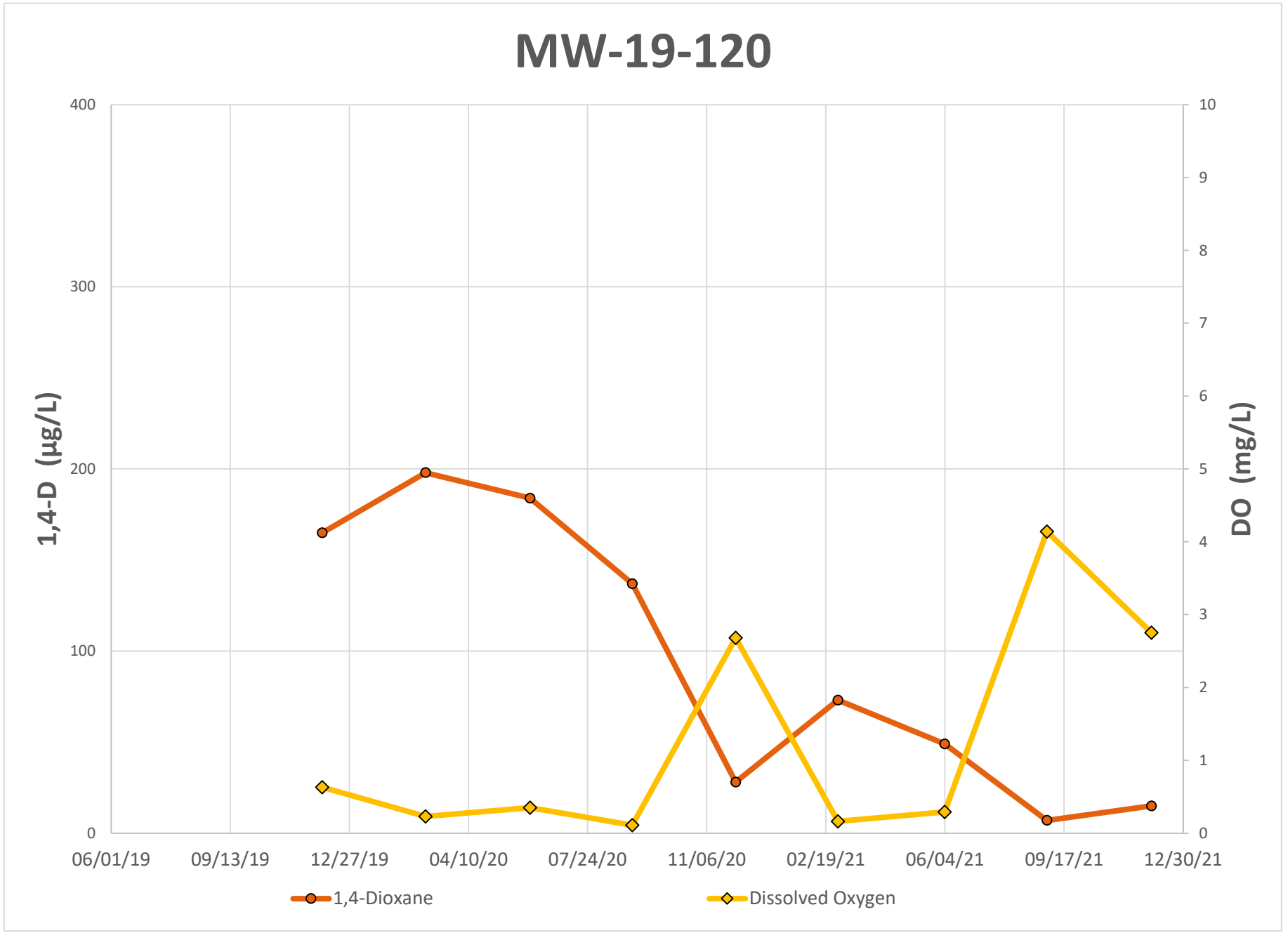
Plant 2 Transect F Downgradient Well 100 ft
Performance Graph



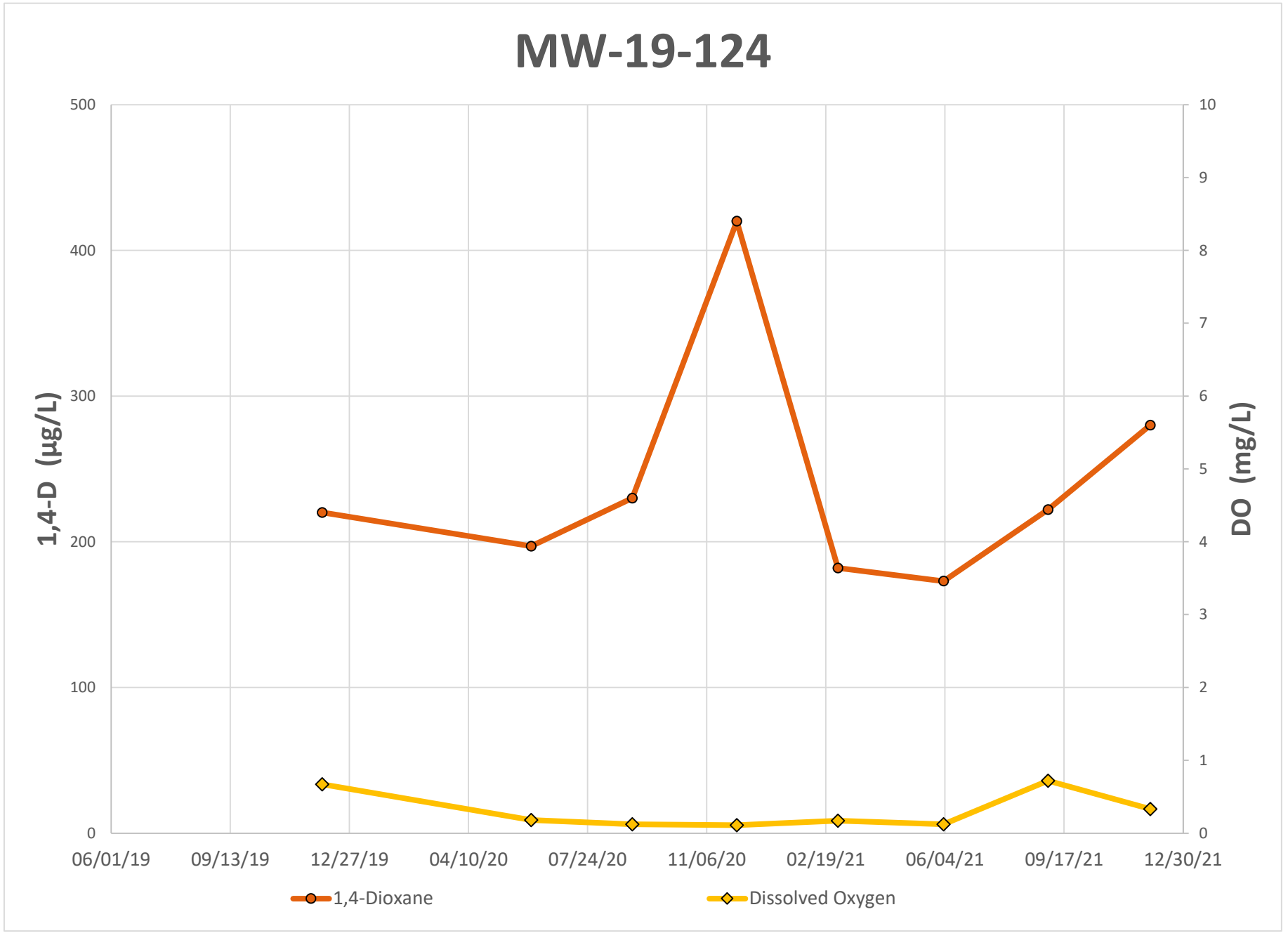
Plant 2 Transect F ROI Well
Performance Graph



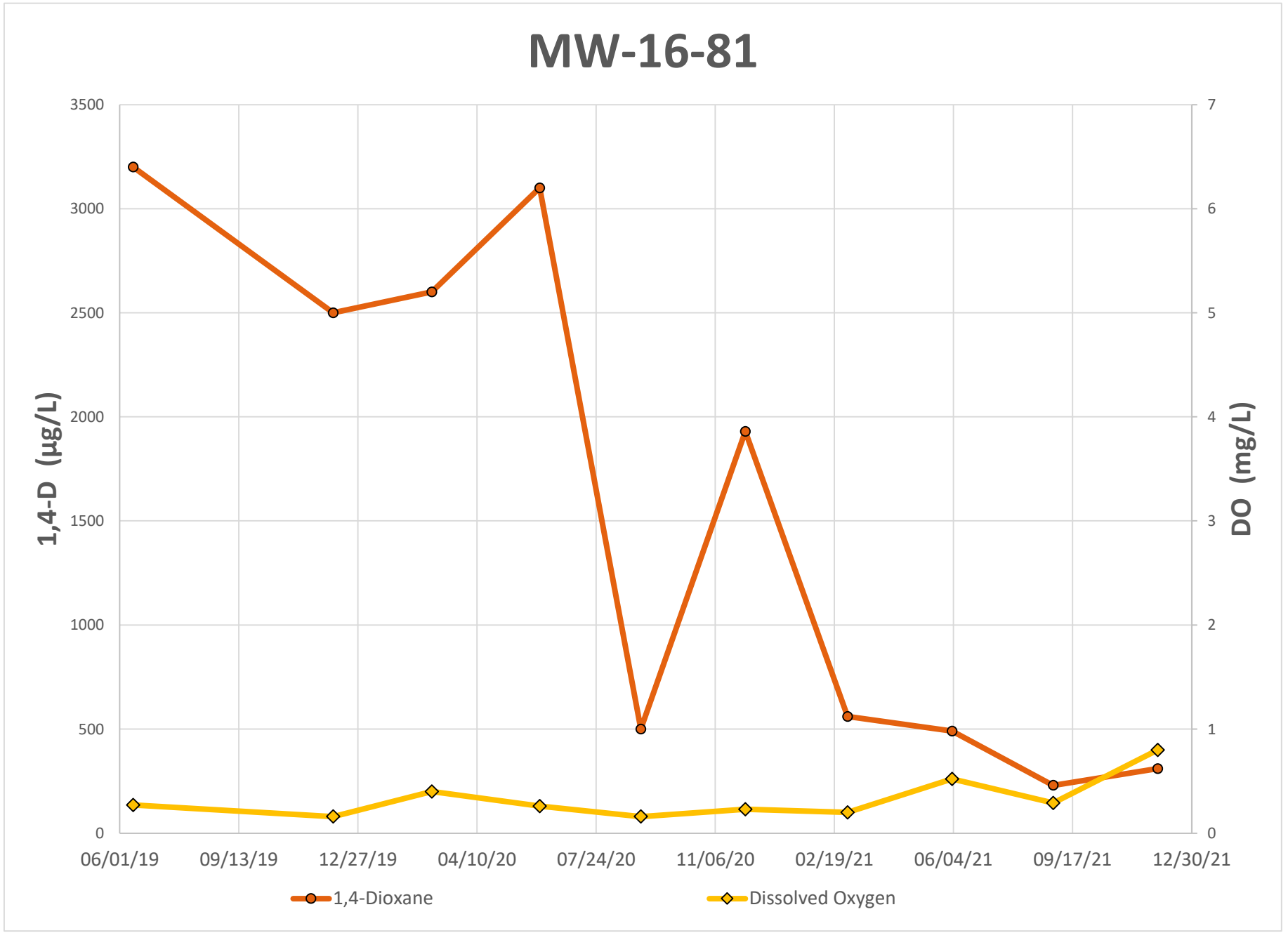
Plant 2 Transect E Downgradient Well 40 ft
Performance Graph



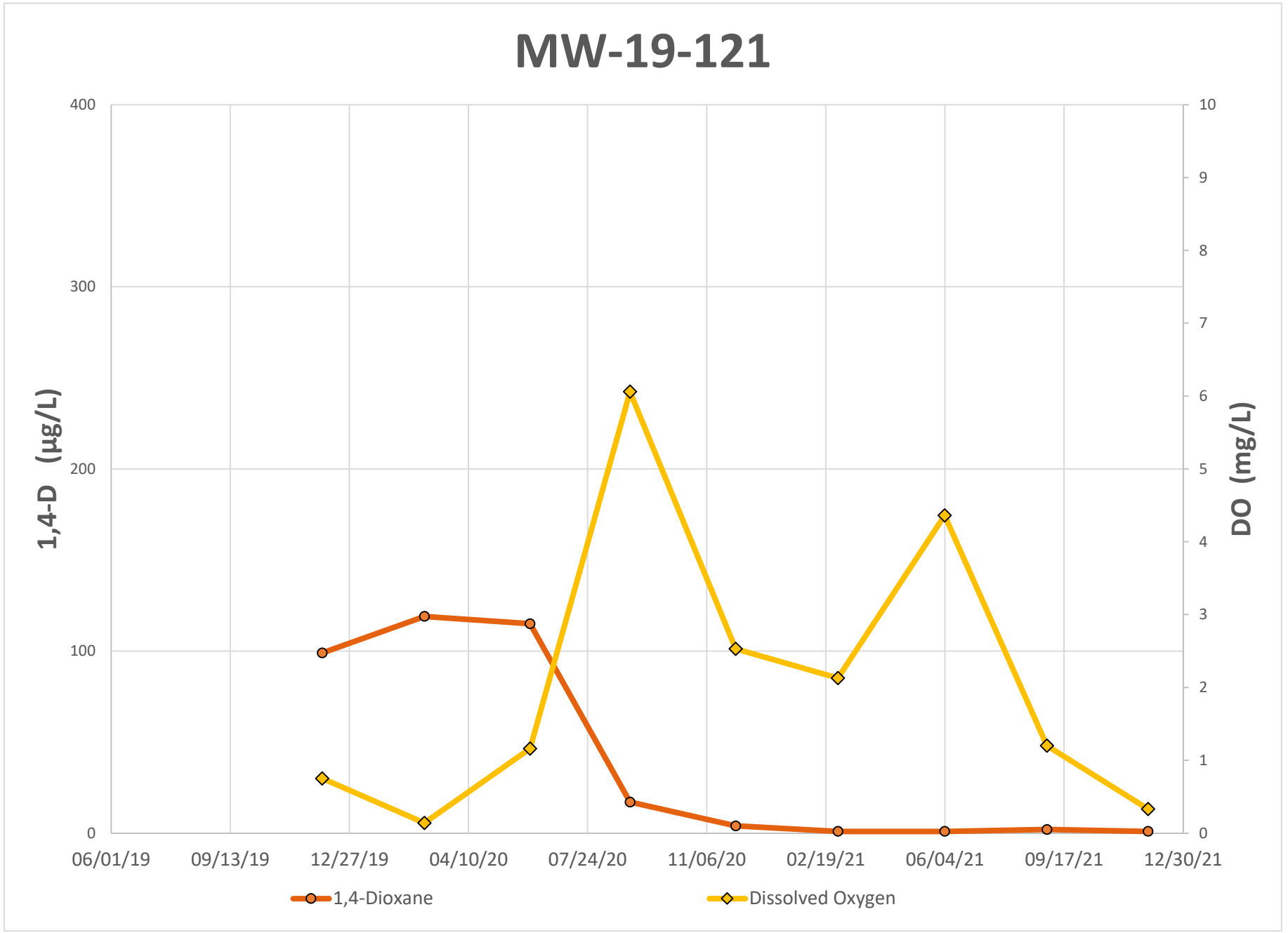
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



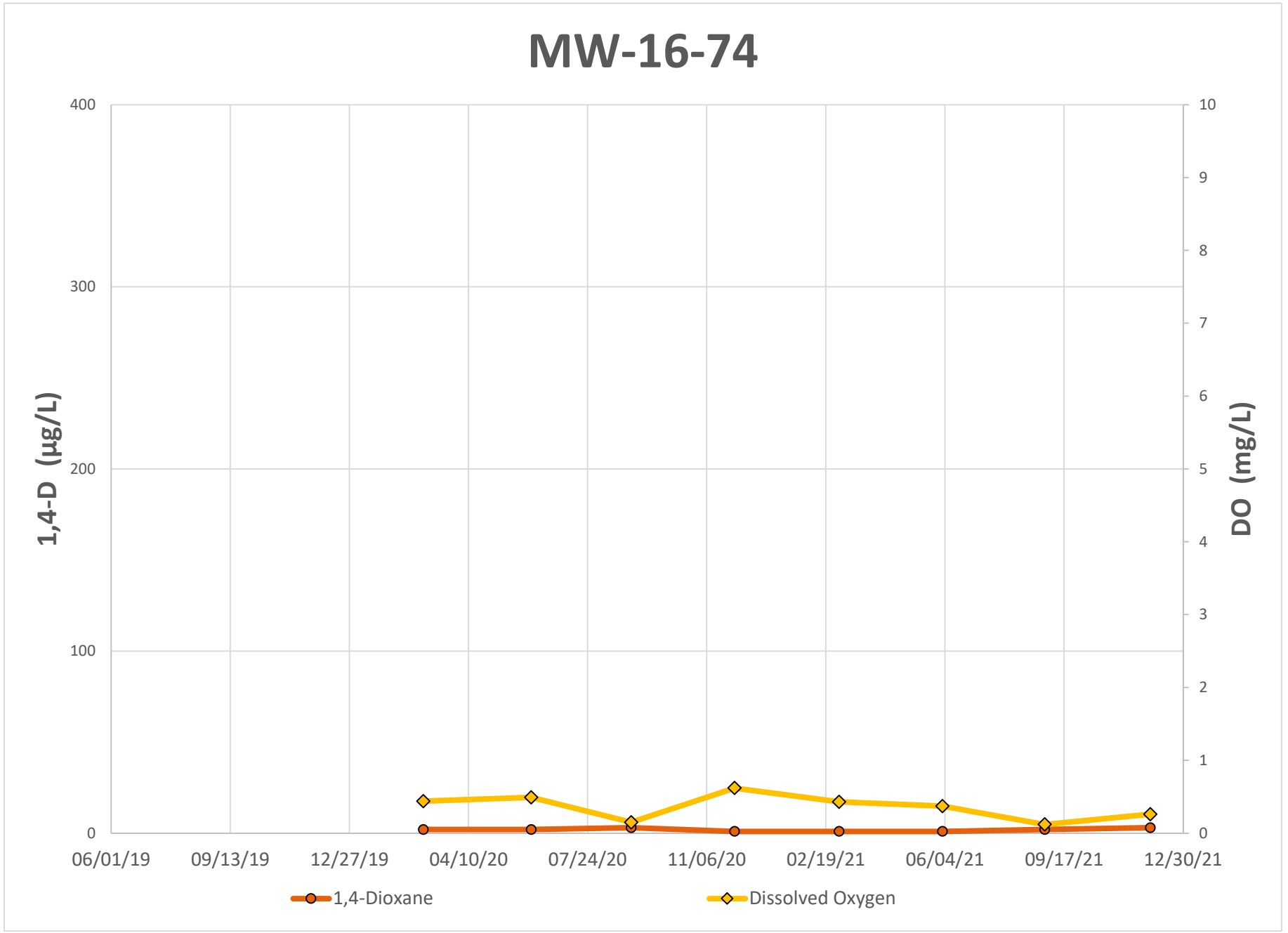
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



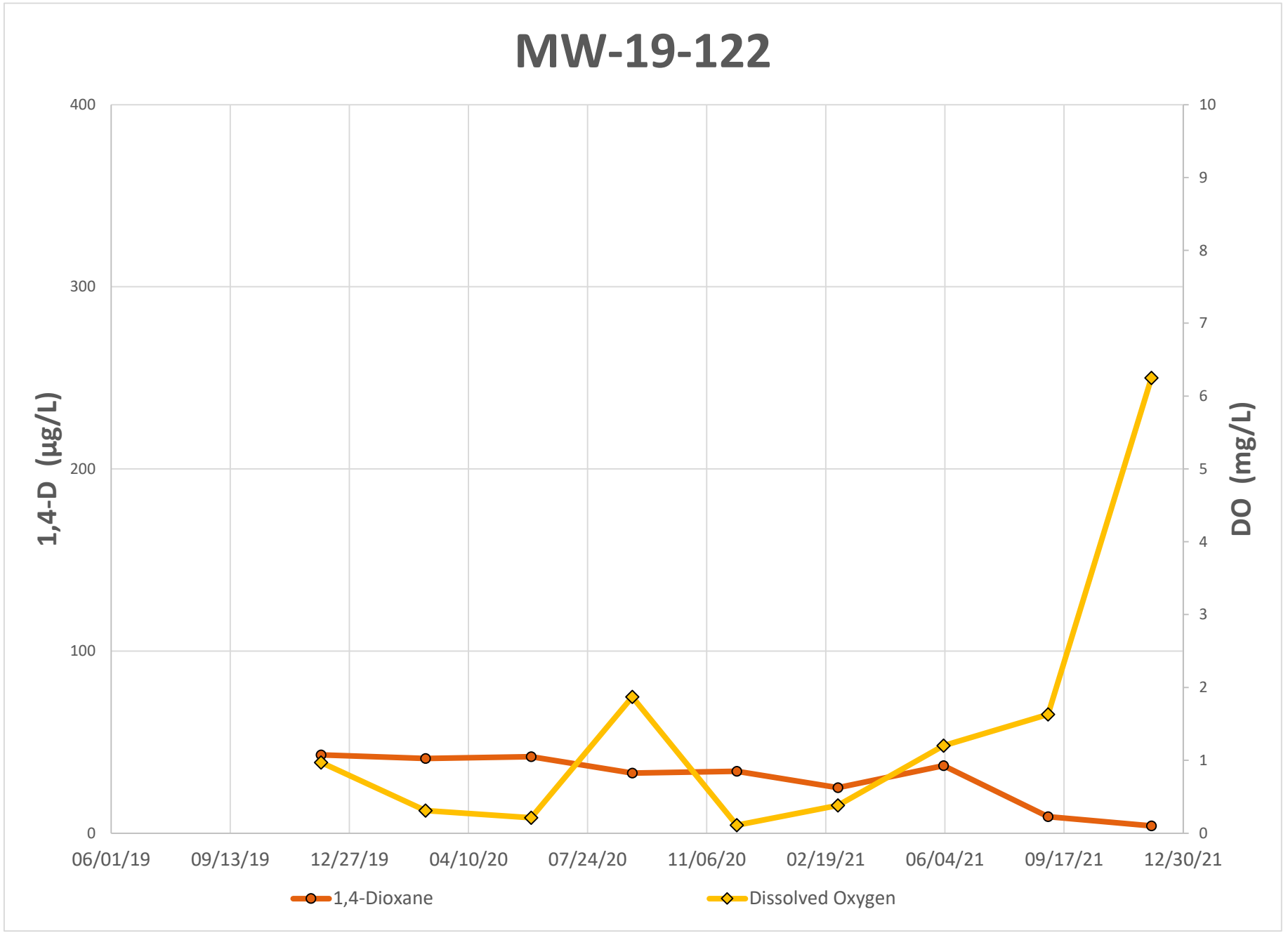
Plant 2 Transect E ROI Well
Performance Graph



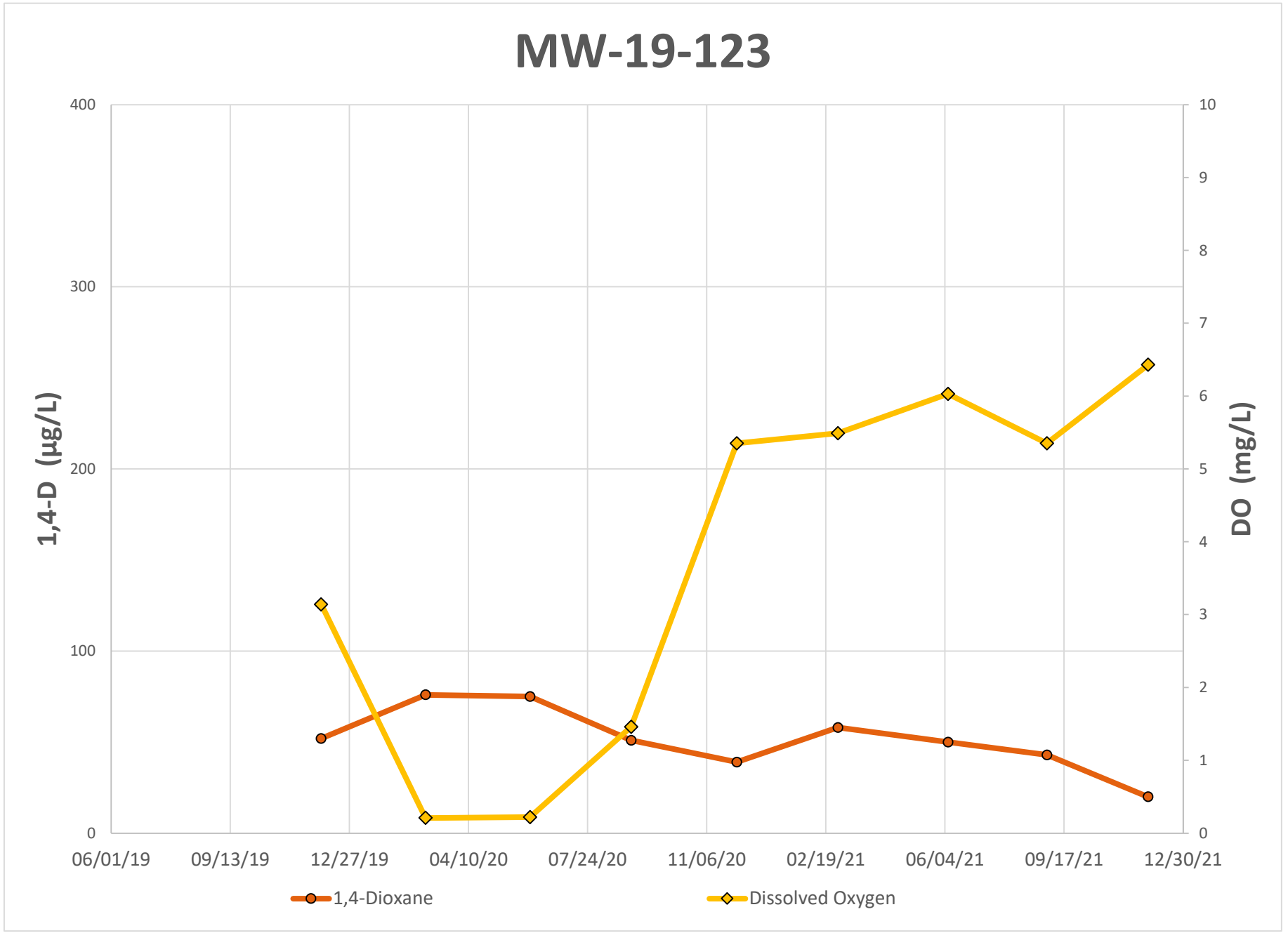
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



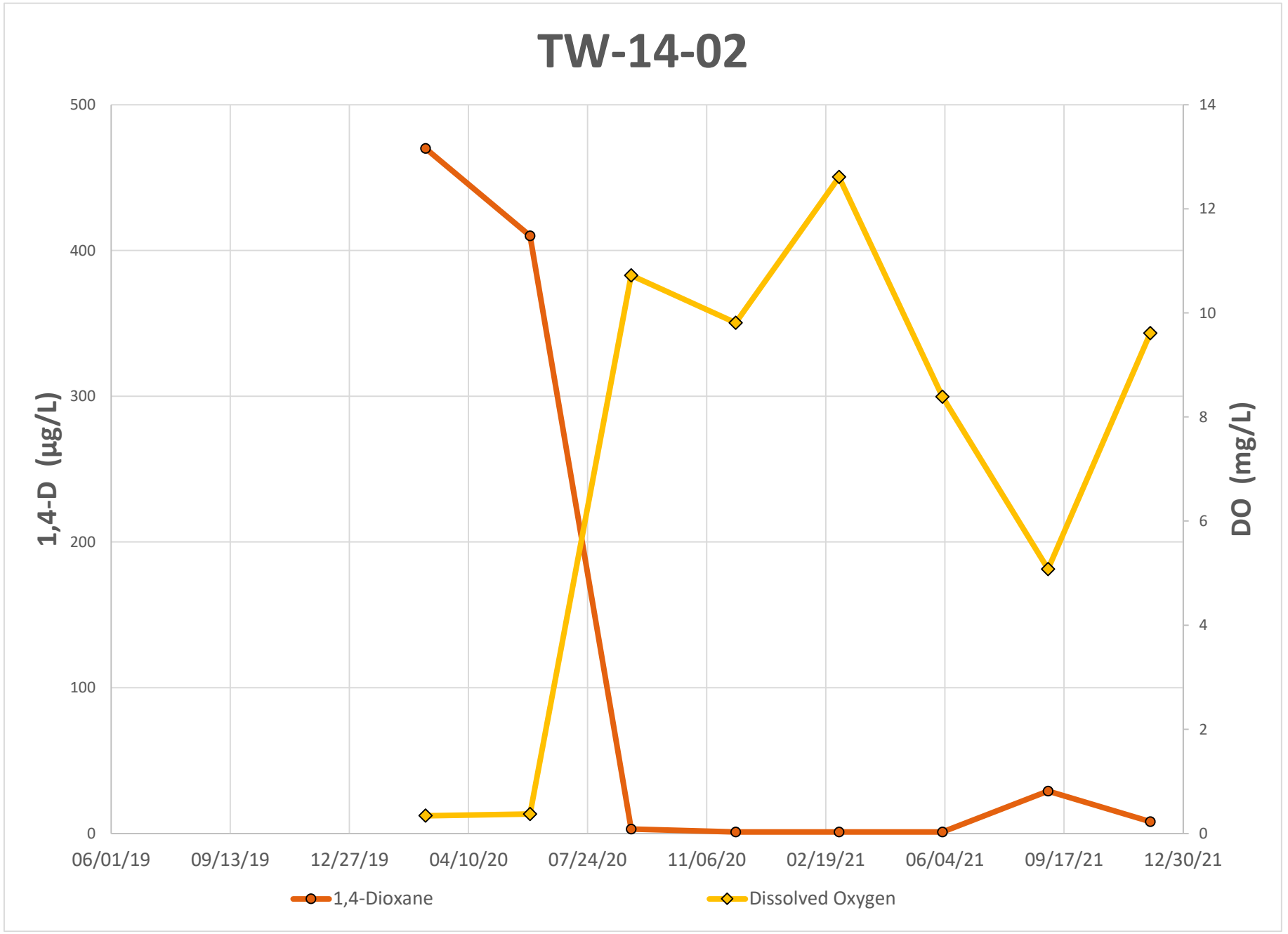
Plant 2 Transect G Upgradient Well 60 ft
Performance Graph



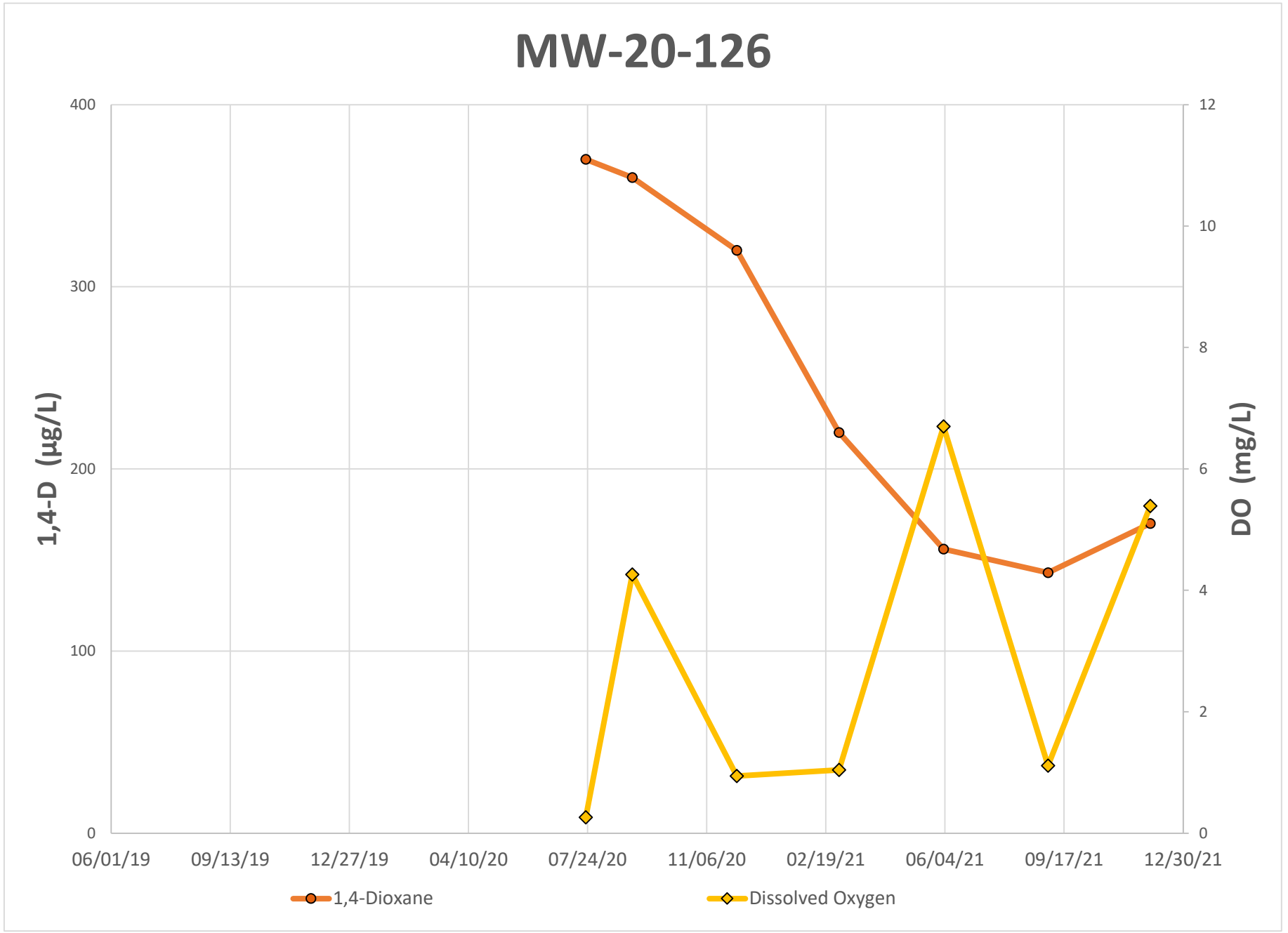
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



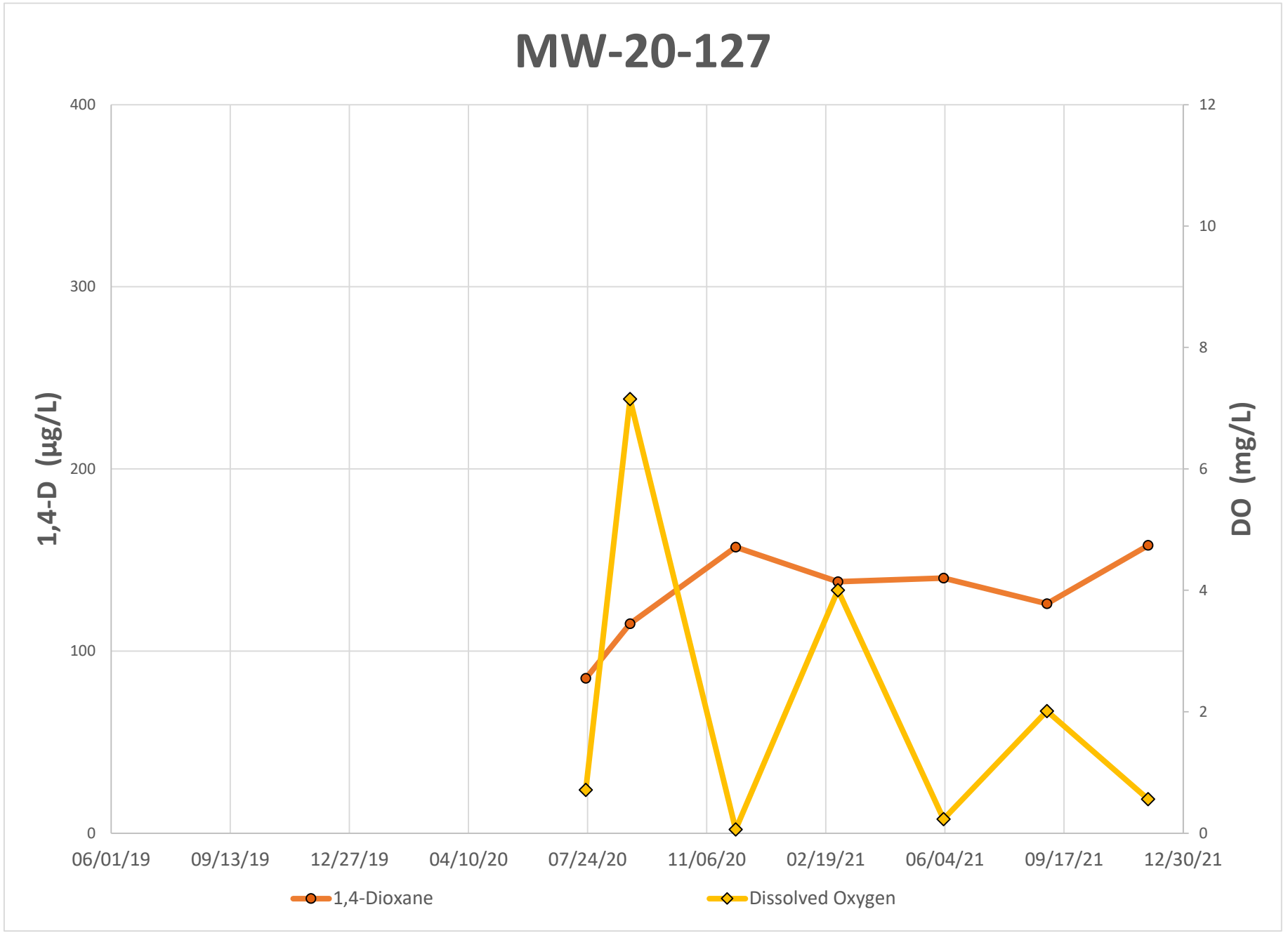
Plant 2 Transect G ROI Well
Performance Graph



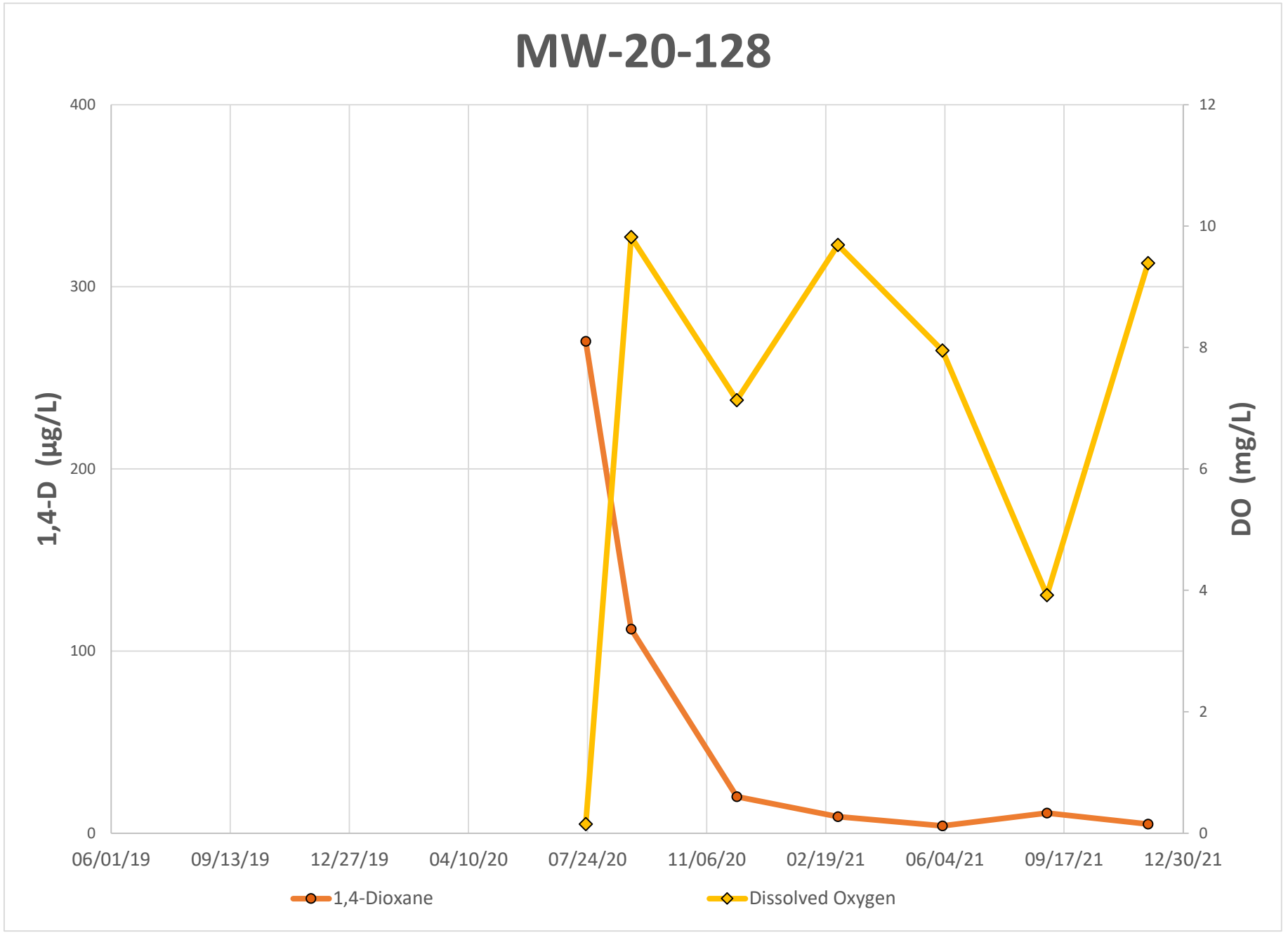
Plant 2 Transect B Upgradient Well 40 ft
Performance Graph



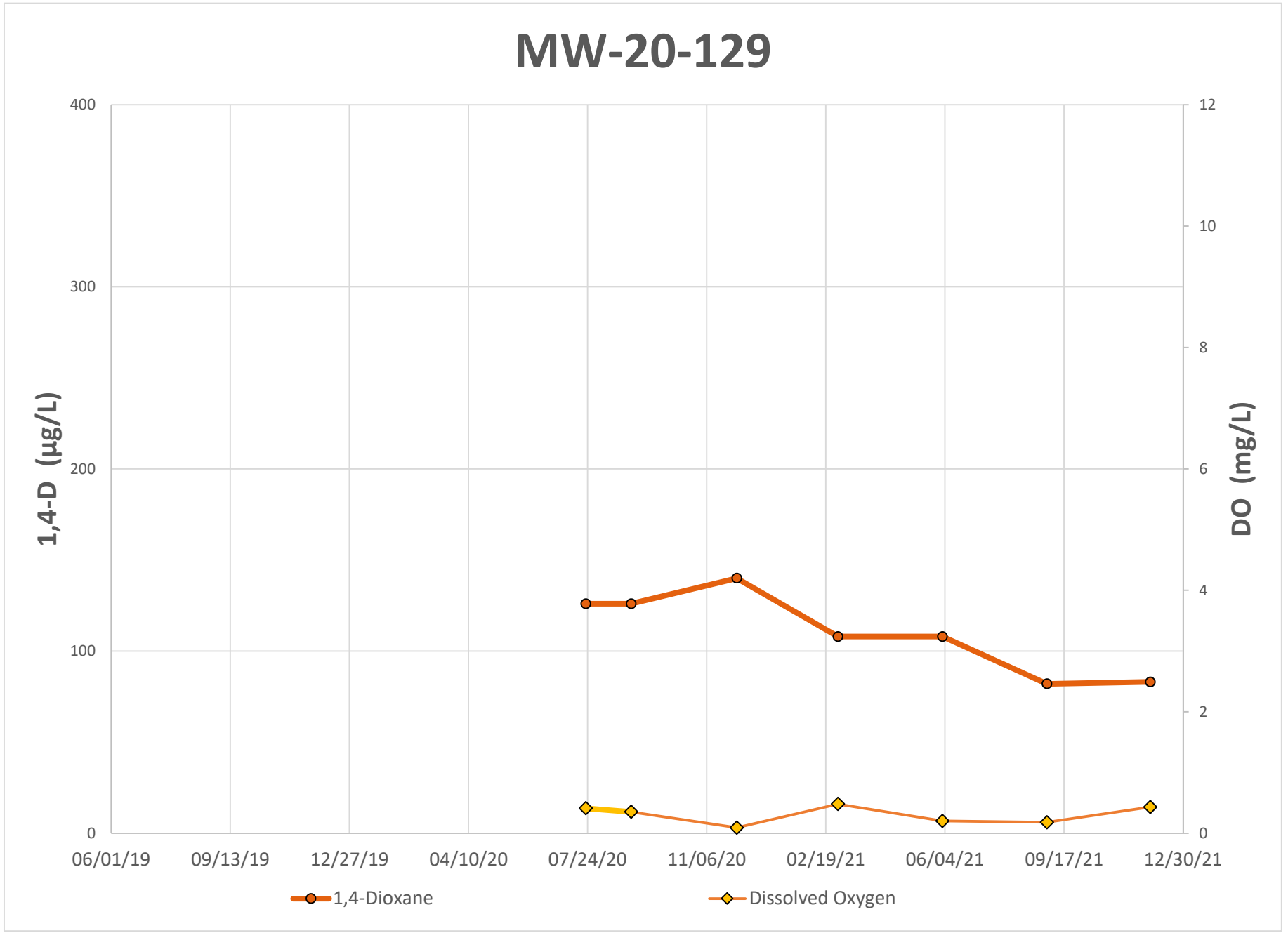
Plant 2 Transect B Downgradient Well 100 ft
Performance Graph



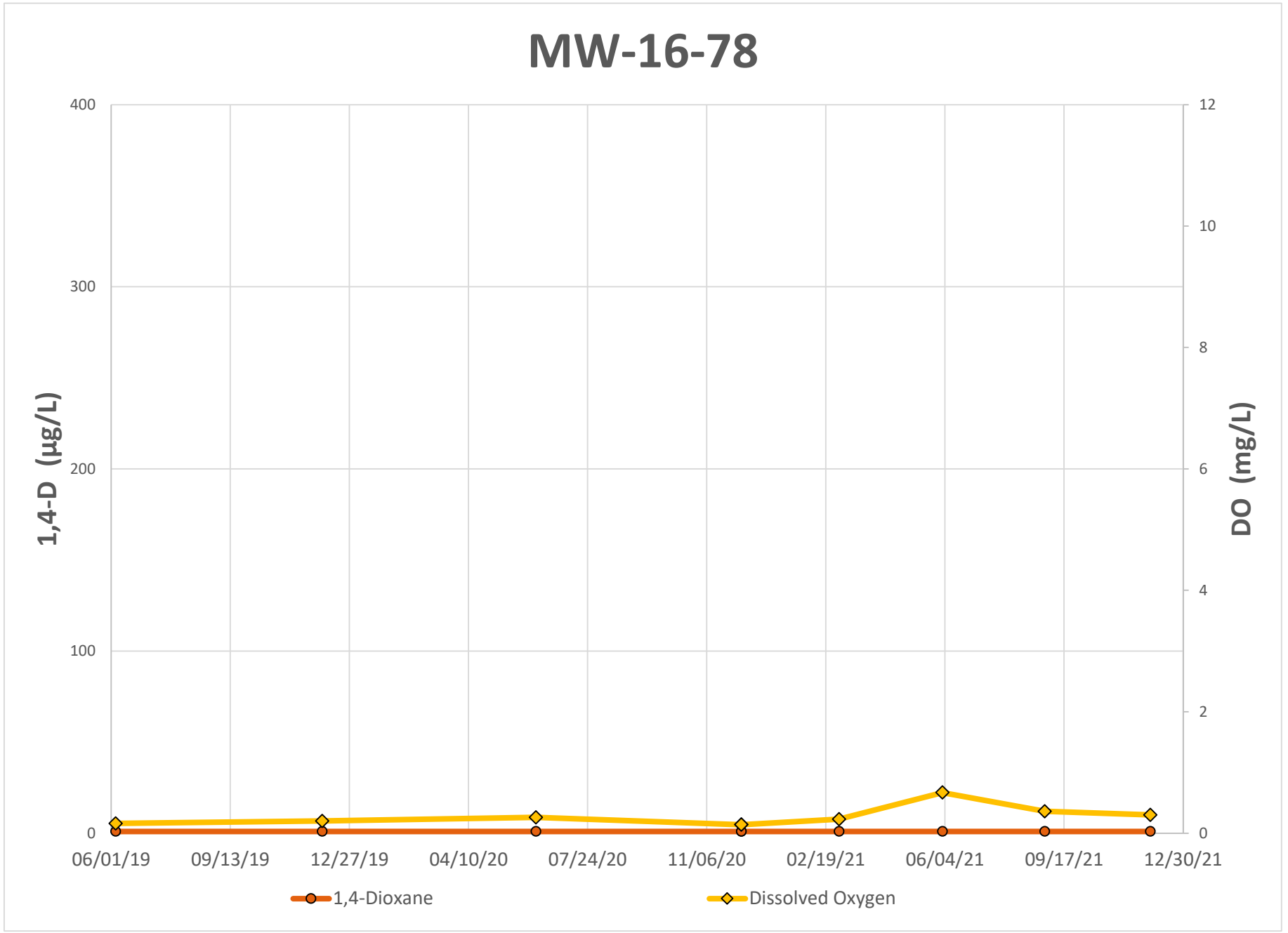
Plant 2 Transect F ROI Well
Performance Graph



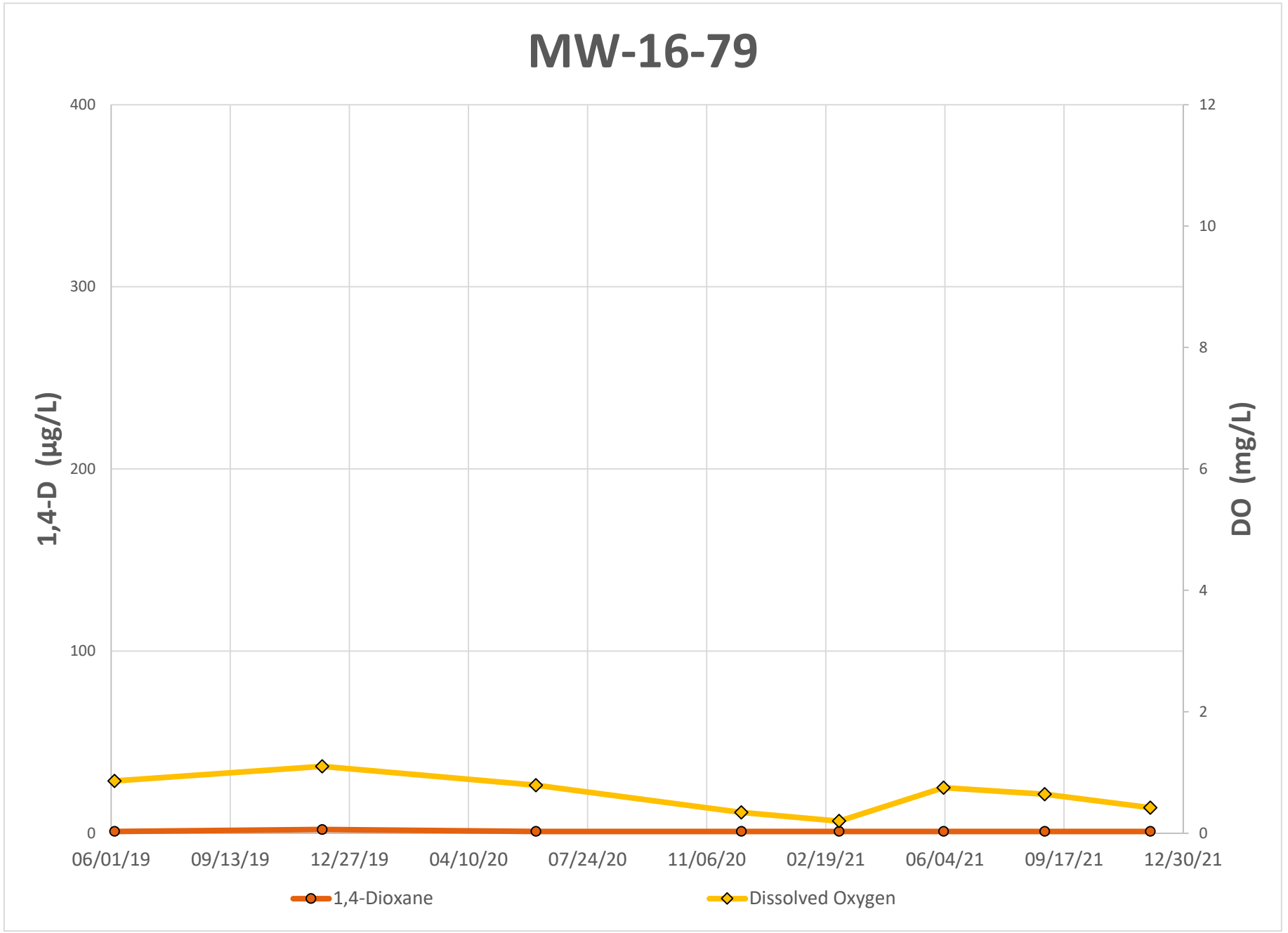
Plant 2 Transect G Upgradient Well 100 ft
Performance Graph



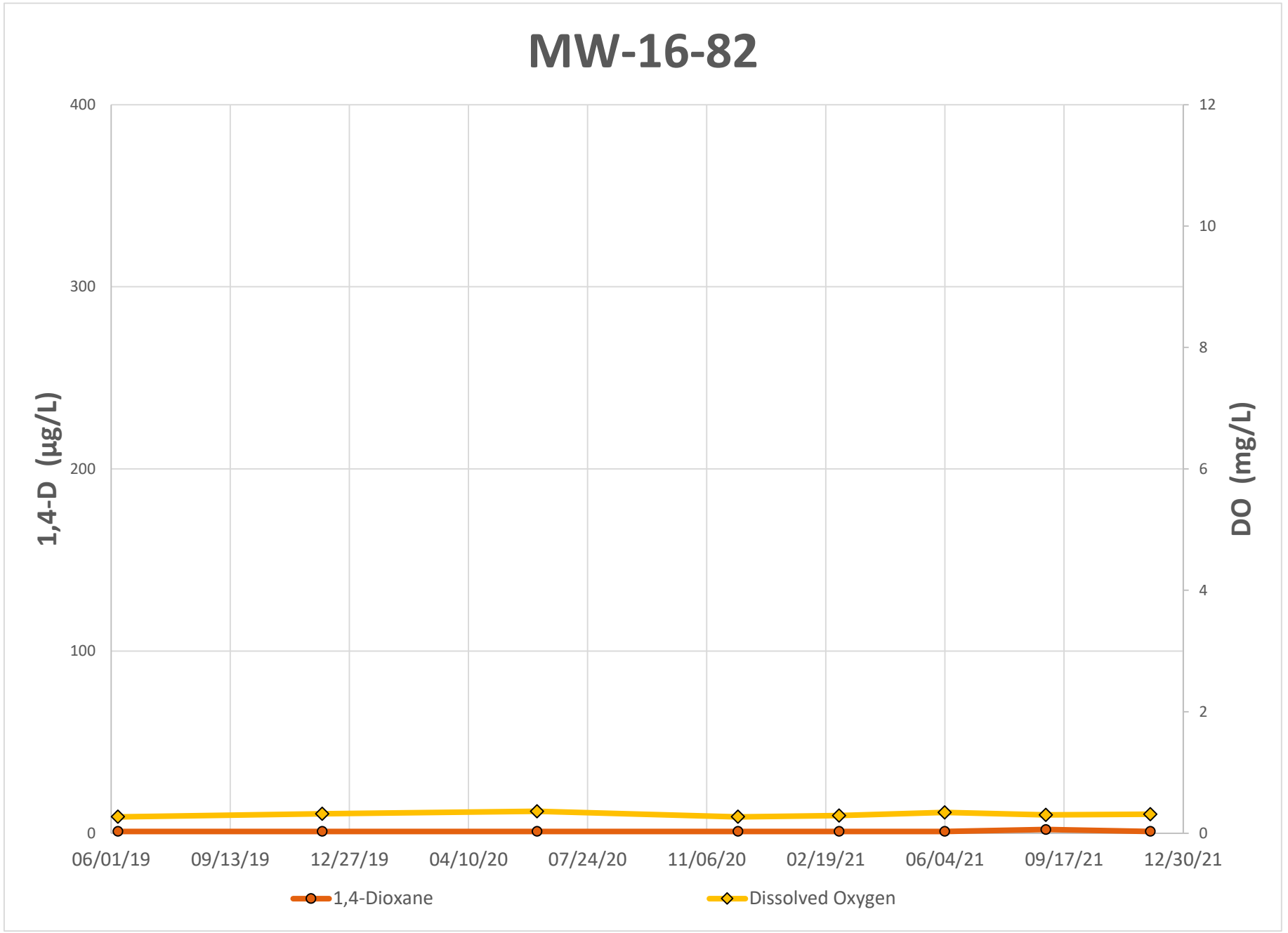
Plant 2 Transect E Downgradient Well 150 ft
Performance Graph

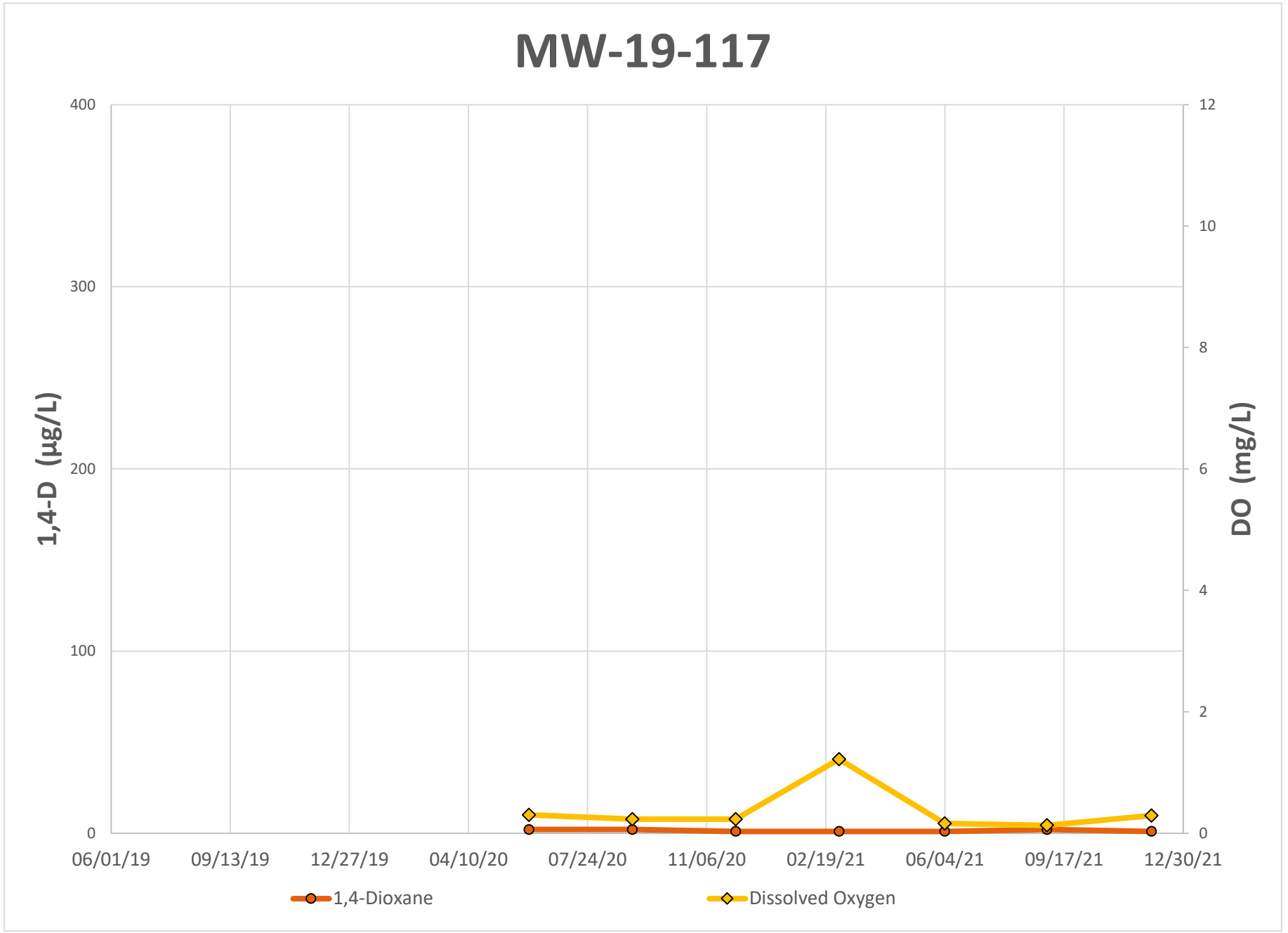


Plant 2 Transect E Downgradient Well 200 ft
Performance Graph

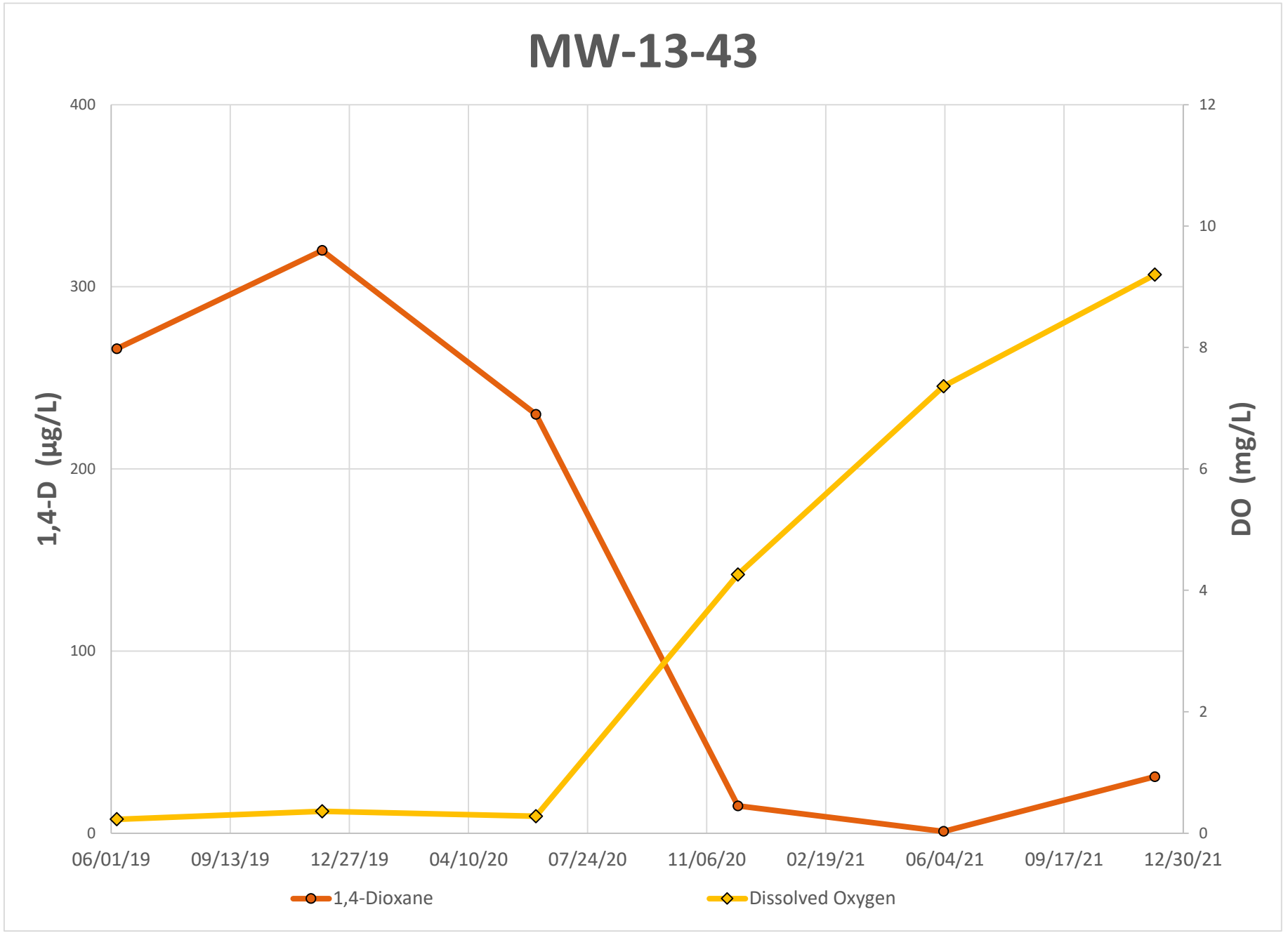


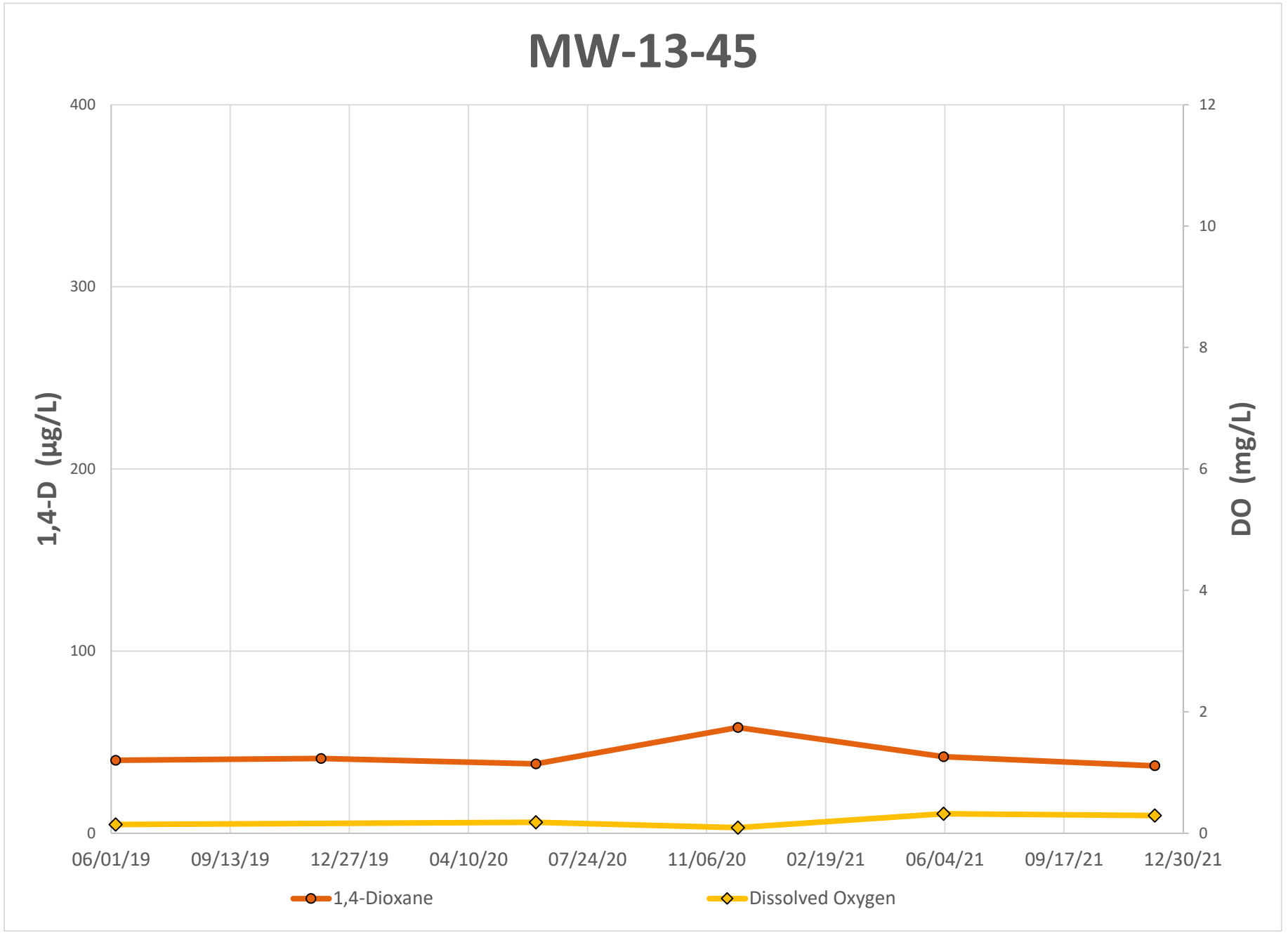
Plant 2 Transect G Upgradient Well 140 ft
Performance Graph



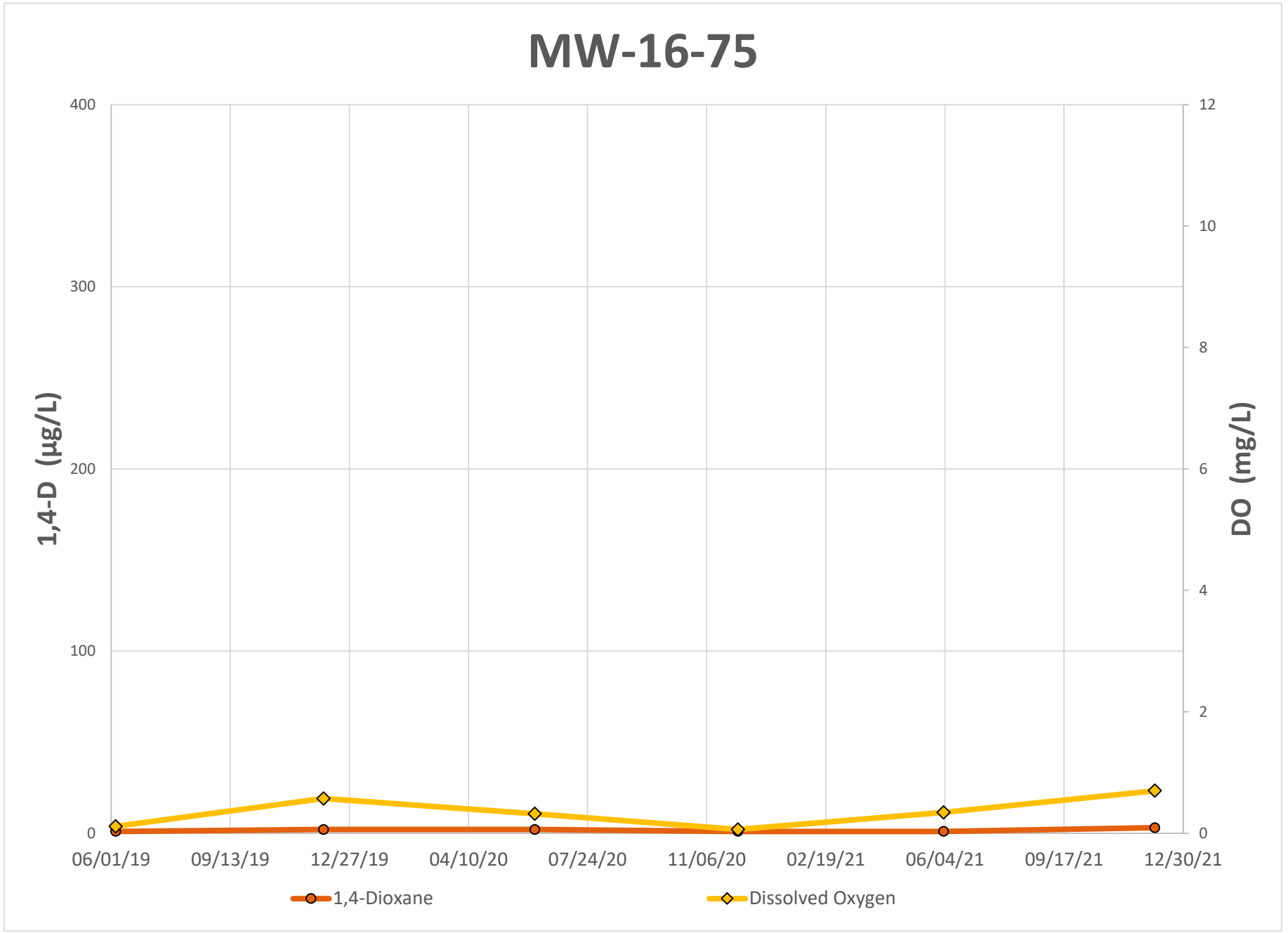

MW-19-117
1,4-D (µg/L)
DO (mg/L)
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
09/13/19
12/27/19
04/10/20
07/24/20
11/06/20
02/19/21
06/04/21
09/17/21
12/30/21
1,4-Dioxane
Dissolved Oxygen

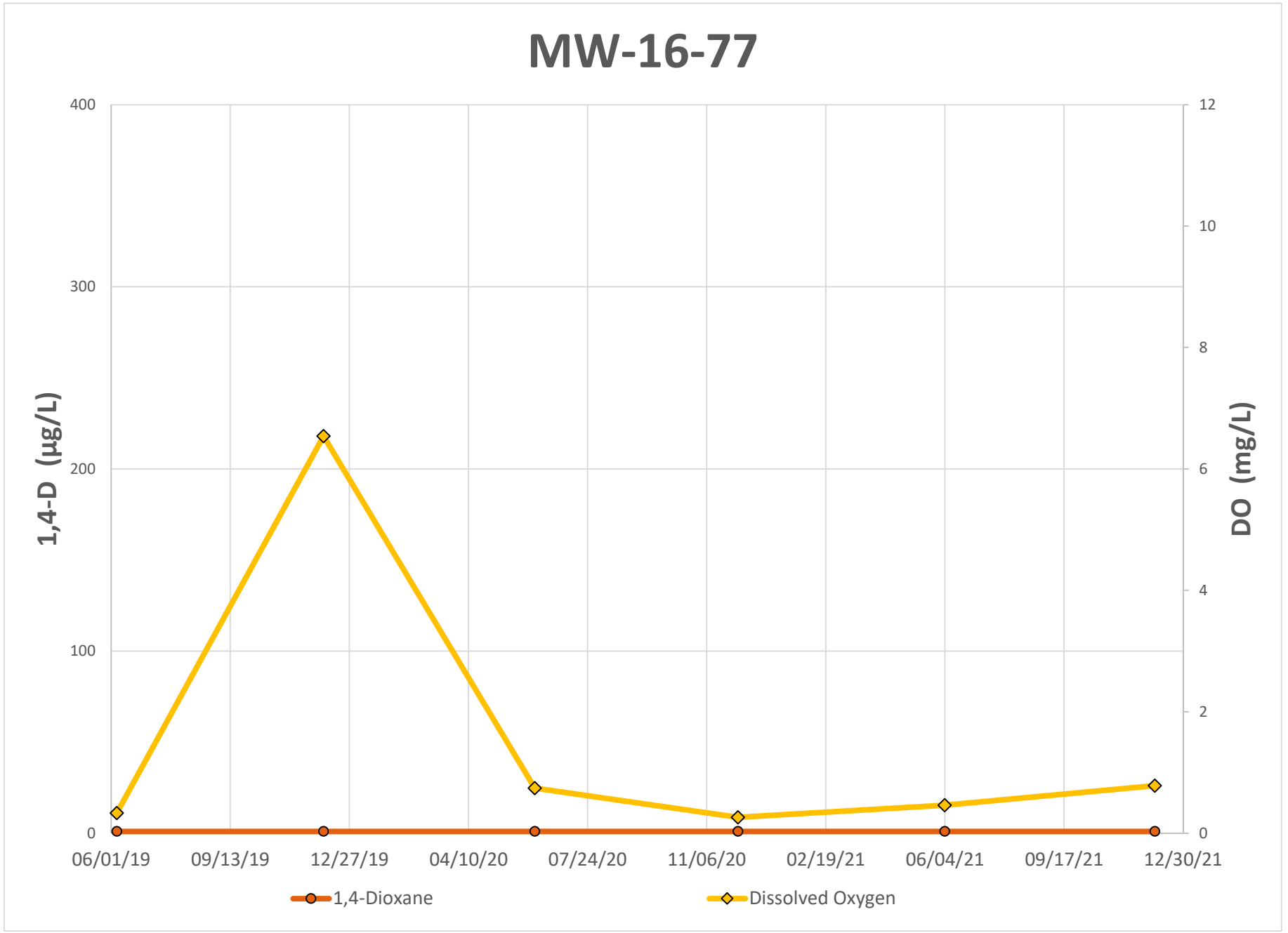
Plant 2 Transect B ROI Well
Performance Graph



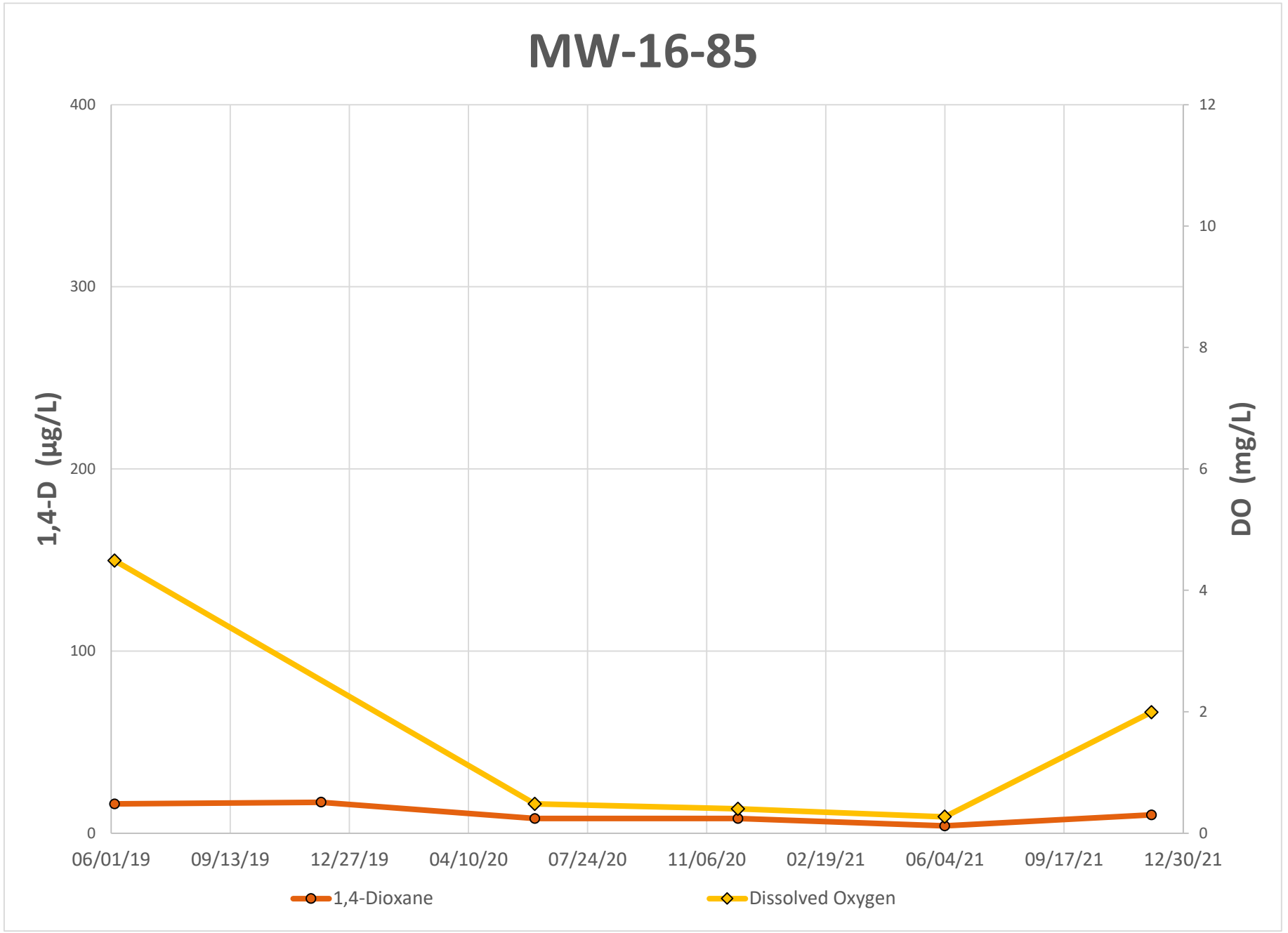

MW-13-45
1,4-D (µg/L)
DO (mg/L)
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
09/13/19
12/27/19
04/10/20
07/24/20
11/06/20
02/19/21
06/04/21
09/17/21
12/30/21
1,4-Dioxane
Dissolved Oxygen

Plant 2 Transect G Downgradient Well 200 ft
Performance Graph

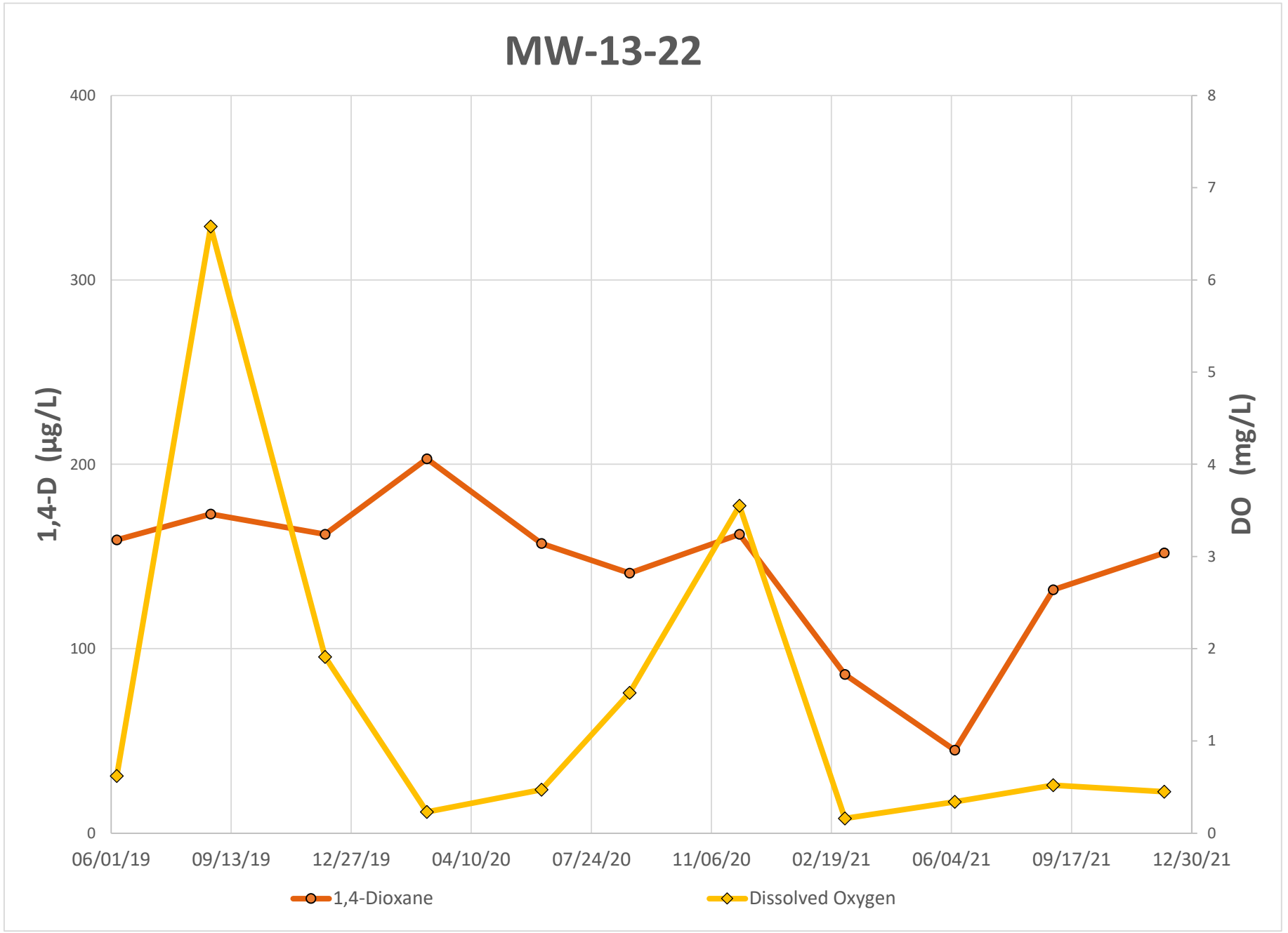



MW-16-77
1,4-D (µg/L)
DO (mg/L)
400
300
200
100
0
12
10
8
6
4
2
0
06/01/19
09/13/19
12/27/19
04/10/20
07/24/20
11/06/20
02/19/21
06/04/21
09/17/21
12/30/21
1,4-Dioxane
Dissolved Oxygen

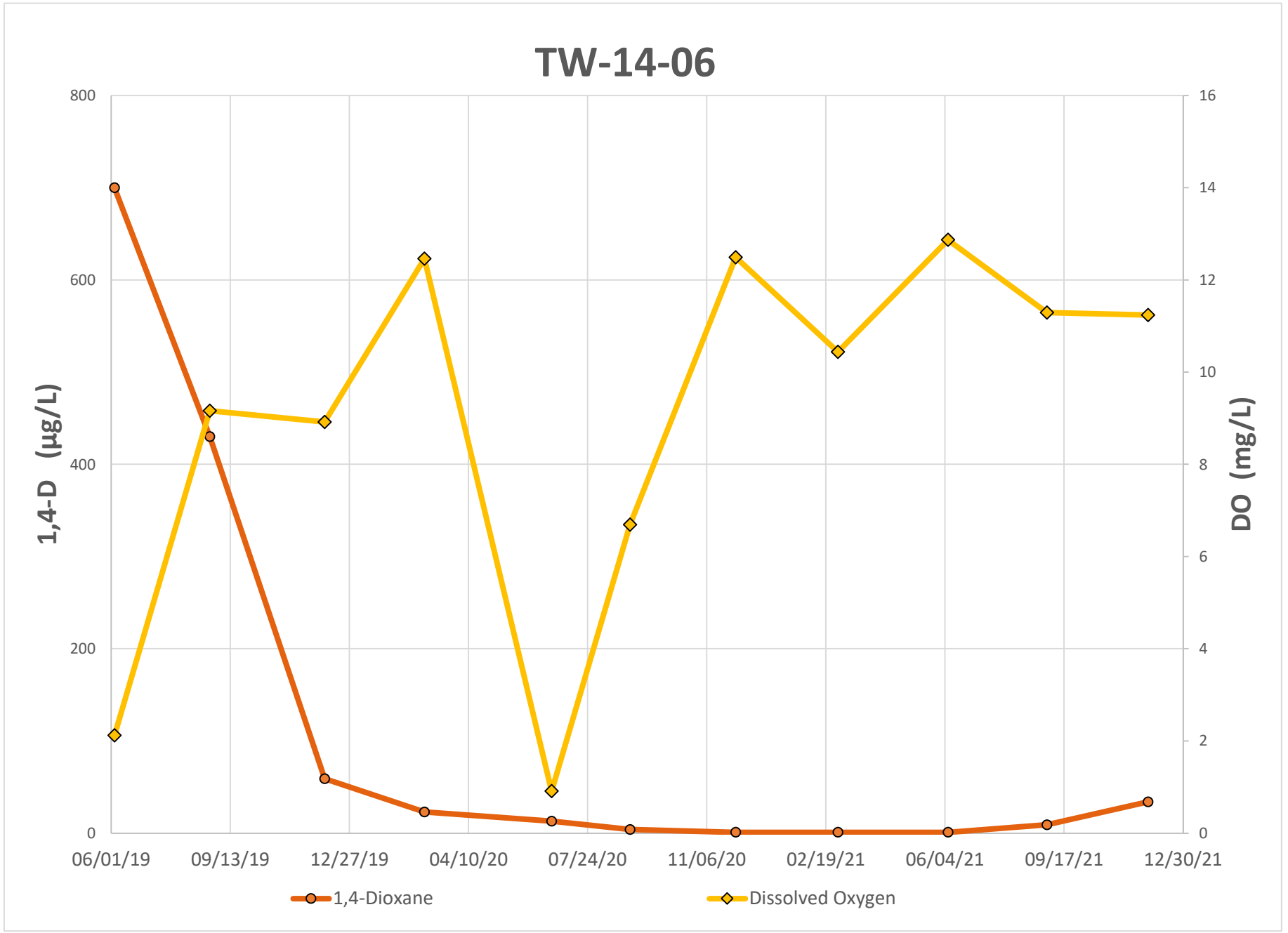
Plant 2 Transect F Downgradient Well 170 ft
Performance Graph



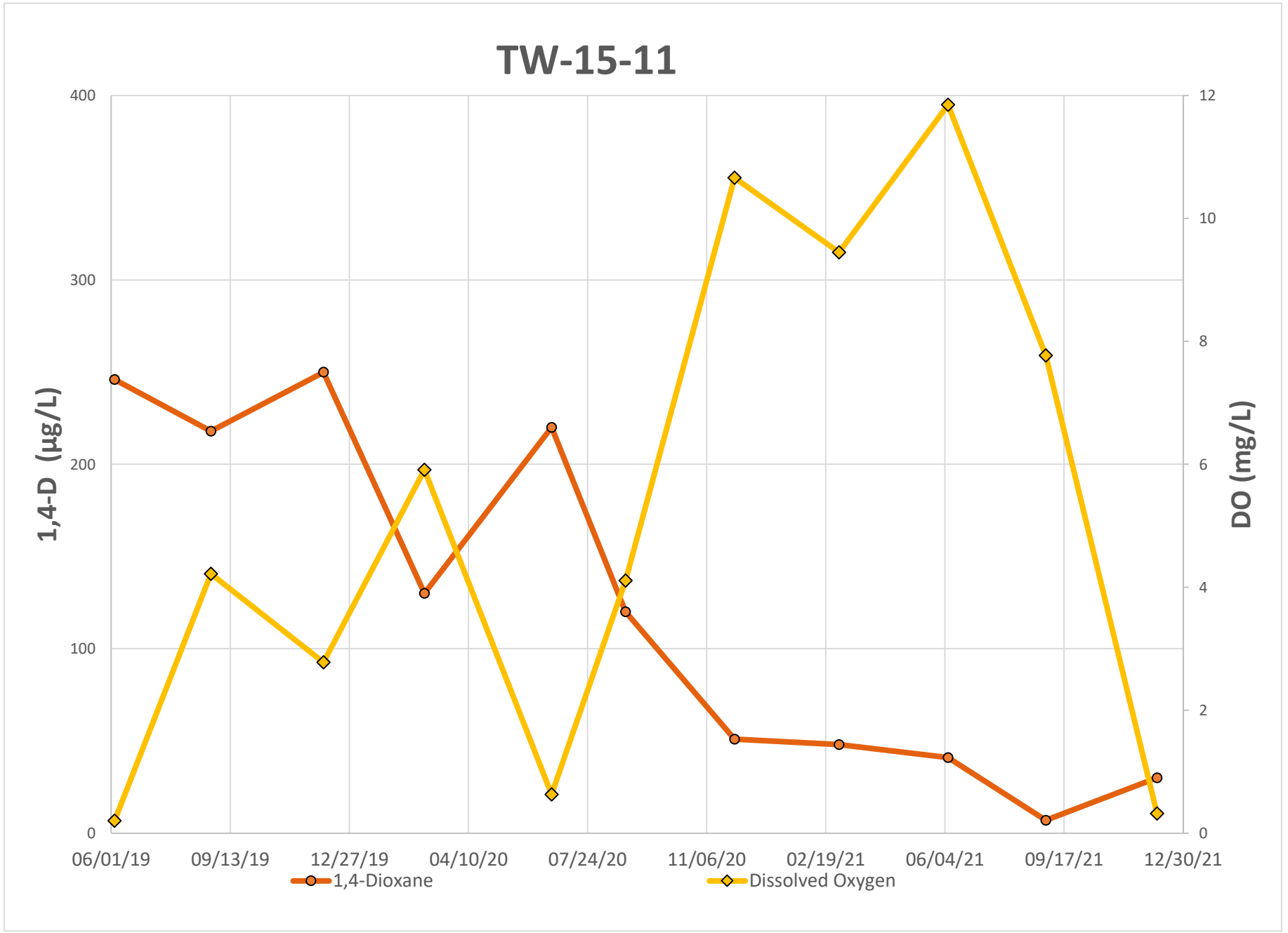
Plant 3 Transect A Upgradient Well 50 ft
Performance Graph



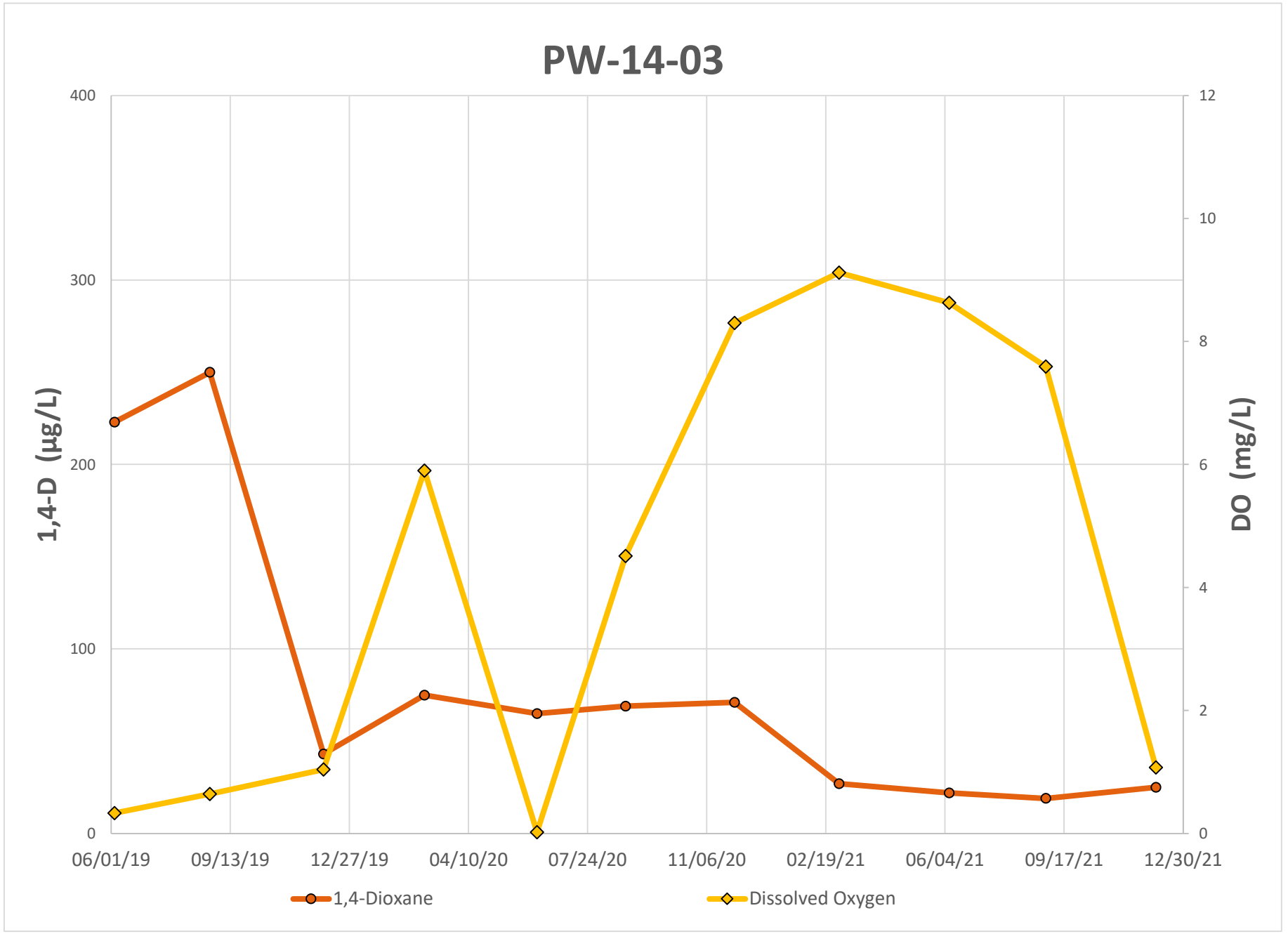
Plant 3 Transect A ROI Well
Performance Graph



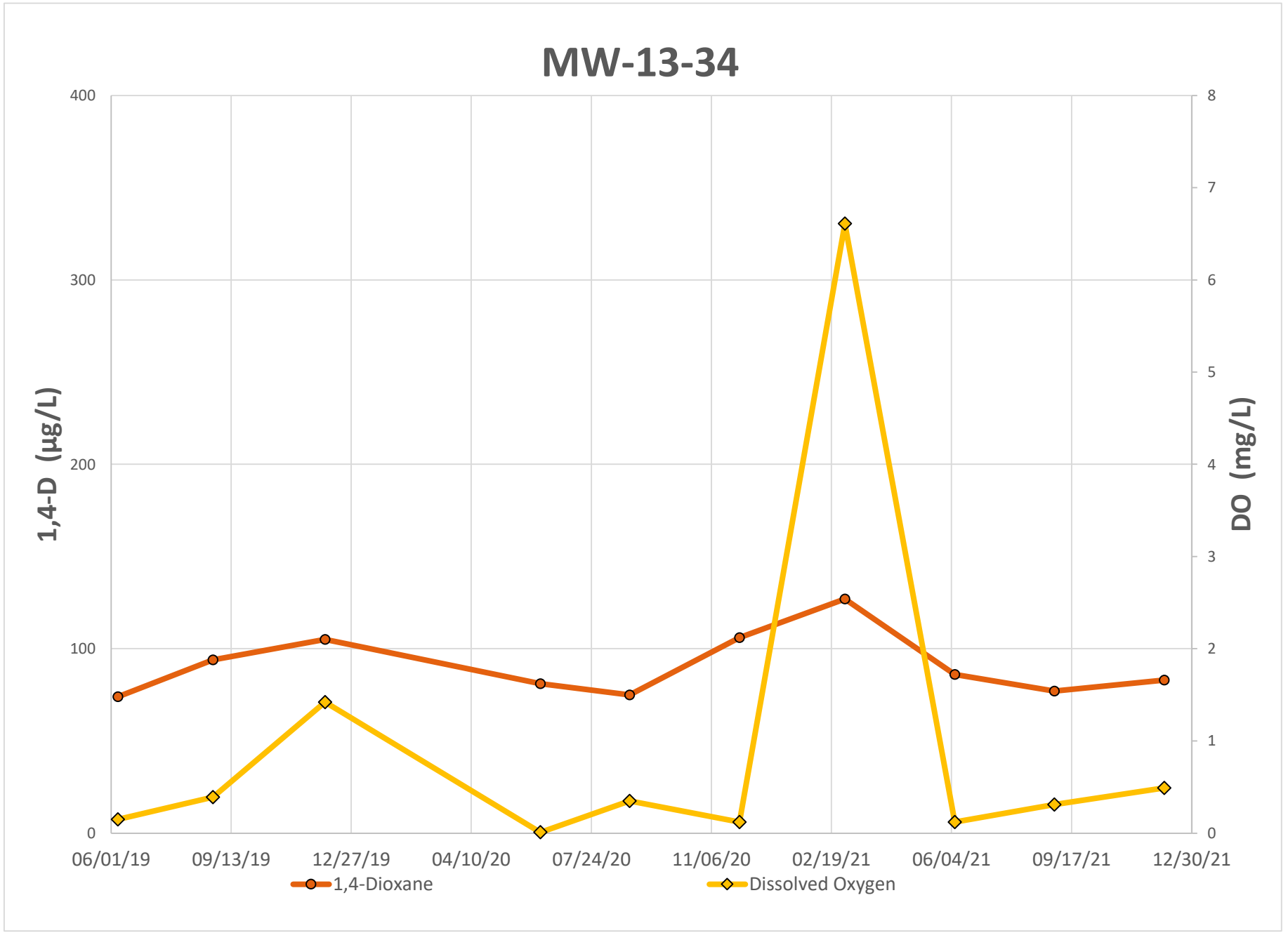
Plant 3 Transect A Downgradient Well 35 ft
Performance Graph



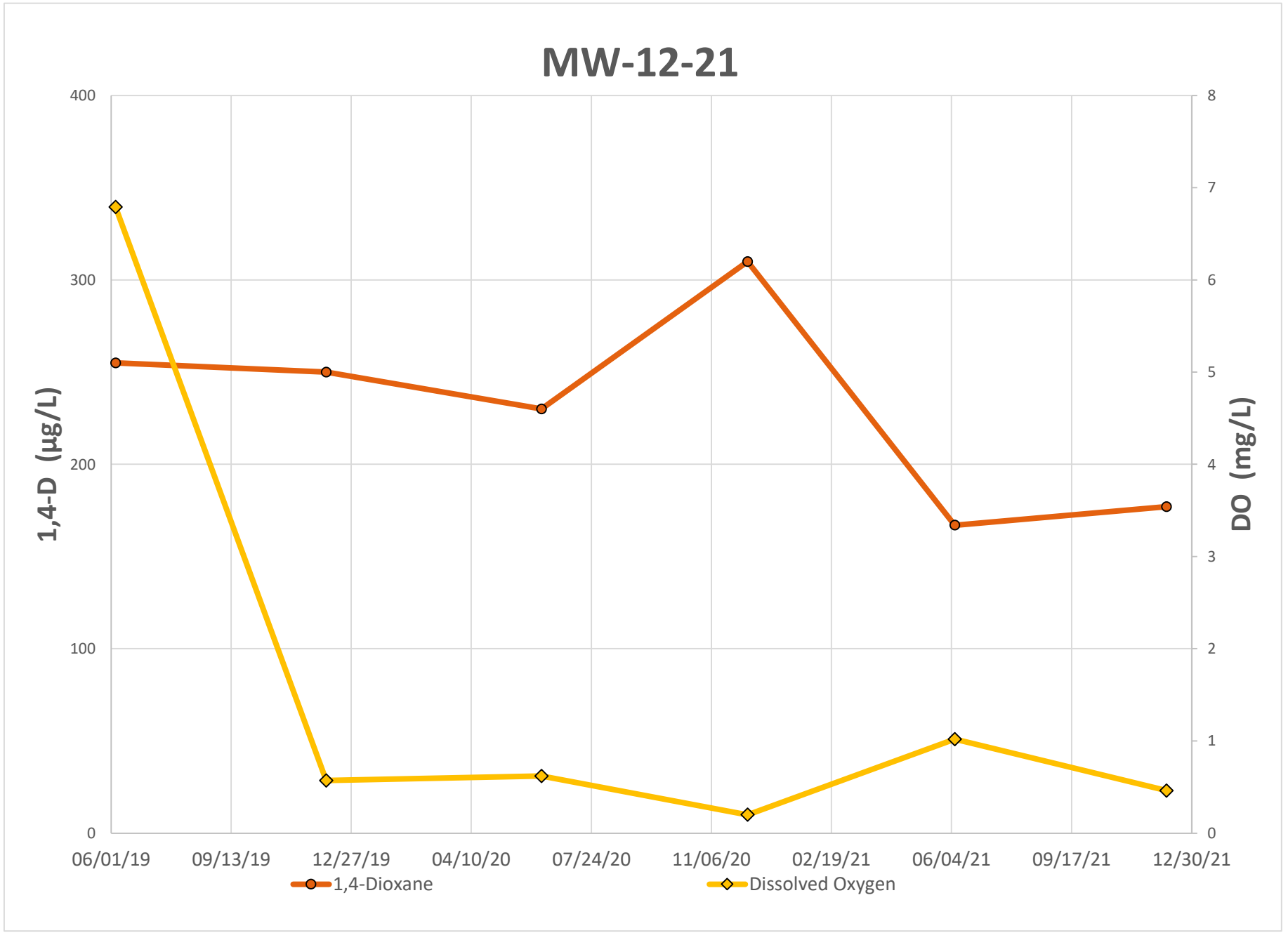
Plant 3 Transect A Downgradient Well 40 ft
Performance Graph



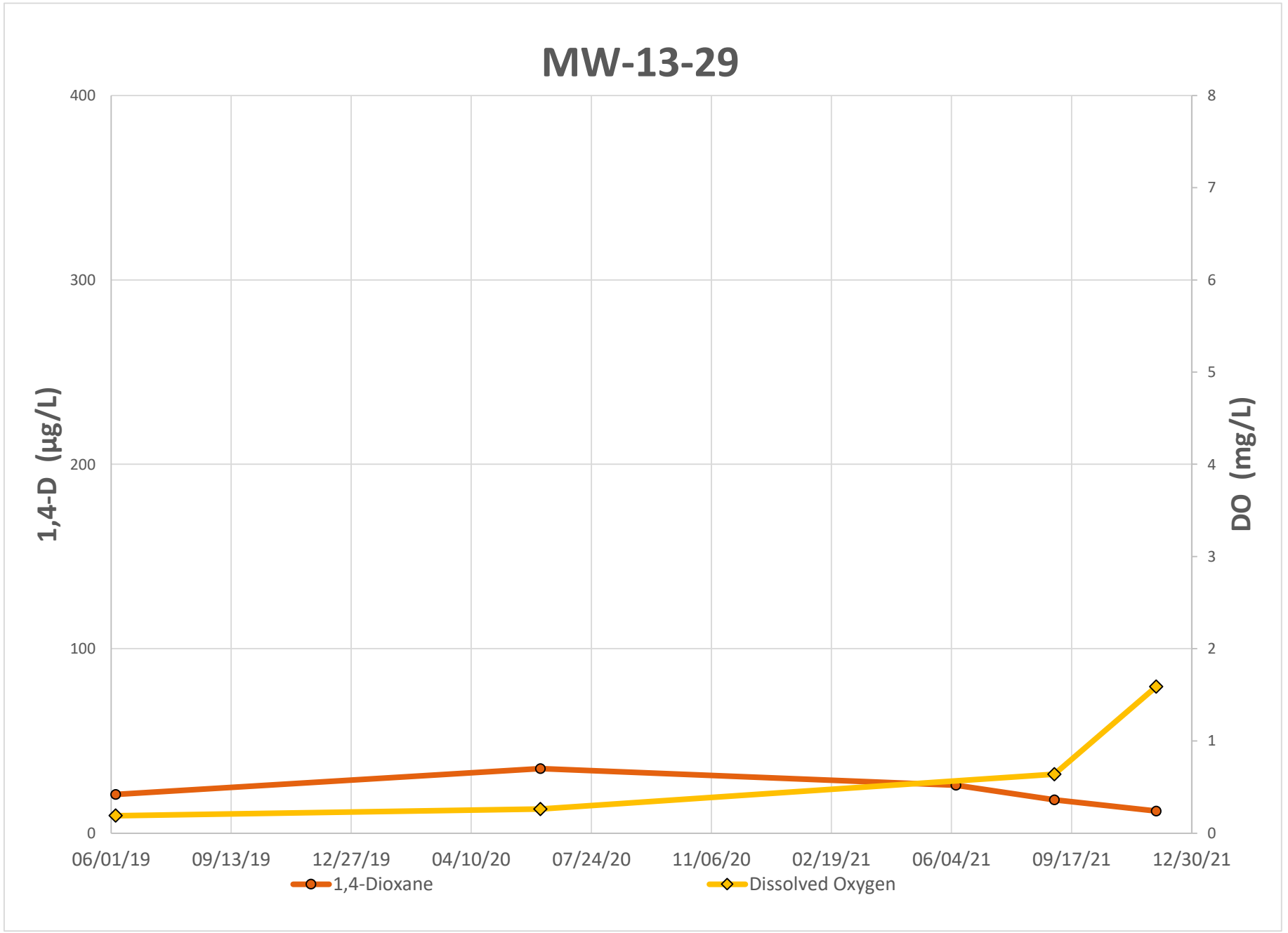
Plant 3 Transect A Downgradient Well 460 ft
Performance Graph



Plant 3 Transect A Well
Performance Graph



Plant 3 Transect A Well
Performance Graph



Plant 3 Transect A Well Performance Graph

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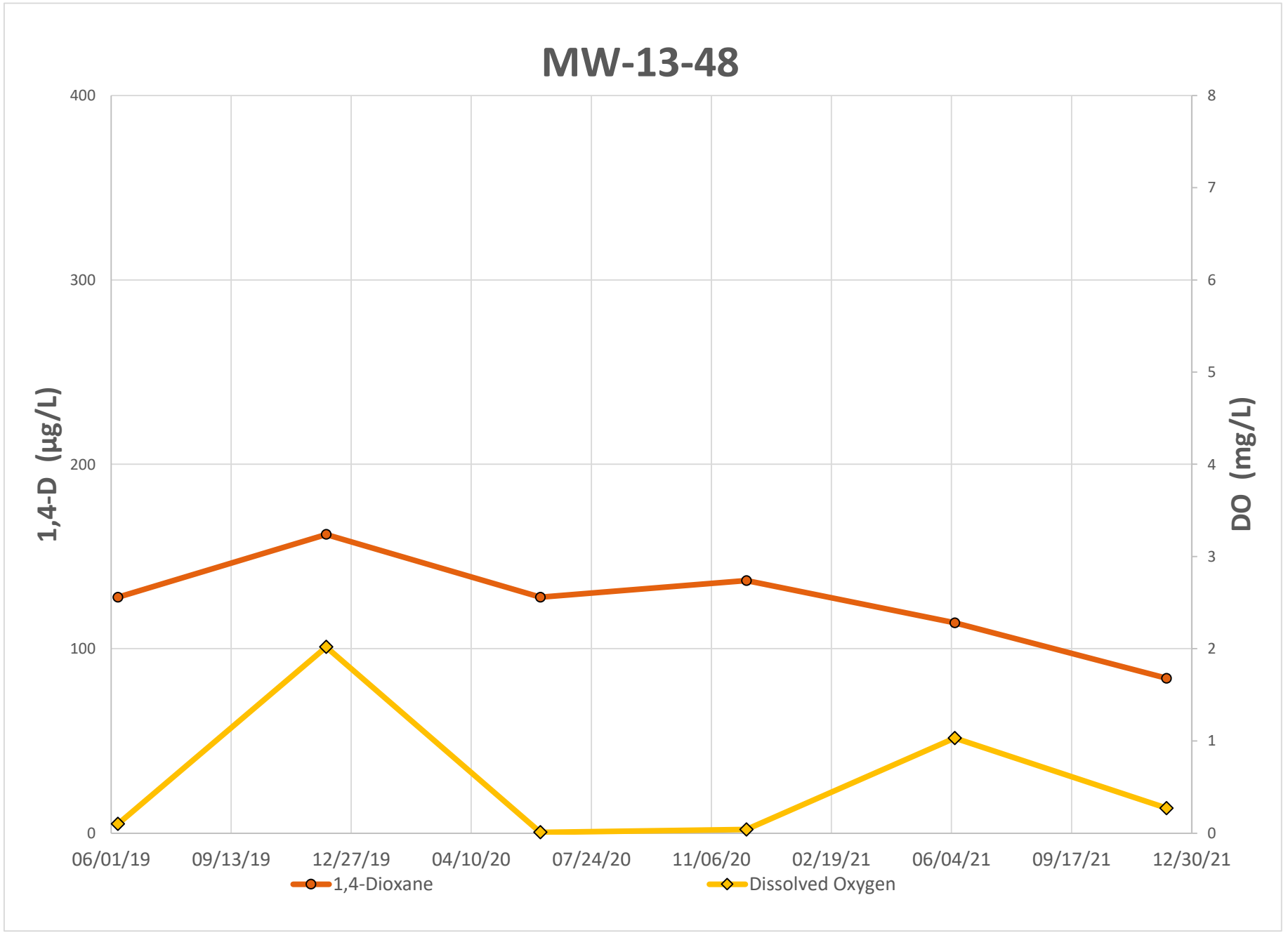

Appendix C

Treatment Cost Evaluation

Appendix C
Biosparge Performance Cost Tracking

Lower 1,4-Dioxane Biosparge Update 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

Year	Months of Operation	Yearly Operation Price	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L)
2019*	7	$23,333	39	$595
2020	12	$65,000	0	NA
2021	12	$40,000	0	NA

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

Plant 2 Operations Cost Per ug/L Treated

			P2 North - B		P2 South - G&E		P2 East - E&F	
Year	Months of Operation	Yearly Operation Price	Annual Avg Reduction in Plume Concentration	Unit Treatment Cost ($ per ug/L)	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

*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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