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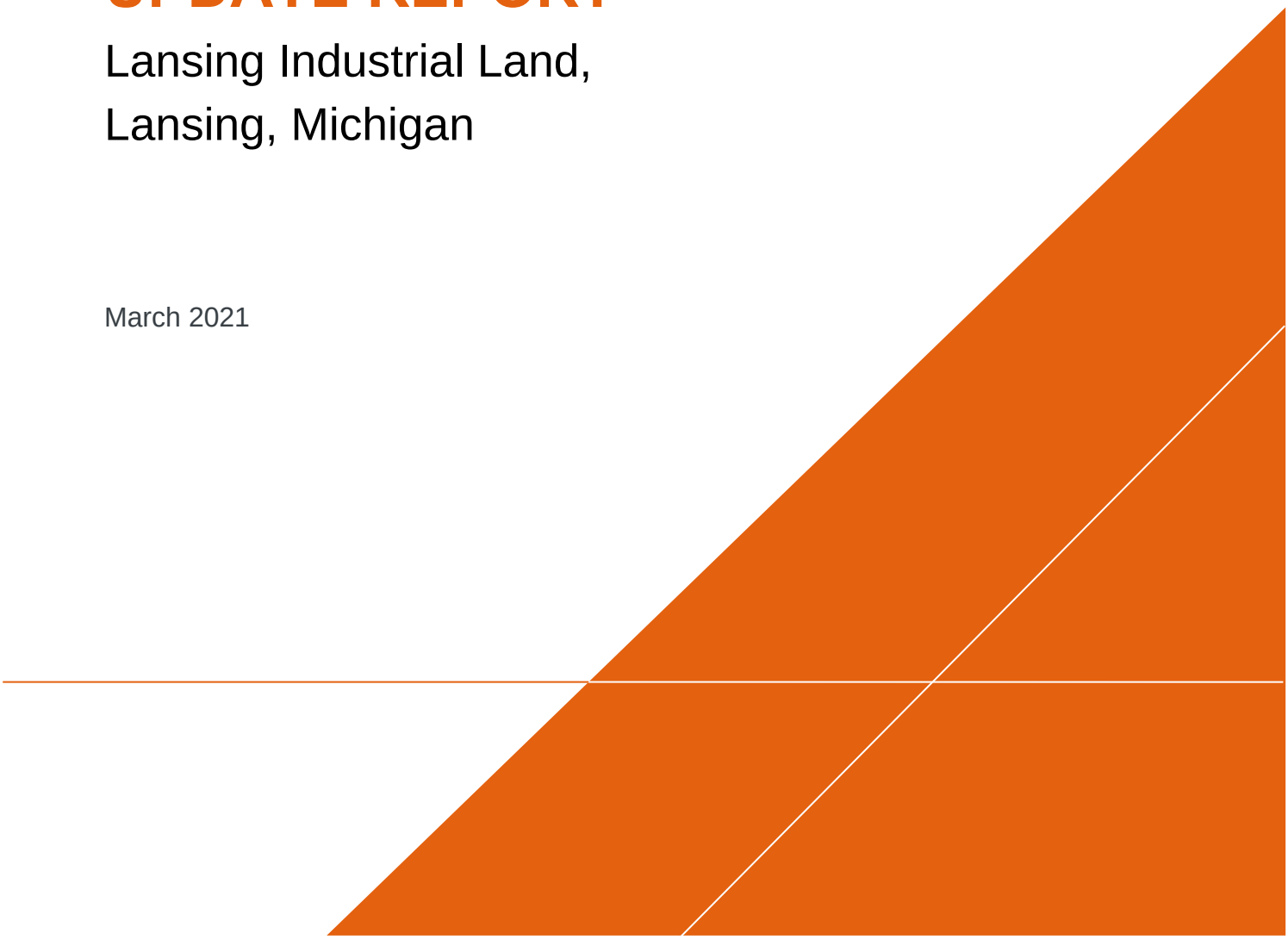
Revitalizing Auto Communities Environmental Response (RACER) Trust

LOWER 1,4-DIOXANE BIOSPARGE UPDATE REPORT

Lansing Industrial Land,
Lansing, Michigan

March 2021



LOWER 1,4-DIOXANE BIOSPARGE UPDATE REPORT

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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
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
RRV	Reference Reduction Value
Site	Revitalizing Auto Communities Environmental Response Trust Lansing Industrial Land, Lansing, Michigan

1 INTRODUCTION

On behalf of Revitalizing Auto Communities Environmental Response Trust (RACER Trust), Arcadis of Michigan, LLC (Arcadis) installed a propane biosparge remediation system at the RACER 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 as shown on **Figure 1**. 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 from start-up of the biosparge systems through December 2020.

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 will likely 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 2 system started operating in August 2020 and had a 97% operational uptime in 2020. The Plant 3 system started operating in July 2019 and operated continuously until a temporary shutdown in May to July 2020 when the piston compressor was replaced with a more durable rotary vane compressor. The Plant 3 system had 95% operational uptime during 2020, except for the two months down for the compressor replacement. Other than the new compressor installation, both systems have had minimal downtime, mostly for various maintenance activities, including lower explosive limit (LEL) calibration and maintenance, propane flow controller troubleshooting and maintenance, local power outages, and nutrient injections.

Air flow rates are controlled to 3 to 5 actual cubic feet per minute (ACFM) per biosparge well using the gate vales installed on the manifolds. Wells are 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 systems is controlled with mass flow controllers and LEL meters. Propane is dosed at 15 to 20 percent (%) LEL propane, two hours total per day per well, in one half hour increments. Most of the wells have a wellhead pressure of 8-12 pounds per square inch (psi), with the exception of three former pilot wells (AS-19-G01, AS-19-G03, and AS-19-G03) at Transect G at 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 once a week in the first month of system operation, and then once per month thereafter. O&M visits include data collection, equipment maintenance, and system checks for verifying normal system operation. Onsite data collection includes flow rates and pressures for individual wells; the system flow and pressure data are logged remotely through the programmable logic controller. At the Plant 3 system, propane tank change outs occur once a month. At the Plant 2 system, propane is delivered approximately quarterly, the most recent delivery was in November 2020. Other routine O&M includes compressor maintenance, equipment calibration, and nutrient injections. The compressors need regular maintenance related to oil, filters, drains, and valves for optimal performance. The Plant 3 compressor was serviced in August 2020, and both compressors were serviced in December 2020. Nutrient injections are performed twice a year for optimal biodegradation, once in the spring and once in the fall. At Plant 3, nutrient injections occurred October 2019 and March 2020, and then at both systems September 2020. **Appendix A** contains all O&M logs since start up at both systems.

2.3 Non-Routine O&M

There have not been any non-routine O&M activities required for the Plant 2 system since start-up. At Plant 3, non-routine O&M has included the new compressor installation in June 2020 and the tasks associated with restarting the system.

3 PERFORMANCE MONITORING RESULTS

System performance is monitored using multiple monitoring wells across the site. Both previous monitoring wells and newly installed wells are utilized. Performance monitoring wells are set within the biosparge well radius of influence (ROI), upgradient, and downgradient positioned approximately every 300 feet along the transects. **Figure 2** presents the Plant 2 performance monitoring network and **Figure 3** presents the Plant 3 performance monitoring network.

3.1 Results for 2019 through 2020

As part of the start-up procedure, dissolved oxygen (DO) profiles were collected once a week in all ROI wells and downgradient wells within approximately 115 feet of the transects during the first month of operation for each system. After the first month, DO was collected once a month for three months to verify continued gas distribution throughout the formation. DO profiles showed DO concentrations consistently greater than 3 milligrams per liter in ROI wells, indicating the design radius of influence for the sparge wells is being achieved. Dissolved oxygen monitoring results tables and graphs are included as **Appendix B**.

Groundwater samples and field parameters have been collected quarterly since system startup. **Figures 4** through **7** show the 1,4-dioxane and dissolved oxygen concentrations at performance monitoring wells. Since start up at Plant 3, there have been decreasing 1,4-dioxane concentrations at radius of influence (ROI) wells and certain downgradient wells (**Figure 4**). For example, ROI well TW-14-06 has shown a 97% decrease in 1,4-dioxane concentrations since startup. At Plant 2, there has been decreasing 1,4-dioxane concentrations and increased DO response in ROI wells (**Figures 5**, **6** and **7**). Based on local groundwater velocities additional time is required to see farther downgradient changes in 1,4-dioxane. Performance monitoring data including 1,4-dioxane, DO, and nutrients is summarized on **Table 1**.

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) and the upcoming 2020 Annual Groundwater report.

3.2 Performance Evaluation

Plant 3 results demonstrate significant treatment within the ROI of the biosparge transect and at downgradient wells approximately 50 to 60 feet beyond the transect. The next farthest downgradient well, MW-13-34, approximately 460 feet from the Plant 3 transect, has not yet shown a trend to suggest treated groundwater has arrived at that distance. Results from the Plant 3 downgradient performance monitoring wells suggests that the groundwater flow velocity within the Grand River formation is within the expected design range of 70 to 540 feet per year.

The Plant 2 system has shown treatment in all ROI monitoring wells but has not been running long enough to see downgradient treatment.

As discussed in the Corrective Action Objective section of this report, 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 EGLE);
- Further reduction in groundwater concentrations require extra ordinary efforts, (i.e. the system reaches a point of diminishing returns); or,
- The short and long-term objectives have been 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.

The following sections discuss the 1,4-dioxane concentration trends along the core of the plume and the diminishing returns evaluation.

3.2.1 Trends

As show on **Figures 4** through **7** and trend graphs presented in **Appendix C**, all wells monitored as part of the biosparge performance plan are showing a stable to decreasing trend, except for MW-19-124 and MW-20-127. Monitoring well MW-19-124 is approximately 100 feet from the biosparge transect and effects from the biosparge system are not expected to be observed for some time. This well is upgradient to Transect E and monitors leakage from the perched zone and potential concentrations of 1,4-dioxane migrating toward the biosparge treatment transect. Monitoring well MW-20-127 is located 100 feet downgradient of Transect B. It is not expected that MW-20-127 would have been affected by the biosparge system within the 4 months of operation.

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.

3.2.2 Diminishing Returns Evaluation

This section of the report details a quantitative process for evaluating when the biosparge system has reached a point of diminishing returns. An initial framework for the evaluation of diminishing returns has been laid out in this report; however it is recognized that it will likely be appropriate to update this framework, 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.

In order to define the point of diminishing returns, biosparge performance monitoring wells are grouped based on transect and proximity, to allow for evaluation of localized system effectiveness. An average concentration for each group of wells is calculated after each sampling event (**Table 2**). 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. 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). All future reductions will be compared against the RRV. Diminishing returns is achieved when 12-month reduction is less than 20% of the RRV or less than 30 µg/L, whichever is greater. The 30 µg/L threshold represents approximately 10% to 20% of the average plume concentration which exceeds what could be considered normal fluctuations in the plume and above which would be representative of treatment. **Table 2** presents the basis for diminishing return evaluations that will be used after the first 3 years of operation to establish the RRV and compare against it.

4 RECOMMENDATIONS

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. As performance monitoring data is collected and evaluated, actions will be recommended to EGLE as appropriate.

There are no recommended changes to the biosparge system operations currently. The wells associated with both systems will continue to operate full-time. Wellhead pressure and performance at the three former pilot test wells (AS-17-G01, AS-17-G02 and AS-17-G03) on Transect G will continue to be monitored to determine if future rehabilitation of these wells is warranted. Currently, even though their wellhead pressure is slightly higher than the other biosparge wells, these three wells are operating within the design range, show acceptable DO distribution and good 1,4-dioxane degradation; therefore no additional action is recommended at this time. Monitoring in the central portion of Plant 2 (MW-19-115, MW-19-116, MW-19-117, MW-16-82, MW-15-72) where biosparge Transect C was originally planned did not result in information that suggests any part of Transect C needs to be installed at this time. This area will continue to be monitored and if Transect C is not warranted after the first year of operation of the Plant 2 system, the blank casings that are currently installed will be recommended for abandonment.

Operational adjustments will be recommended if future performance monitoring results justify them. Operational adjustments could include increasing or decreasing flow to certain wells, additional bioaugmentation or biostimulation, or idling portions of a transect that are no longer exceeding 12-month reductions more than 20% of the RRV or 30 µg/L. When all or portions of the biosparge system are idled, monitoring will continue to assess rebound. In addition to the ongoing adaptive operation, the biosparge system will be reviewed every 5 years to assess system performance and alignment with the overall Site objectives at that time. The first 5-year review is planned to be after receipt of third quarter 2025 monitoring data.

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.

TABLES

Table 1
Biosparge Performance Monitoring Summary

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
DUP-01	2	03/02/20	0.4	NA	NA	NA	2700
		09/02/20	0.24	NA	NA	NA	55
		12/02/20	0.3	NA	NA	NA	83
DUP-02	2	06/05/20	0.26	NA	NA	NA	2700
		09/02/20	0.16	NA	NA	NA	590
		12/03/20	0.23	NA	NA	NA	1070
		03/04/20	0.31	NA	NA	NA	41
DUP-03	2	06/04/20	0.63	NA	NA	NA	58
DUP-04	2	06/03/20	0.39	NA	NA	NA	160
DUP-05	2	12/07/20	0.14	NA	NA	NA	1
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
MW-15-72	2	05/16/16	0.11	NA	NA	NA	190 Y
		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	290
		01/10/18	0.27	NA	NA	NA	NA
		02/14/18	0.21	NA	NA	NA	230
		03/08/18	0.4	NA	NA	NA	324
		04/09/18	0.19	NA	NA	NA	220
		05/08/18	0.25	NA	NA	NA	260
		09/05/18	0.06	NA	NA	NA	240
		12/05/18	0.3	NA	NA	NA	290
		02/27/19	0.68	NA	NA	NA	28
		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
		12/03/20	0.09	NA	NA	NA	270
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

Table 1
Biosparge Performance Monitoring Summary

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
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
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
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
		06/05/20	0.26	NA	NA	NA	3100
		09/02/20	0.16	NA	NA	NA	500
		12/03/20	0.23	NA	NA	NA	1930
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
		09/01/20	0.39	NA	NA	NA	57
		12/01/20	0.1	NA	NA	NA	81
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
		12/01/20	0.11	NA	NA	NA	106
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
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
		12/02/20	0.3	NA	NA	NA	82
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
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

Table 1
Biosparge Performance Monitoring Summary

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
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
MW-19-122	2	12/03/19	0.97	NA	NA	NA	43
		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
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
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
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
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-20-128	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
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
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
		09/02/20	7.57	NA	NA	NA	43
		12/03/20	1.15	NA	NA	NA	97
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
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

Table 1
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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
DUP-01	3	08/27/19	0.64	<0.5	1.1	0.11	245
DUP-03	3	08/31/20	6.69	<0.5	2.2	1.1	4
		12/02/20	12.49	<0.5	19.1	24.0	1
DUP-06	3	12/06/19	8.92	NA	NA	NA	61
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
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
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
		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
		08/27/20	4.51	NA	NA	NA	69
		12/01/20	8.3	NA	NA	NA	71
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
		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
		12/02/20	12.49	<0.5	18	22.0	1
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

NA = Not Analyzed
mg/L = Milligrams per liter
ug/L = Micrograms per liter
[ ] = Indicates duplicate sample
J = Indicates an estimated value below laboratory reporting limit
Y = Sample diluted due to high initial concentrations
< = The compound was analyzed for but not detected.

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)*
Descriptor		TW-14-06	TW-15-11	PW-14-03	MW-13-34		
Distance (ft)		ROI 14	DG 48	DG 56	DG 460		
Year	Date						
1	6/4/2019	700	246	223	74	311	--
	8/27/2019	430	218	250	94	248	--
	12/6/2019	59	250	43	105	114	--
	3/3/2020	23	130	75		76	--
2	6/23/2020	13	220	65	81	95	216
	8/27/2020	4	120	69	75	67	181
	12/1/2020	1	51	71	106	57	57

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter

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)
Descriptor		TW-15-12	PW-14-02	MW-20-127	MW-19-116		
Distance (ft)		ROI	DG	DG	DG		
Year	Date	8	54	102	295		
1	3/3/2020	220			60	140	--
	6/2/2020	210	160	85	61	129	--
	8/31/2020	100	43	115	54	78	--
	12/1/2020	34	97	157	82	93	--
2							

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter

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)*
Descriptor		TW-14-02	MW-19-123	MW-16-74	MW-19-121		
Distance (ft)		ROI	DG	DG	ROI		
Year	Date	2	70	75	2		
1	3/3/2020	470	76	2	119	167	--
	6/23/2020	410	75	2	115	151	--
	9/7/2020	3	51	3	17	19	--
	12/1/2020	1	39	1	4	11	--
2							

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter

Table 2
Biosparge Performance Tracking

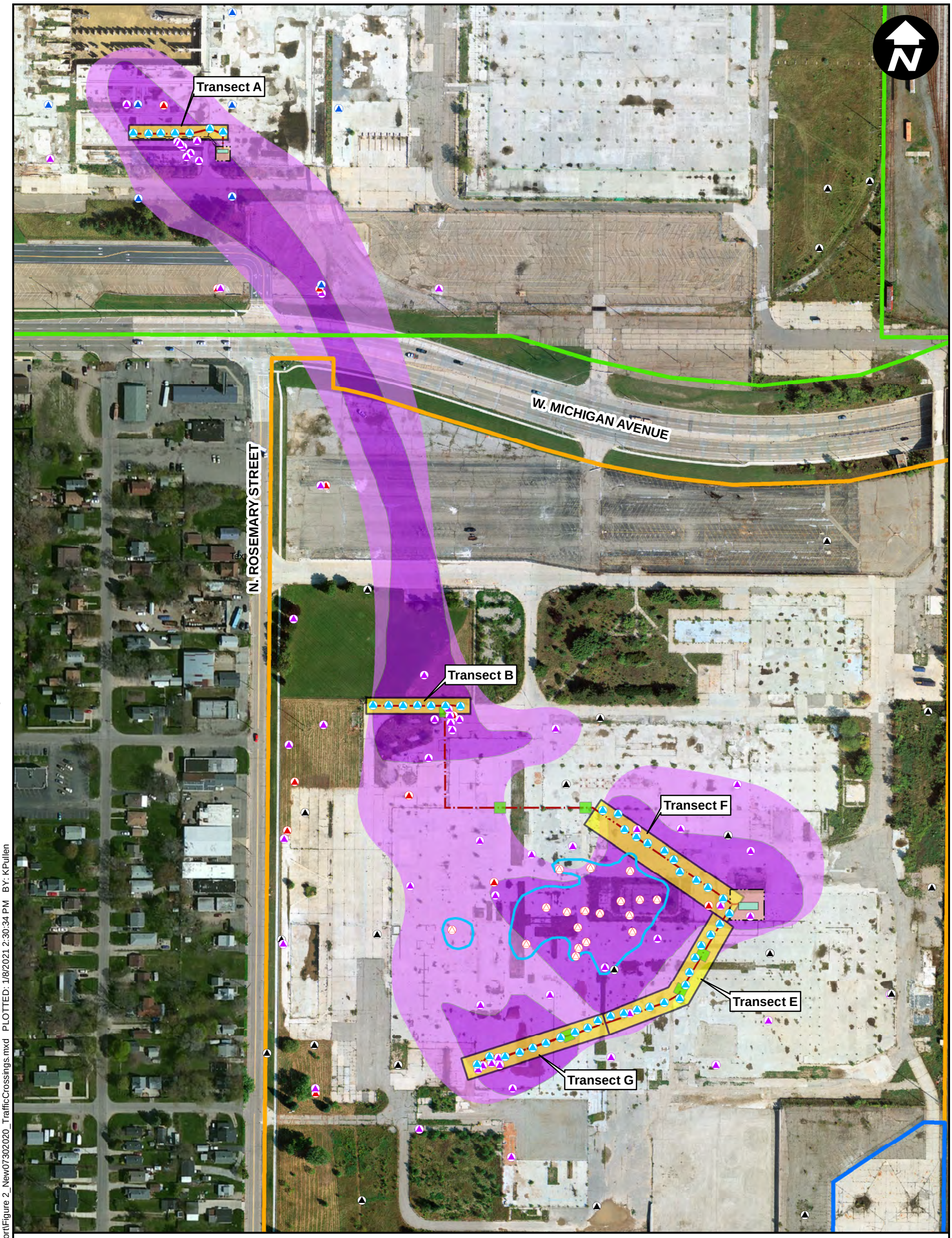
Lower 1,4-Dioxane Biosparge Update Report
Lansing Industrial Land, Lansing, Michigan

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	Average (µg/L)	Average 12-month Reduction (µg/L)*
Distance (ft)		ROI 13	ROI 44	ROI 17	DG 69	DG 115		
Year	Date							
1	3/3/2020	148	198		66	99	128	--
	6/23/2020	152	184	270	58	94	152	--
	9/7/2020	98	137	112	57	88	98	--
	12/1/2020	18	28	20	81	106	51	--
2								

Notes:
All concentrations are in micrograms per liter.
ROI = radius of influence
DG = downgradient
UG = upgradient
µg/L = micrograms per liter

FIGURES



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

LNAPL PLUME
SYSTEM BUILDING
FENCE
FENCED AREA
LOWER 1,4-DIOXANE IMPACTS > 72 µg/L
LOWER 1,4-DIOXANE IMPACTS > 7.2 µg/L

1-INCH CONVEYANCE HOSE
HOSE
TRAFFIC CROSSING

PLANT BOUNDARIES
- PLANT 2
- PLANT 3
- PLANT 6

0 200 400
SCALE IN FEET

DRAFT

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

BIOSPARGE SITE 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 2_New07302020_TrafficCrossings.mxd PLOTTED: 1/8/2021 2:30:34 PM BY: KPullen

W. SAGINAW STREET

N. ROSEMARY STREET

MW-14-63
MW-12-02
P2-MW-03
MW-16-80
Transect B
MW-20-126
AS-19-B04
AS-19-B05
AS-19-B02
AS-19-B06
AS-19-B01
AS-19-B07
AS-19-B03
TW-15-12
MW-13-44
MW-13-42
TW-14-04
TW-15-13
TW-14-05
MW-13-43
PW-14-02
MW-15-73
MW-20-127
MW-13-45
P2-SB-20
MW-19-118S/D
MW-14-59
MW-16-85
MW-19-125
AS-19-F01
MW-14-58
AS-19-F02
MW-17-87
AS-19-F03
MW-20-128
MW-16-84
MW-16-83
MW-19-116
AS-19-F04
AS-19-F05
MW-14-60
MW-16-82
MW-17-86
MW-19-117
AS-19-F06
AS-19-F07
Transect F
AS-19-F08
AS-19-F09
AS-19-F10
MW-19-115
MW-15-72
AS-19-F11
MW-14-61
MW-12-06
MW-19-120
AS-19-F12
AS-19-E11
AS-19-E12
MW-19-124
MW-14-56
AS-19-E10
AS-19-E09
P2-SB-06
MW-16-81
MW-14-62
AS-19-E08
AS-19-E07
Transect E
MW-19-122
AS-19-E05
AS-19-E06
MW-19-121
MW-20-129
AS-19-G09
AS-19-E01
AS-19-E04
MW-16-79
MW-20-130
TW-14-02
AS-19-G07
AS-19-E03
AS-19-G06
AS-19-G08
AS-19-G10
AS-19-E02
MW-14-55
AS-17-G02
AS-19-G05
MW-16-74
MW-16-78
MW-12-18
AS-17-G01
AS-19-G04
AS-17-03
MW-14-54
TW-14-01
Transect G
MW-16-76
AS-16-02
AS-16-01
MW-12-01
TW-16-01
MW-19-123
PW-14-01
MW-16-77
MW-16-75
MW-12-07

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

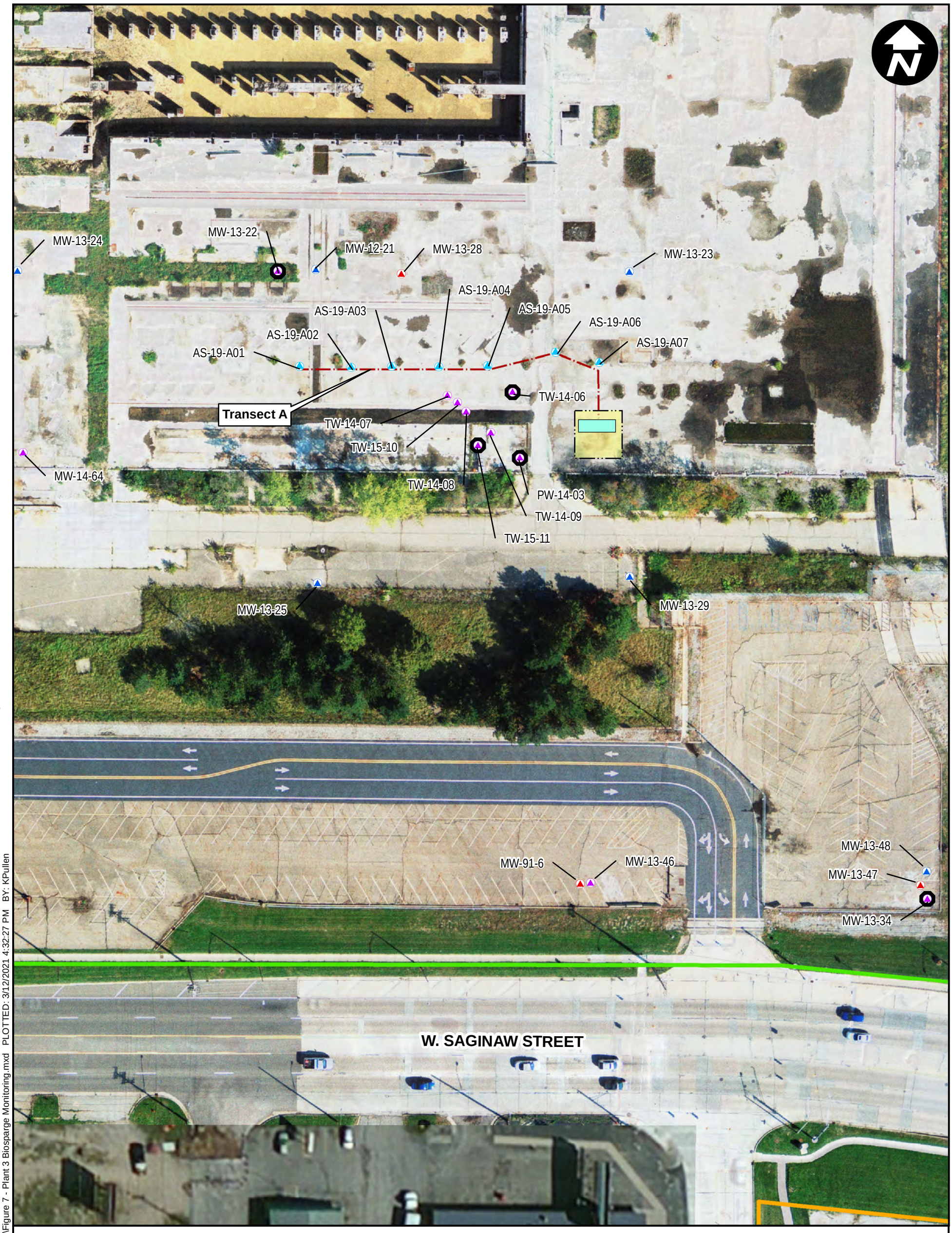
RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 2 BIOSPARGE SYSTEM PERFORMANCE MONITORING WELLS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B00644479.2019 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: 3/12/2021 3:10:46 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

DRAFT

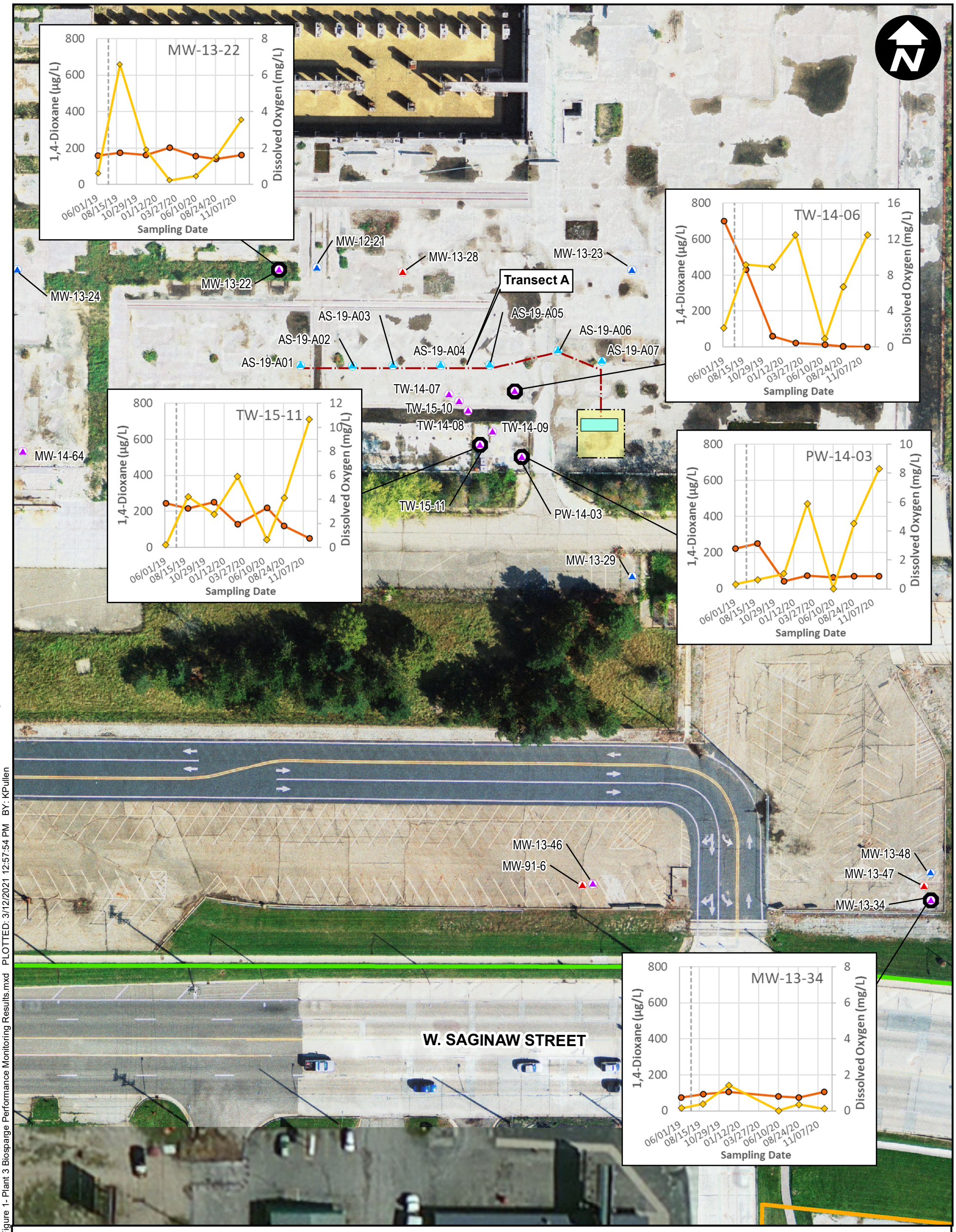
RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 3 BIOSPARGE SYSTEM PERFORMANCE MONITORING WELLS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

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: 3/12/2021 4:32:27 PM BY: KPullen



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\Quarterly Results\Figure 1- Plant 3 Biosparge Performance Monitoring Results.mxd PLOTTED: 3/12/2021 12:57:54 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

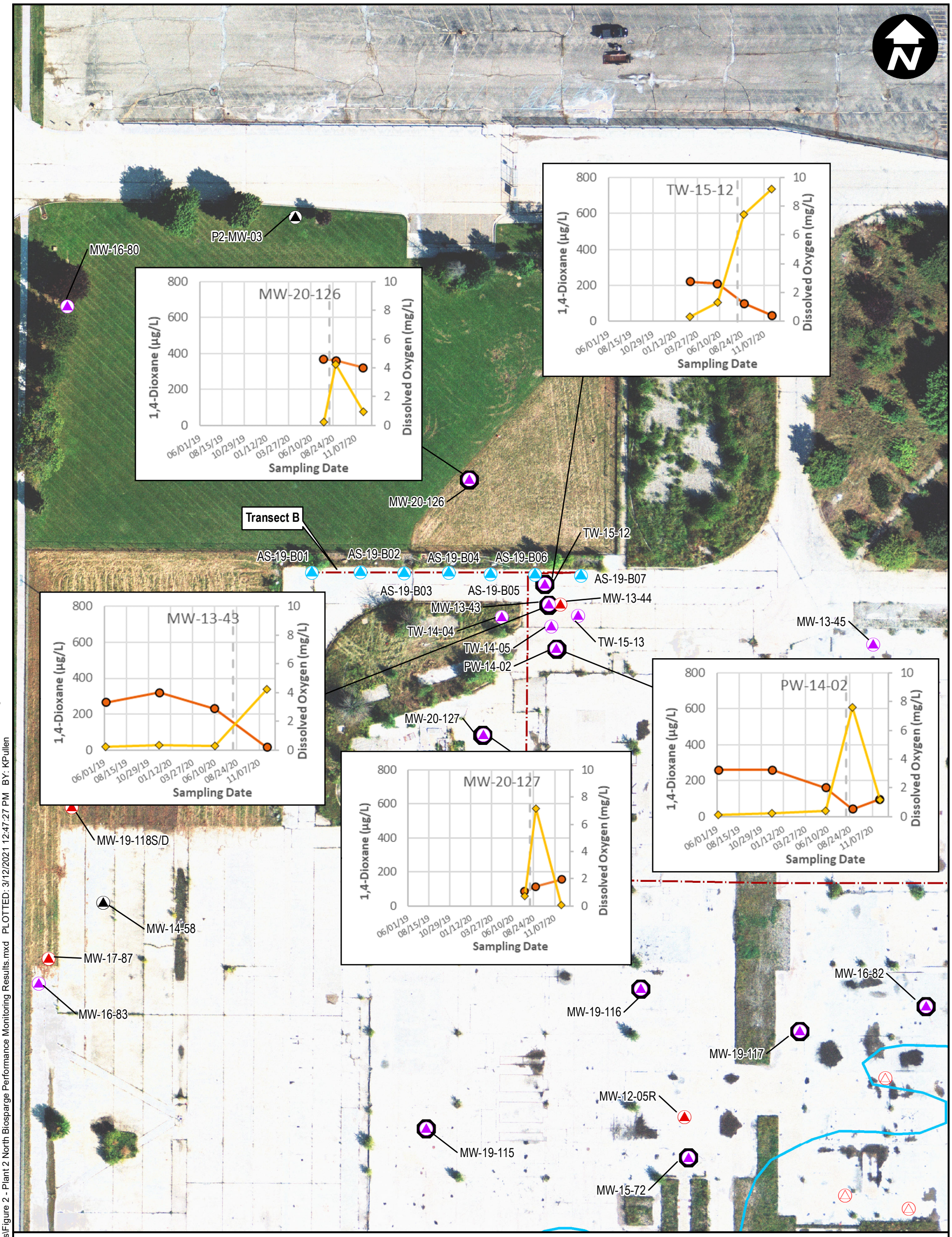
0 50 100
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 3 BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE
4



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\Quarterly Results\Figure 2 - Plant 2 North Biosparge Performance Monitoring Results.mxd PLOTTED: 3/12/2021 12:47:27 PM BY: KPullen

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 60 120

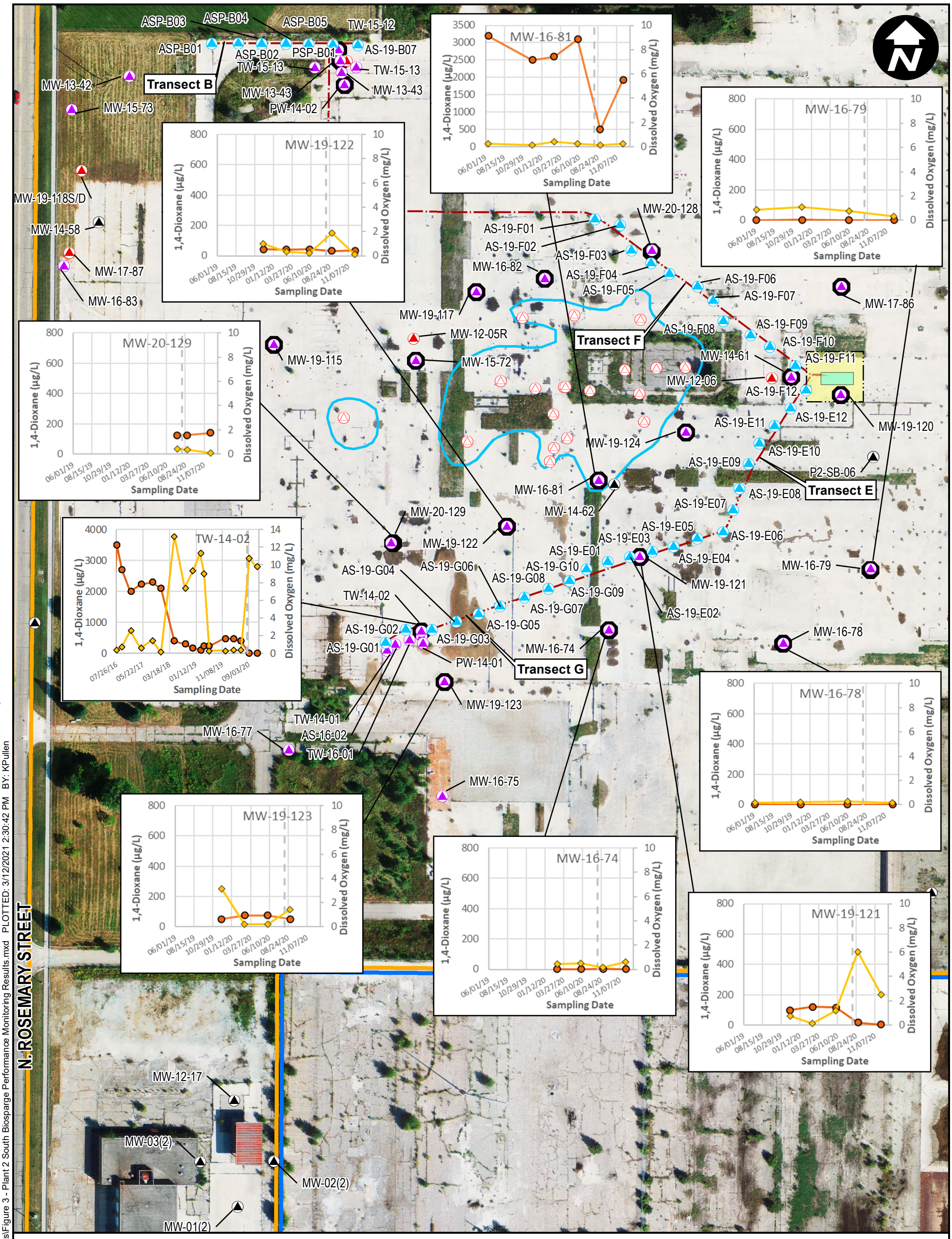
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 NORTH BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE 5



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\Quarterly Results\Figure 3 - Plant 2 South Biosparge Performance Monitoring Results.mxd PLOTTED: 3/12/2021 2:30:42 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

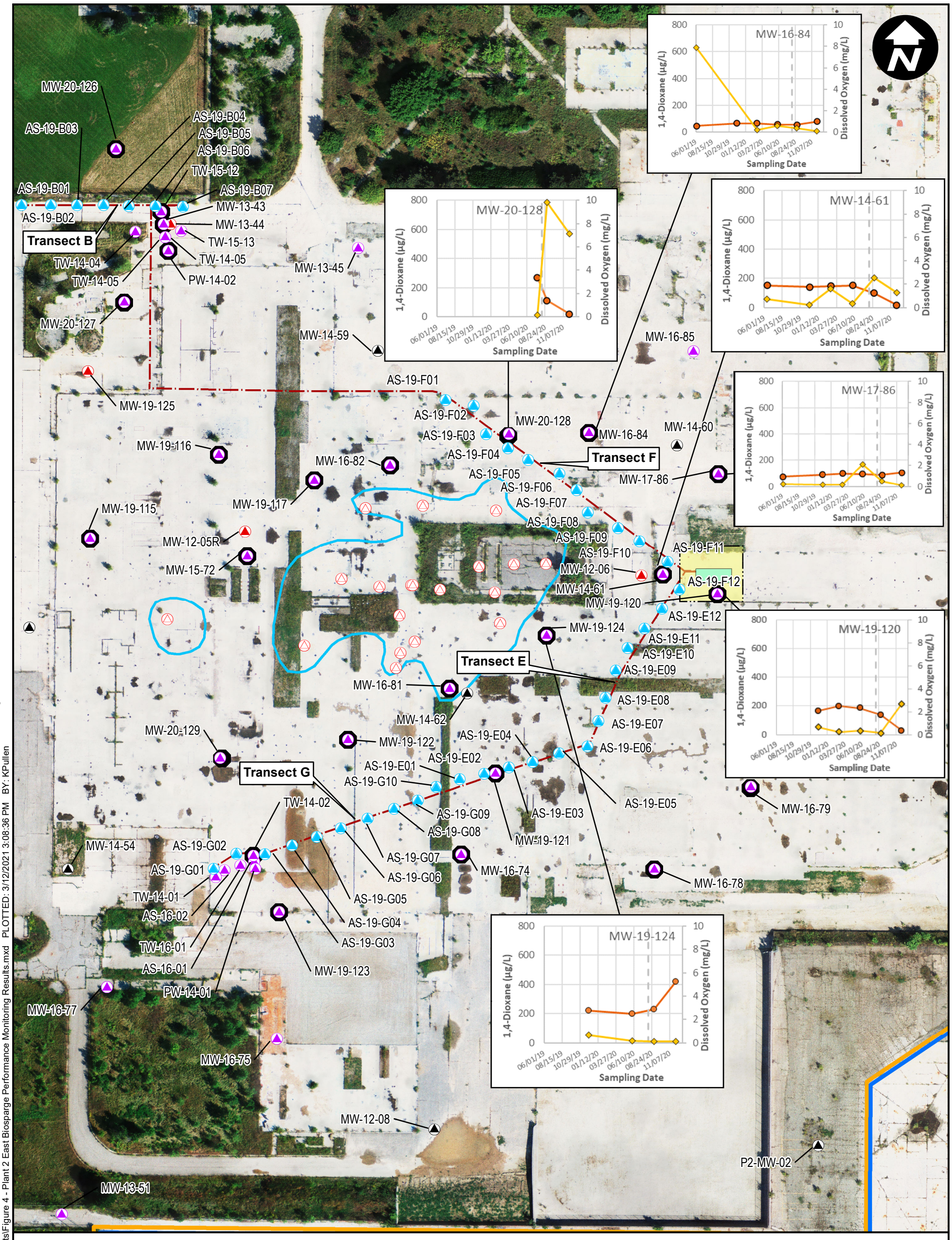
0 120 240
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 SOUTH BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE 6



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

0 110 220
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 AND 6
LANSING, MICHIGAN

PLANT 2 CENTRAL/EAST BIOSPARGE PERFORMANCE MONITORING RESULTS

ARCADIS

FIGURE 7

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\Quarterly Results\Figure 4 - Plant 2 East Biosparge Performance Monitoring Results.mxd PLOTTED: 3/12/2021 3:08:36 PM BY: KPullen

APPENDIX A

O&M Logs

Inspection Date	September 3, 2020
Last Quarterly Event Date	
Arrival Time	10:45
Personnel	Anyssa Mandich, Eric Feenstra, Marina Samp, Billy Cobern
Weather	Sunny, 74°

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	1000
Propane setpoint (LPM)	7.994
PIT-101 (PSIG)	50.7
PIT-102 (PSIA)	64.6
FQI-101 (SLPM)	2000
PIT-201 (PSIA)	40.7
PIT-300 (PSIG)	25.6
FQI-201 (LPM)	8
AE-350 (%LEL)	23.7
AE-351 (%LEL)	24.6
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	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	

Number of air filters remaining	2
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	571
Oil Pressure (PSIG)	140
Wet receiver tank loading pressure (PI-101)	120
Wet receiver tank unloading pressure (PI-101)	118
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	120
PI-103 (PSIG)	46
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	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	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, PI-103 Verify pressure, PF-103 Check/Replace Filter element, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	28.13
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	

Non-XP room photo

XP-Room

First Aid Kit Expiration Date	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)	38
MFC-201 temperature	35.69
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	-0.12
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	-0.03
PI-300 (PSIG)	28
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, 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)., 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).
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), AE-350 verify that the M2A responds properly to the target gas. Calibrate the sensor according to the procedures in the manual.

Semiannual XP Instrumentation Checks	HS-402 Hit button to test system shutdown and that alarm is sent
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	0
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	0
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	0
AS-19-G06 Manifold Flowrate (CFM)	0
AS-19-G09 Manifold Pressure (PSIG)	0
AS-19-G09 Manifold Flowrate (CFM)	0
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)	0
AS-19-E08 Manifold Pressure (PSIG)	0
AS-19-E08 Manifold Flowrate (CFM)	0

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	0
AS-19-G05 Manifold Flowrate (CFM)	0
AS-19-G08 Manifold Pressure (PSIG)	0
AS-19-G08 Manifold Flowrate (CFM)	0
AS-19-E01 Manifold Pressure (PSIG)	0
AS-19-E01 Manifold Flowrate (CFM)	0
AS-19-E04 Manifold Pressure (PSIG)	0
AS-19-E04 Manifold Flowrate (CFM)	0
AS-19-E07 Manifold Pressure (PSIG)	0
AS-19-E07 Manifold Flowrate (CFM)	0
AS-19-E10 Manifold Pressure (PSIG)	0
AS-19-E10 Manifold Flowrate (CFM)	0

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	0
AS-19-G04 Manifold Flowrate (CFM)	0
AS-19-G07 Manifold Pressure (PSIG)	0
AS-19-G07 Manifold Flowrate (CFM)	0
AS-19-G10 Manifold Pressure (PSIG)	0
AS-19-G10 Manifold Flowrate (CFM)	0
AS-19-E03 Manifold Pressure (PSIG)	0
AS-19-E03 Manifold Flowrate (CFM)	0
AS-19-E06 Manifold Pressure (PSIG)	0
AS-19-E06 Manifold Flowrate (CFM)	0
AS-19-E09 Manifold Pressure (PSIG)	0
AS-19-E09 Manifold Flowrate (CFM)	0
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	0
AS-19-F12 Manifold Flowrate (CFM)	0
AS-19-F09 Manifold Pressure (PSIG)	0
AS-19-F09 Manifold Flowrate (CFM)	0

AS-19-F06 Manifold Pressure (PSIG)	0
AS-19-F06 Manifold Flowrate (CFM)	0
AS-19-F03 Manifold Pressure (PSIG)	0
AS-19-F03 Manifold Flowrate (CFM)	0
AS-19-B06 Manifold Pressure (PSIG)	0
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	0
AS-19-B03 Manifold Flowrate (CFM)	0

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	0
AS-19-E11 Manifold Flowrate (CFM)	0
AS-19-F11 Manifold Pressure (PSIG)	0
AS-19-F11 Manifold Flowrate (CFM)	0
AS-19-F08 Manifold Pressure (PSIG)	0
AS-19-F08 Manifold Flowrate (CFM)	0
AS-19-F05 Manifold Pressure (PSIG)	0
AS-19-F05 Manifold Flowrate (CFM)	0
AS-19-F02 Manifold Pressure (PSIG)	0
AS-19-F02 Manifold Flowrate (CFM)	0
AS-19-B05 Manifold Pressure (PSIG)	0
AS-19-B05 Manifold Flowrate (CFM)	0
AS-19-B02 Manifold Pressure (PSIG)	0
AS-19-B02 Manifold Flowrate (CFM)	0

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	0
AS-19-F10 Manifold Flowrate (CFM)	0
AS-19-F07 Manifold Pressure (PSIG)	0
AS-19-F07 Manifold Flowrate (CFM)	0
AS-19-F04 Manifold Pressure (PSIG)	0
AS-19-F04 Manifold Flowrate (CFM)	0
AS-19-F01 Manifold Pressure (PSIG)	0
AS-19-F01 Manifold Flowrate (CFM)	0
AS-19-B07 Manifold Pressure (PSIG)	0
AS-19-B07 Manifold Flowrate (CFM)	0
AS-19-B04 Manifold Pressure (PSIG)	0

AS-19-B04 Manifold Flowrate (CFM)	0
AS-19-B01 Manifold Pressure (PSIG)	0
AS-19-B01 Manifold Flowrate (CFM)	0

Outdoors and General

Propane tank level (%)	67
Number of condensate drums outside	0
Drum Photo	
Electric Meter Reading (kWh)	11141
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, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	

Signature	 Signed 9/13/2020, 4:49:31 PM UTC
Departure Time	12:15

Inspection Date	September 29, 2020
Last Quarterly Event Date	September 3, 2020
Arrival Time	08:49
Personnel	Billy J Cobern, Marina Samp
Weather	Cloudy, rainy, 50's

HMI and Control Panel

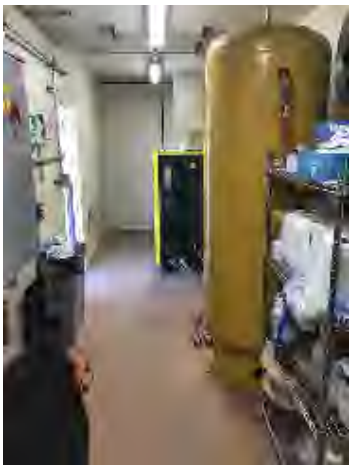
HMI display functioning (not frozen)?	Yes
Current zone	Zone 1 and 4
Compressed air setpoint (LPM)	1860
Propane setpoint (LPM)	1858
PIT-101 (PSIG)	50.9
PIT-102 (PSIA)	65
FQI-101 (SLPM)	1857
PIT-201 (PSIA)	52
PIT-300 (PSIG)	12.2
FQI-201 (LPM)	0.028
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
Comments	

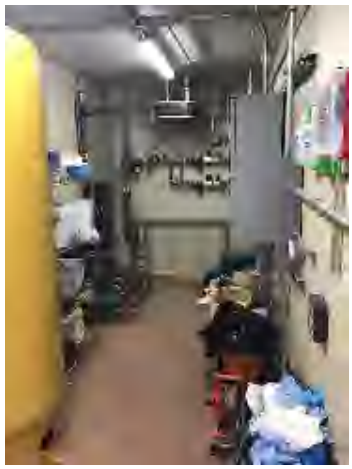
Non-XP Room

Fire Extinguisher Check	Needle in the green?, 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	

Number of air filters remaining	2
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	703
Oil Pressure (PSIG)	9.5
Wet receiver tank loading pressure (PI-101)	128
Wet receiver tank unloading pressure (PI-101)	118
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	105
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., 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	18.01
MFC-101 standardized flow rate on display (SLPM)	2001
MFC-101 uncorrected flow rate on display (LPM)	443
Comments	

Non-XP room photo



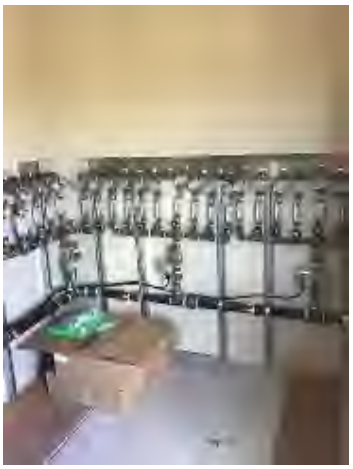
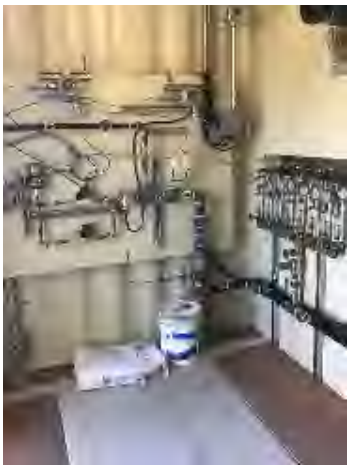


XP-Room

First Aid Kit Expiration Date	September 29, 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
PI-201 (PSIG)	76
PI-202 (PSIG)	39
MFC-201 temperature	27.88
MFC-201 standard flow rate on alicat display during propane cycle (SLPM)	0.57
MFC-201 uncorrected flow rate on alicat display during propane cycle (LPM)	0.16
PI-300 (PSIG)	20
Bi-Weekly XP Instrumentation Checks	FQI-351/352 verify rate, AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	HS-402 Hit button to test system shutdown and that alarm is sent
AE-500 Reading	0
AE-350 reading during propane sparge cycle	22
AE-351 reading during propane sparge cycle	23
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)	0
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	0
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	12
AS-19-G06 Manifold Flowrate (CFM)	4
AS-19-G09 Manifold Pressure (PSIG)	8
AS-19-G09 Manifold Flowrate (CFM)	6
AS-19-E02 Manifold Pressure (PSIG)	14
AS-19-E02 Manifold Flowrate (CFM)	4
AS-19-E05 Manifold Pressure (PSIG)	13
AS-19-E05 Manifold Flowrate (CFM)	9

AS-19-E08 Manifold Pressure (PSIG)	8
AS-19-E08 Manifold Flowrate (CFM)	5

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	11
AS-19-G05 Manifold Flowrate (CFM)	4
AS-19-G08 Manifold Pressure (PSIG)	2
AS-19-G08 Manifold Flowrate (CFM)	2
AS-19-E01 Manifold Pressure (PSIG)	10
AS-19-E01 Manifold Flowrate (CFM)	4
AS-19-E04 Manifold Pressure (PSIG)	4
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)	18
AS-19-E10 Manifold Flowrate (CFM)	3

Zone 3

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

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	2
AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (CFM)	2
AS-19-F03 Manifold Pressure (PSIG)	9
AS-19-F03 Manifold Flowrate (CFM)	3
AS-19-B06 Manifold Pressure (PSIG)	14
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	10
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)	11
AS-19-F11 Manifold Flowrate (CFM)	5
AS-19-F08 Manifold Pressure (PSIG)	10
AS-19-F08 Manifold Flowrate (CFM)	4
AS-19-F05 Manifold Pressure (PSIG)	10
AS-19-F05 Manifold Flowrate (CFM)	4
AS-19-F02 Manifold Pressure (PSIG)	0
AS-19-F02 Manifold Flowrate (CFM)	0
AS-19-B05 Manifold Pressure (PSIG)	18
AS-19-B05 Manifold Flowrate (CFM)	7
AS-19-B02 Manifold Pressure (PSIG)	10
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	7
AS-19-F10 Manifold Flowrate (CFM)	1
AS-19-F07 Manifold Pressure (PSIG)	11
AS-19-F07 Manifold Flowrate (CFM)	3
AS-19-F04 Manifold Pressure (PSIG)	12
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	10

AS-19-F01 Manifold Flowrate (CFM)	3
AS-19-B07 Manifold Pressure (PSIG)	18
AS-19-B07 Manifold Flowrate (CFM)	10
AS-19-B04 Manifold Pressure (PSIG)	8
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	1

Outdoors and General

Propane tank level (%)	58
Number of condensate drums outside	3

Drum Photo

Electric Meter Reading (kWh)	19893
Last fire extinguisher certification date	August 29, 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	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 9/29/2020, 10:30:06 PM UTC
Departure Time	11:23

Inspection Date	October 30, 2020
Last Quarterly Event Date	September 29, 2020
Arrival Time	10:49
Personnel	Billy J Cobern
Weather	Cloudy, 30's

HMI and Control Panel

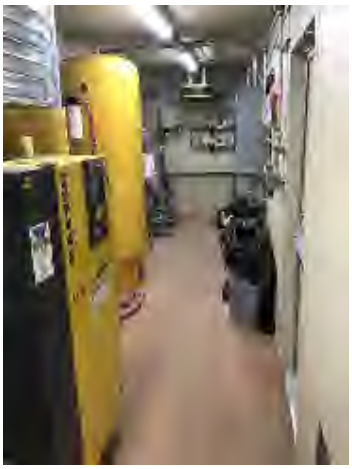
HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	2000
PIT-101 (PSIG)	55.1
PIT-102 (PSIA)	69.6
FQI-101 (SLPM)	0
PIT-201 (PSIA)	63.5
PIT-300 (PSIG)	9.9
FQI-201 (LPM)	0
AE-350 (%LEL)	0.2
AE-351 (%LEL)	0
AE-500 (%LEL)	0.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
UPS enabled?	Yes
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	2
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	1782
Oil Pressure (PSIG)	150
Wet receiver tank loading pressure (PI-101)	122
Wet receiver tank unloading pressure (PI-101)	119
How full is the condensate drum? (Percentage)	50
PI-101 (PSIG)	120
PI-102 (PSIG)	118
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
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	16.44
MFC-101 standardized flow rate on display (SLPM)	0
MFC-101 uncorrected flow rate on display (LPM)	0
Comments	

Non-XP room photo



XP-Room

First Aid Kit Expiration Date	September 30, 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
PI-201 (PSIG)	58
PI-202 (PSIG)	50
MFC-201 temperature	28.93
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)	5
Bi-Weekly XP Instrumentation Checks	AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).

Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)
Semiannual XP Instrumentation Checks	HS-402 Hit button to test system shutdown and that alarm is sent
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo

Zone 1

AS-19-G01 Manifold Pressure (PSIG)	0
AS-19-G01 Manifold Flowrate (CFM)	0
AS-19-G03 Manifold Pressure (PSIG)	0
AS-19-G03 Manifold Flowrate (CFM)	0
AS-19-G06 Manifold Pressure (PSIG)	9
AS-19-G06 Manifold Flowrate (CFM)	5
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)	5
AS-19-E05 Manifold Pressure (PSIG)	7
AS-19-E05 Manifold Flowrate (CFM)	12

AS-19-E08 Manifold Pressure (PSIG)	2
AS-19-E08 Manifold Flowrate (CFM)	6

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
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)	0
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)	4
AS-19-E07 Manifold Pressure (PSIG)	5
AS-19-E07 Manifold Flowrate (CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	10
AS-19-E10 Manifold Flowrate (CFM)	6

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	10
AS-19-G04 Manifold Flowrate (CFM)	2
AS-19-G07 Manifold Pressure (PSIG)	2
AS-19-G07 Manifold Flowrate (CFM)	2
AS-19-G10 Manifold Pressure (PSIG)	0
AS-19-G10 Manifold Flowrate (CFM)	3
AS-19-E03 Manifold Pressure (PSIG)	0
AS-19-E03 Manifold Flowrate (CFM)	3
AS-19-E06 Manifold Pressure (PSIG)	0
AS-19-E06 Manifold Flowrate (CFM)	2
AS-19-E09 Manifold Pressure (PSIG)	0
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	4
AS-19-E12 Manifold Flowrate (CFM)	4

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	5
AS-19-F12 Manifold Flowrate (CFM)	4
AS-19-F09 Manifold Pressure (PSIG)	4
AS-19-F09 Manifold Flowrate (CFM)	3
AS-19-F06 Manifold Pressure (PSIG)	8
AS-19-F06 Manifold Flowrate (CFM)	2
AS-19-F03 Manifold Pressure (PSIG)	7
AS-19-F03 Manifold Flowrate (CFM)	3
AS-19-B06 Manifold Pressure (PSIG)	12
AS-19-B06 Manifold Flowrate (CFM)	0
AS-19-B03 Manifold Pressure (PSIG)	8
AS-19-B03 Manifold Flowrate (CFM)	3

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	3
AS-19-E11 Manifold Flowrate (CFM)	2
AS-19-F11 Manifold Pressure (PSIG)	8
AS-19-F11 Manifold Flowrate (CFM)	6
AS-19-F08 Manifold Pressure (PSIG)	4
AS-19-F08 Manifold Flowrate (CFM)	4
AS-19-F05 Manifold Pressure (PSIG)	10
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	0
AS-19-F02 Manifold Flowrate (CFM)	0
AS-19-B05 Manifold Pressure (PSIG)	14
AS-19-B05 Manifold Flowrate (CFM)	9
AS-19-B02 Manifold Pressure (PSIG)	5
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	0
AS-19-F10 Manifold Flowrate (CFM)	3
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)	4
AS-19-F01 Manifold Pressure (PSIG)	8

AS-19-F01 Manifold Flowrate (CFM)	5
AS-19-B07 Manifold Pressure (PSIG)	16
AS-19-B07 Manifold Flowrate (CFM)	14
AS-19-B04 Manifold Pressure (PSIG)	6
AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	0
AS-19-B01 Manifold Flowrate (CFM)	0

Outdoors and General

Propane tank level (%)	38
Number of condensate drums outside	7

Drum Photo

Electric Meter Reading (kWh)	35237
Last fire extinguisher certification date	September 30, 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	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	Signed 10/30/2020, 5:21:54 PM UTC
Departure Time	13:45

Inspection Date	December 4, 2020
Last Quarterly Event Date	
Arrival Time	08:30
Personnel	Billy J Cobern
Weather	Cloudy, 30s

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3 and 6
Compressed air setpoint (LPM)	2000
Propane setpoint (LPM)	2000
PIT-101 (PSIG)	50.9
PIT-102 (PSIA)	64.9
FQI-101 (SLPM)	0
PIT-201 (PSIA)	90.2
PIT-300 (PSIG)	27
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	Verified
UPS enabled?	Yes
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	
Is the annual compressor inspection happening during this event?	No
Compressor Audio	

Number of air filters remaining	1
Do we need more compressor oil? (Less than a half gallon remaining)	No
Motor Runtime (hours)	2543
Oil Pressure (PSIG)	150
Wet receiver tank loading pressure (PI-101)	125
Wet receiver tank unloading pressure (PI-101)	115
How full is the condensate drum? (Percentage)	60
PI-101 (PSIG)	120
PI-102 (PSIG)	110
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	Electric box Open panel to ensure there are no tripped circuit breakers, 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)
Semiannual Non-XP Instrument Maintenance	
Quarterly Filter Maintenance	PF-101 Check and clean filter (knock out dirt and rinse with DI water). Replace filter if necessary., CF-101 Check and clean filter element and chamber. Replace if necessary., PF-102 Check and replace filter element, PF-103 Check/Replace Filter element, PI-103 Verify pressure, PT-103 Check pressure reading on HMI and make sure it is close to a manual pressure gauge
Desiccant Media Replaced?	No
Which compressed air Alicat is in use (upon leaving system)?	MFC-101A (older)
MFC-101 compressed air temperature	27.13
MFC-101 standardized flow rate on display (SLPM)	2000
MFC-101 uncorrected flow rate on display (LPM)	458
Comments	

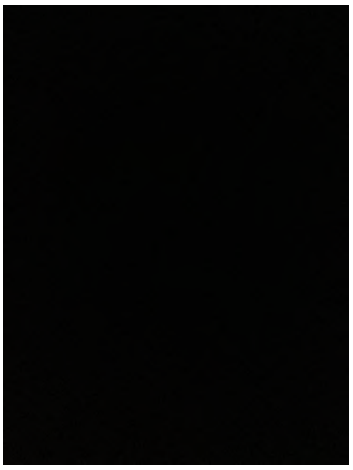
Non-XP room photo

XP-Room

First Aid Kit Expiration Date	September 30, 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
PI-201 (PSIG)	70
PI-202 (PSIG)	88
MFC-201 temperature	17.24
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)	300
Bi-Weekly XP Instrumentation Checks	AE-350 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-351 Investigate significant changes in the reading. Check the LEL during a propane sparging cycle. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere)., AE-500 Investigate significant changes in the reading. Check to make sure the reading is accurate for the conditions (should read 0% in the atmosphere).
Monthly XP Instrumentation Checks	MFC-201 / PIT-202 Check the flow rate to make sure it matches the setpoint on the PLC. Check the pressure reading as well, S-201 Actuate valves and ensure it is working properly (turn on and off and listen for the click), PIT-300 Check pressure reading on HMI and make sure it is close to a manual pressure gauge, FQI-301 Check flow reading to make sure it is close to the flow reading on the HMI, S-301 to S-306 Actuate valves and ensure they are working properly (turn on and off and listen for the click)

Semiannual XP Instrumentation Checks	
AE-500 Reading	0
AE-350 reading during propane sparge cycle	0
AE-351 reading during propane sparge cycle	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-351 calibrated, AE-500 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201A (older)
Comments	

XP-room photo



Zone 1

AS-19-G01 Manifold Pressure (PSIG)	10
AS-19-G01 Manifold Flowrate (CFM)	4
AS-19-G03 Manifold Pressure (PSIG)	16
AS-19-G03 Manifold Flowrate (CFM)	2
AS-19-G06 Manifold Pressure (PSIG)	10
AS-19-G06 Manifold Flowrate (CFM)	2
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)	5
AS-19-E08 Manifold Flowrate (CFM)	4

Zone 2

AS-19-G02 Manifold Pressure (PSIG)	0
AS-19-G02 Manifold Flowrate (CFM)	0
AS-19-G05 Manifold Pressure (PSIG)	2
AS-19-G05 Manifold Flowrate (CFM)	3
AS-19-G08 Manifold Pressure (PSIG)	4
AS-19-G08 Manifold Flowrate (CFM)	4
AS-19-E01 Manifold Pressure (PSIG)	3
AS-19-E01 Manifold Flowrate (CFM)	3
AS-19-E04 Manifold Pressure (PSIG)	8
AS-19-E04 Manifold Flowrate (CFM)	4
AS-19-E07 Manifold Pressure (PSIG)	5
AS-19-E07 Manifold Flowrate (CFM)	2
AS-19-E10 Manifold Pressure (PSIG)	0
AS-19-E10 Manifold Flowrate (CFM)	0

Zone 3

AS-19-G04 Manifold Pressure (PSIG)	1
AS-19-G04 Manifold Flowrate (CFM)	5
AS-19-G07 Manifold Pressure (PSIG)	1
AS-19-G07 Manifold Flowrate (CFM)	2
AS-19-G10 Manifold Pressure (PSIG)	1
AS-19-G10 Manifold Flowrate (CFM)	1
AS-19-E03 Manifold Pressure (PSIG)	1
AS-19-E03 Manifold Flowrate (CFM)	1
AS-19-E06 Manifold Pressure (PSIG)	1
AS-19-E06 Manifold Flowrate (CFM)	3
AS-19-E09 Manifold Pressure (PSIG)	5
AS-19-E09 Manifold Flowrate (CFM)	3
AS-19-E12 Manifold Pressure (PSIG)	0
AS-19-E12 Manifold Flowrate (CFM)	0

Zone 4

AS-19-F12 Manifold Pressure (PSIG)	10
AS-19-F12 Manifold Flowrate (CFM)	1
AS-19-F09 Manifold Pressure (PSIG)	8
AS-19-F09 Manifold Flowrate (CFM)	3

AS-19-F06 Manifold Pressure (PSIG)	10
AS-19-F06 Manifold Flowrate (CFM)	4
AS-19-F03 Manifold Pressure (PSIG)	10
AS-19-F03 Manifold Flowrate (CFM)	2
AS-19-B06 Manifold Pressure (PSIG)	20
AS-19-B06 Manifold Flowrate (CFM)	1
AS-19-B03 Manifold Pressure (PSIG)	10
AS-19-B03 Manifold Flowrate (CFM)	4

Zone 5

AS-19-E11 Manifold Pressure (PSIG)	2
AS-19-E11 Manifold Flowrate (CFM)	3
AS-19-F11 Manifold Pressure (PSIG)	3
AS-19-F11 Manifold Flowrate (CFM)	4
AS-19-F08 Manifold Pressure (PSIG)	2
AS-19-F08 Manifold Flowrate (CFM)	4
AS-19-F05 Manifold Pressure (PSIG)	8
AS-19-F05 Manifold Flowrate (CFM)	6
AS-19-F02 Manifold Pressure (PSIG)	15
AS-19-F02 Manifold Flowrate (CFM)	7
AS-19-B05 Manifold Pressure (PSIG)	14
AS-19-B05 Manifold Flowrate (CFM)	4
AS-19-B02 Manifold Pressure (PSIG)	2
AS-19-B02 Manifold Flowrate (CFM)	4

Zone 6

AS-19-F10 Manifold Pressure (PSIG)	6
AS-19-F10 Manifold Flowrate (CFM)	3
AS-19-F07 Manifold Pressure (PSIG)	10
AS-19-F07 Manifold Flowrate (CFM)	4
AS-19-F04 Manifold Pressure (PSIG)	100
AS-19-F04 Manifold Flowrate (CFM)	2
AS-19-F01 Manifold Pressure (PSIG)	18
AS-19-F01 Manifold Flowrate (CFM)	6
AS-19-B07 Manifold Pressure (PSIG)	15
AS-19-B07 Manifold Flowrate (CFM)	6
AS-19-B04 Manifold Pressure (PSIG)	0

AS-19-B04 Manifold Flowrate (CFM)	3
AS-19-B01 Manifold Pressure (PSIG)	10
AS-19-B01 Manifold Flowrate (CFM)	2

Outdoors and General

Propane tank level (%)	38
Number of condensate drums outside	7
Drum Photo	
Electric Meter Reading (kWh)	35237
Last fire extinguisher certification date	September 30, 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?	
Comments, questions, ruminations, suggestions for improvement?	

Signature	BC Signed 12/8/2020, 7:36:57 PM UTC
Departure Time	16:00

2019-07-16

Created	2019-07-16 15:42:39 UTC by Anyssa Mandich
Updated	2019-07-16 16:04:10 UTC by Anyssa Mandich
Location	42.7413023791474, -84.5890915779033
Date	2019-07-16
Time	11:42
Personnel	Anyssa Schember, Dan Stockard
Weather	Partly Cloudy, 77 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	90
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	Yes
Air compressor cleaned?	No
Motor Run Time (seconds)	4206325
Number of air filters remaining	3
Approximate volume of condensation in can	1.5
Bucket emptied?	No
PI-102 (PSI)	50
PI-103 (PSI)	49
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	85
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	95

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 1 (AS-17-03)
PIT-101 (PSI)	49.1
PIT-102 (PSI)	28
FQI-101 (LPM)	299.8
PIT-202 (PSI)	11.7
FQI-201 (LPM)	0
FE-301 (LPM)	299.9
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	13.9
Cycle counter calibrated?	Yes
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	N/A
Propane Changed?	No

PI-201 (PSI)	0
PI-202 (PSI)	0
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	1
PI-300 (PSI)	11
PI-301 (PSI) - Zone 1	14
PI-302 (PSI) - Zone 2	6
PI-303 (PSI) - Zone 3	8
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No
Comments	Will do on Friday

Outdoors

AS-19-A01 Wellhead Pressure	3
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	14
AS-19-A04 Wellhead Pressure	0
AS-19-A05 Wellhead Pressure	14
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	7
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	Yes. TW-14-07, TW-14-08, MW-19-109

Signature

Signed 2019-07-16 12:03:52 EDT

Departure Time	12:04

2019-07-17

Created	2019-07-17 14:11:39 UTC by Anyssa Mandich
Updated	2019-07-17 14:20:53 UTC by Anyssa Mandich
Location	42.742078270424, -84.5880490252419
Date	2019-07-17
Time	10:15
Personnel	Anyssa Schember
Weather	Cloudy, 77 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	130
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4214377
Number of air filters remaining	8
Approximate volume of condensation in can	2.5
Bucket emptied?	Yes
PI-102 (PSI)	48
PI-103 (PSI)	48
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	115

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 2 (AS-17-04)
PIT-101 (PSI)	48.6
PIT-102 (PSI)	27.7
FQI-101 (LPM)	299.8
PIT-202 (PSI)	11.5
FQI-201 (LPM)	0
FE-301 (LPM)	300.1
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	13.4
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

PI-201 (PSI)	0
PI-202 (PSI)	0

MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	1.5
PI-300 (PSI)	10
PI-301 (PSI) - Zone 1	12
PI-302 (PSI) - Zone 2	12
PI-303 (PSI) - Zone 3	8
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No
Comments	Will remove trash Friday

Outdoors

AS-19-A01 Wellhead Pressure	14
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	13
AS-19-A04 Wellhead Pressure	14
AS-19-A05 Wellhead Pressure	13
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	13

For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.

DO Profile collected, downloaded, and hobo file sent to project team?	Yes

Check with the project team on if we want to collect DO readings from any other wells

DO readings collected from other wells?	No.

Signature

Signed 2019-07-17 10:20:44 EDT

Departure Time	10:30

2019-07-19

Created	2019-07-19 13:55:46 UTC by Anyssa Mandich
Updated	2019-07-19 14:03:34 UTC by Anyssa Mandich
Location	42.7418891267782, -84.5879300095964
Date	2019-07-19
Time	09:50
Personnel	Anyssa Schember
Weather	Partly cloudy, 82 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	120
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4231528
Number of air filters remaining	8
Approximate volume of condensation in can	2.5
Bucket emptied?	Yes
PI-102 (PSI)	49
PI-103 (PSI)	48
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	8
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120
Comments	I went and got a bigger bucket for condensate.

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 1 (AS-17-03)
PIT-101 (PSI)	48.8
PIT-102 (PSI)	27.7
FQI-101 (LPM)	300
PIT-202 (PSI)	11.6
FQI-201 (LPM)	0
FE-301 (LPM)	299.8
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	13.6
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

PI-201 (PSI)	0

PI-202 (PSI)	0
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	1.5
PI-300 (PSI)	10
PI-301 (PSI) - Zone 1	14
PI-302 (PSI) - Zone 2	10
PI-303 (PSI) - Zone 3	8
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	Yes

Outdoors

AS-19-A01 Wellhead Pressure	11
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	13
AS-19-A04 Wellhead Pressure	10
AS-19-A05 Wellhead Pressure	14
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	10
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	MW-13-22 and TW-15-11 profiles
Any other comments or concerns?	The condensate bucket is filling very fast. Maybe we need to start pumping directly into the drum on the outside of the system building.

Signature

Signed 2019-07-19 10:02:50 EDT

Departure Time	10:40

2019-07-25

Created	2019-07-25 16:32:57 UTC by Anyssa Mandich
Updated	2019-07-25 16:42:51 UTC by Anyssa Mandich
Location	42.7421850113834, -84.587879524244
Date	2019-07-25
Time	12:32
Personnel	Anyssa Schember, Stacey Hannula
Weather	Sunny, 78 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	115
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4283927
Number of air filters remaining	8
Approximate volume of condensation in can	7
Bucket emptied?	Yes
PI-102 (PSI)	50
PI-103 (PSI)	49
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	118

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 3 (AS-17-05)
PIT-101 (PSI)	49
PIT-102 (PSI)	29.4
FQI-101 (LPM)	300
PIT-202 (PSI)	25.1
FQI-201 (LPM)	0.2
FE-301 (LPM)	300.2
AE-350 (%LEL)	5.3
PIT-300 (PSI)	15.5
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	Full
Propane Changed?	No

PI-201 (PSI)	142
PI-202 (PSI)	37
MFC-201 Mass Flow (LPM)	0.115
FI-350 (LPM)	1
PI-300 (PSI)	12
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	7
PI-303 (PSI) - Zone 3	15
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	5
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	12
AS-19-A03 Wellhead Pressure	10
AS-19-A04 Wellhead Pressure	9
AS-19-A05 Wellhead Pressure	11
AS-19-A06 Wellhead Pressure	7
AS-19-A07 Wellhead Pressure	8
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	TW-14-07, TW-14-08, TW-14-09, TW-15-11, MW-19-109, PW-14-03

Signature

Signed 2019-07-25 12:42:31 EDT

Departure Time	13:00

2019-07-31

Created	2019-07-31 16:57:55 UTC by Anyssa Mandich
Updated	2019-07-31 17:05:21 UTC by Anyssa Mandich
Location	42.7420331857214, -84.5879976902667
Date	2019-07-31
Time	12:35
Personnel	Anyssa Schember
Weather	Sunny, 73 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	120
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4334872
Number of air filters remaining	8
Approximate volume of condensation in can	5
Bucket emptied?	No
PI-102 (PSI)	54
PI-103 (PSI)	53
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	8
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Rest Cycle
PIT-101 (PSI)	53.3
PIT-102 (PSI)	63.8
FQI-101 (LPM)	4.1
PIT-202 (PSI)	14
FQI-201 (LPM)	0
FE-301 (LPM)	4
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	53.7
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	30
Propane Changed?	No

PI-201 (PSI)	145
PI-202 (PSI)	45
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	3
PI-300 (PSI)	52
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	9
PI-303 (PSI) - Zone 3	9
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	4
AS-19-A03 Wellhead Pressure	9
AS-19-A04 Wellhead Pressure	9
AS-19-A05 Wellhead Pressure	9
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	8
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	TW-14-07, TW-14-08, TW-14-09, TW-15-11, MW-13-22, MW-19-109, PW-14-03

Signature

Signed 2019-07-31 13:05:06 EDT

Departure Time	15:00

2019-08-05

Created	2019-08-05 15:37:13 UTC by Anyssa Mandich
Updated	2019-08-05 16:28:01 UTC by Anyssa Mandich
Location	42.7421170643344, -84.5879269591132
Date	2019-08-05
Time	11:37
Personnel	Anyssa Schember, Dan Stockard
Weather	Sunny, 82 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	115
Oil change on the compressor?	Yes
Do we need more oil?	No
Air filter changed?	Yes
Air compressor cleaned?	No
Motor Run Time (seconds)	4377672
Number of air filters remaining	7
Approximate volume of condensation in can	8
Bucket emptied?	Yes
PI-102 (PSI)	50
PI-103 (PSI)	48
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 3 (AS-17-05)
PIT-101 (PSI)	48.8
PIT-102 (PSI)	29.4
FQI-101 (LPM)	300.3
PIT-202 (PSI)	24.2
FQI-201 (LPM)	0
FE-301 (LPM)	300
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	15.5
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

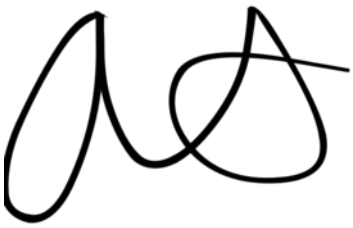
Propane tank weight (lbs)	25
Propane Changed?	No

PI-201 (PSI)	130
PI-202 (PSI)	40
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	0.5
PI-300 (PSI)	12
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	8
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	10
AS-19-A04 Wellhead Pressure	9
AS-19-A05 Wellhead Pressure	10
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	9
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	MW-19-109, MW-13-22, TW-14-07, TW-14-08, TW-14-08, TW-14-09, PW-14-03

Signature



Signed 2019-08-05 12:27:35 EDT

Departure Time	12:45

2019-08-12

Created	2019-08-12 12:15:59 UTC by Anyssa Mandich
Updated	2019-08-12 16:16:53 UTC by Anyssa Mandich
Location	42.7409991884973, -84.5877691921142
Date	2019-08-12
Time	08:15
Personnel	Anyssa Schember
Weather	Partly cloudy, 72 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	120
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4436733
Number of air filters remaining	7
Approximate volume of condensation in can	8
Bucket emptied?	Yes
PI-102 (PSI)	54
PI-103 (PSI)	53
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	118

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Rest Cycle
PIT-101 (PSI)	53.8
PIT-102 (PSI)	64.1
FQI-101 (LPM)	6.6
PIT-202 (PSI)	10.7
FQI-201 (LPM)	0
FE-301 (LPM)	6.7
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	54.1
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	20
Propane Changed?	No

PI-201 (PSI)	110
PI-202 (PSI)	45
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	4.5
PI-300 (PSI)	52
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	9
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	8
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	8
AS-19-A04 Wellhead Pressure	8
AS-19-A05 Wellhead Pressure	9
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	8
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	TW-14-07, TW-14-08, TW-14-09, TW-15-11, PW-14-03, MW-13-22, MW-19-109
Any other comments or concerns?	We need to change out the propane soon. Contacted Dan regarding this.

Signature

Signed 2019-08-12 08:31:46 EDT

Departure Time	12:45

2019-08-23

Created	2019-08-23 14:56:53 UTC by Anyssa Mandich
Updated	2019-08-23 15:15:55 UTC by Anyssa Mandich
Location	42.7420828227132, -84.5878916854049
Date	2019-08-23
Time	11:00
Personnel	Anyssa Schember
Weather	Sunny, 70 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	110
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	4521984
Number of air filters remaining	7
Approximate volume of condensation in can	1
Bucket emptied?	No
PI-102 (PSI)	50
PI-103 (PSI)	48
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	8
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 3 (AS-17-05)
PIT-101 (PSI)	48.9
PIT-102 (PSI)	26.3
FQI-101 (LPM)	300.5
PIT-202 (PSI)	20.2
FQI-201 (LPM)	0
FE-301 (LPM)	300.3
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	20
Cycle counter calibrated?	Yes
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	24
Propane Changed?	No

PI-201 (PSI)	92
PI-202 (PSI)	43
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	1
PI-300 (PSI)	14
PI-301 (PSI) - Zone 1	12
PI-302 (PSI) - Zone 2	11
PI-303 (PSI) - Zone 3	16
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	Yes

Outdoors

AS-19-A01 Wellhead Pressure	12
AS-19-A02 Wellhead Pressure	13
AS-19-A03 Wellhead Pressure	12
AS-19-A04 Wellhead Pressure	12
AS-19-A05 Wellhead Pressure	12
AS-19-A06 Wellhead Pressure	7
AS-19-A07 Wellhead Pressure	11
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	TW-14-07, TW-14-08, TW-14-09, TW-15-11, PW-14-03, MW-13-22, MW-19-109
Any other comments or concerns?	Condensate bucket is >1/3 full.

Signature

Signed 2019-08-23 11:08:12 EDT

Departure Time	11:30

2019-08-29

Created	2019-08-29 12:37:03 UTC by Anyssa Mandich
Updated	2019-08-29 16:51:32 UTC by Anyssa Mandich
Location	42.7421326991596, -84.5879157678586
Date	2019-08-29
Time	08:37
Personnel	Anyssa Schember, Billy Cobern
Weather	Sunny, 67 degrees

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	48
Oil change on the compressor?	Yes
Do we need more oil?	No
Air filter changed?	Yes
Air compressor cleaned?	No
Motor Run Time (seconds)	4573002
Number of air filters remaining	6
Approximate volume of condensation in can	0.25
Bucket emptied?	No
PI-102 (PSI)	40
PI-103 (PSI)	40
Coalescing filters emptied and cleaned?	Yes
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	2.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	48

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	System Off (Explain in comments)
PIT-101 (PSI)	35.5
PIT-102 (PSI)	44
FQI-101 (LPM)	0
PIT-202 (PSI)	9.7
FQI-201 (LPM)	0
FE-301 (LPM)	0
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	20.7
Cycle counter calibrated?	Yes
PLC Time Adjusted?	Yes
Comments	System off for oil change

XP Room

Propane tank weight (lbs)	35

Propane Changed?	Yes
PI-201 (PSI)	100
PI-202 (PSI)	45
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	0
PI-300 (PSI)	5
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	10
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	3
AS-19-A02 Wellhead Pressure	0
AS-19-A03 Wellhead Pressure	5
AS-19-A04 Wellhead Pressure	3
AS-19-A05 Wellhead Pressure	6
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	3

For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.

DO Profile collected, downloaded, and hobo file sent to project team?	Yes

Check with the project team on if we want to collect DO readings from any other wells

DO readings collected from other wells?	TW-14-07, TW-14-08, TW-14-09, TW-15-11, PW-14-03, MW-19-109, MW-13-22
Condensate volume in drum	35

Signature

Signed 2019-08-29 09:30:00 EDT

Departure Time	13:00

2019-09-18

Created	2019-09-18 16:35:27 UTC by Anyssa Mandich
Updated	2019-09-18 17:22:24 UTC by Anyssa Mandich
Location	42.2673613226929, -84.4239558982069
Date	2019-09-18
Time	12:35
Personnel	Billy Cobern
Weather	Sunny, 75

Non-XP Room

Heater setting (degrees F)	40
Compressor - PI-101 (PSI)	140
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	Yes
Air compressor cleaned?	No
Motor Run Time (seconds)	4746936
Number of air filters remaining	6
PI-102 (PSI)	58
PI-103 (PSI)	56
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	6.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120
Comments	Lots of oil in the air filter box

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Rest Cycle
PIT-101 (PSI)	55.4
PIT-102 (PSI)	65.7
FQI-101 (LPM)	3.2
PIT-202 (PSI)	8.5
FQI-201 (LPM)	0
FE-301 (LPM)	3.2
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	55.6
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	46
Propane Changed?	Yes
PI-201 (PSI)	141
PI-202 (PSI)	44
FI-350 (LPM)	0.5

PI-300 (PSI)	0
PI-301 (PSI) - Zone 1	12
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	9
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Comments	Propane tank is leaking clear liquid that has an odor. XP room smells like propane.

Outdoors

AS-19-A01 Wellhead Pressure	8
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	13
AS-19-A04 Wellhead Pressure	8
AS-19-A05 Wellhead Pressure	13
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	8.5

For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.

DO Profile collected, downloaded, and hobo file sent to project team?	Yes

Check with the project team on if we want to collect DO readings from any other wells

DO readings collected from other wells?	Yes.
Condensate volume in drum	25

Photos

Signature

Signed 2019-09-18 13:19:52 EDT

Departure Time	16:30

2019-10-16

Created	2019-10-16 19:14:07 UTC by Billy Cobern
Updated	2019-10-16 20:08:24 UTC by Billy Cobern
Location	42.7422008989777, -84.587887348686
Date	2019-10-16
Time	07:45
Personnel	Billy J Cobern
Weather	Cloudy, windy, periods of light rain, 40's

Non-XP Room

Heater setting (degrees F)	65
Compressor - PI-101 (PSI)	48.8
Oil change on the compressor?	Yes
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	Yes
Motor Run Time (seconds)	4989414
Number of air filters remaining	6
Approximate volume of condensation in can	0
Bucket emptied?	No
PI-102 (PSI)	49
PI-103 (PSI)	50
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	118
Comments	Oil level was low upon arrival. Changed oil (looked ok), changed oil filter, checked air filter (good).

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 3 (AS-17-05)
PIT-101 (PSI)	48.8
PIT-102 (PSI)	28.4
FQI-101 (LPM)	260.1
PIT-202 (PSI)	9.4
FQI-201 (LPM)	0.2
FE-301 (LPM)	260.2
AE-350 (%LEL)	22.1
PIT-300 (PSI)	15.2
Cycle counter calibrated?	Yes
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	30
Propane Changed?	Yes
PI-201 (PSI)	79
PI-202 (PSI)	43
FI-350 (LPM)	2
PI-300 (PSI)	14
PI-301 (PSI) - Zone 1	11
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	15
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	12
AS-19-A03 Wellhead Pressure	11
AS-19-A04 Wellhead Pressure	10
AS-19-A05 Wellhead Pressure	11
AS-19-A06 Wellhead Pressure	7
AS-19-A07 Wellhead Pressure	8
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	Yes
Condensate volume in drum	2
Any equipment that needs to be ordered?	No

Signature

Signed 2019-10-16 19:35:37 UTC

Departure Time	16:15

2019-11-18

Created	2019-11-18 21:38:15 UTC by Billy Cobern
Updated	2019-11-19 13:32:31 UTC by Billy Cobern
Location	42.7421066444765, -84.5878910367233
Date	2019-11-18
Time	16:45
Personnel	Billy J Cobern
Weather	Partly Cloudy, 30's

Non-XP Room

Heater setting (degrees F)	65
Compressor - PI-101 (PSI)	48.7
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	Yes
Motor Run Time (seconds)	5274215
Number of air filters remaining	6
Bucket emptied?	No
PI-102 (PSI)	55
PI-103 (PSI)	55
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	115
Comments	Checked air filter (good). Checked oil level (good).

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Rest Cycle
PIT-101 (PSI)	53.2
PIT-102 (PSI)	63.5
FQI-101 (LPM)	8.1
PIT-202 (PSI)	0
FQI-201 (LPM)	0
FE-301 (LPM)	8.2
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	53.4
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	38

Propane Changed?	No
PI-201 (PSI)	71
PI-202 (PSI)	45
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	5
PI-300 (PSI)	3
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	10
PI-303 (PSI) - Zone 3	10
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	7
AS-19-A03 Wellhead Pressure	17
AS-19-A04 Wellhead Pressure	10
AS-19-A05 Wellhead Pressure	16
AS-19-A06 Wellhead Pressure	4
AS-19-A07 Wellhead Pressure	9
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	Yes
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	No
Condensate volume in drum	2
Any equipment that needs to be ordered?	No
Any other comments or concerns?	No

Signature

Signed 2019-11-18 21:54:35 UTC

Departure Time	17:45

2020-01-10

Created	2020-01-10 17:17:24 UTC by Billy Cobern
Updated	2020-01-10 18:33:03 UTC by Billy Cobern
Location	42.7421191335122, -84.5879633725477
Date	2020-01-10
Time	12:17
Personnel	Billy J Cobern
Weather	Cloudy, 40's, misty

Non-XP Room

Heater setting (degrees F)	65
Compressor - PI-101 (PSI)	125
Oil change on the compressor?	Yes
Do we need more oil?	No
Air filter changed?	Yes
Air compressor cleaned?	Yes
Motor Run Time (seconds)	5619636
Number of air filters remaining	5
Approximate volume of condensation in can	0
Bucket emptied?	No
PI-102 (PSI)	58
PI-103 (PSI)	54
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	8
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	125
Comments	Cleaned heat exchanger and belt guard.

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Rest Cycle
PIT-101 (PSI)	54.1
PIT-102 (PSI)	64.5
FQI-101 (LPM)	3.1
PIT-202 (PSI)	-7.5
FQI-201 (LPM)	0
FE-301 (LPM)	3.1
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	54.4
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	25
Propane Changed?	No
PI-201 (PSI)	0
PI-202 (PSI)	0
FI-350 (LPM)	2
PI-300 (PSI)	0
PI-301 (PSI) - Zone 1	10
PI-302 (PSI) - Zone 2	8
PI-303 (PSI) - Zone 3	10
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Ambient LEL (Handheld 4-gas meter) (%LEL)	0
Trash removed from system building?	No
Comments	Oil and oil filter changed. Air filter changed. Greased compressor motor.

Outdoors

AS-19-A01 Wellhead Pressure	9
AS-19-A02 Wellhead Pressure	5
AS-19-A03 Wellhead Pressure	9
AS-19-A04 Wellhead Pressure	9
AS-19-A05 Wellhead Pressure	10
AS-19-A06 Wellhead Pressure	0
AS-19-A07 Wellhead Pressure	8
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	No
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	No
Condensate volume in drum	9
Any equipment that needs to be ordered?	Compressor oil

Signature

Signed 2020-01-10 17:44:57 UTC

Departure Time	13:45

2020-03-06

Created	2020-03-06 14:56:40 UTC by Billy Cobern
Updated	2020-03-06 16:46:50 UTC by Billy Cobern
Location	42.7421032078962, -84.5879364666385
Date	2020-03-06
Time	09:56
Personnel	Billy J Cobern
Weather	Cloudy, rainy, 30's

Non-XP Room

Heater setting (degrees F)	70
Compressor - PI-101 (PSI)	125
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	No
Motor Run Time (seconds)	5908699
Number of air filters remaining	5
Approximate volume of condensation in can	8.5
Bucket emptied?	No
PI-102 (PSI)	50
PI-103 (PSI)	50
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	7.5
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	120
Comments	Air Compressor oil level good, greased air compressor motor

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 2 (AS-17-04)
PIT-101 (PSI)	49.4
PIT-102 (PSI)	28.2
FQI-101 (LPM)	199.8
PIT-202 (PSI)	25.6
FQI-201 (LPM)	0
FE-301 (LPM)	199.9
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	15.6
Cycle counter calibrated?	No
PLC Time Adjusted?	No
Comments	No Alarms

XP Room

Propane tank weight (lbs)	21
Propane Changed?	Yes
PI-201 (PSI)	75
PI-202 (PSI)	43
FI-350 (LPM)	1
PI-300 (PSI)	3
PI-301 (PSI) - Zone 1	13
PI-302 (PSI) - Zone 2	14
PI-303 (PSI) - Zone 3	7
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Ambient LEL (Handheld 4-gas meter) (%LEL)	0
Trash removed from system building?	No
Comments	11:45 Reset all alarms

Outdoors

AS-19-A01 Wellhead Pressure	15
AS-19-A02 Wellhead Pressure	2
AS-19-A03 Wellhead Pressure	13
AS-19-A04 Wellhead Pressure	15
AS-19-A05 Wellhead Pressure	14
AS-19-A06 Wellhead Pressure	1
AS-19-A07 Wellhead Pressure	14
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	No
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	No
Condensate volume in drum	8.5
Any equipment that needs to be ordered?	No

Signature

Signed 2020-03-06 15:30:20 UTC

Departure Time	12:00

2020-03-31

Created	2020-03-31 16:52:53 UTC by Billy Cobern
Updated	2020-03-31 17:34:21 UTC by Billy Cobern
Location	42.7421319578241, -84.5879886858953
Date	2020-03-31
Time	12:52
Personnel	Billy J Cobern
Weather	Cloudy, periods of light rain, 30's

Non-XP Room

Heater setting (degrees F)	70
Compressor - PI-101 (PSI)	60
Oil change on the compressor?	Yes
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	Yes
Motor Run Time (seconds)	6122185
Number of air filters remaining	5
Approximate volume of condensation in can	9
Bucket emptied?	No
PI-102 (PSI)	52
PI-103 (PSI)	50
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	4
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	60
Comments	Air Components was on site to check the compressor. According to them the compressor is operating as it should.

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 1 (AS-17-03)
PIT-101 (PSI)	49.5
PIT-102 (PSI)	29.2
FQI-101 (LPM)	199.9
PIT-202 (PSI)	23.6
FQI-201 (LPM)	0
FE-301 (LPM)	199.7
AE-350 (%LEL)	-0.1
PIT-300 (PSI)	16.6
Cycle counter calibrated?	No
PLC Time Adjusted?	No

XP Room

Propane tank weight (lbs)	30
Propane Changed?	Yes
PI-201 (PSI)	71
PI-202 (PSI)	45
MFC-201 Mass Flow (LPM)	0
FI-350 (LPM)	1.5
PI-300 (PSI)	18
PI-301 (PSI) - Zone 1	12
PI-302 (PSI) - Zone 2	10
PI-303 (PSI) - Zone 3	16
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	No
In-Line LEL AE-350 (%LEL)	0
Calibrated? (quarterly)	No
Trash removed from system building?	No

Outdoors

AS-19-A01 Wellhead Pressure	12
AS-19-A02 Wellhead Pressure	12.5
AS-19-A03 Wellhead Pressure	11
AS-19-A04 Wellhead Pressure	12
AS-19-A05 Wellhead Pressure	12
AS-19-A06 Wellhead Pressure	7
AS-19-A07 Wellhead Pressure	11
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	No
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	No
Condensate volume in drum	9

Photos

Any equipment that needs to be ordered?	No
Any other comments or concerns?	Recorded a 1 minute video for future reference. ALICAT temperature is 56.45.

Signature

Signed 2020-03-31 17:13:10 UTC

Departure Time	13:45

2020-05-13

Created	2020-05-13 14:18:43 UTC by Daniel Stockard
Updated	2020-05-13 14:38:48 UTC by Daniel Stockard
Location	42.7420927305173, -84.5877854247434
Date	2020-05-13
Time	10:18
Personnel	D. Stockard
Weather	Sunny, 50s

Non-XP Room

Heater setting (degrees F)	0
Compressor - PI-101 (PSI)	70
Oil change on the compressor?	No
Do we need more oil?	No
Air filter changed?	No
Air compressor cleaned?	Yes
Motor Run Time (seconds)	6491208
Number of air filters remaining	5
Approximate volume of condensation in can	25
Bucket emptied?	No
PI-102 (PSI)	50
PI-103 (PSI)	50
Red Coalescing Filter (PSI)	0
Coalescing filters emptied and cleaned?	No
Trident dessicant dryer left meter green?	Yes
Pressure of trident dessicant dryer	3
Trident dessicant dryer right meter green?	Yes
Dried air tank (old compressor) pressure	60
Comments	Compressor unloader appears to be nonfunctional. Will take apart to diagnose.

PLC

PLC display operating (not frozen)?	Yes
Current Cycle	Zone 2 (AS-17-04)
PIT-101 (PSI)	49.6
PIT-102 (PSI)	28.3
FQI-101 (LPM)	0.5
PIT-202 (PSI)	28.4
FQI-201 (LPM)	0.5
FE-301 (LPM)	200.4
AE-350 (%LEL)	8.4
PIT-300 (PSI)	15.6
Cycle counter calibrated?	Yes
PLC Time Adjusted?	Yes

XP Room

Propane tank weight (lbs)	60
Propane Changed?	Yes
PI-201 (PSI)	100
PI-202 (PSI)	30
MFC-201 Mass Flow (LPM)	0.264
FI-350 (LPM)	1
PI-300 (PSI)	16
PI-301 (PSI) - Zone 1	11
PI-302 (PSI) - Zone 2	14
PI-303 (PSI) - Zone 3	8
Ambient LEL AE-401 (% LEL)	0
Calibrated? (quarterly)	Yes
In-Line LEL AE-350 (%LEL)	8
Calibrated? (quarterly)	Yes
Ambient LEL (Handheld 4-gas meter) (%LEL)	0
Trash removed from system building?	Yes
Comments	GWS inventory: 9 rolls of poly tubing, 54 bladders, ~30 ft flex tubing, approx 10 field filters

Outdoors

AS-19-A01 Wellhead Pressure	15
AS-19-A02 Wellhead Pressure	12
AS-19-A03 Wellhead Pressure	15
AS-19-A04 Wellhead Pressure	14
AS-19-A05 Wellhead Pressure	18
AS-19-A06 Wellhead Pressure	13
AS-19-A07 Wellhead Pressure	10
For the following section, collect a DO profile from TW-14-06. Set the DO datalogger to record every one minute. Record the time. Lower the DO probe to the bottom of the well, wait two minutes. Raise it one foot, wait two minutes. Repeat until the DO probe is 5 feet above the bottom of the well. Then download the data and verify a profile was collected successfully.	
DO Profile collected, downloaded, and hobo file sent to project team?	No
Check with the project team on if we want to collect DO readings from any other wells	
DO readings collected from other wells?	No
Any other comments or concerns?	Wellhead pressure gauges on as-19-a01 and 06 are stuck reading high.

Signature	
	Signed 2020-05-13 10:38:37 EDT
Departure Time	10:38

Inspection Date	August 3, 2020
Last Quarterly Event Date	
Arrival Time	08:34
Personnel	Cobern, Stockard, Veenstra, Mandich
Weather	Cloudy, Humid, 70's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	49.5
PIT-102 (PSIA)	31.8
FQI-101 (SLPM)	299.8
FQI-201 (SLPM)	200
PIT-202 (PSIA)	28.3
FE-301 (LPM)	299.7
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?	Yes
Comments	

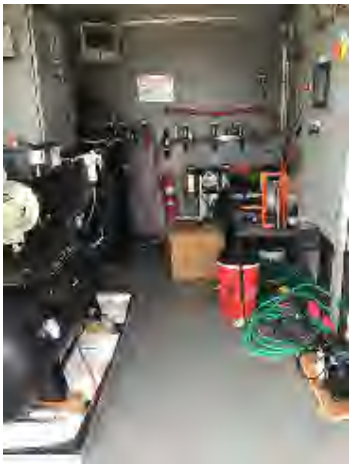
Non-classified Room

Fire Extinguisher Check	Needle in the green, All moving parts appear intact, No deformation
Heater set to turn on and operation verified?	No
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	262
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	1
Number of air filters remaining	4
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)	14.8
Motor RPMs while loading	1734
VFD thermal state	33
VFD line voltage in (while compressor is loading)	233
Wet receiver tank loading pressure (PI-101)	68
Wet receiver tank unloading pressure (PI-101)	85
How full is the condensate drum? (Gallons)	20
PI-102 (PSIG)	50
PI-103 (PSIG)	50
Trident Desiccant Dryer Pressure (PSIG)	75
Are the trident desiccant dryer meters green?	Yes
Biweekly Non-XP Instrument Maintenance	System depressurized to drain filter chambers, PF-101 drained manually, PF-102 needle green, PF-102 needle yellow or red, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, PF-103 needle yellow or red, Actuate S-101 to ensure it is working properly, CF-102 needle green, CF-102 needle yellow or red, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	Check and clean PF-101, Check, clean, and replace filter element on CF-101, Check PF-102 filter element and inform TM if it needs to be replaced, Check PF-103 filter element and inform TM if it needs to be replaced, Open and clean CF-102, inform TM if element needs to be replaced, Open and check PF-104, inform TM if element needs to be replaced, Open desiccant dryer towers, take picture, note condition in the comments (Q2 and Q4)
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	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)	169.16
MFC-101 standardized flow rate on display (SLPM)	299.9

MFC-101 uncorrected flow rate on display (LPM)	145.1
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)	120
PI-202 (PSIG)	55
MFC-201 temperature (Fahrenheit)	171.32
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)	0.291
PI-300 (PSIG)	14
PI-301 Z1 (PSIG)	14
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	8
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated

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

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	9
AS-19-A03 Wellhead Pressure (PSIG)	14
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	10
AS-19-A06 Wellhead Pressure (PSIG)	9
AS-19-A07 Wellhead Pressure (PSIG)	13
Number of condensate drums outside	1

Drum Photo

Electric Meter Reading (kWh)	26878
Electric meter power draw (kW) while compressor is on	5.1
Last fire extinguisher certification date	July 25, 2020
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 8/3/2020, 9:36:31 PM UTC
Departure Time	13:40

Inspection Date	September 3, 2020
Last Quarterly Event Date	
Arrival Time	07:45
Personnel	Billy
Weather	Partly Cloudy 60's-80's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Rest
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	54.8
PIT-102 (PSIA)	64.8
FQI-101 (SLPM)	4.4
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.2
FE-301 (LPM)	4.3
AE-350 (%LEL)	0
PIT-300 (PSIG)	54.7
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	837
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	Done
Oil sample taken?	No
Number of routine maintenance kits remaining	3
Number of air filters remaining	3
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)	13.8
Motor RPMs while loading	1750
VFD thermal state	30
VFD line voltage in (while compressor is loading)	232
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	68
How full is the condensate drum? (Gallons)	24
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	PF-102 needle green, PF-101 drained manually, System depressurized to drain filter chambers, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	Check and clean PF-101, Check, clean, and replace filter element on CF-101, Check PF-102 filter element and inform TM if it needs to be replaced, Check PF-103 filter element and inform TM if it needs to be replaced, Open and clean CF-102, inform TM if element needs to be replaced, Open and check PF-104, inform TM if element needs to be replaced
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	76.06
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	146

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)	78.8
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)	11
PI-301 Z1 (PSIG)	12
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	10
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)

Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	4
AS-19-A03 Wellhead Pressure (PSIG)	13
AS-19-A04 Wellhead Pressure (PSIG)	10
AS-19-A05 Wellhead Pressure (PSIG)	14
AS-19-A06 Wellhead Pressure (PSIG)	0
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1

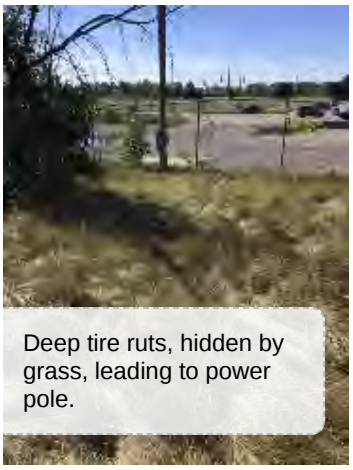
Drum Photo

Electric Meter Reading (kWh)	29268
Electric meter power draw (kW) while compressor is on	5
Last fire extinguisher certification date	August 3, 2020

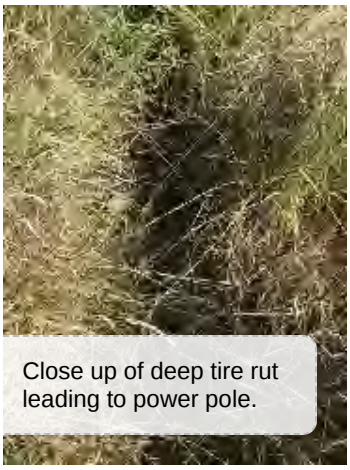
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos



Deep tire ruts, hidden by grass, leading to power pole.



Close up of deep tire rut leading to power pole.

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 9/3/2020, 2:00:02 PM UTC
Departure Time	10:10

Inspection Date	September 29, 2020
Last Quarterly Event Date	September 3, 2020
Arrival Time	10:31
Personnel	Billy J Cobern Marina Samp
Weather	Partly Cloudy 50's

HMI and Control Panel

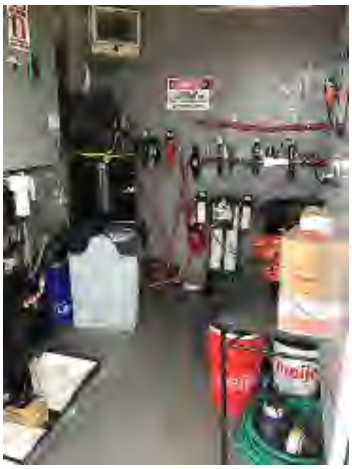
HMI display functioning (not frozen)?	Yes
Current zone	Zone 2
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0.6
PIT-101 (PSIG)	49.6
PIT-102 (PSIA)	28.6
FQI-101 (SLPM)	300
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.2
FE-301 (LPM)	299.9
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.8
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
Comments	

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	1363
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	3
Compressor Audio	1 Audio File
Do we need more compressor oil? (Less than a gallon remaining)	No
Motor voltage while loading	241
Motor Current while loading (amps)	14.68
Motor RPMs while loading	1800
VFD thermal state	64
VFD line voltage in (while compressor is loading)	208
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	67
How full is the condensate drum? (Gallons)	44
PI-102 (PSIG)	48
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, Verify the desiccant dryer is cycling properly, Verify the silencers on the desiccant dryer are not clogged, PF-103 needle green, Actuate S-101 to ensure it is working properly, CF-102 needle green, Make sure there are no tripped breakers in the breaker panel, Breaker panel surge protector green light on
Quarterly Filter Maintenance	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	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)	69.37
MFC-101 standardized flow rate on display (SLPM)	299.8
MFC-101 uncorrected flow rate on display (LPM)	147.2
Comments	

Non-XP room photo



Classified Room

First Aid Kit Expiration Date	September 29, 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)	77.07
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)	12
PI-301 Z1 (PSIG)	13
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	0
Quarterly LEL Meter Calibration	

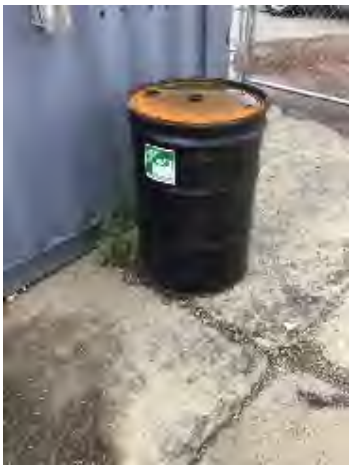
Which propane Alicat is in use (upon leaving system)?	MFC-201B (newer, use August through February)
Comments	

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	5
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)	0
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	1

Drum Photo



Electric Meter Reading (kWh)	31201
Electric meter power draw (kW) while compressor is on	4.85

Last fire extinguisher certification date	August 29, 2020
Quarterly Building Maintenance Tasks	

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	Transferred 36.5 gallons of condensate from interior drum to exterior drum
Signature	Signed 9/29/2020, 10:11:10 PM UTC
Departure Time	14:15

Inspection Date	October 30, 2020
Last Quarterly Event Date	September 29, 2020
Arrival Time	10:30
Personnel	Billy J Cobern
Weather	Cloudy, 30's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 3
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0
PIT-101 (PSIG)	49.5
PIT-102 (PSIA)	28.9
FQI-101 (SLPM)	299.9
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.3
FE-301 (LPM)	300.5
AE-350 (%LEL)	0
PIT-300 (PSIG)	16.2
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	1960
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	3
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)	14.8
Motor RPMs while loading	1800
VFD thermal state	65
VFD line voltage in (while compressor is loading)	227
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	68
How full is the condensate drum? (Gallons)	24
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	
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	80
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)	61.18
MFC-101 standardized flow rate on display (SLPM)	300
MFC-101 uncorrected flow rate on display (LPM)	138.8
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	September 30, 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)	71
PI-202 (PSIG)	70
MFC-201 temperature (Fahrenheit)	69.69
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)	55
PI-301 Z1 (PSIG)	11
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	

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

XP-room photo

Outdoors and General

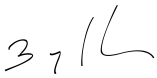
AS-19-A01 Wellhead Pressure (PSIG)	12
AS-19-A02 Wellhead Pressure (PSIG)	10
AS-19-A03 Wellhead Pressure (PSIG)	12
AS-19-A04 Wellhead Pressure (PSIG)	12
AS-19-A05 Wellhead Pressure (PSIG)	12
AS-19-A06 Wellhead Pressure (PSIG)	4
AS-19-A07 Wellhead Pressure (PSIG)	11
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	34169
Electric meter power draw (kW) while compressor is on	10.71
Last fire extinguisher certification date	September 30, 2020
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 10/30/2020, 4:03:10 PM UTC
Departure Time	13:45

Inspection Date	December 4, 2020
Last Quarterly Event Date	September 29, 2020
Arrival Time	08:30
Personnel	Billy J Cobern
Weather	Cloudy, 30's

HMI and Control Panel

HMI display functioning (not frozen)?	Yes
Current zone	Zone 1
Compressed air setpoint (LPM)	300
Propane setpoint (LPM)	0
PIT-101 (PSIG)	49.6
PIT-102 (PSIA)	27.7
FQI-101 (SLPM)	299.9
FQI-201 (SLPM)	0
PIT-202 (PSIA)	13.2
FE-301 (LPM)	300.1
AE-350 (%LEL)	0
PIT-300 (PSIG)	15.1
Ensure the time on the HMI is accurate to the minute, adjust if necessary	Verified
XP fan set to AUTO?	Yes
UPS enabled?	Yes
Comments	

Non-classified Room

Fire Extinguisher Check	Needle in the green
Heater set to turn on and operation verified?	Yes
Room fan set to turn on and operation verified?	Yes
Compressor operating hours	2592
Biweekly Compressor Maintenance	Clean the intake filter with compressed air, Clean the aftercooler with compressed air, Open and check the condensate drain, clean if necessary, Check oil levels while the compressor is turned off - oil should be at the end of the plug threads. Top off if necessary, Listen for the wet receiver tank auto-drain to turn on to confirm it is working
Quarterly Compressor Maintenance	Change the intake filter, Clean the oil filter and replace O-rings, Clean oil return valves with non-flammable solvent and replace O-rings, Change the oil (Q1 and Q3). Use only Mattei Rotoroil 8000F2

Fill out the Mattei Compressor Oil Change and Sample Tracking form on Teams	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	220
Motor Current while loading (amps)	14.87
Motor RPMs while loading	1800
VFD thermal state	56
VFD line voltage in (while compressor is loading)	227
Wet receiver tank loading pressure (PI-101)	85
Wet receiver tank unloading pressure (PI-101)	67
How full is the condensate drum? (Gallons)	42
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	Check and clean PF-101, Check, clean, and replace filter element on CF-101, Check PF-102 filter element and inform TM if it needs to be replaced, Check PF-103 filter element and inform TM if it needs to be replaced, Open and clean CF-102, inform TM if element needs to be replaced, Open and check PF-104, inform TM if element needs to be replaced, Open desiccant dryer towers, take picture, note condition in the comments (Q2 and Q4)
Desiccant Media Replaced?	No
Dried air tank pressure (PSIG)	65
Which compressed air Alicat is in use (upon leaving system)?	MFC-101B (newer, use August through February)
Verify MFC-101 flow rate	Complete
MFC-101 temperature (Fahrenheit)	58.86
MFC-101 standardized flow rate on display (SLPM)	300

MFC-101 uncorrected flow rate on display (LPM)	143.8
Comments	

Non-XP room photo

Classified Room

First Aid Kit Expiration Date	September 30, 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)	80
PI-202 (PSIG)	60
MFC-201 temperature (Fahrenheit)	74.82
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)	55
PI-301 Z1 (PSIG)	12
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	0
Quarterly LEL Meter Calibration	AE-350 calibrated, AE-401 calibrated

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

XP-room photo

Outdoors and General

AS-19-A01 Wellhead Pressure (PSIG)	10
AS-19-A02 Wellhead Pressure (PSIG)	3
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)	0
AS-19-A07 Wellhead Pressure (PSIG)	10
Number of condensate drums outside	0

Drum Photo

Electric Meter Reading (kWh)	39905
Electric meter power draw (kW) while compressor is on	10.73
Last fire extinguisher certification date	September 30, 2020
Quarterly Building Maintenance Tasks	Wipe down system components to cut down on general grime, Remove trash from the system building, Tidy up system and notify TM of unneeded sampling equipment, Take used compressor oil to Advanced Auto Parts for recycling if there is a full container of used oil

System building photo

Photos

Videos	
Any equipment that needs to be ordered?	No
Comments, questions, ruminations, suggestions for improvement?	
Signature	 Signed 12/4/2020, 6:44:41 PM UTC
Departure Time	13:45

APPENDIX B

Dissolved Oxygen Results and Graphs

Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

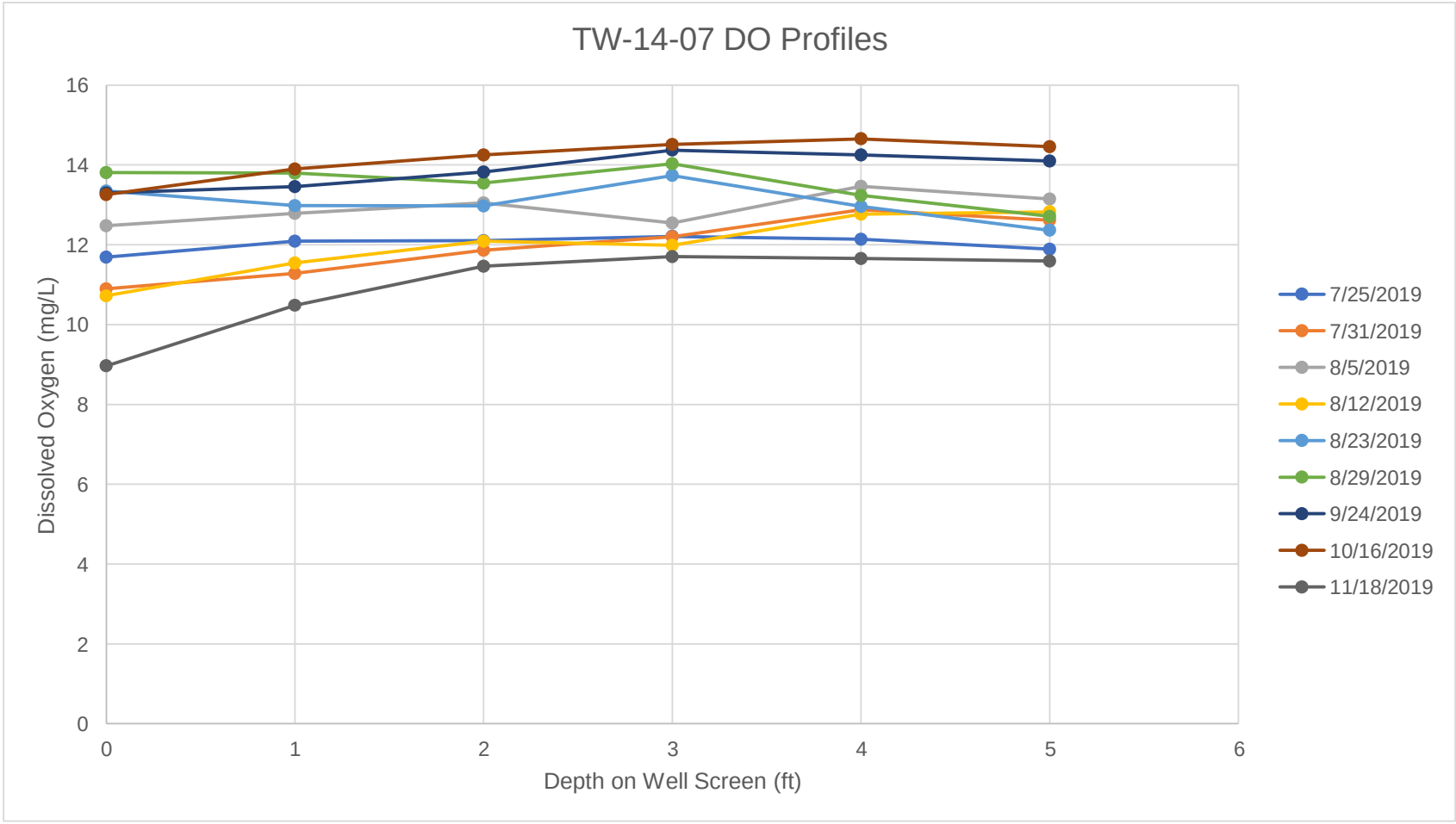


Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

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Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

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Graphs

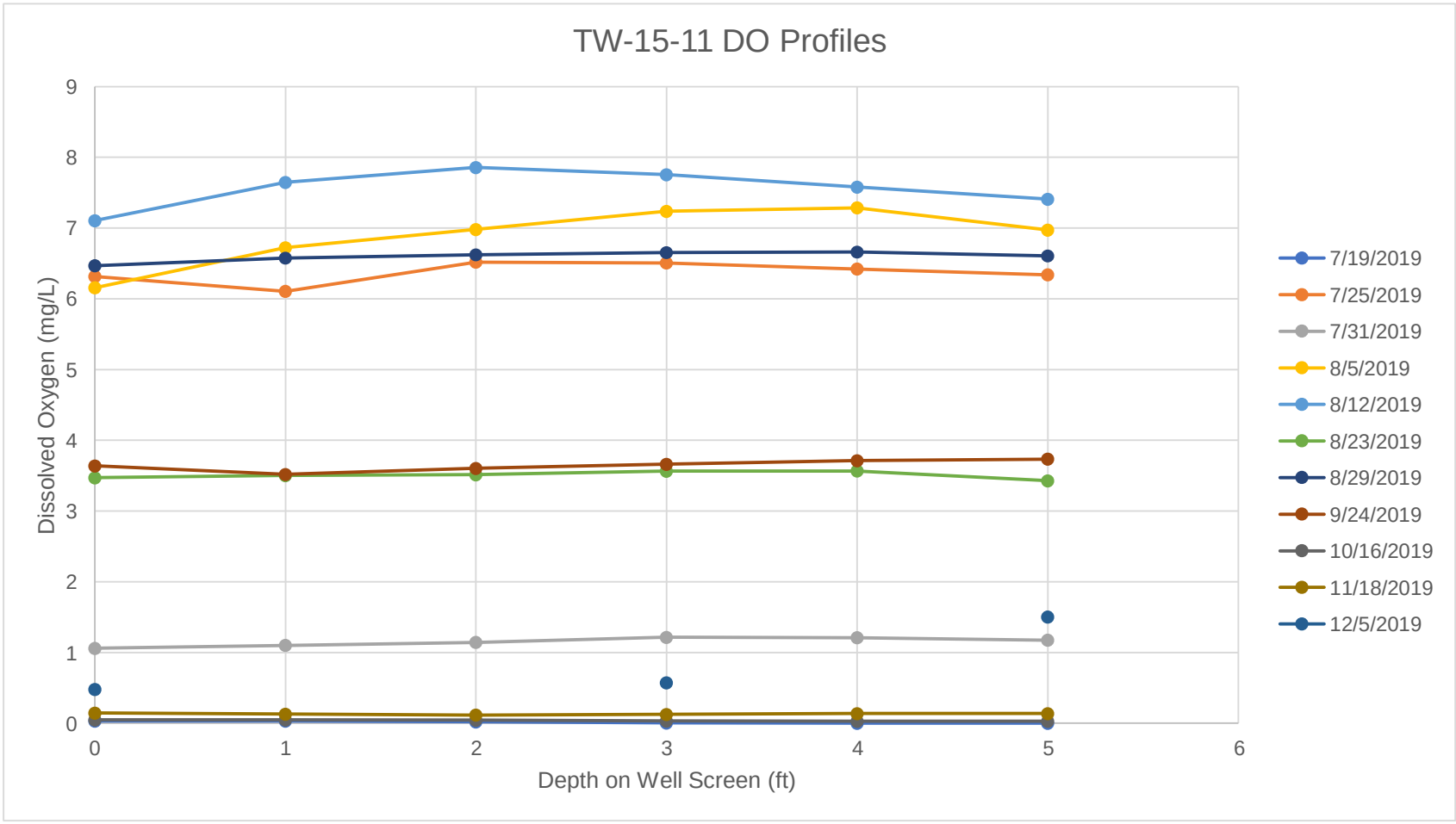


Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

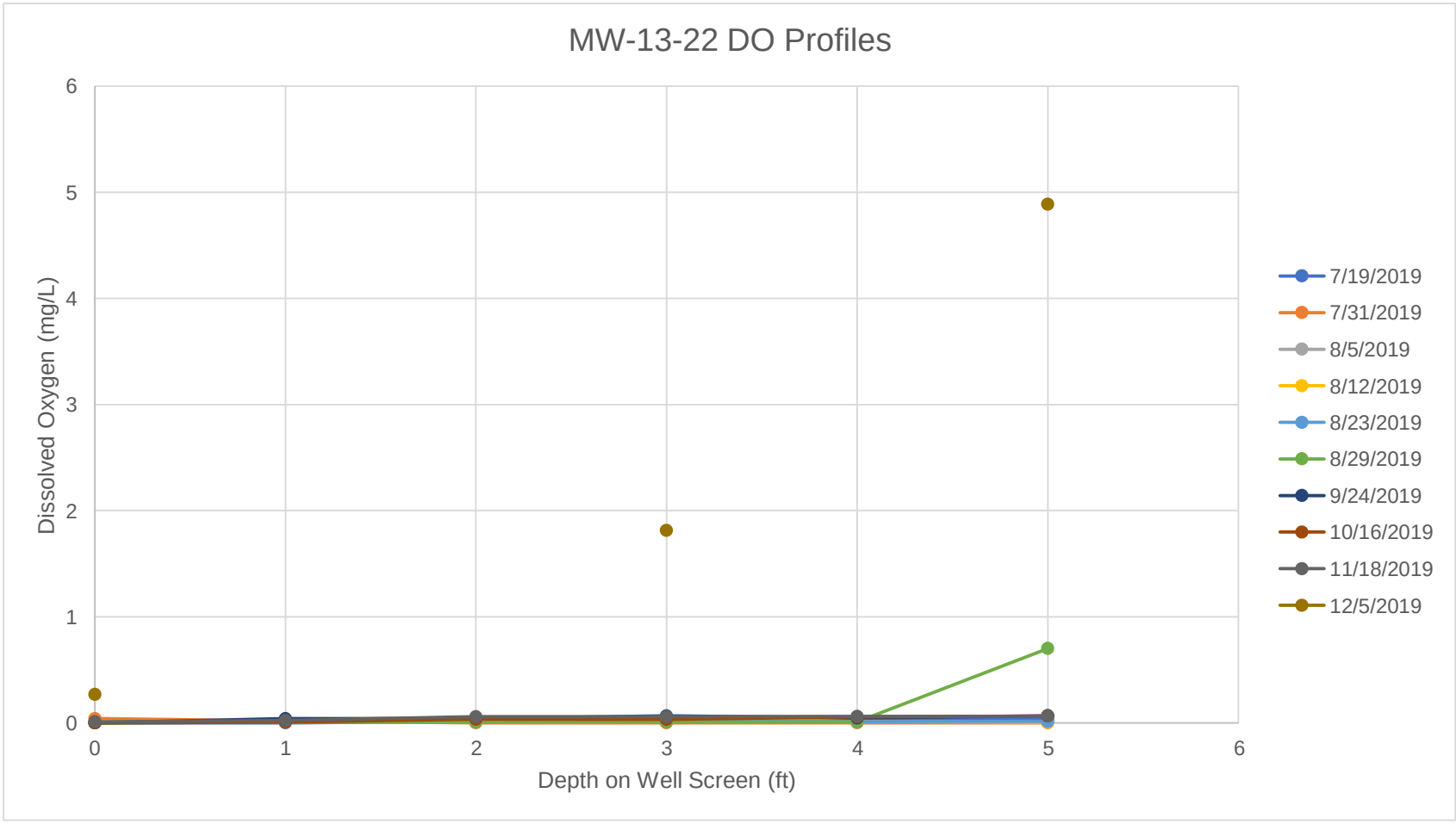


Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

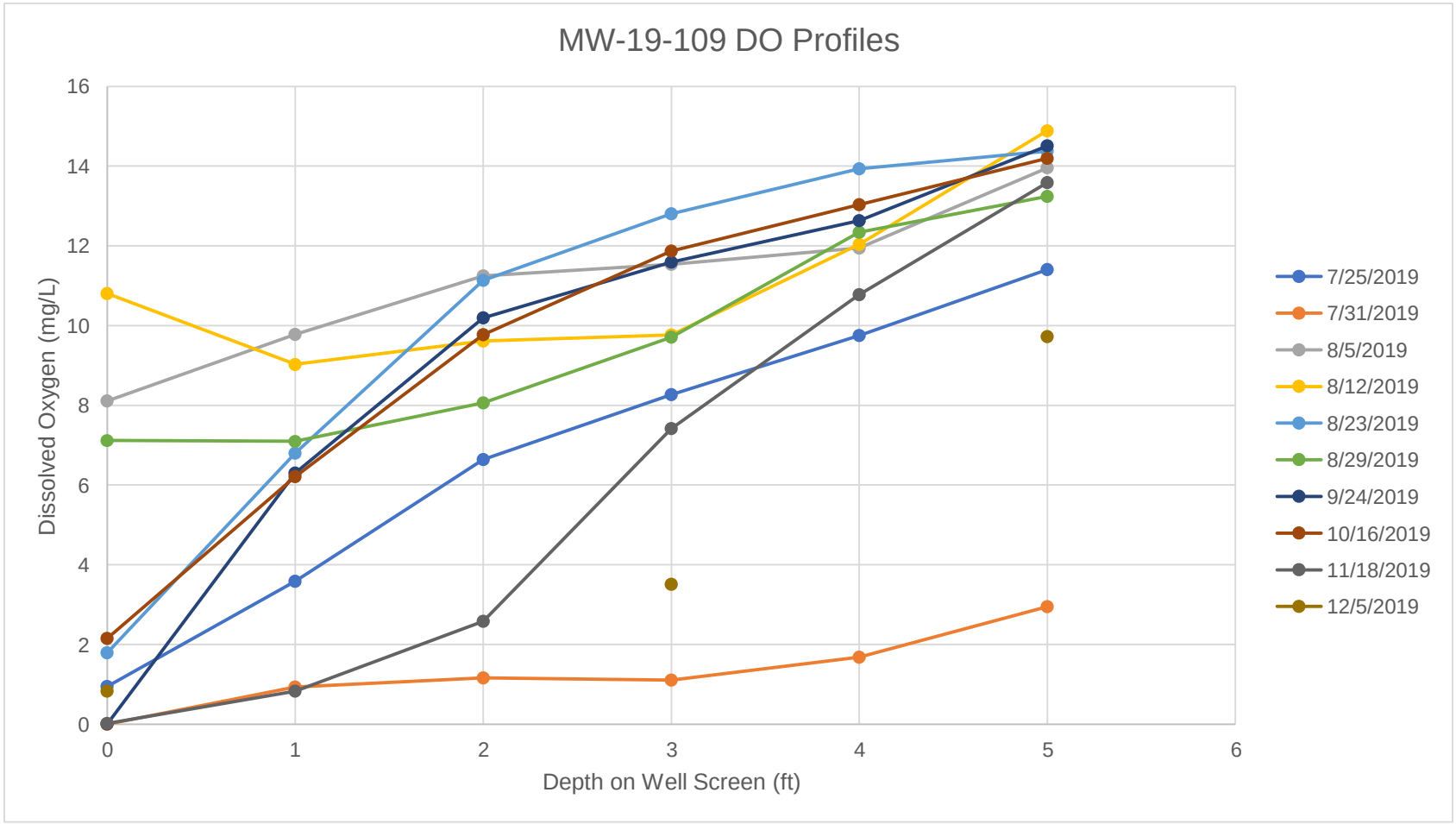


Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

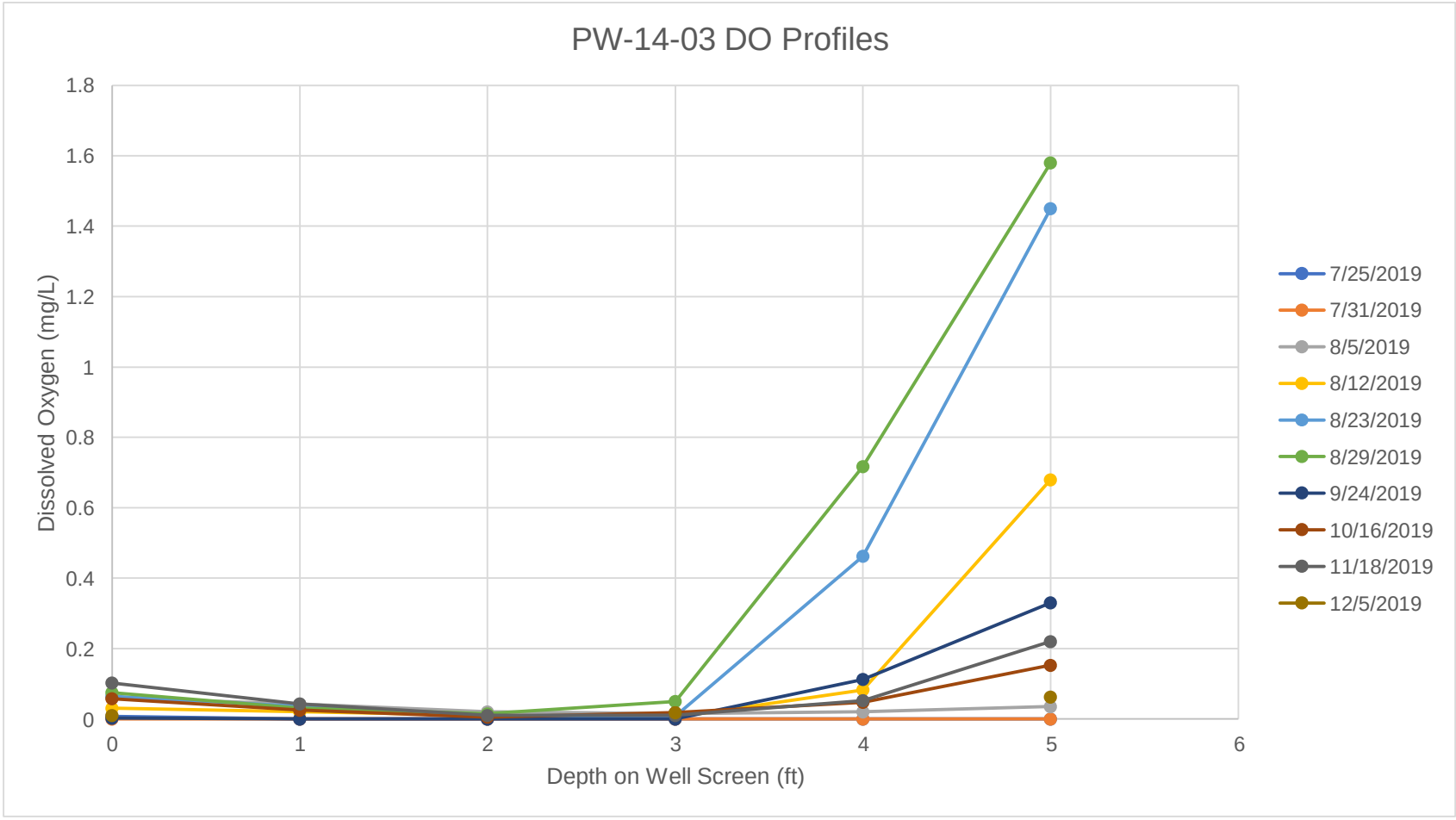


Table S-2
Plant 3 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

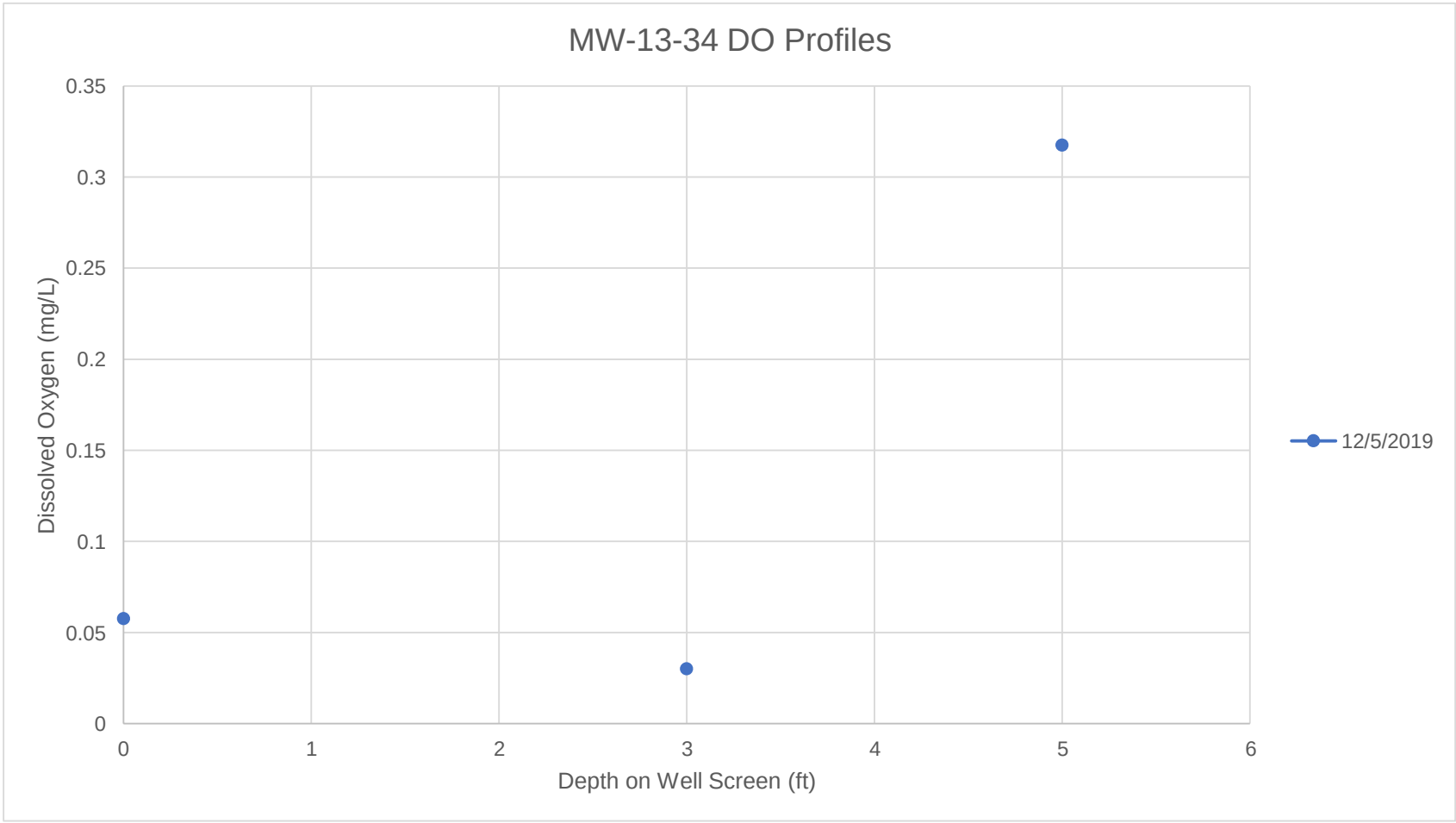


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

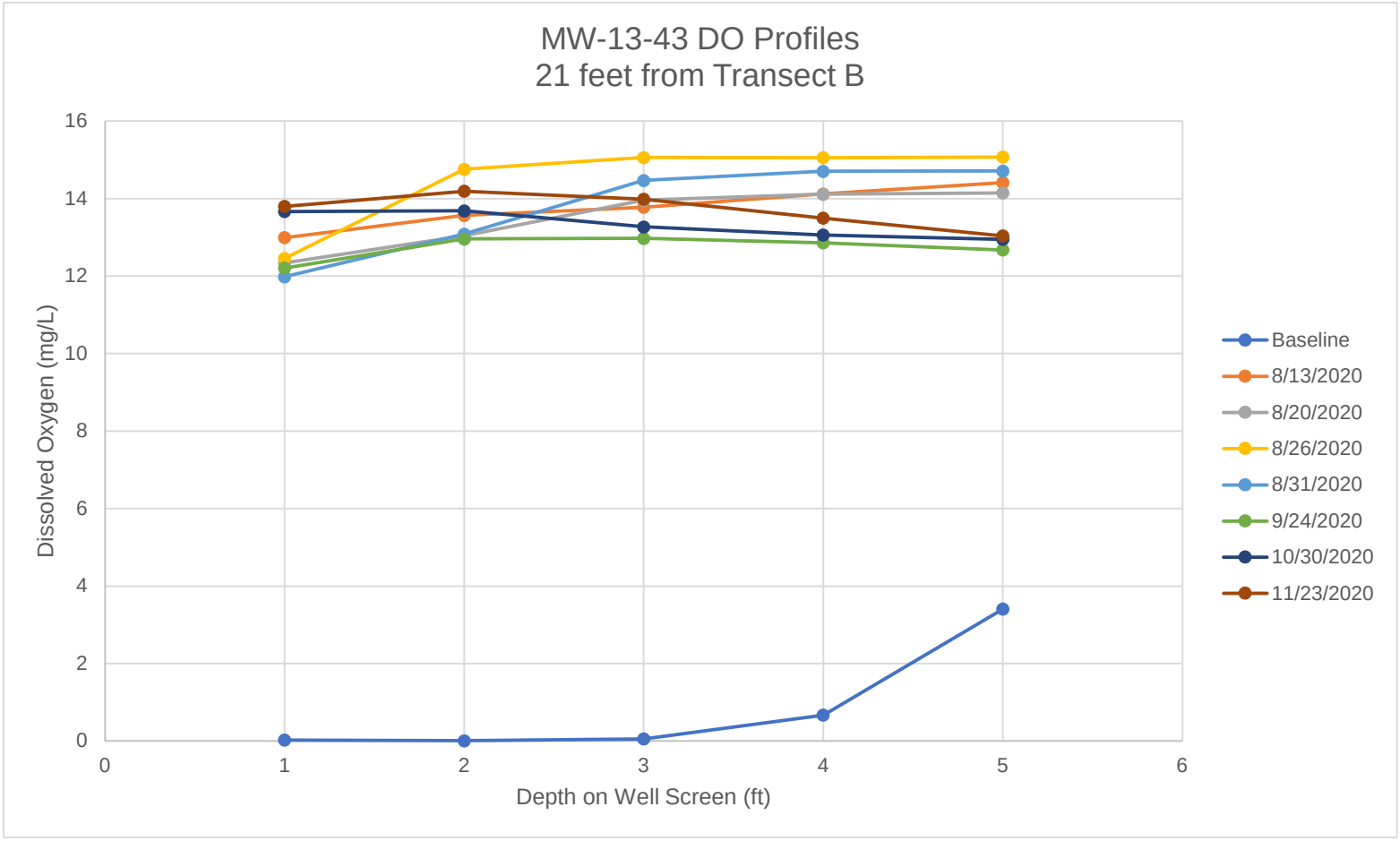


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

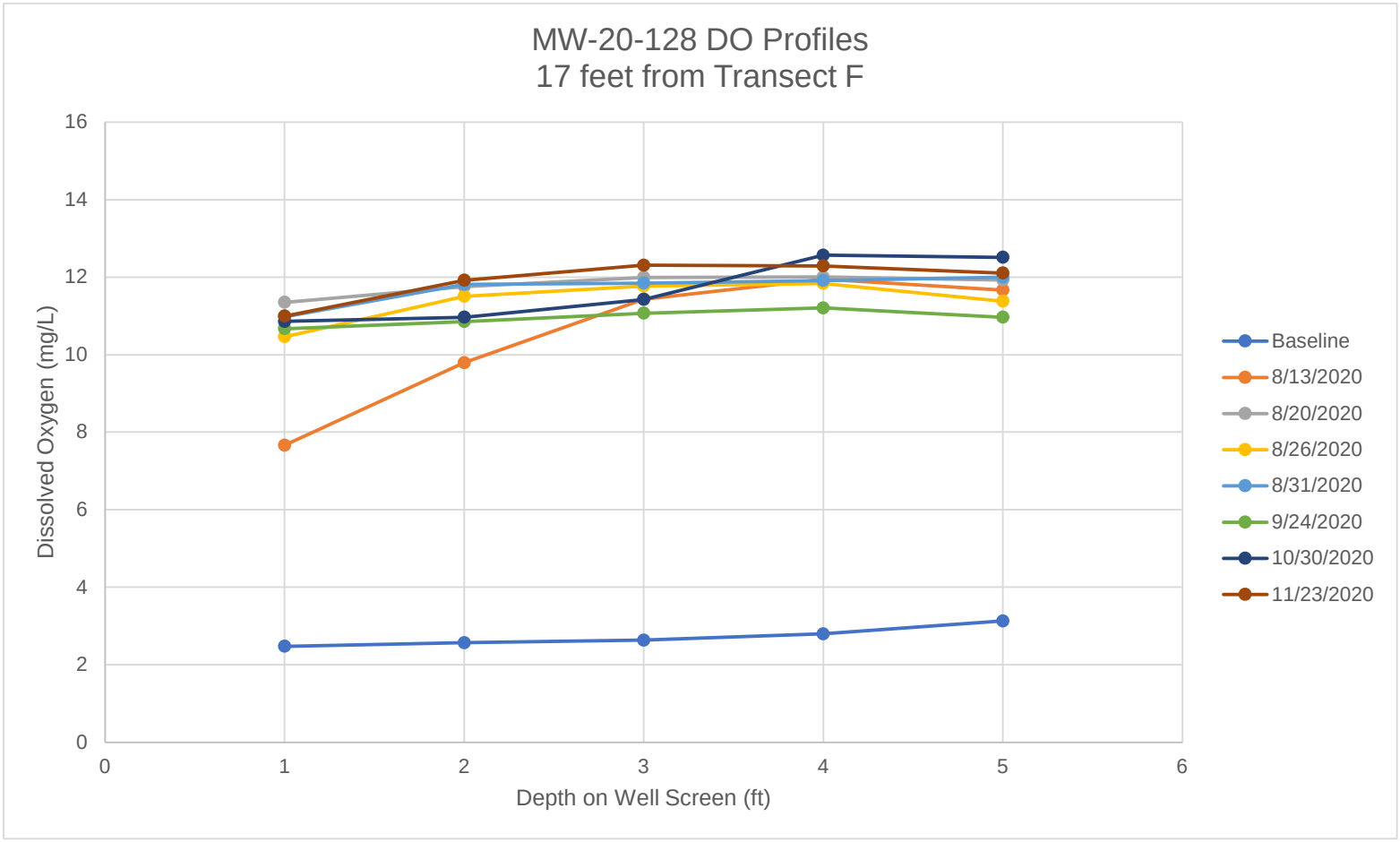


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

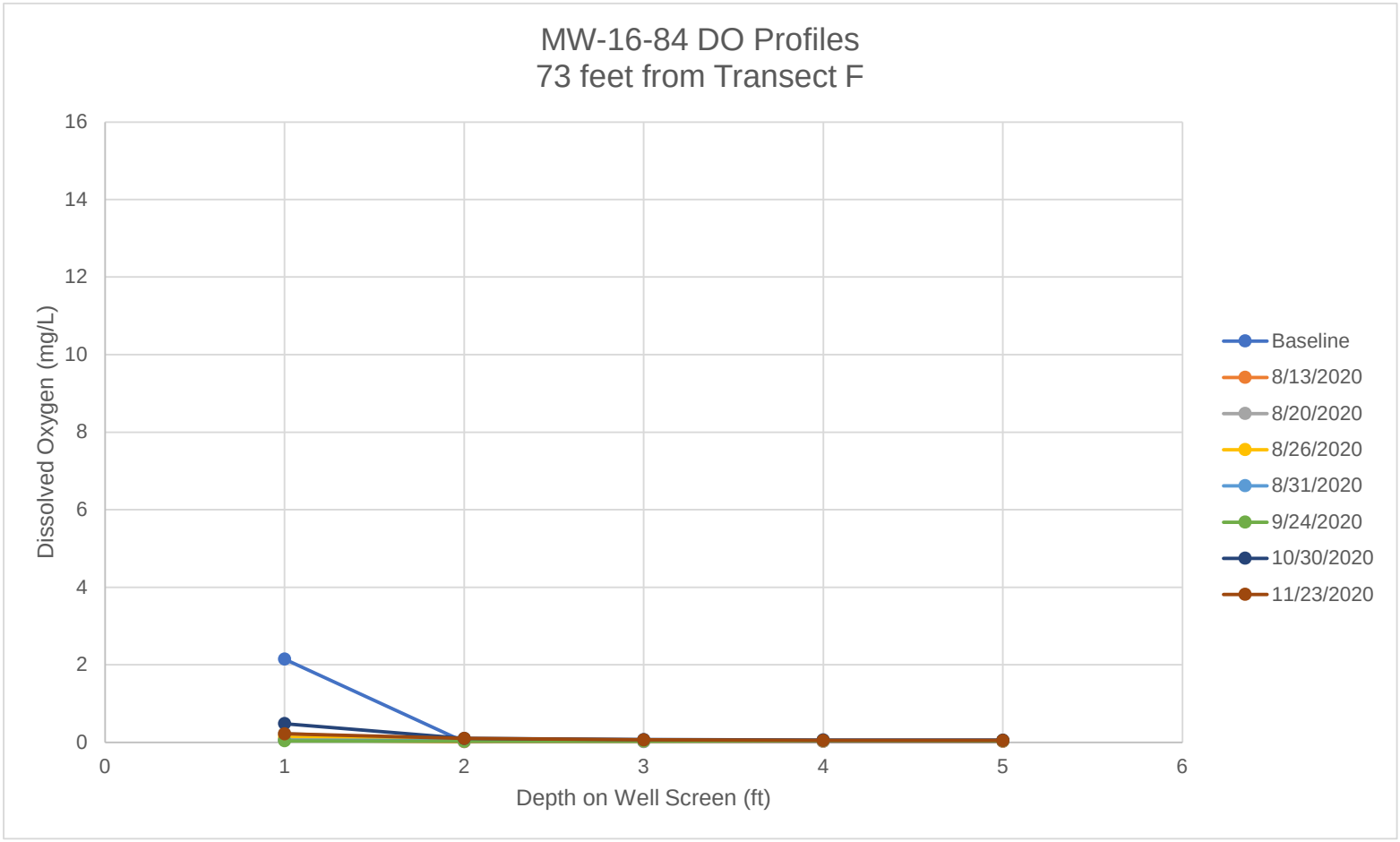


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

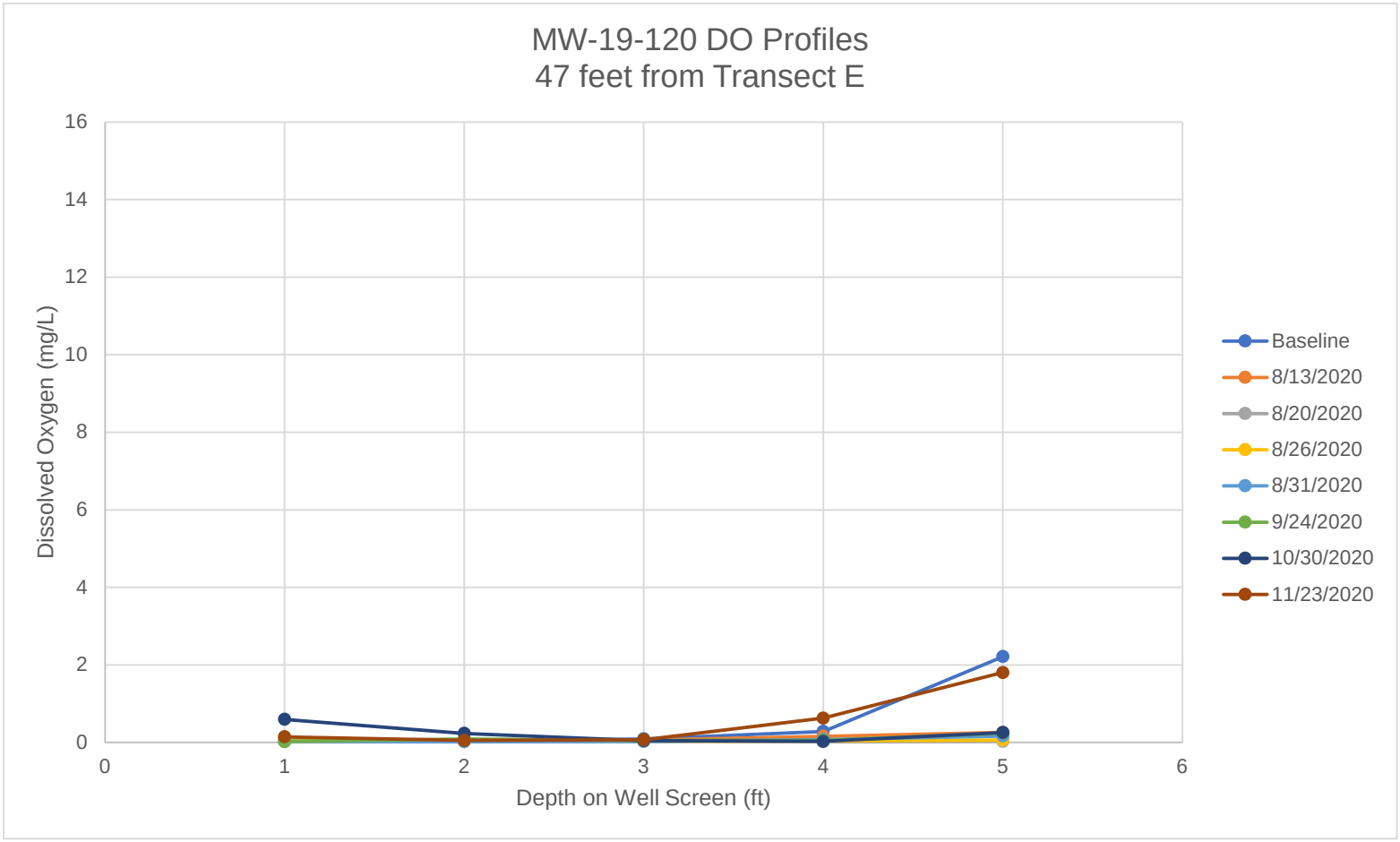


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

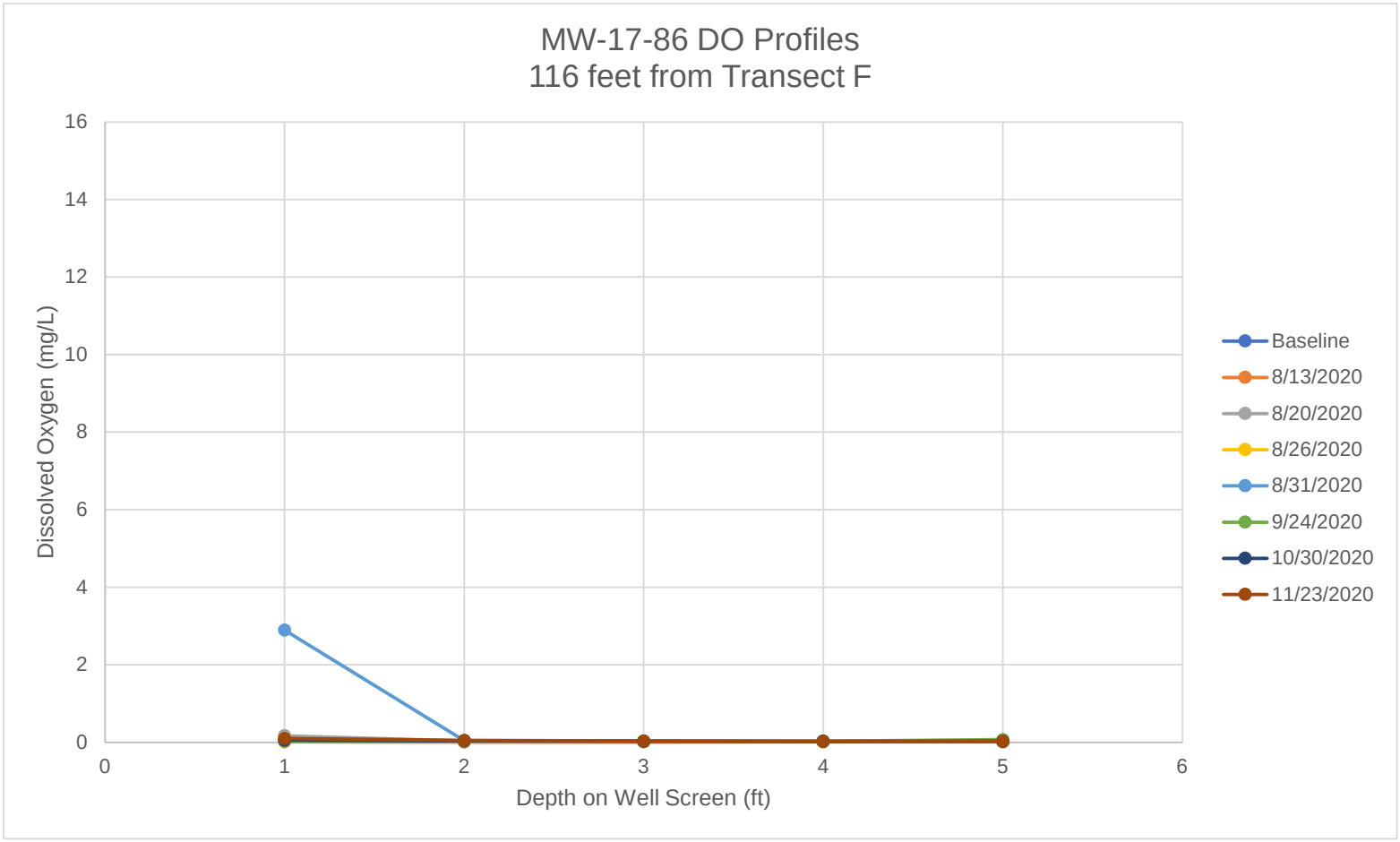


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

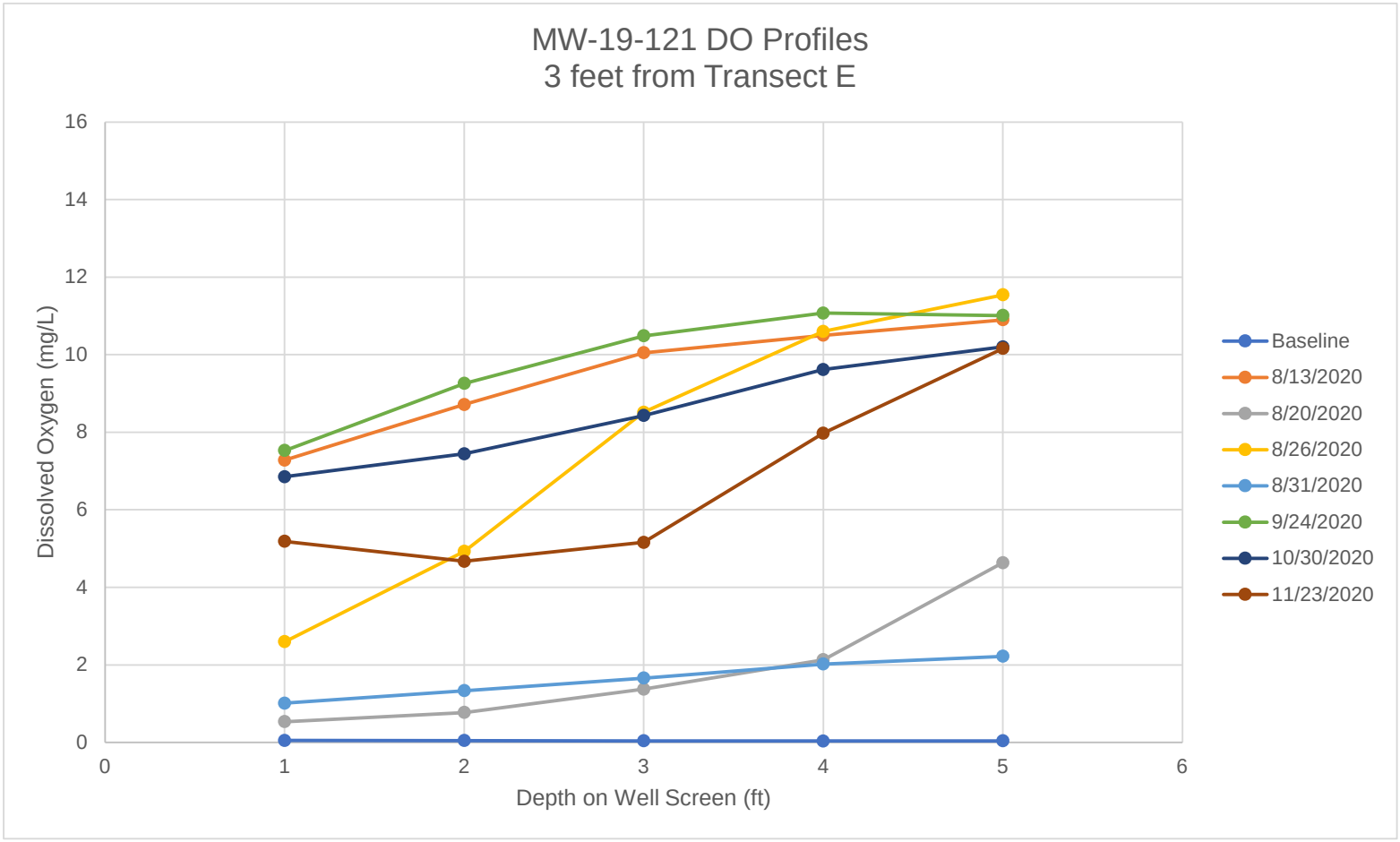


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

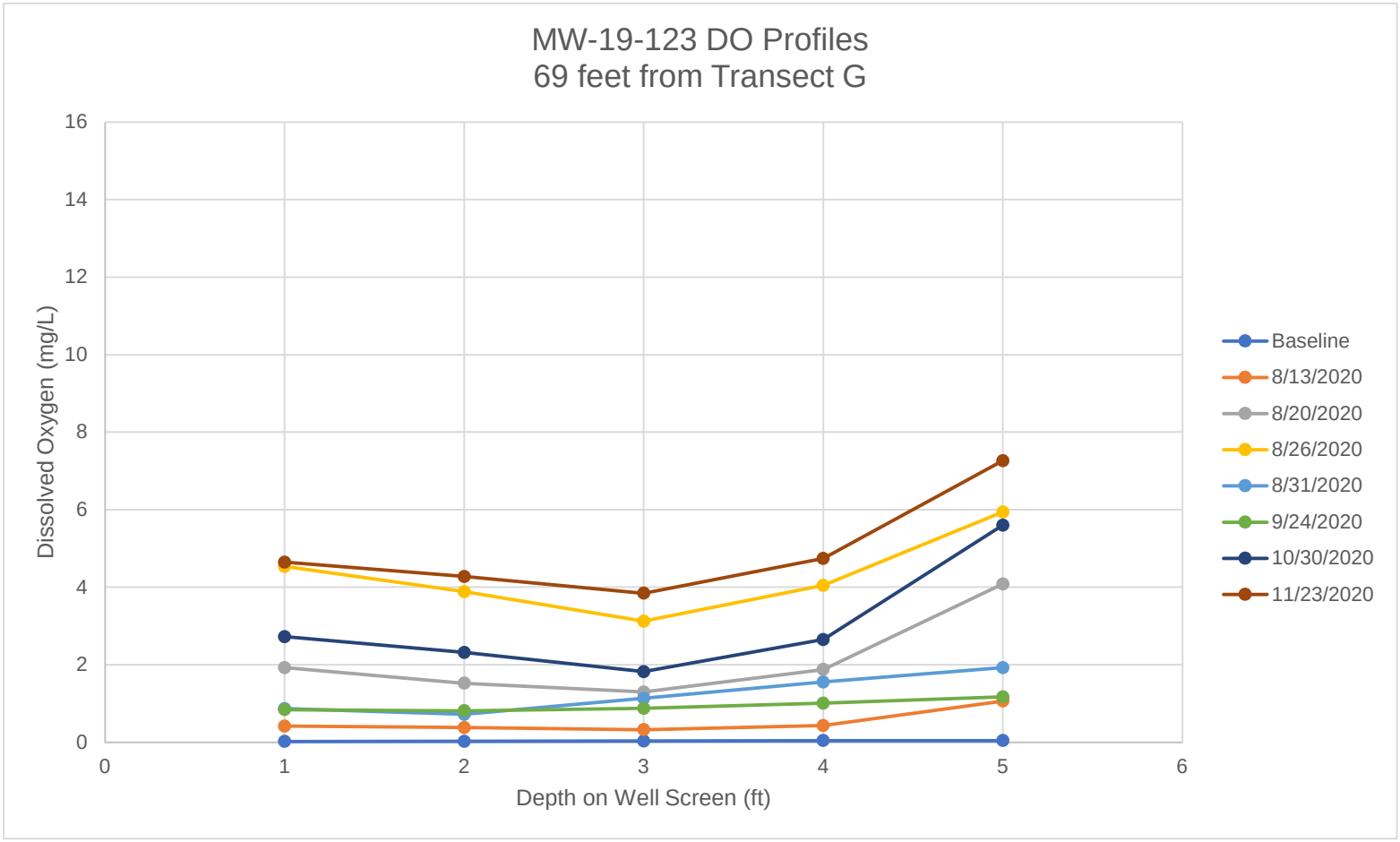


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

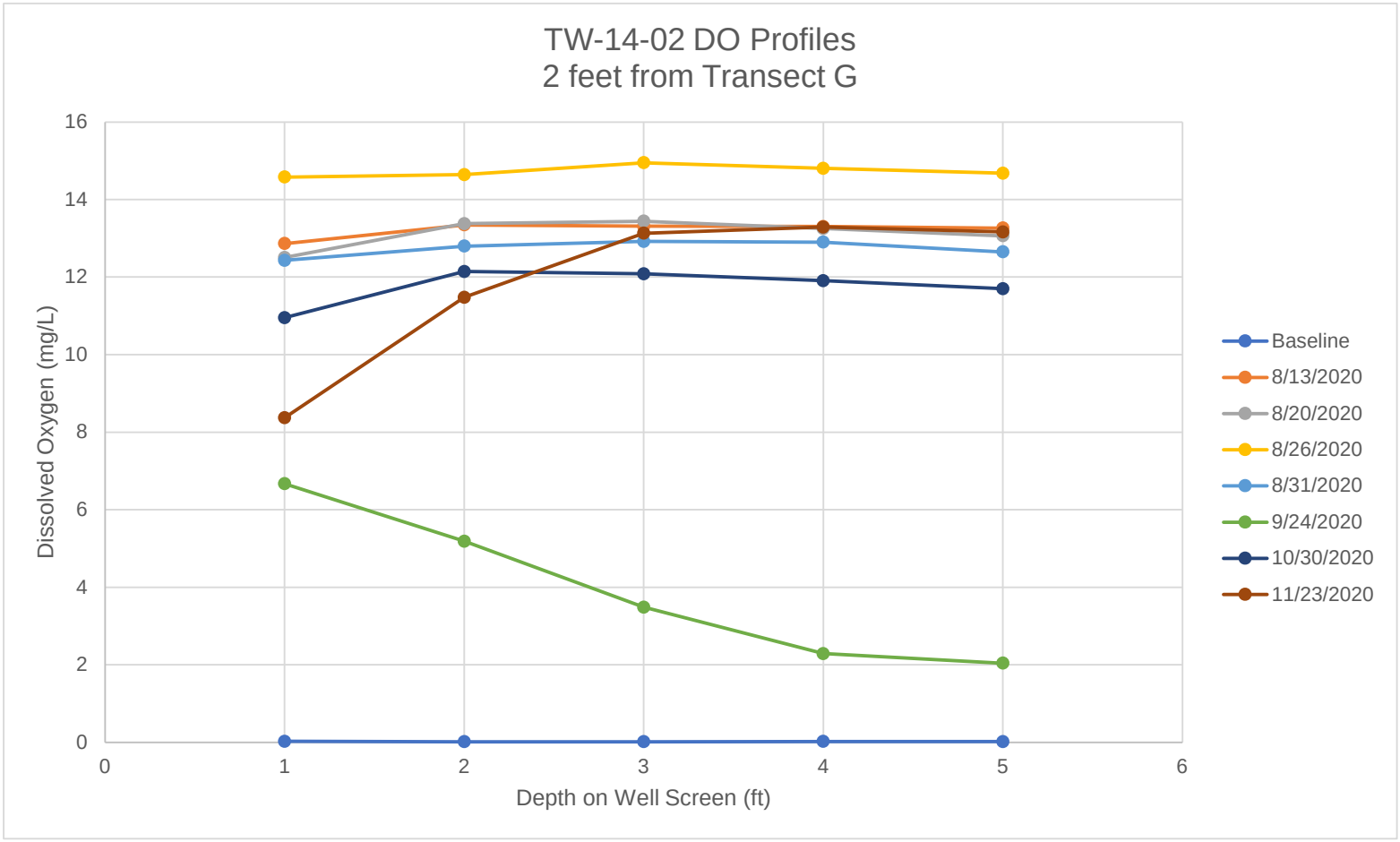


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

Graphs

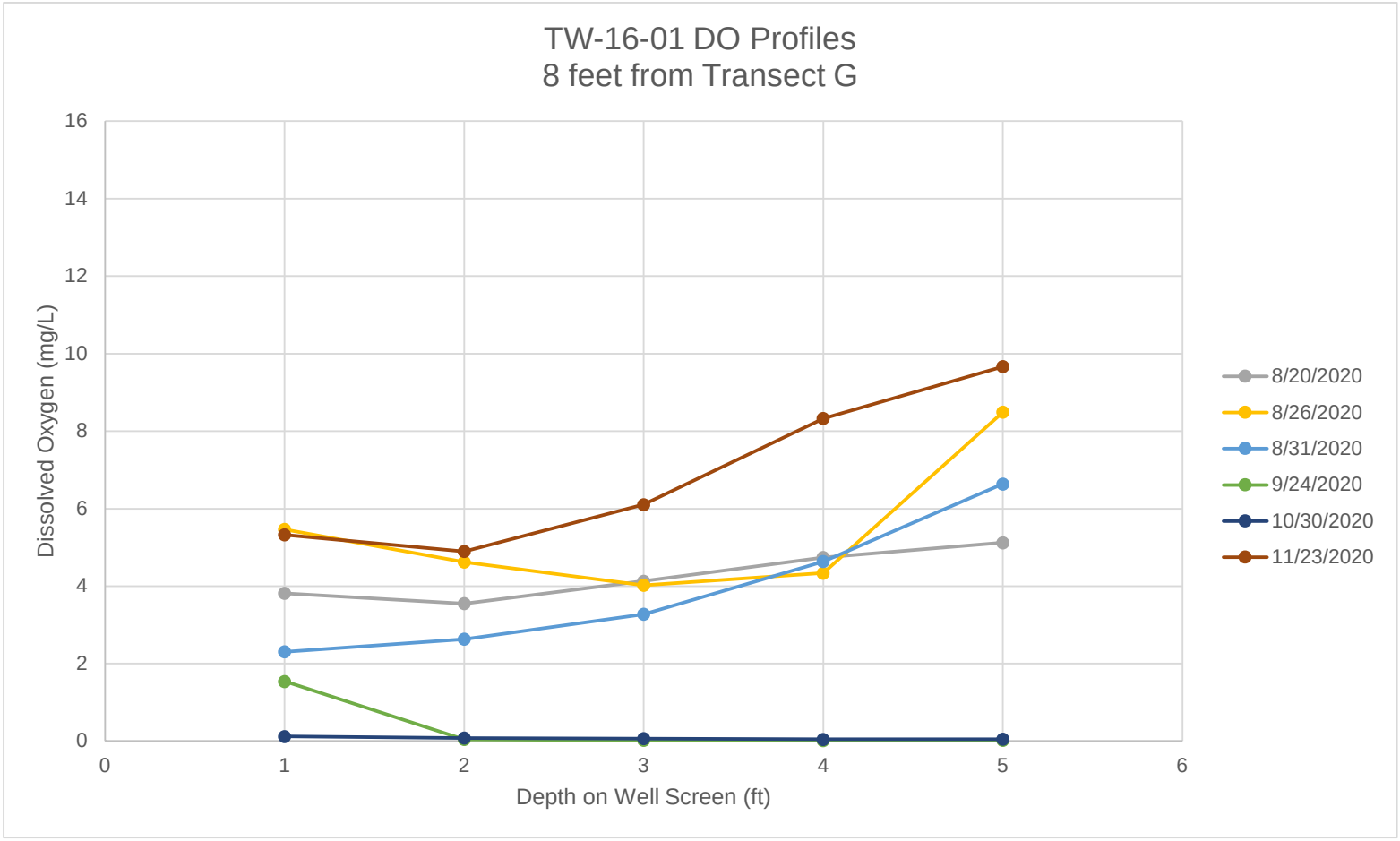
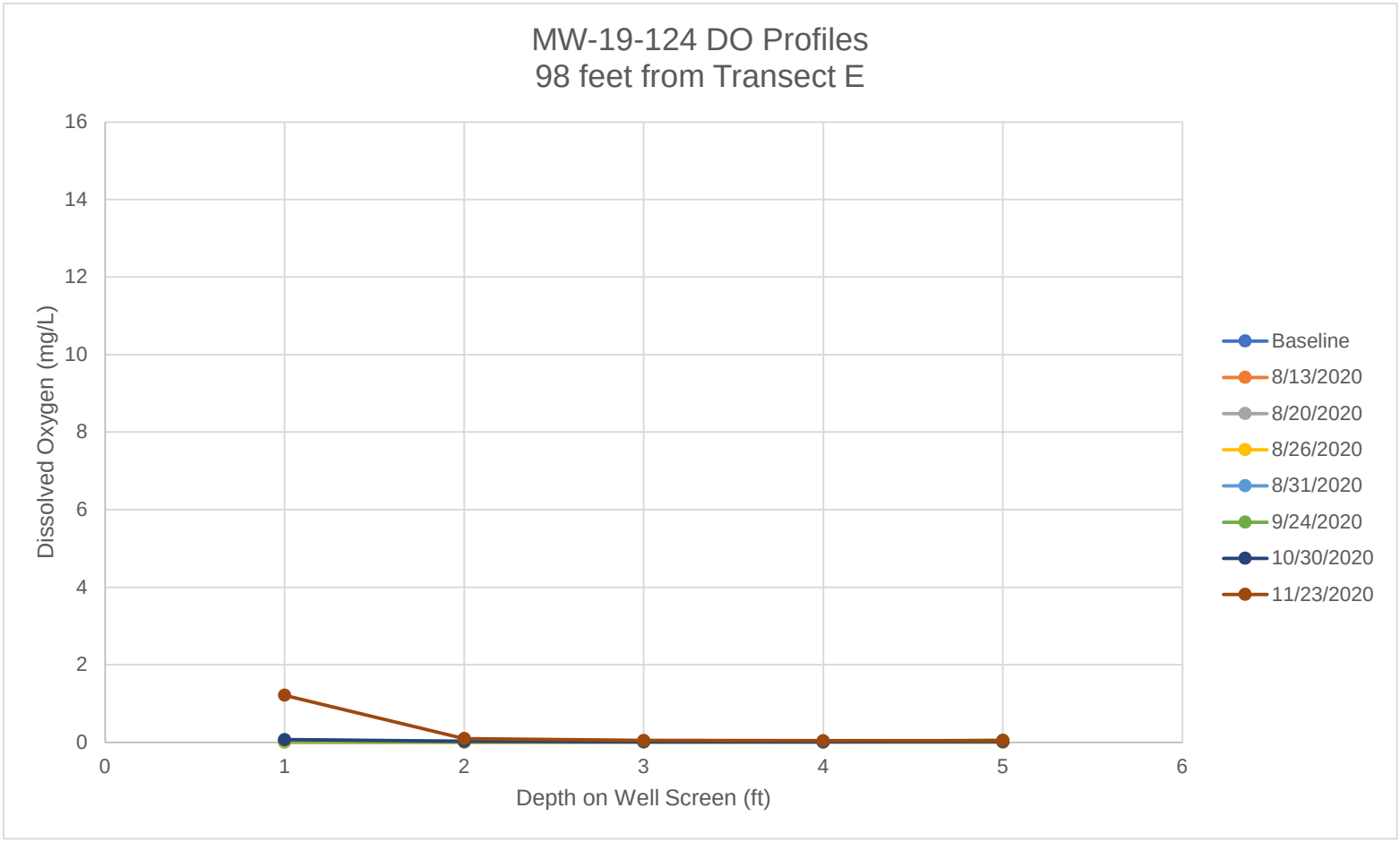


Table S-2
Plant 2 Biosparge Dissolved Oxygen Startup Monitoring

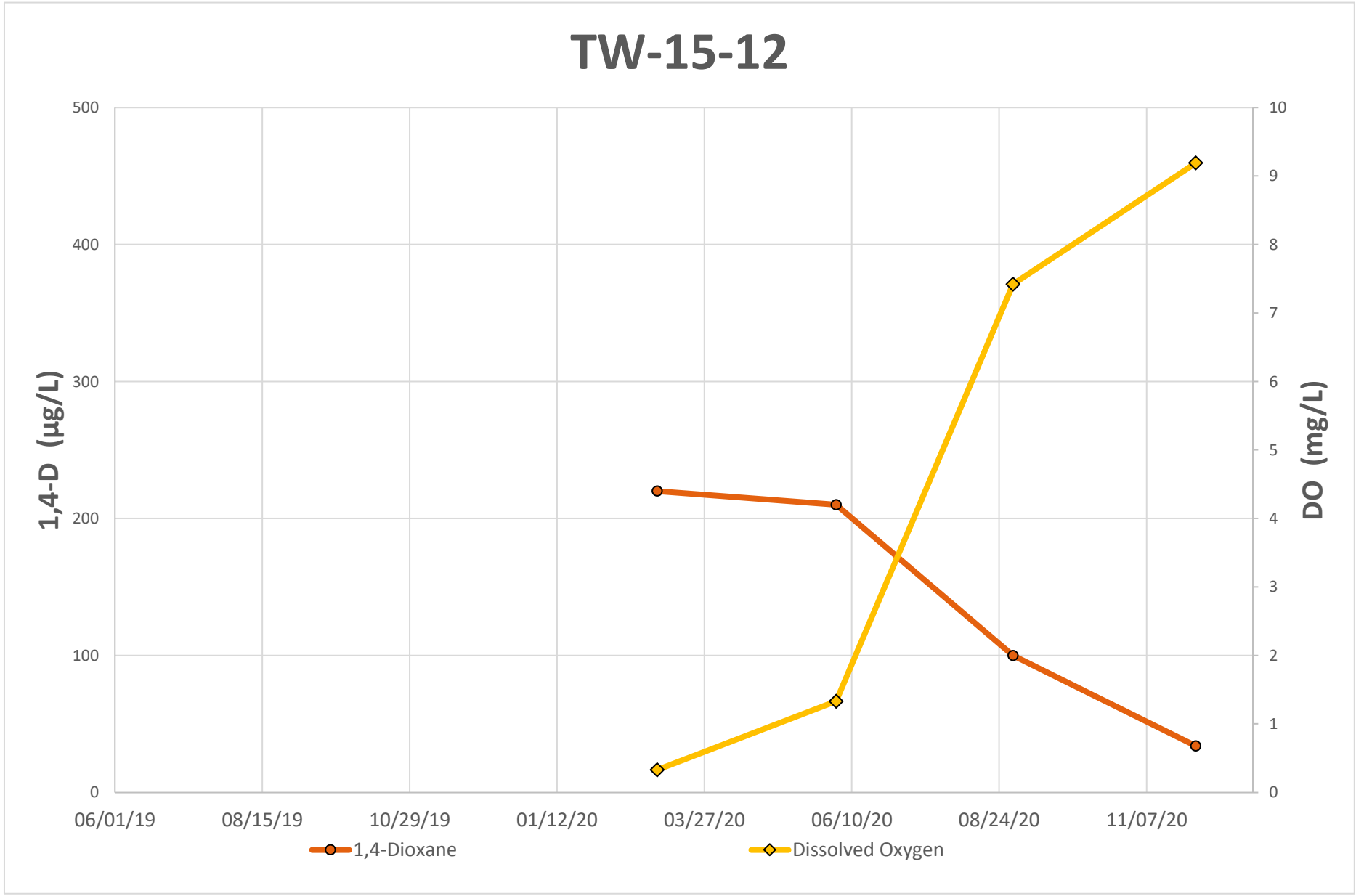
Graphs



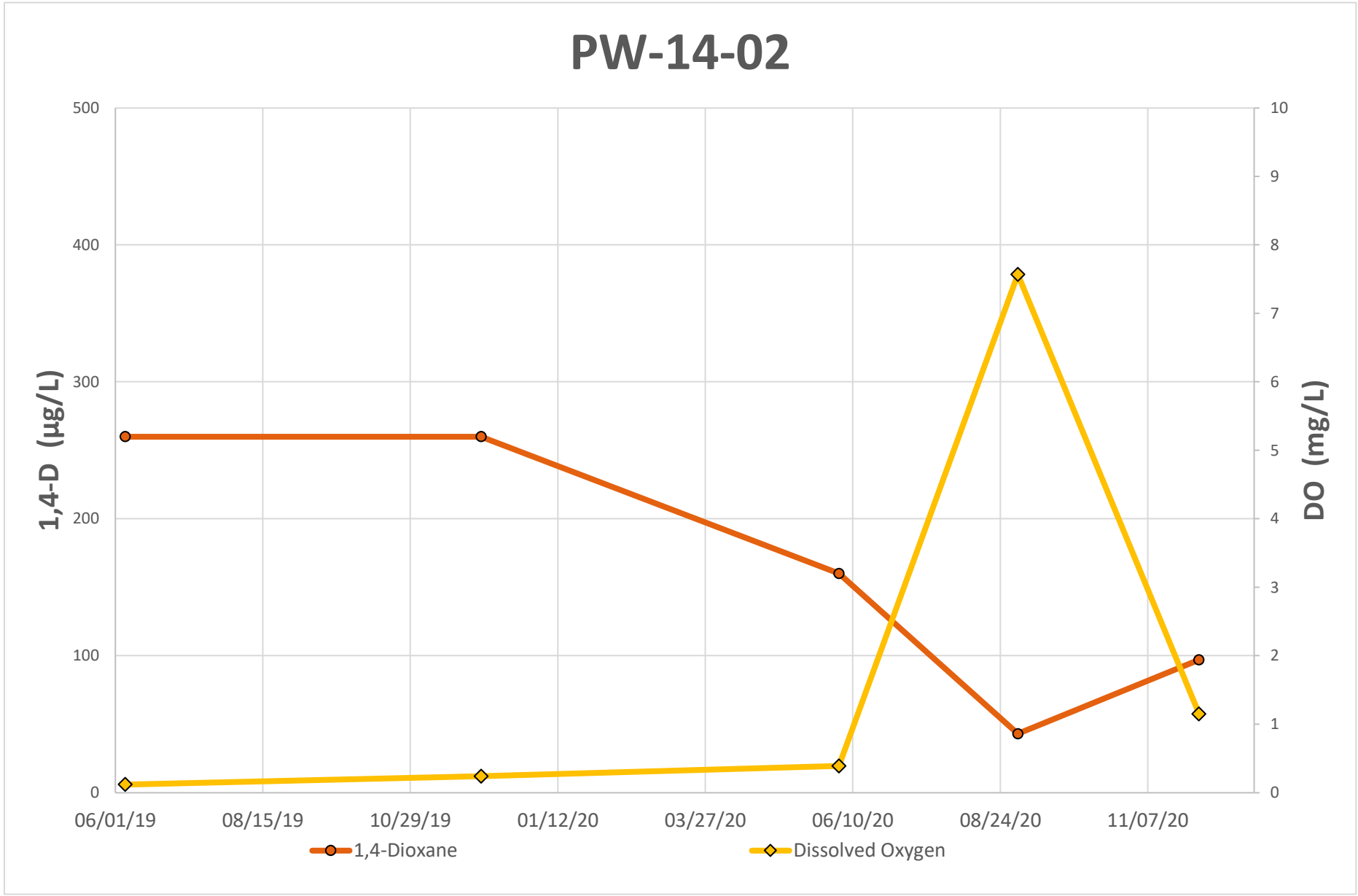
APPENDIX C

Performance Graphs

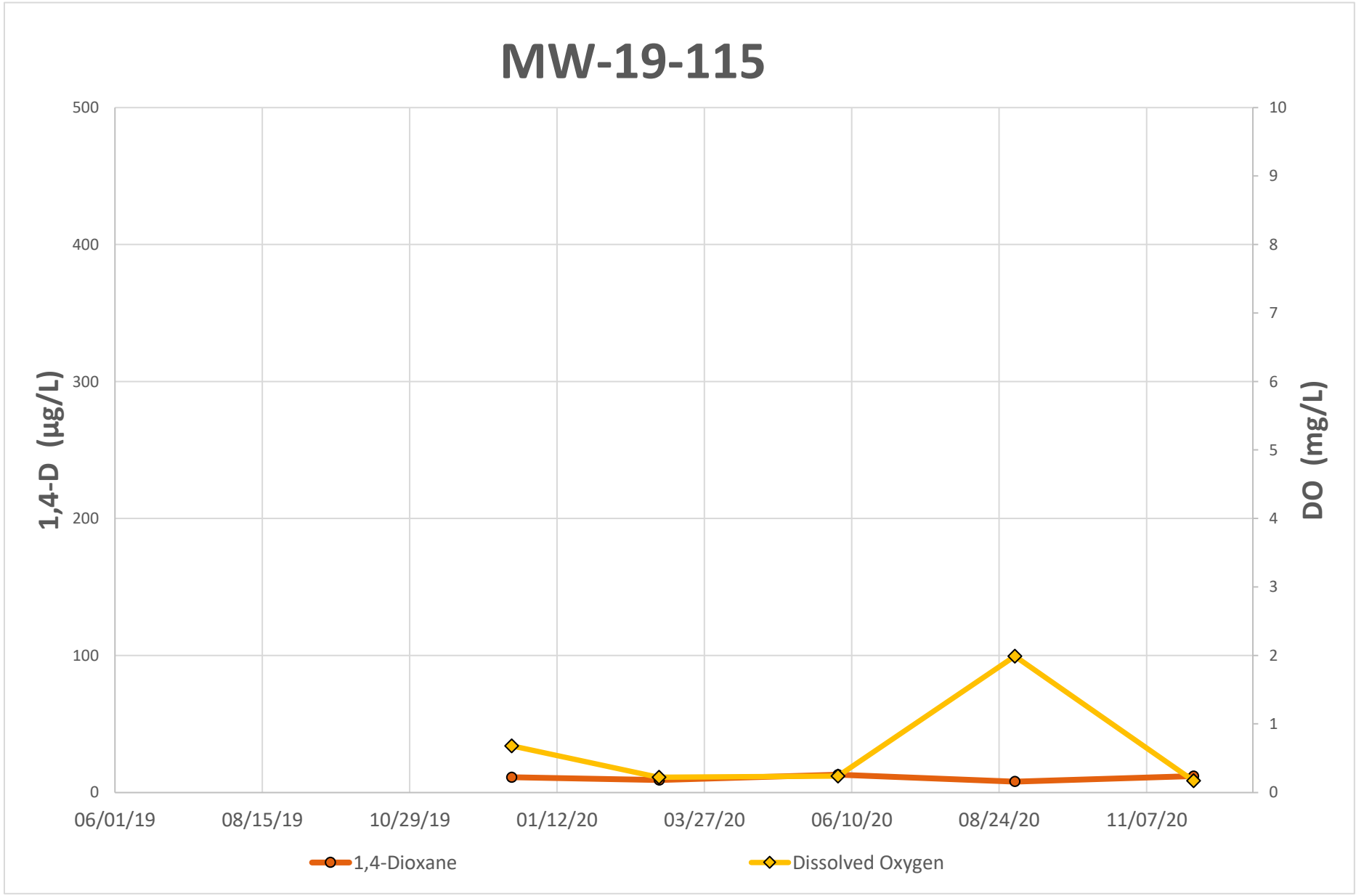
Plant 2 Transect B ROI Well
Performance Graph



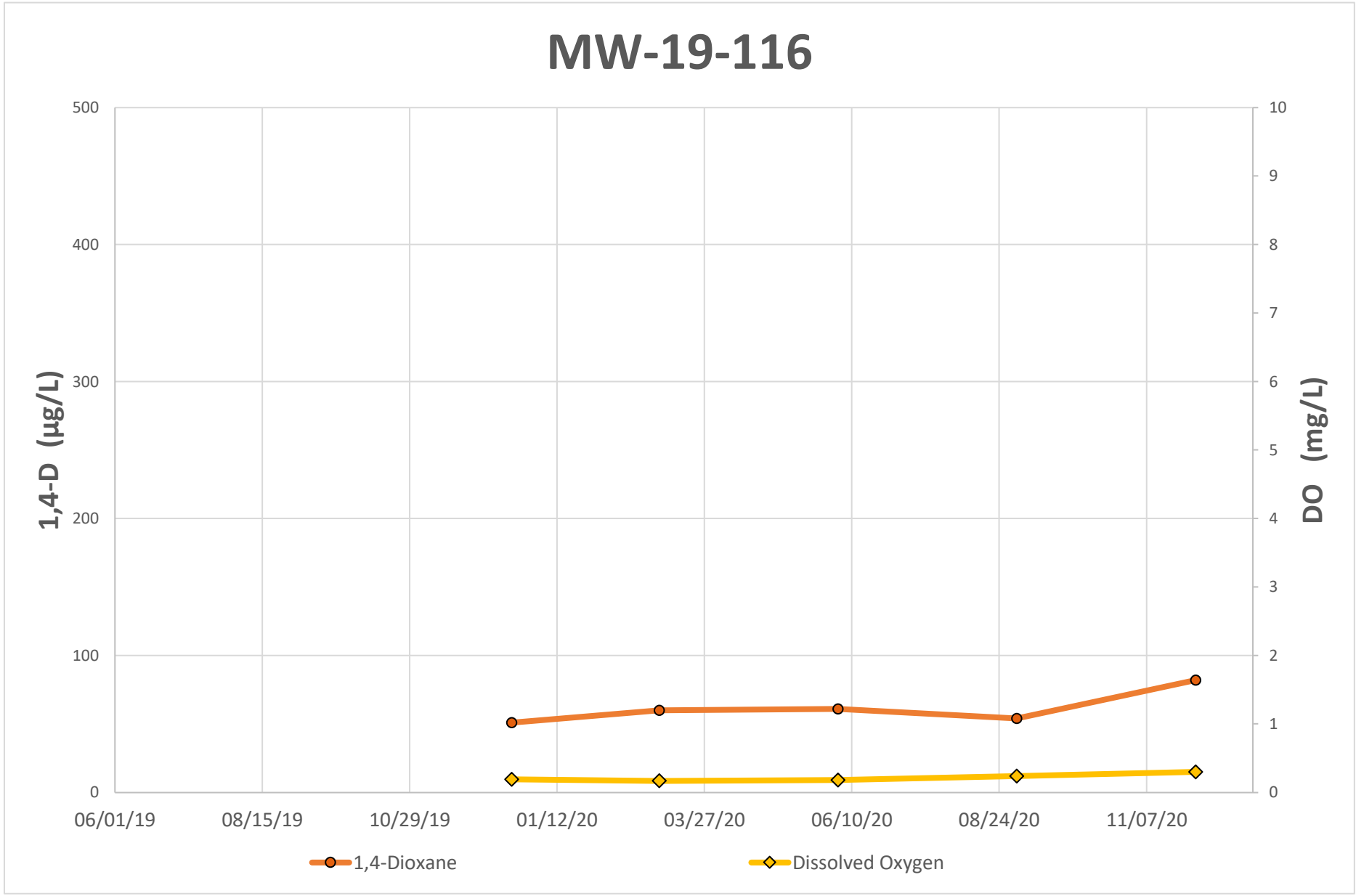
Plant 2 Transect B Downgradient Well 50 ft
Performance Graph



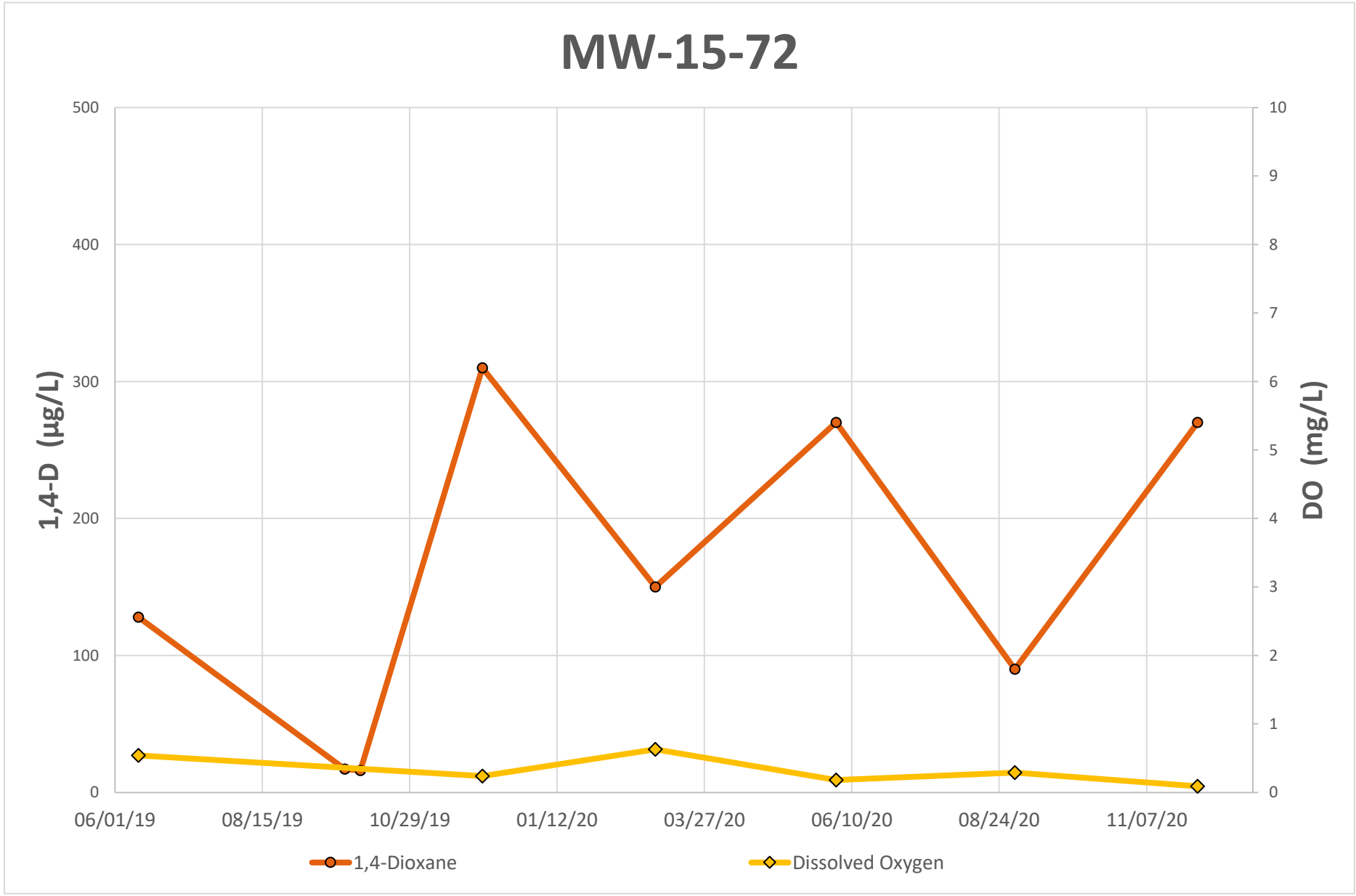
Plant 2 Transect C Monitoring Well
Performance Graph



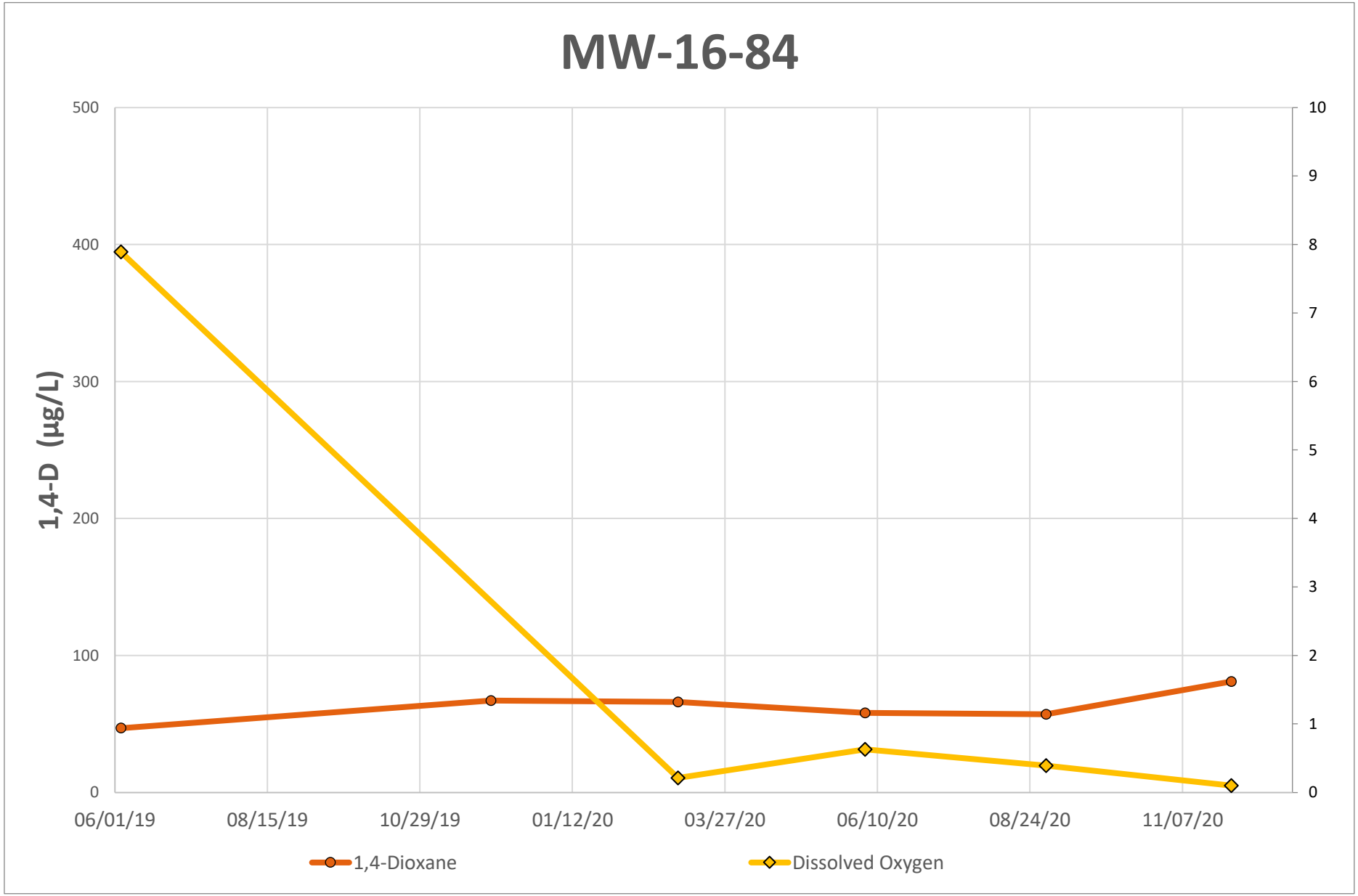
Plant 2 Transect C Monitoring Well
Performance Graph



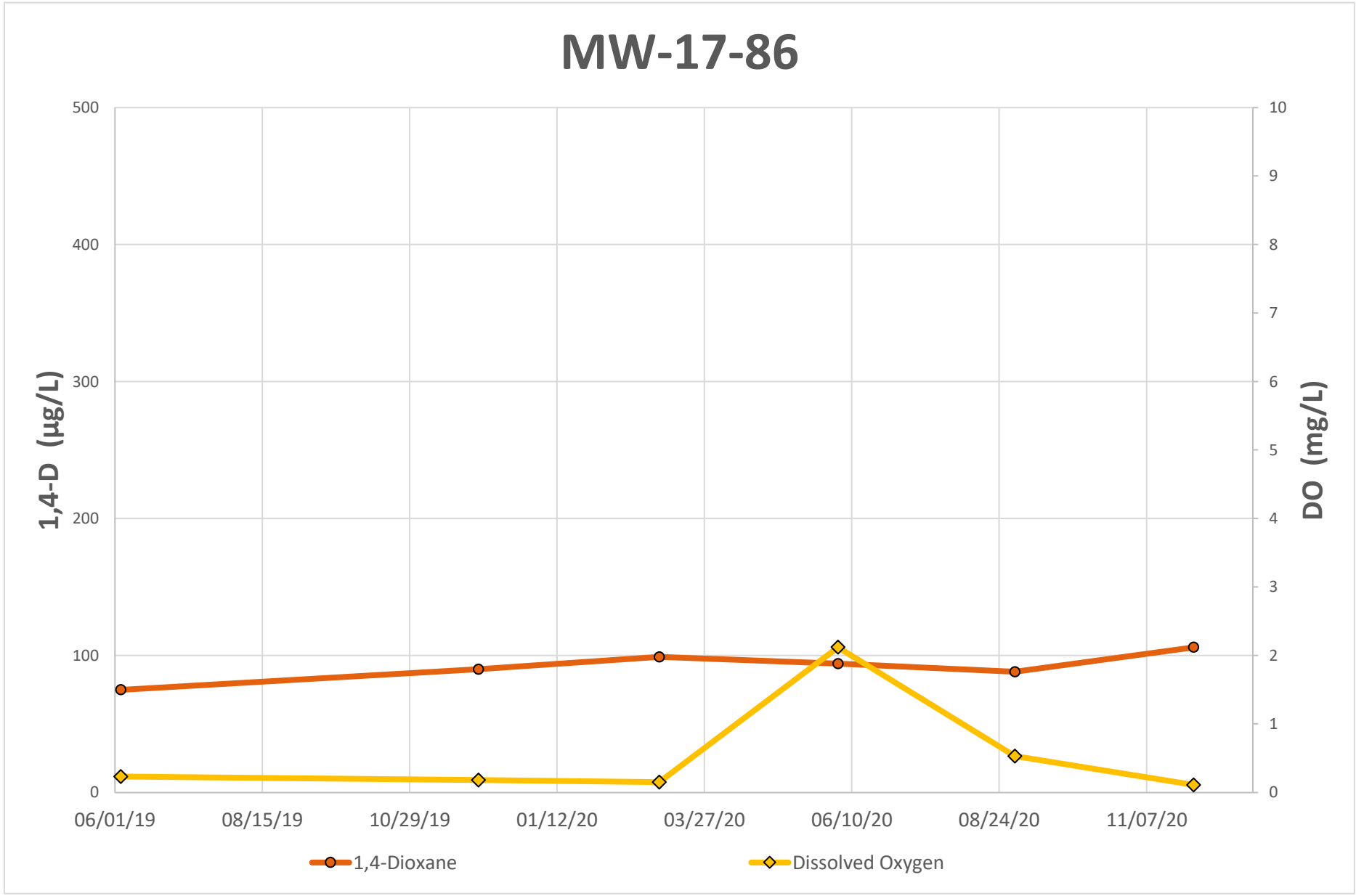
Plant 2 Transect C Monitoring Well
Performance Graph



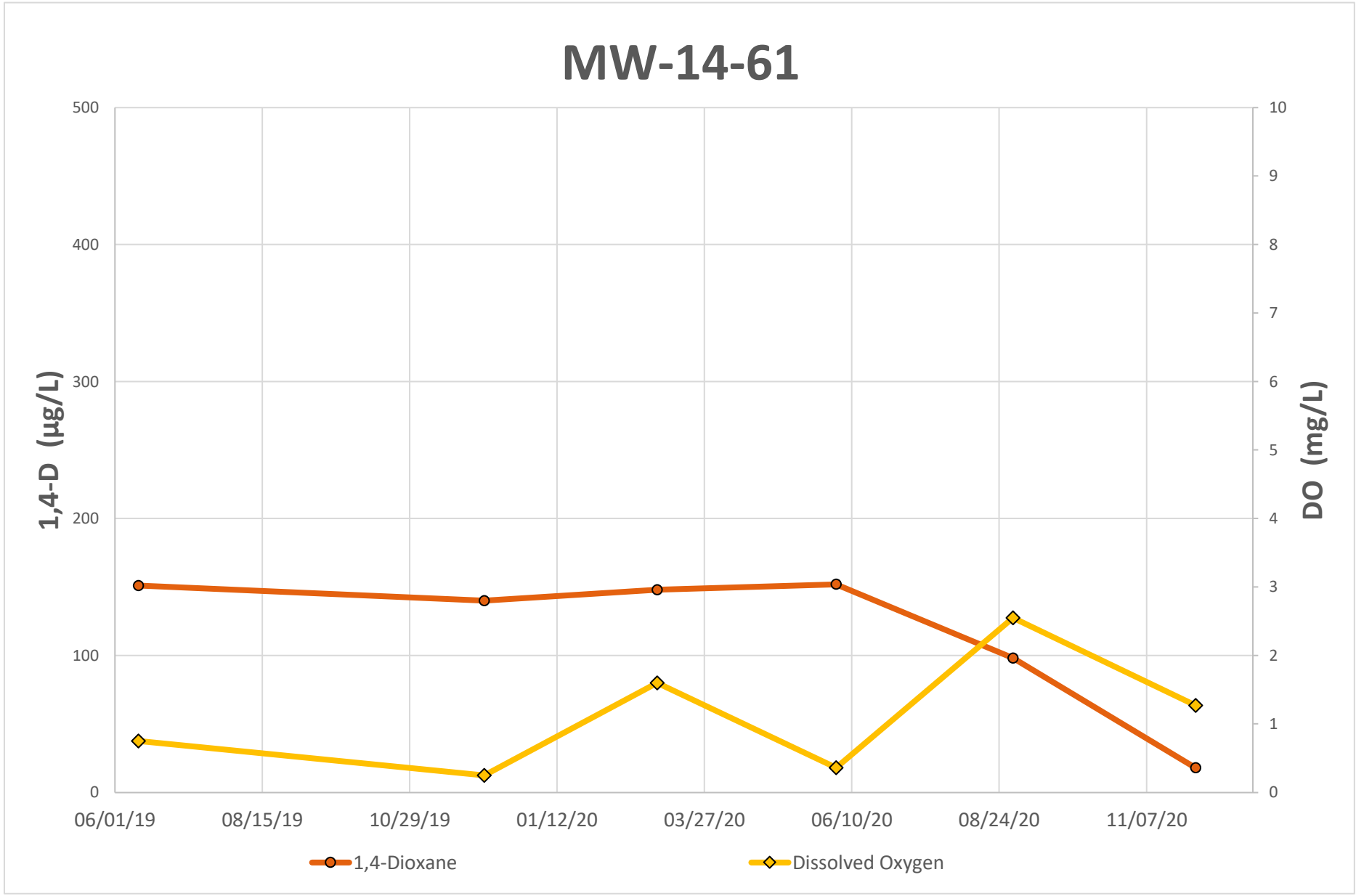
Plant 2 Transect F Downgradient Well 50 ft
Performance Graph



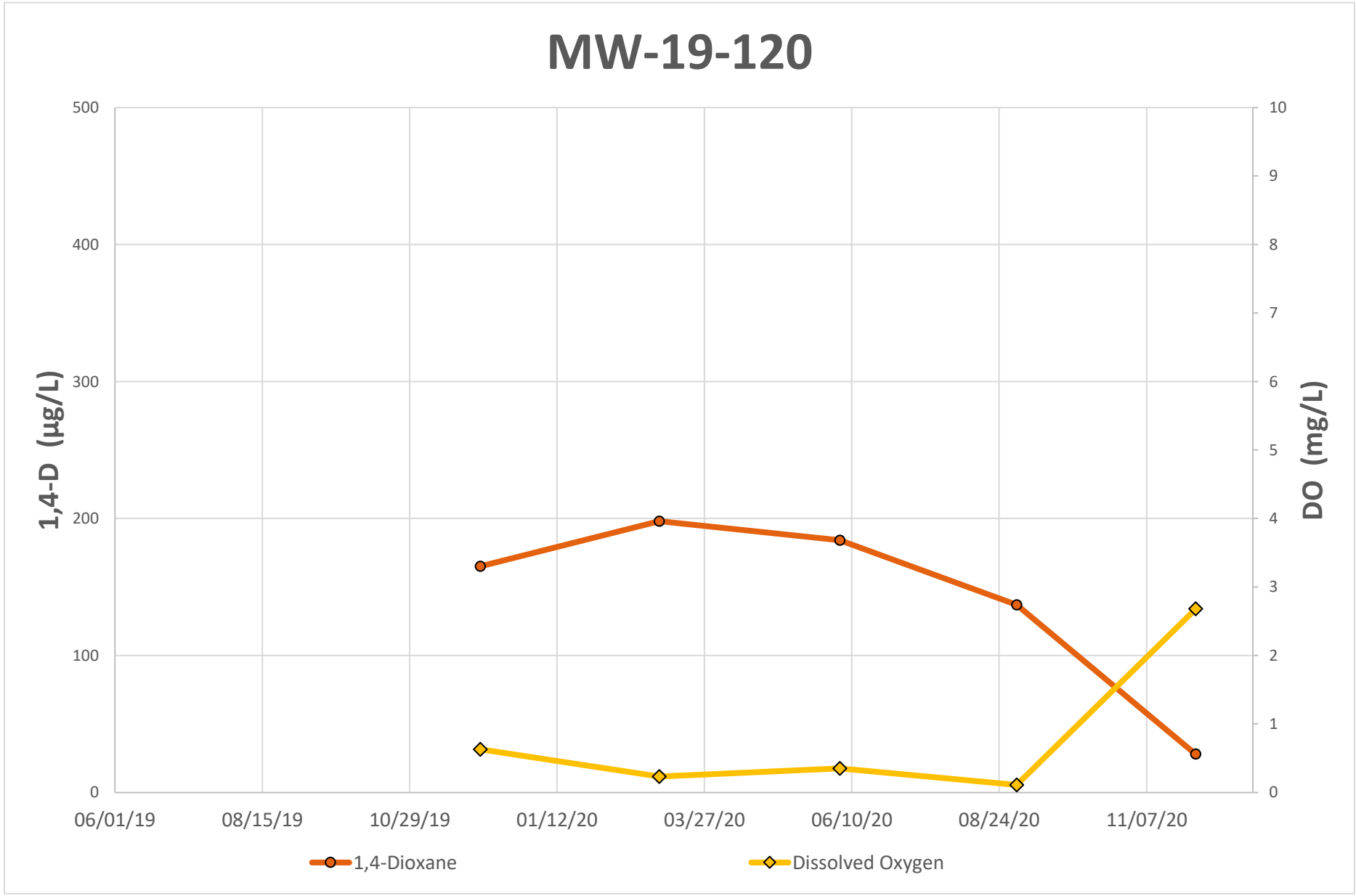
Plant 2 Transect F Downgradient Well 100 ft
Performance Graph



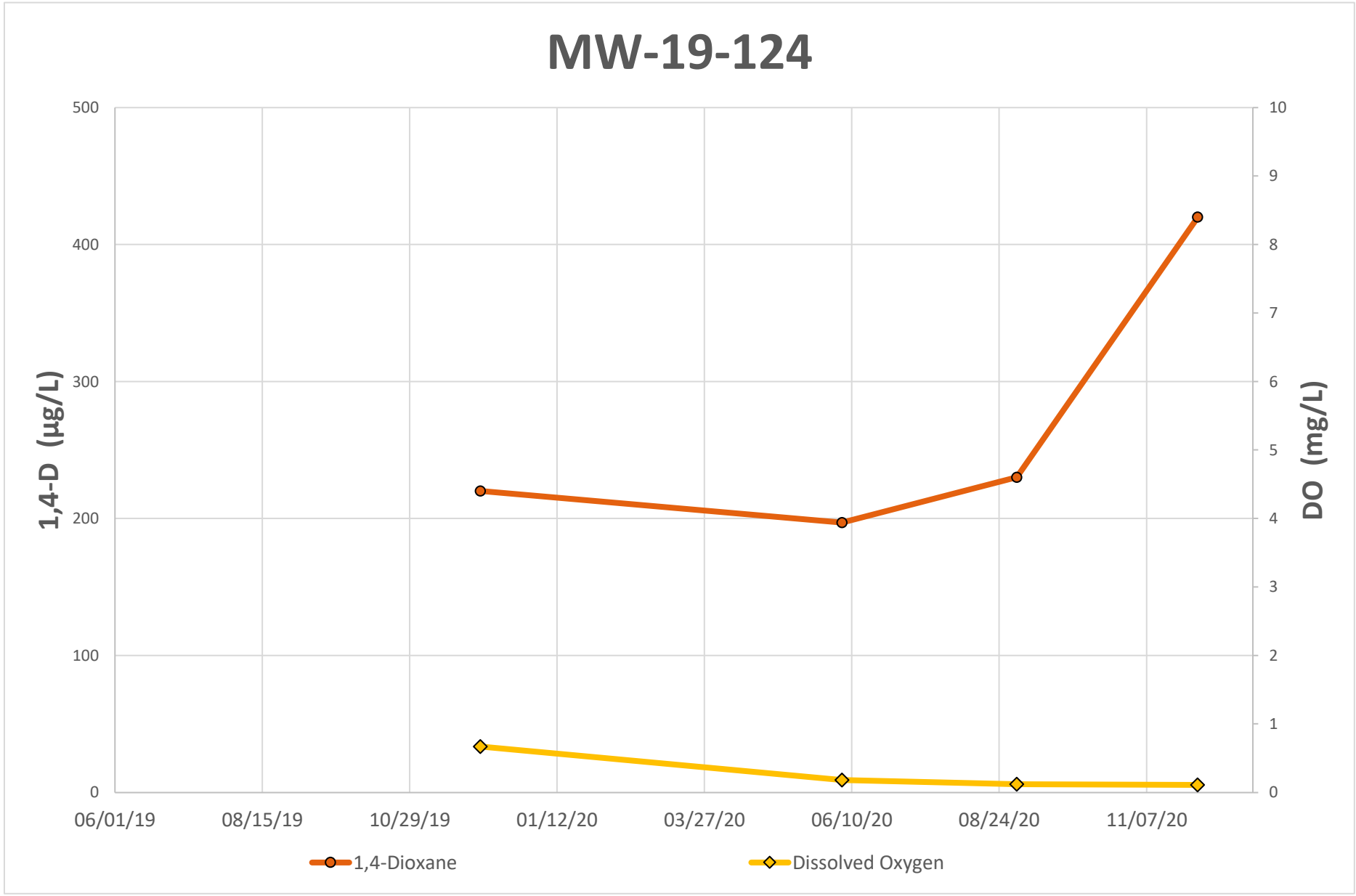
Plant 2 Transect F ROI Well
Performance Graph



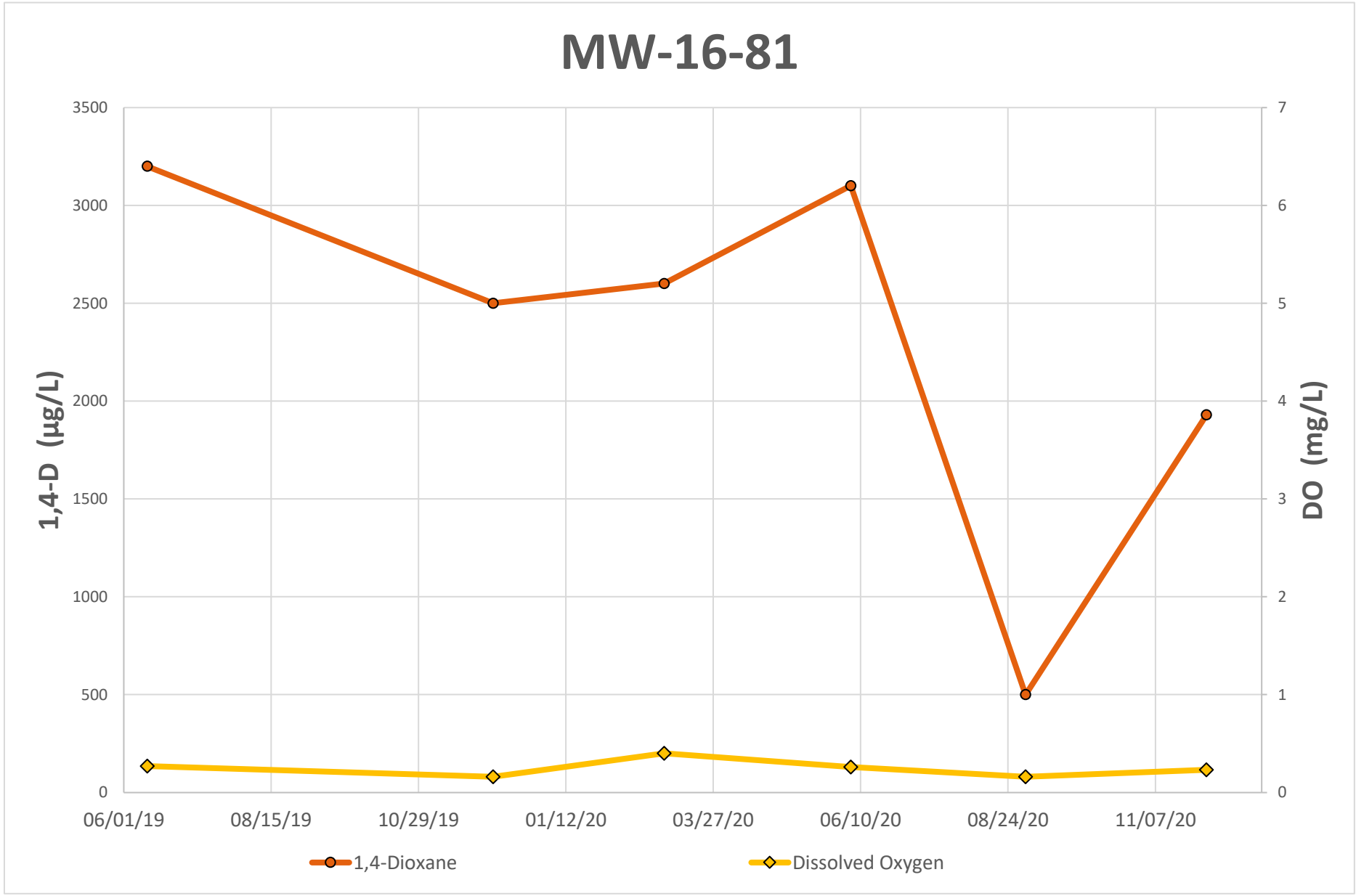
Plant 2 Transect E Downgradient Well 40 ft
Performance Graph



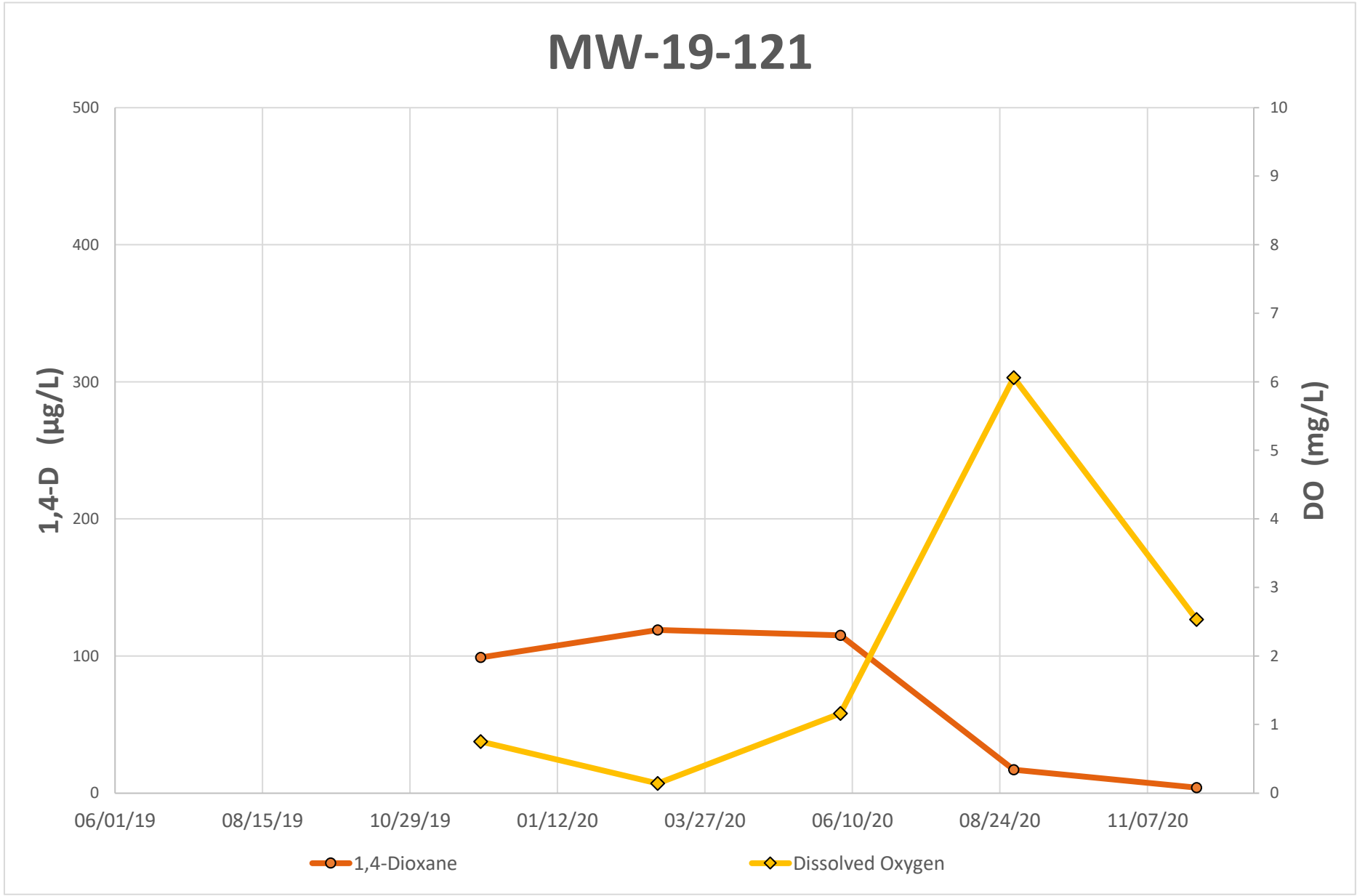
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



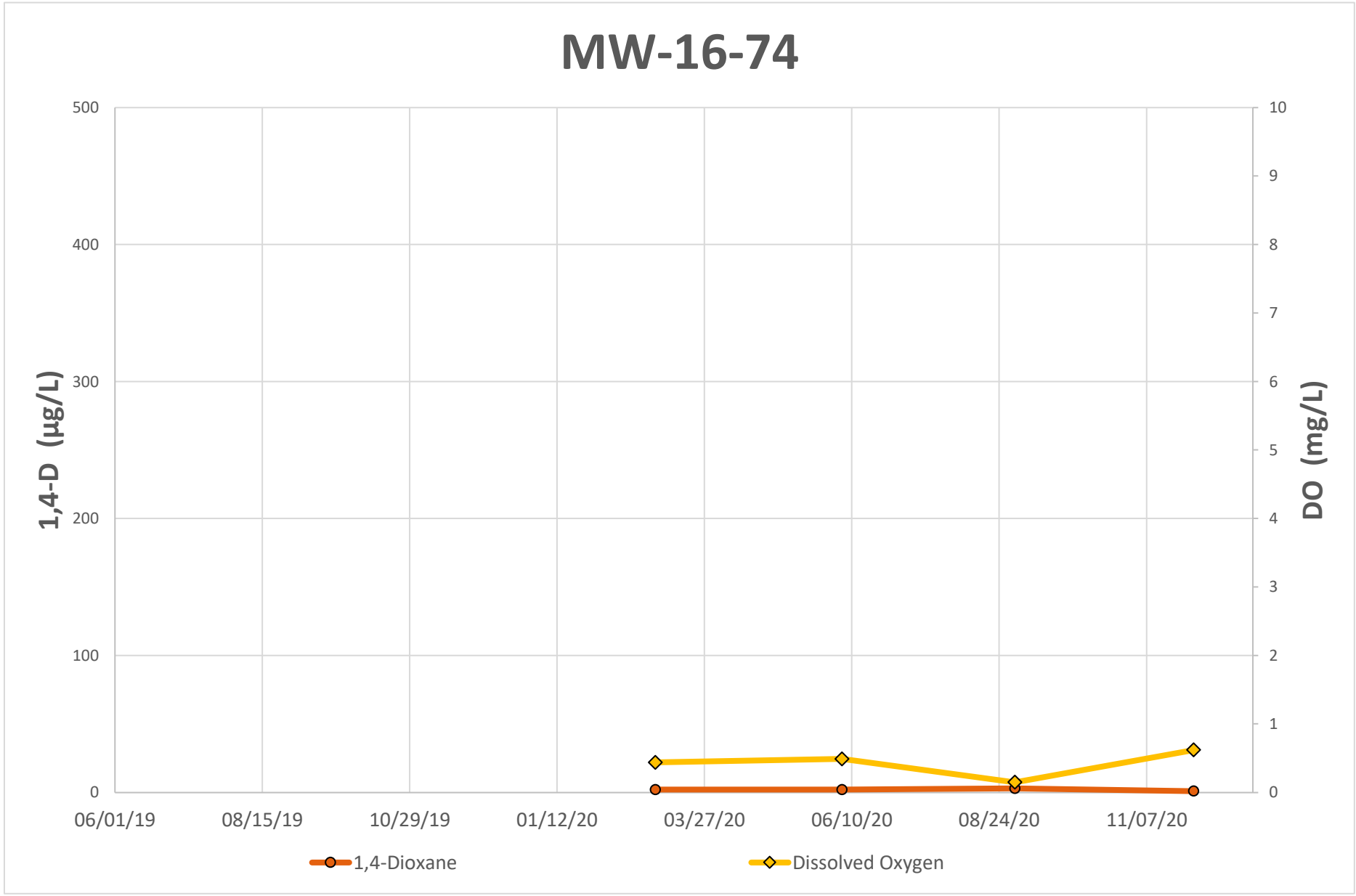
Plant 2 Transect E Upgradient Well 80 ft
Performance Graph



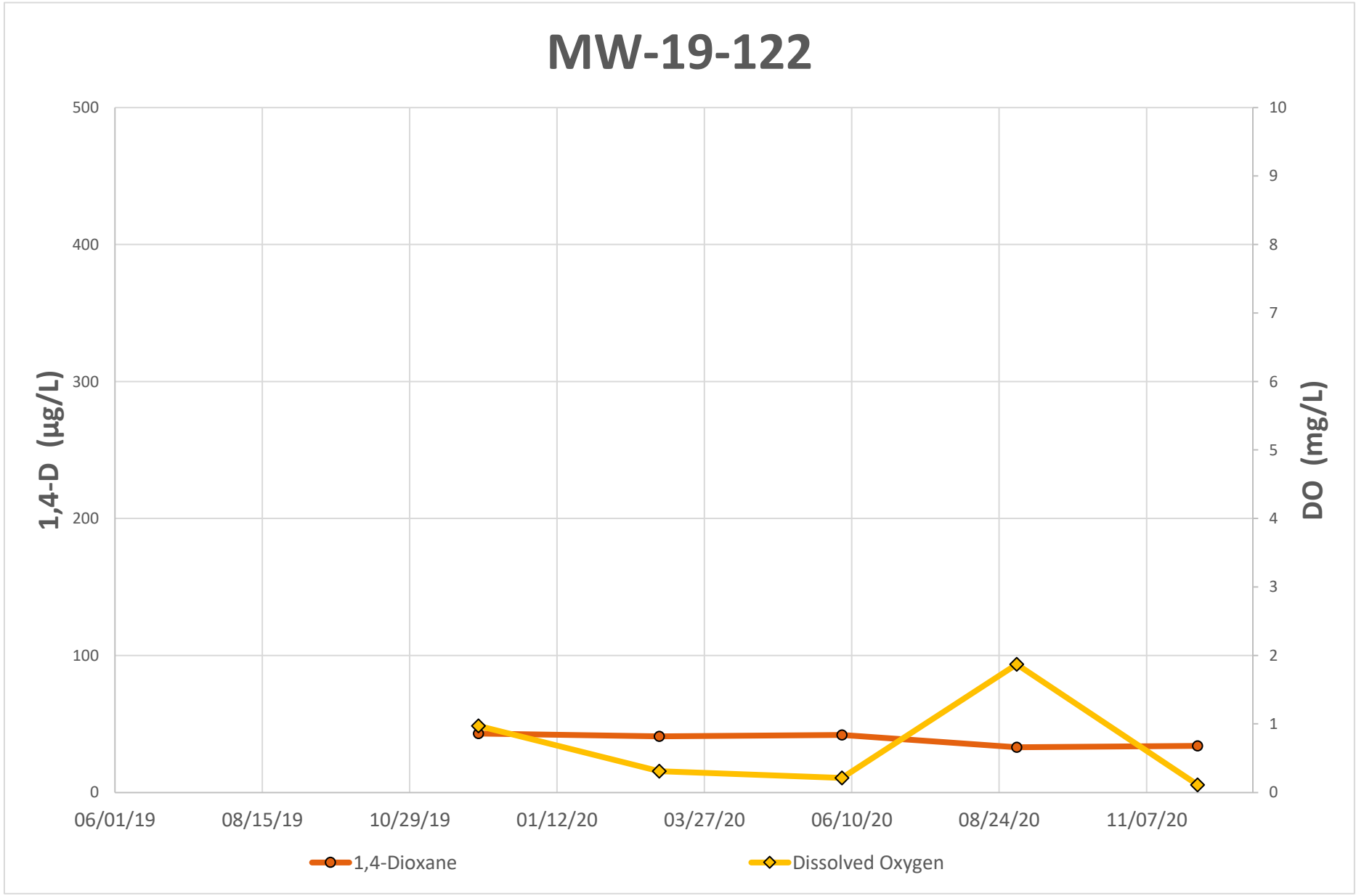
Plant 2 Transect E ROI Well
Performance Graph



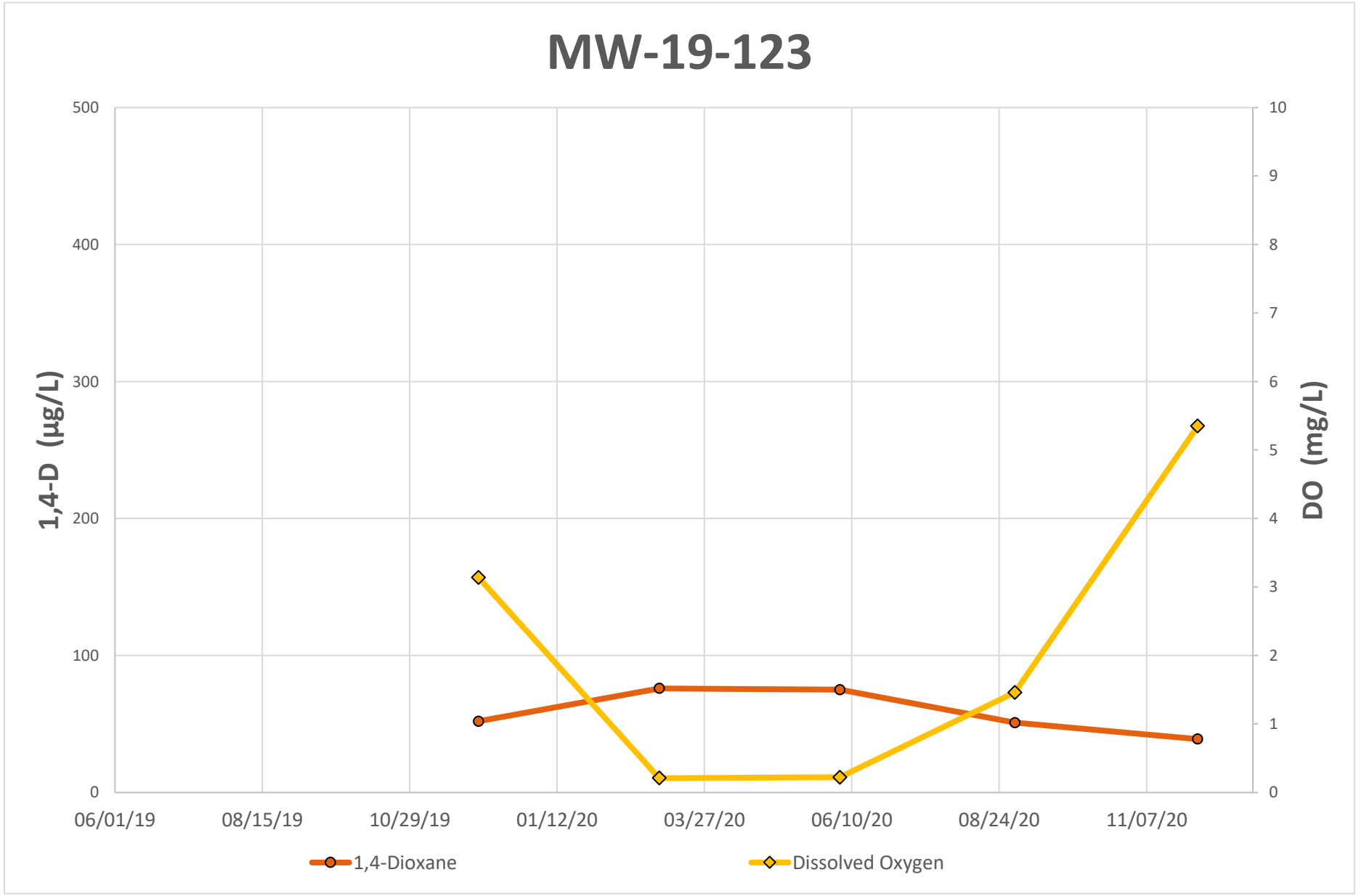
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



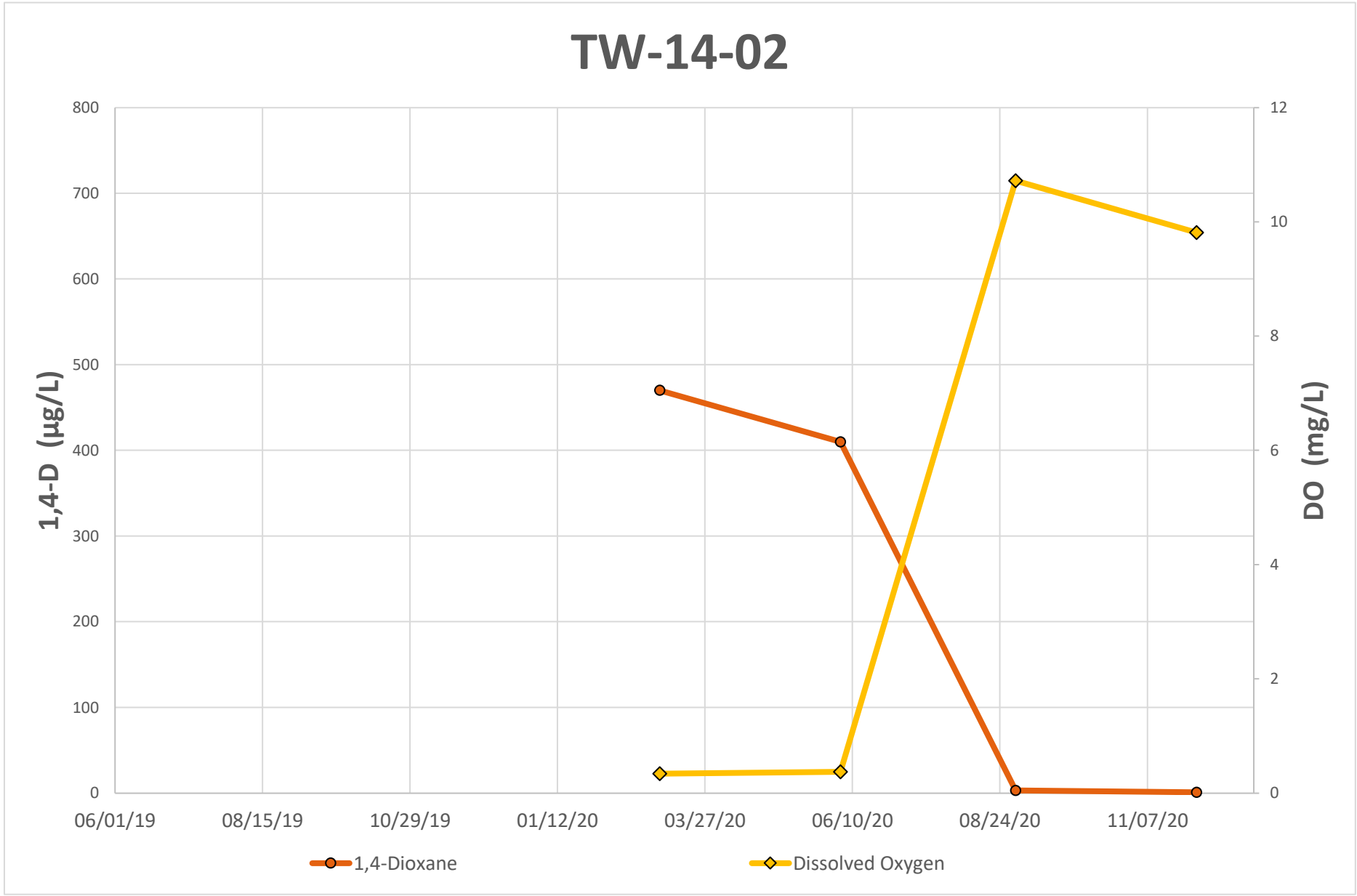
Plant 2 Transect G Upgradient Well 60 ft
Performance Graph



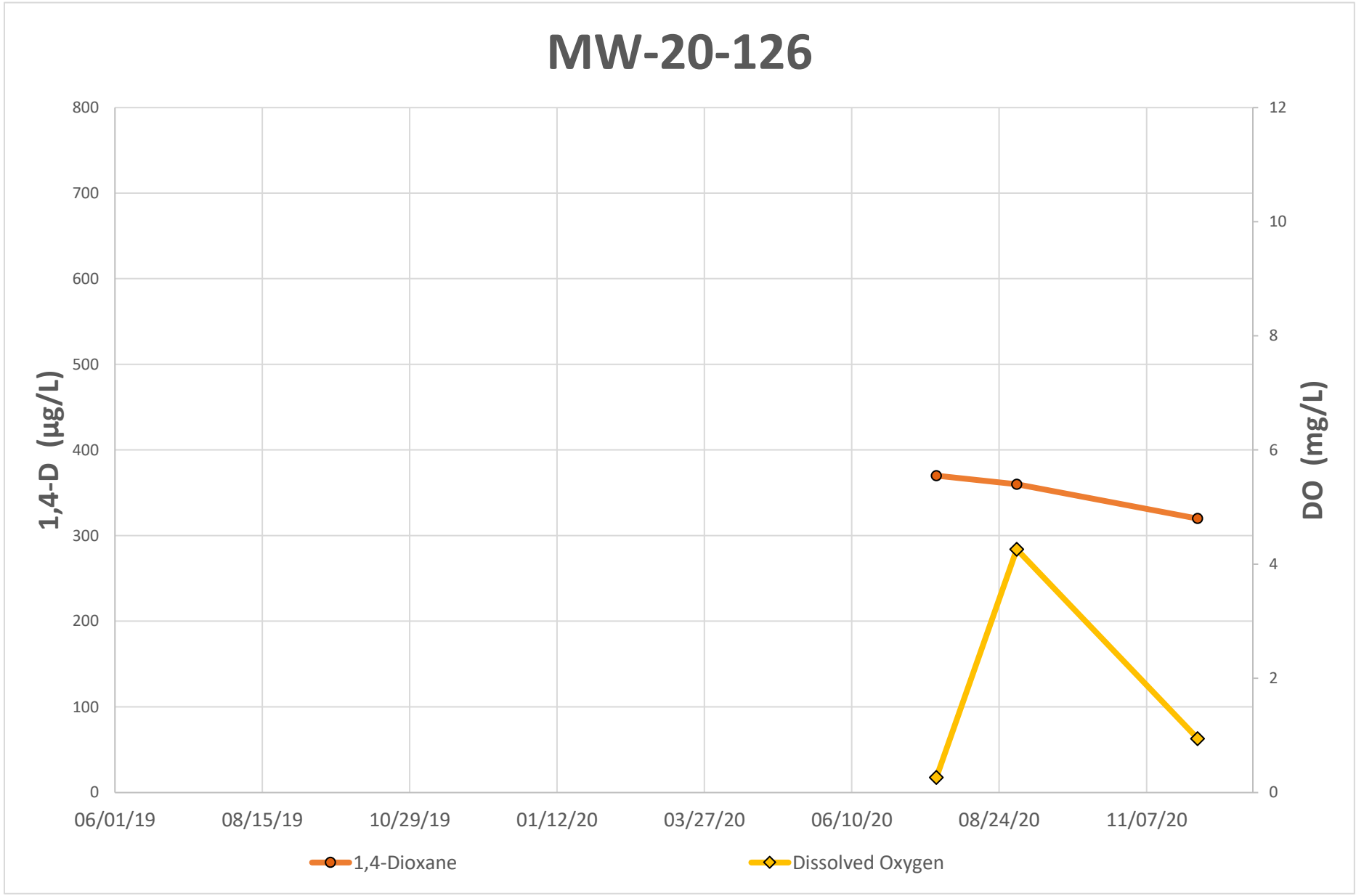
Plant 2 Transect G Downgradient Well 50 ft
Performance Graph



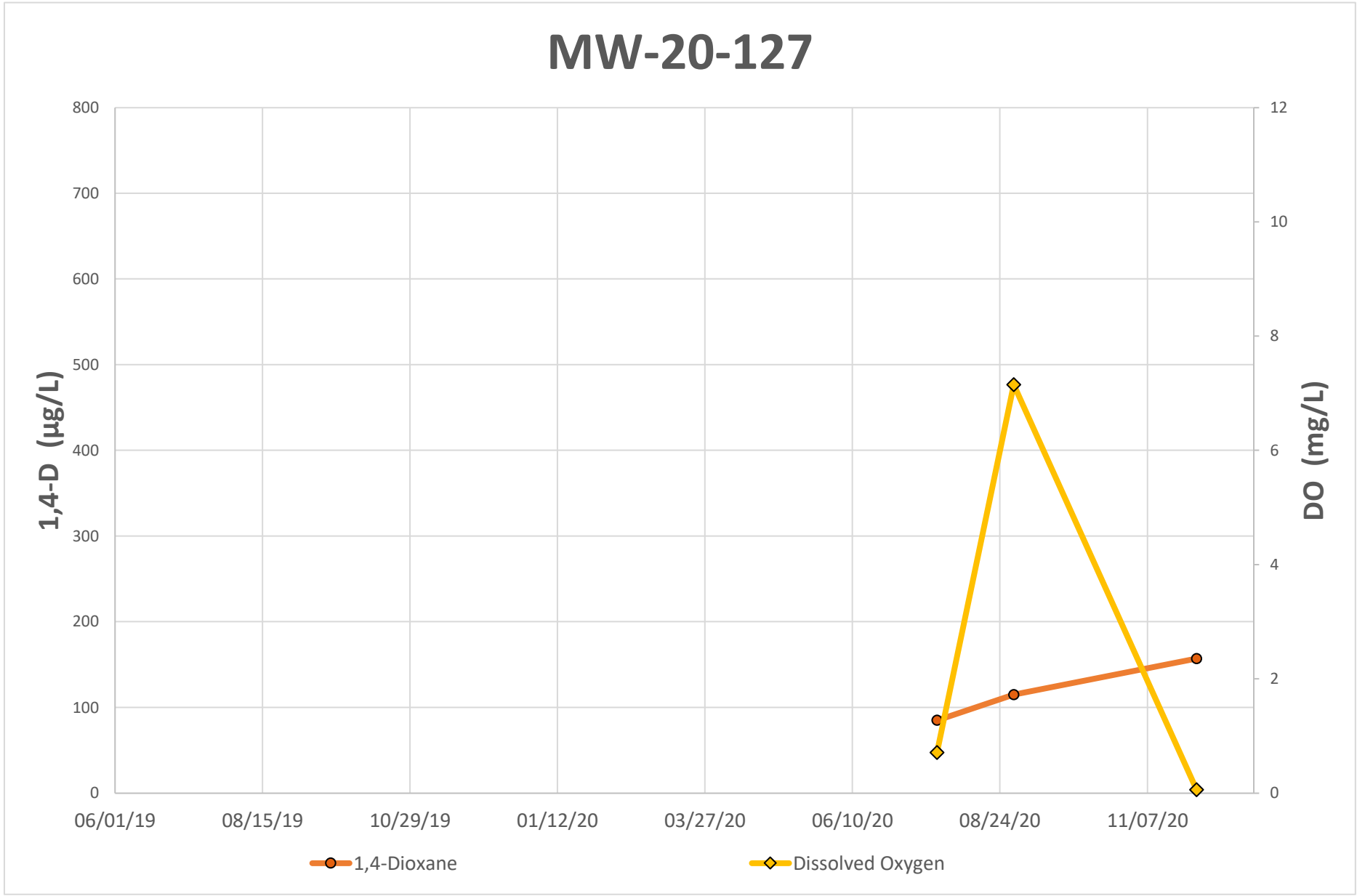
Plant 2 Transect G ROI Well
Performance Graph



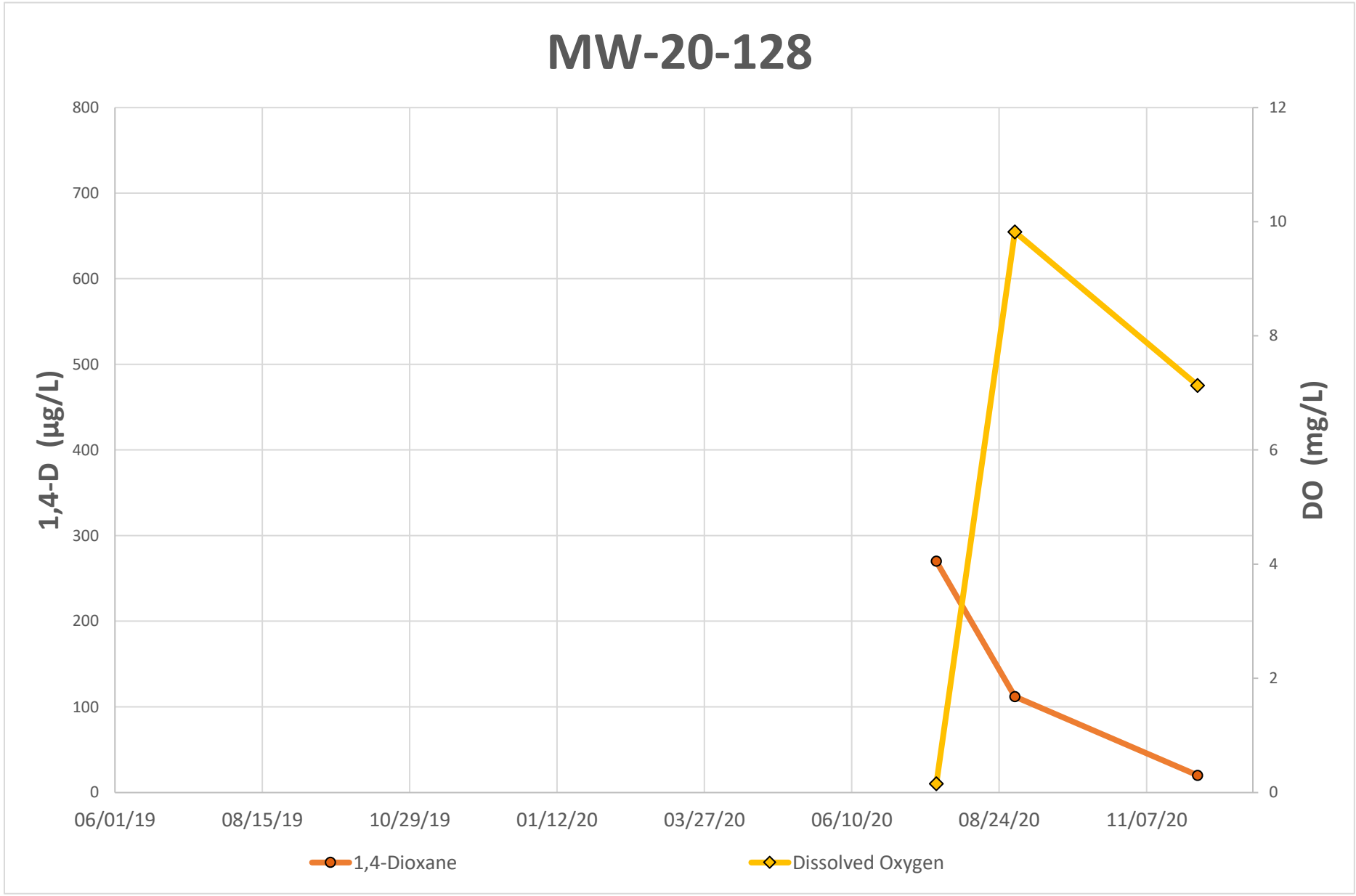
Plant 2 Transect B Upgradient Well 40 ft
Performance Graph



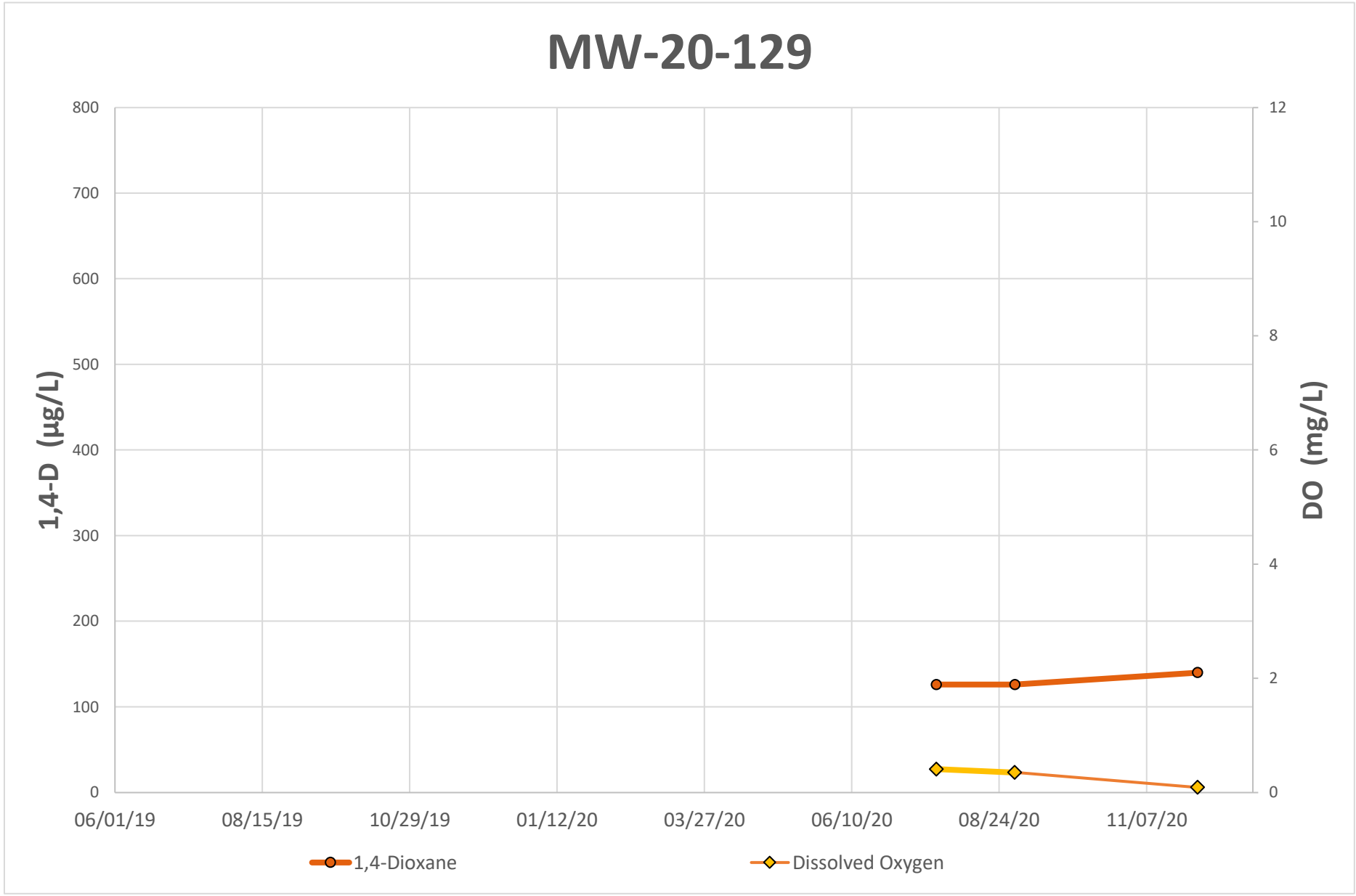
Plant 2 Transect B Downgradient Well 100 ft
Performance Graph



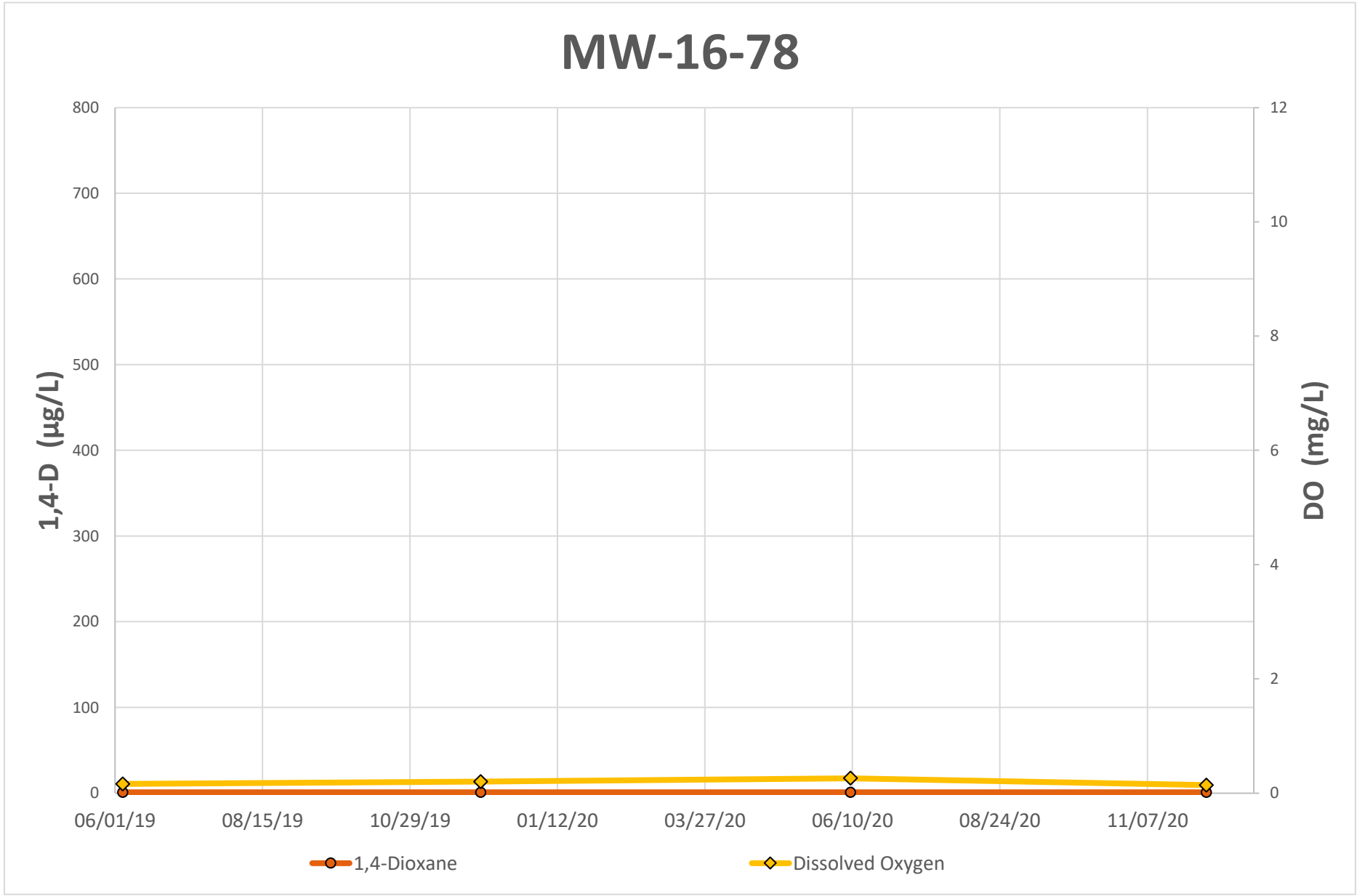
Plant 2 Transect F ROI Well
Performance Graph



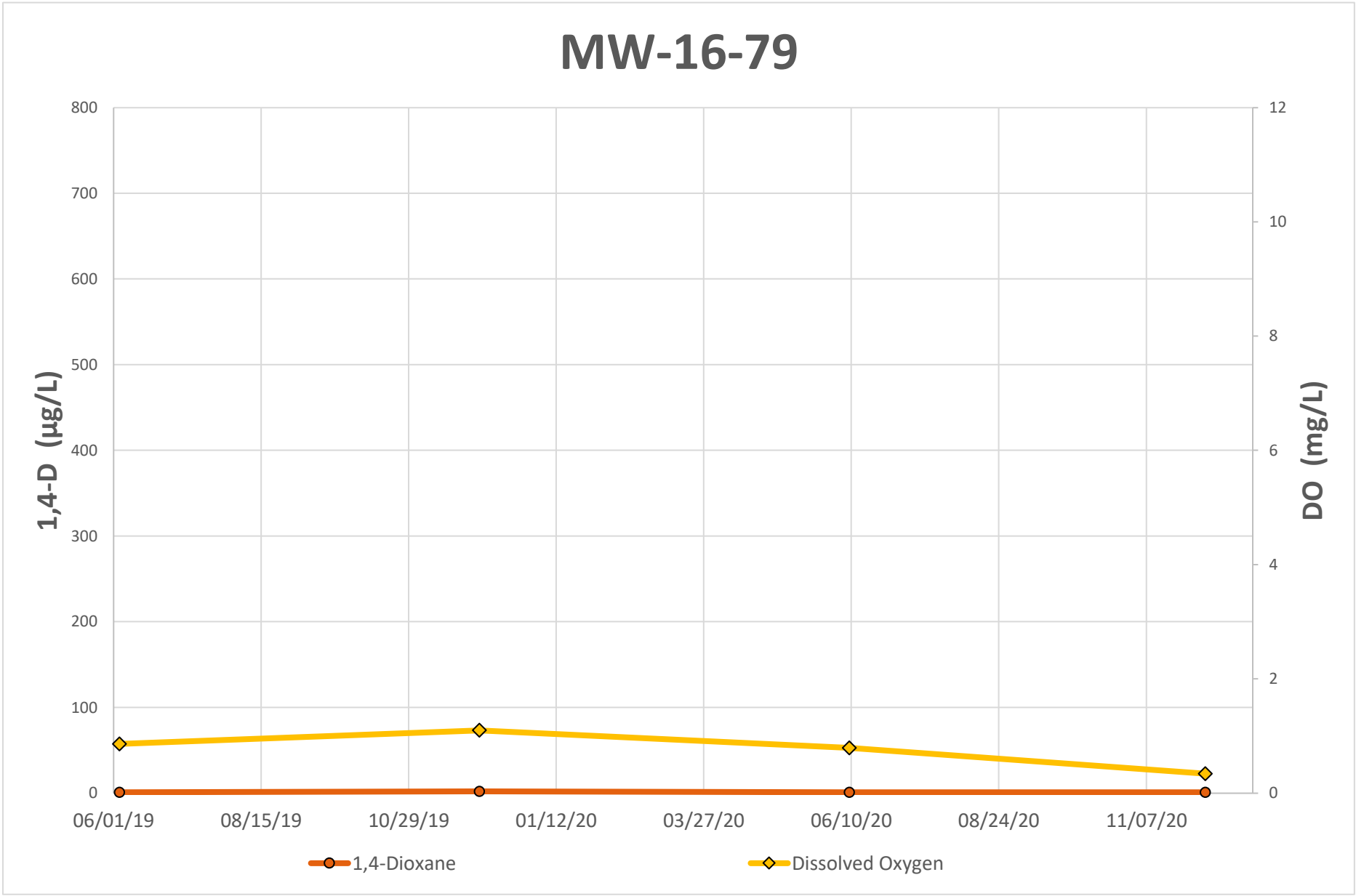
Plant 2 Transect G Upgradient Well 100 ft
Performance Graph



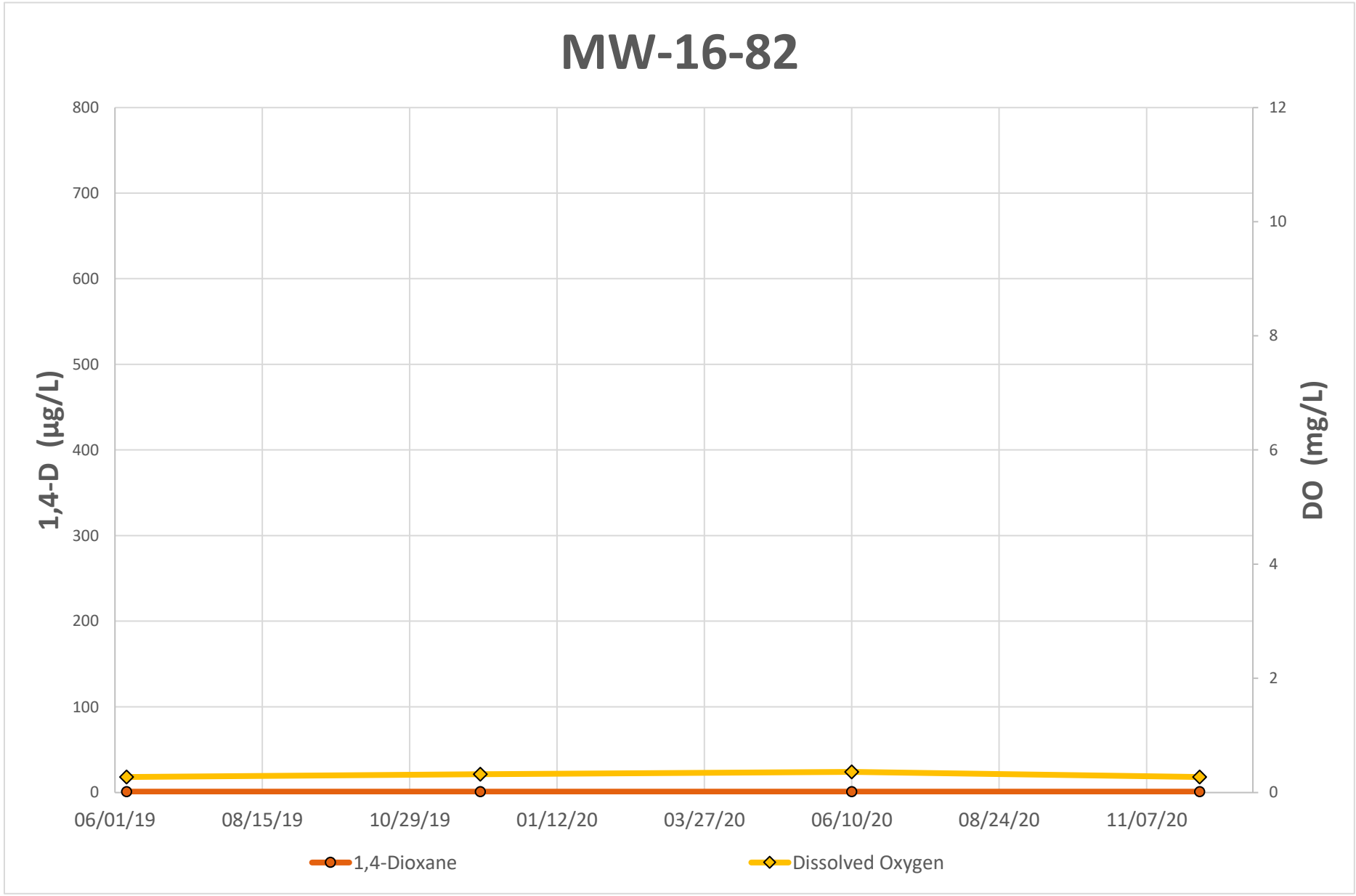
Plant 2 Transect E Downgradient Well 150 ft
Performance Graph



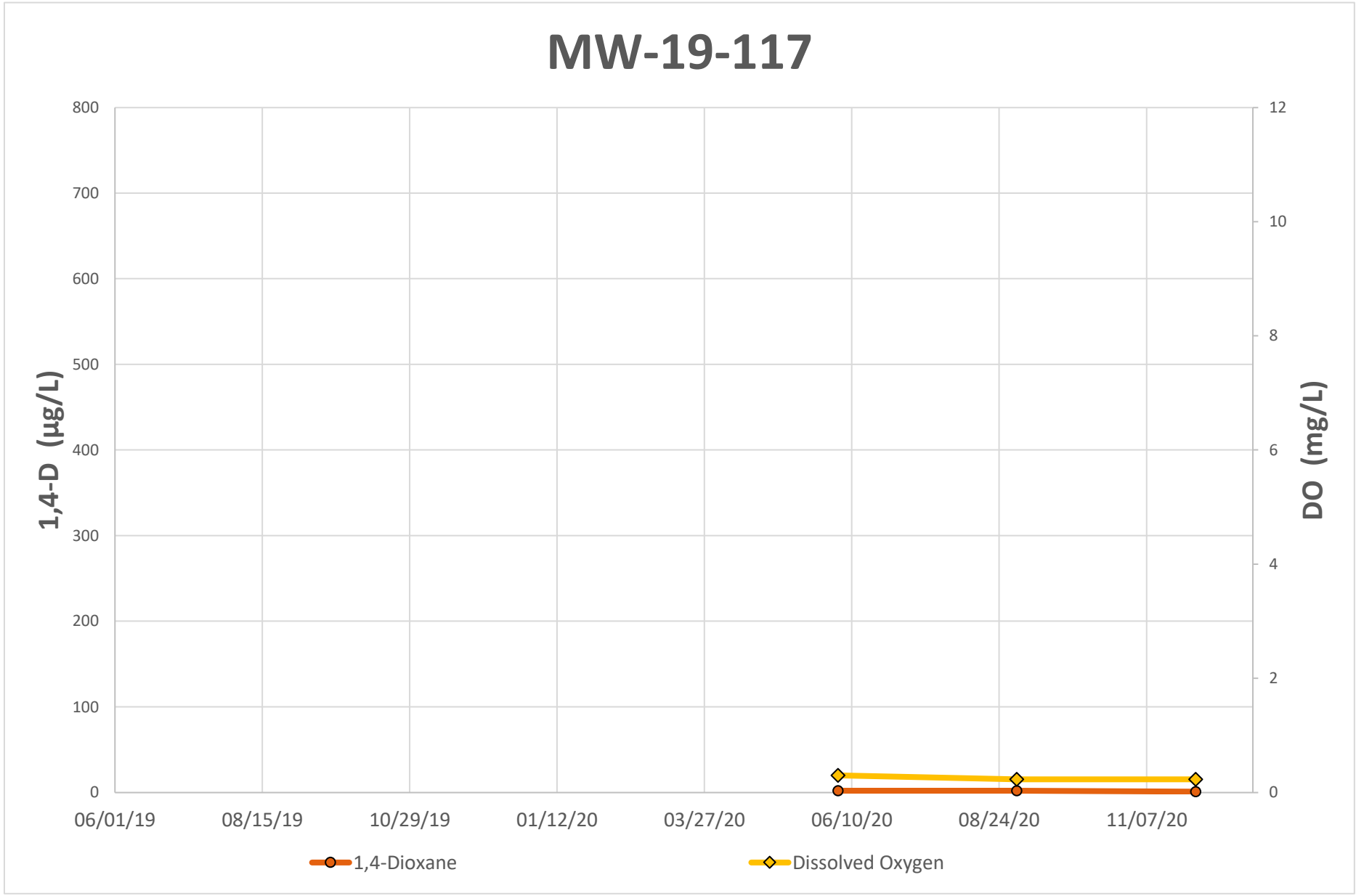
Plant 2 Transect E Downgradient Well 200 ft
Performance Graph



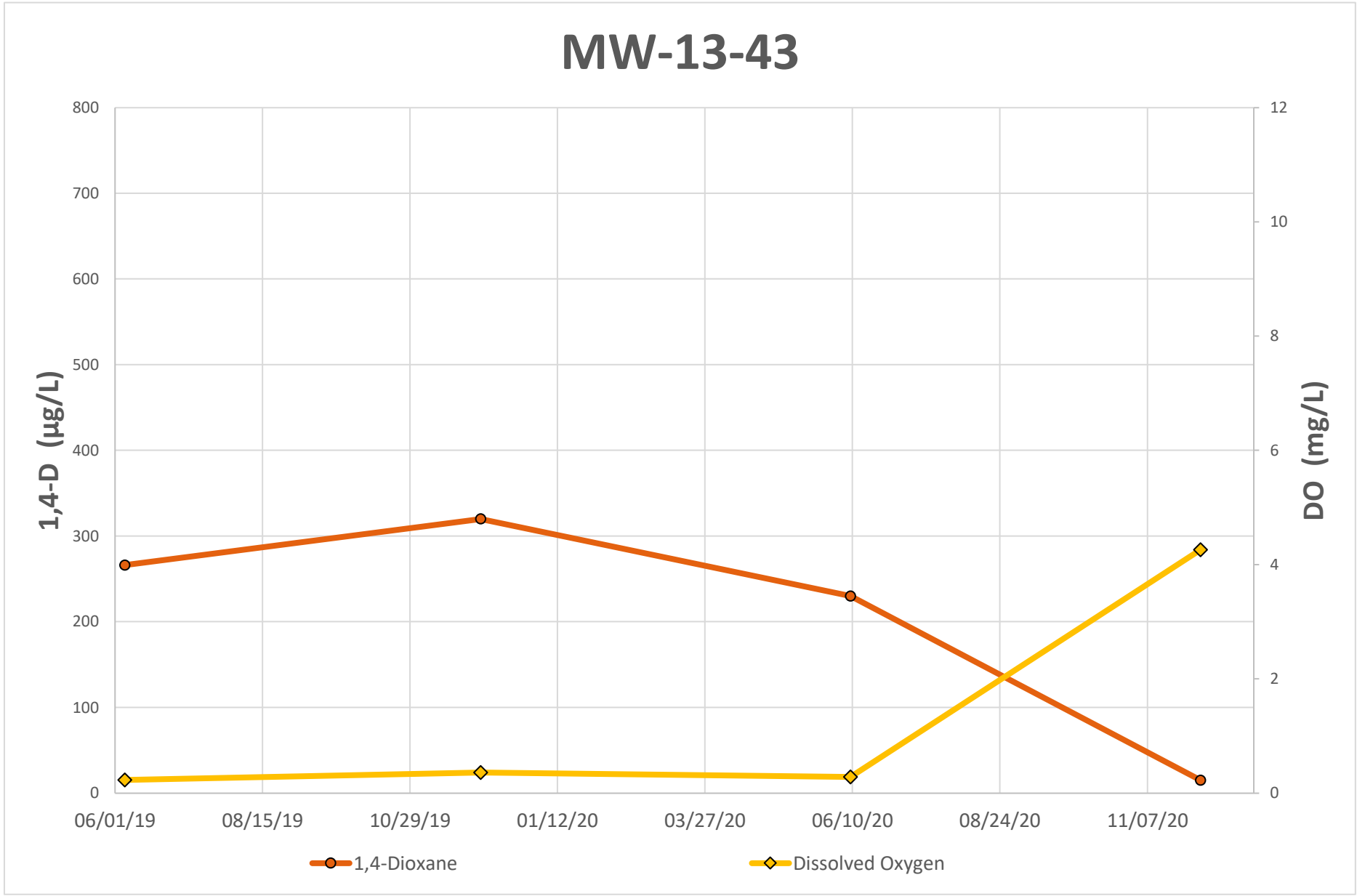
Plant 2 Transect G Upgradient Well 140 ft
Performance Graph



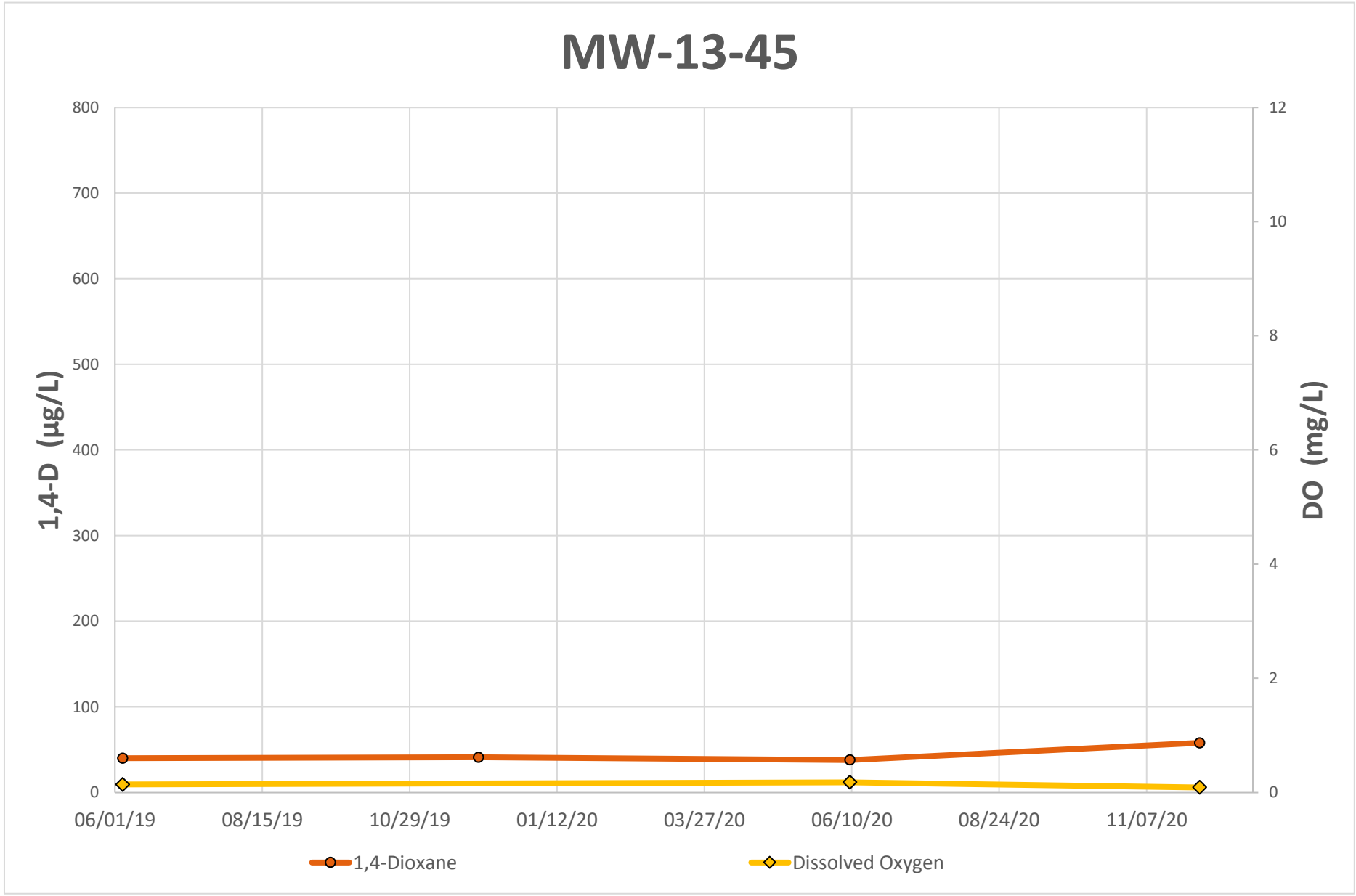
Plant 2 Transect C Monitoring Well
Performance Graph



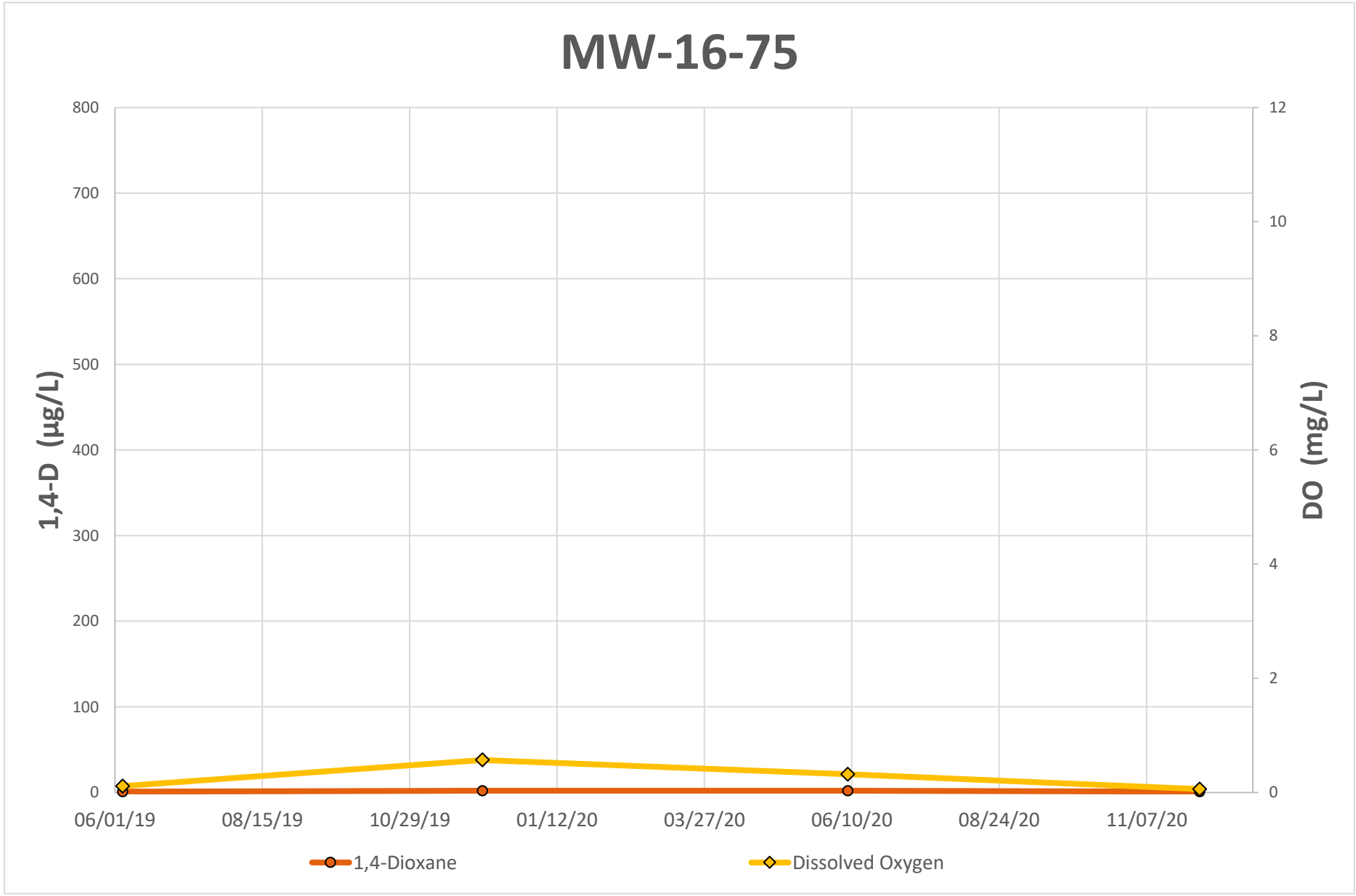
Plant 2 Transect B ROI Well
Performance Graph



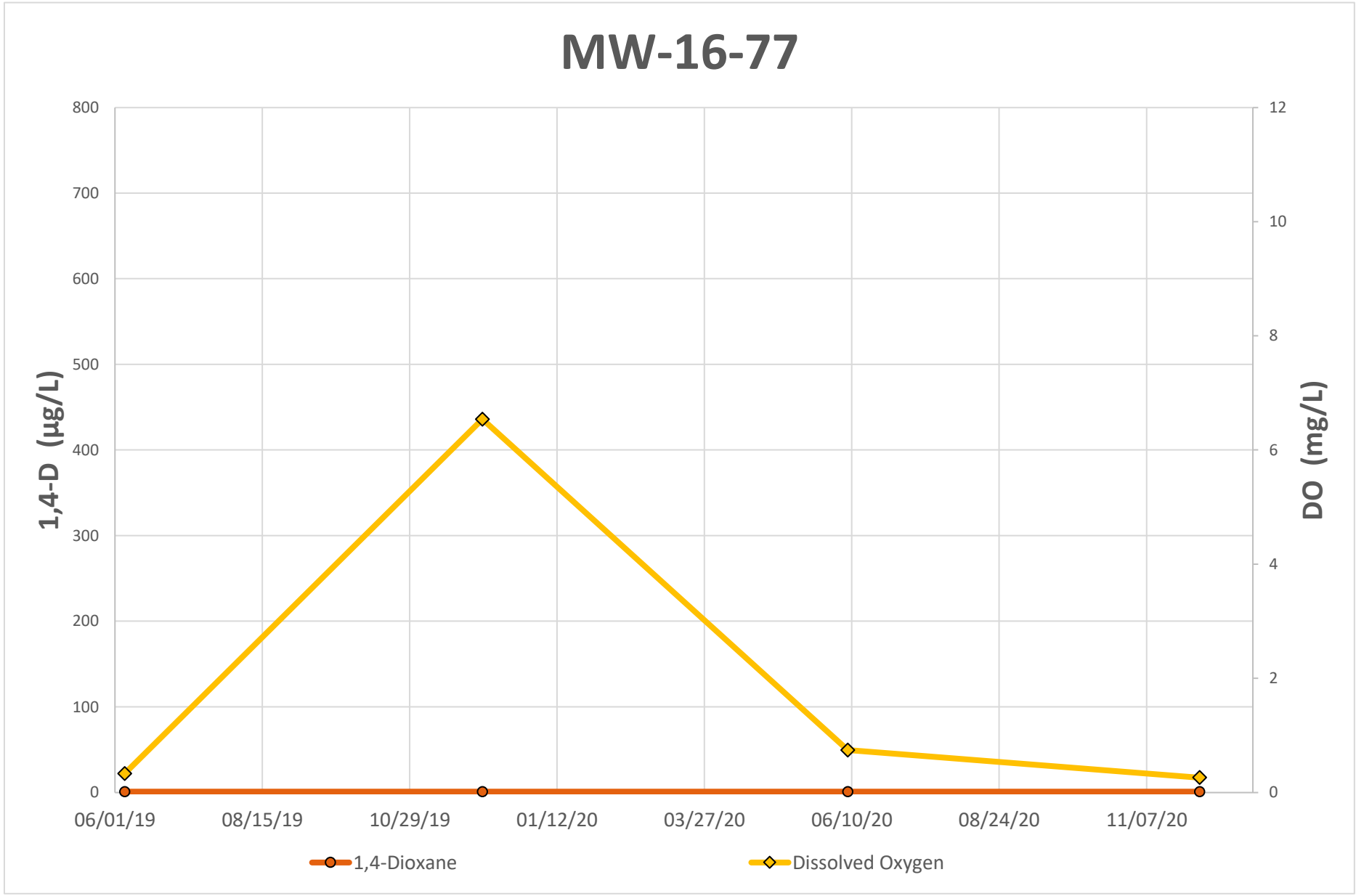
Plant 2 Transect B Cross-gradient Well 200 ft
Performance Graph



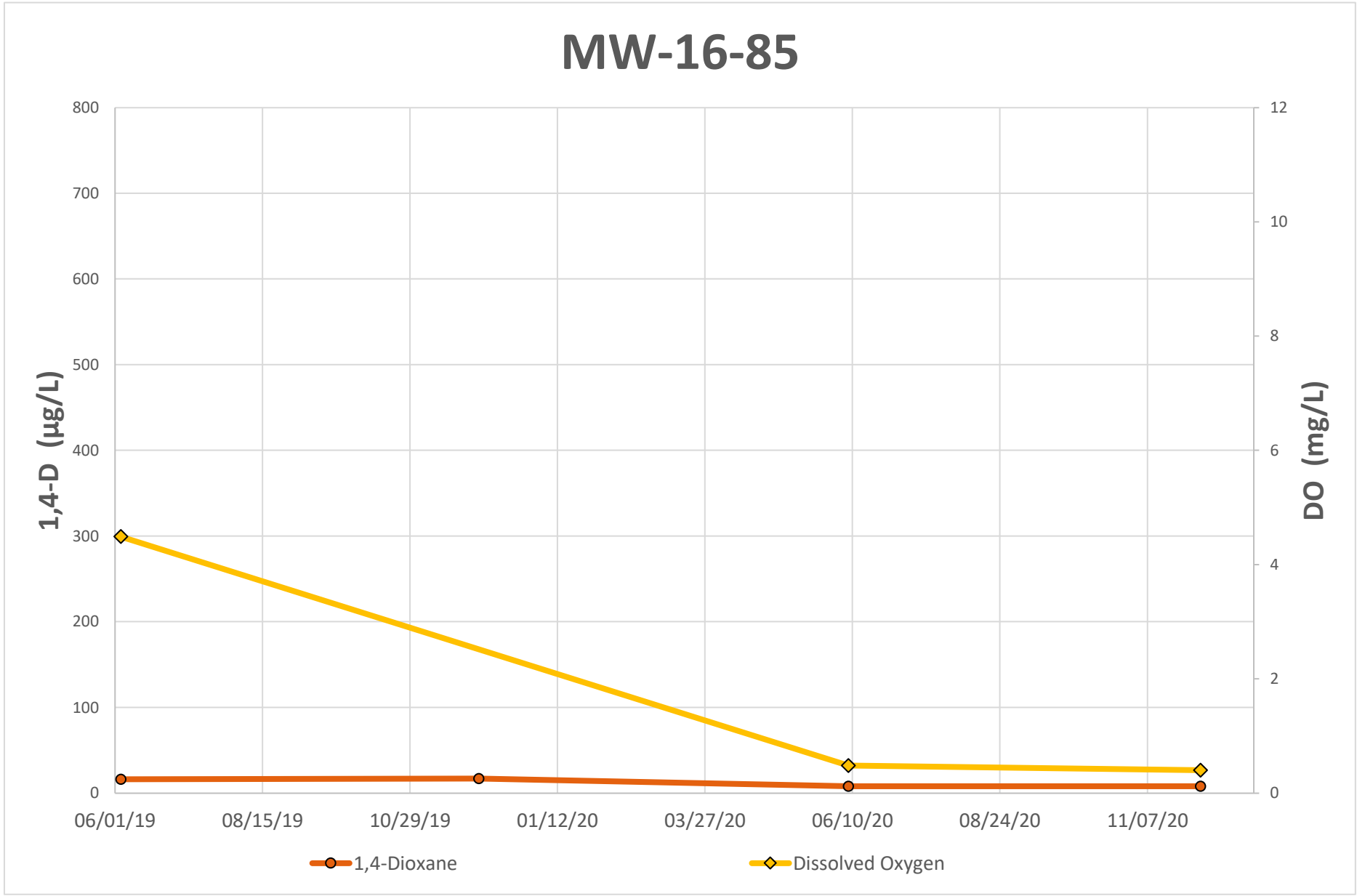
Plant 2 Transect G Downgradient Well 200 ft
Performance Graph



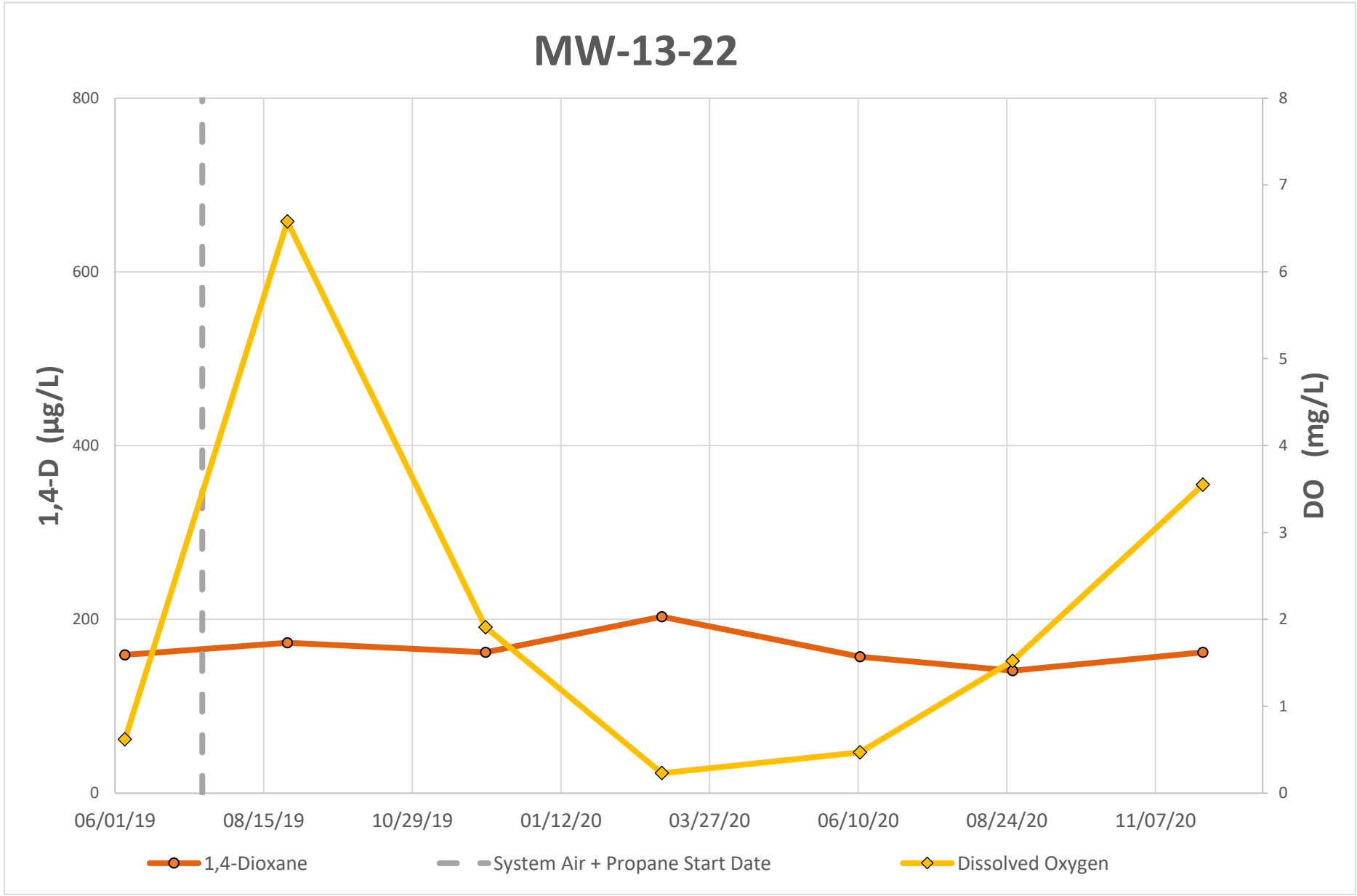
Plant 2 Transect G Cross-gradient Well 160 ft
Performance Graph



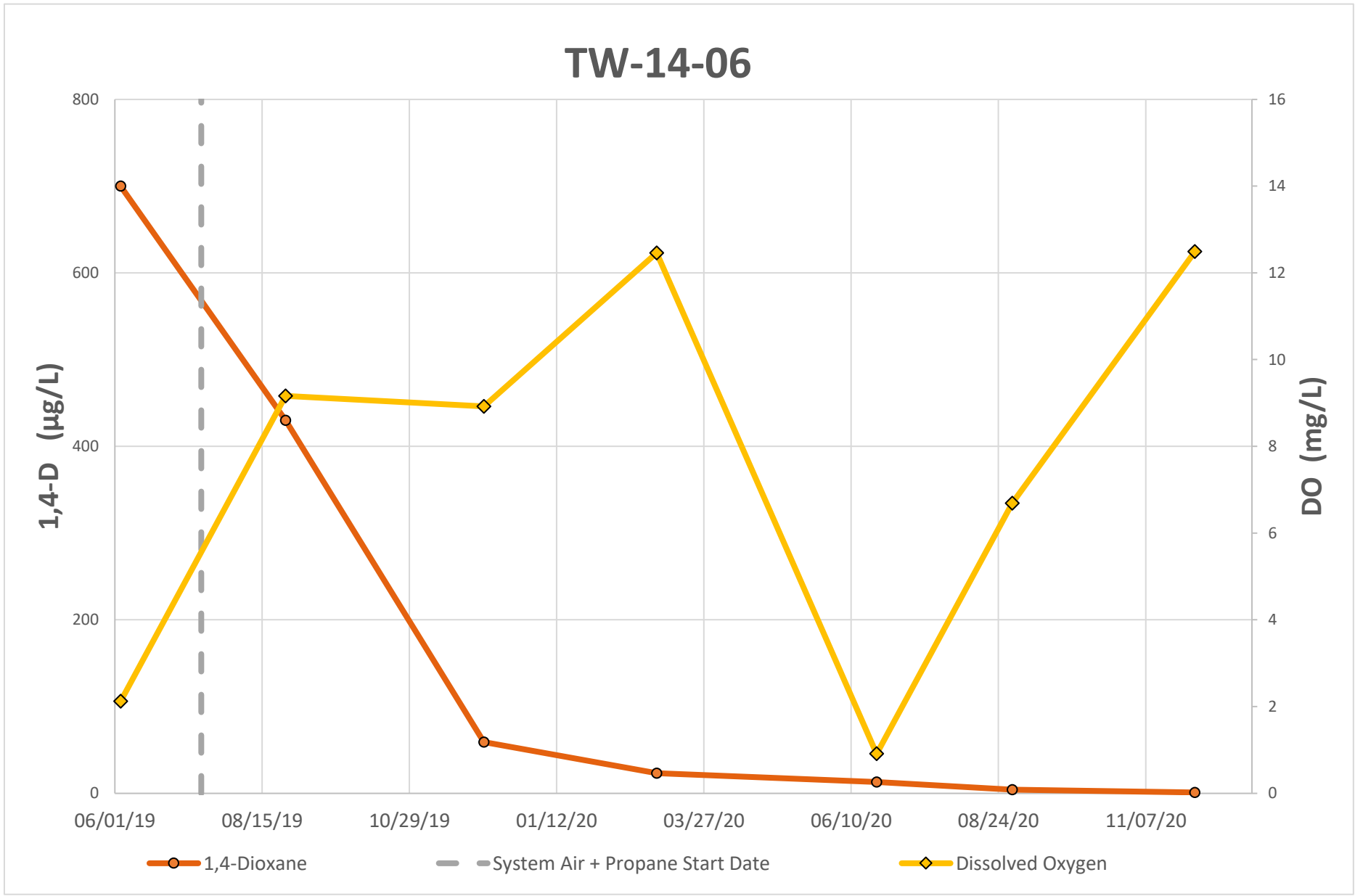
Plant 2 Transect F Downgradient Well 170 ft
Performance Graph



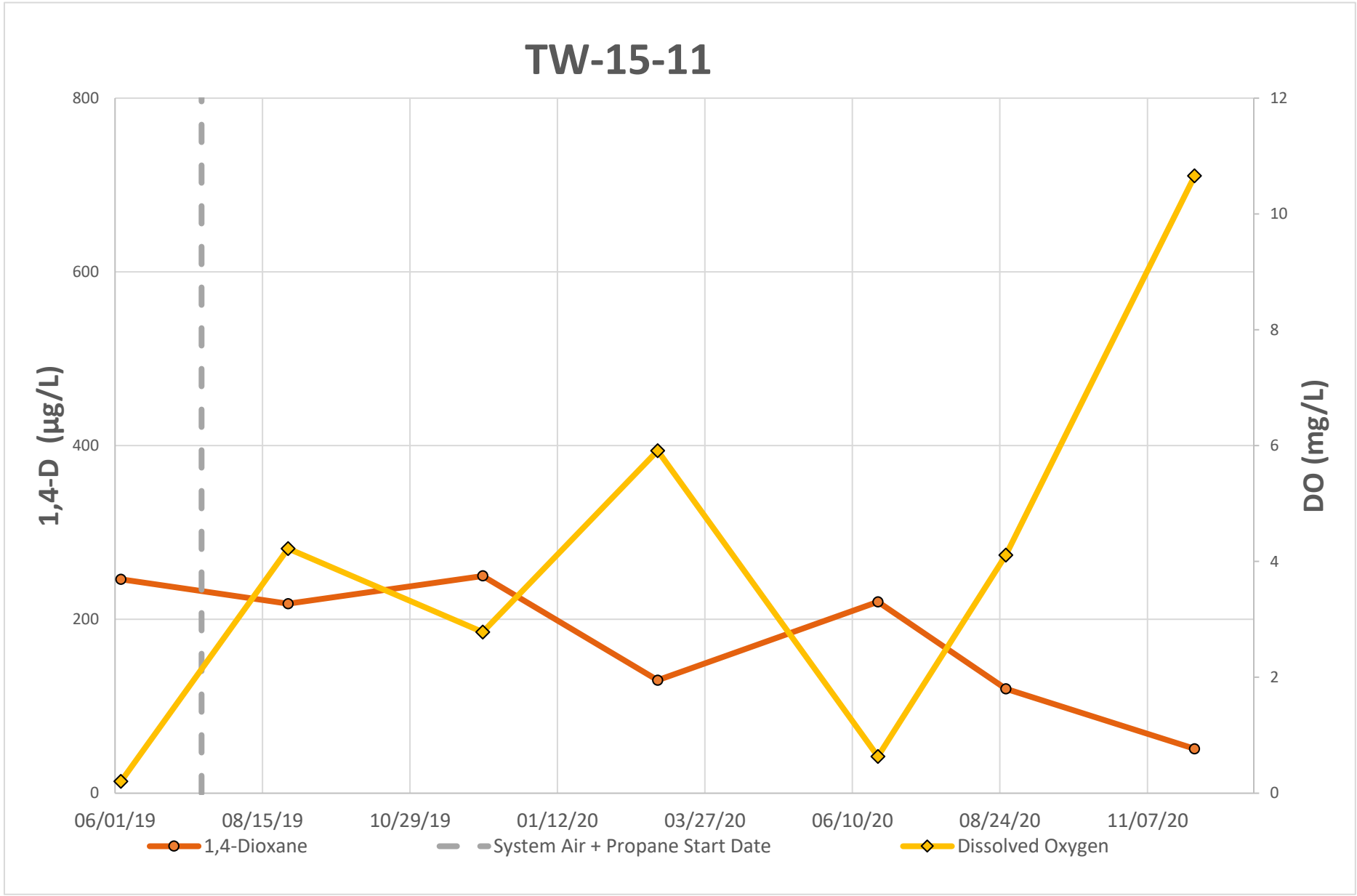
Plant 3 Transect A Upgradient Well 50 ft
Performance Graph



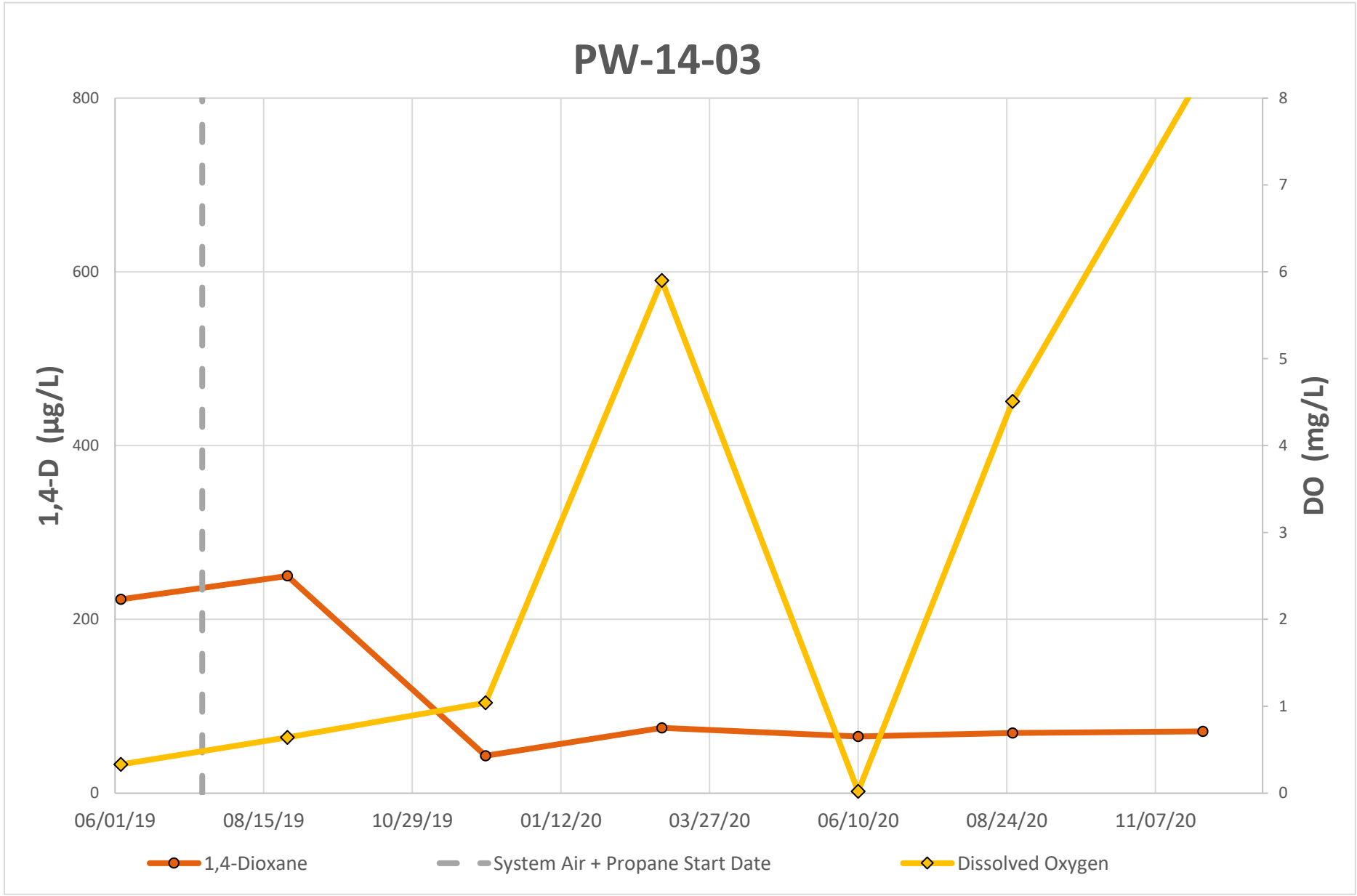
Plant 3 Transect A ROI Well
Performance Graph



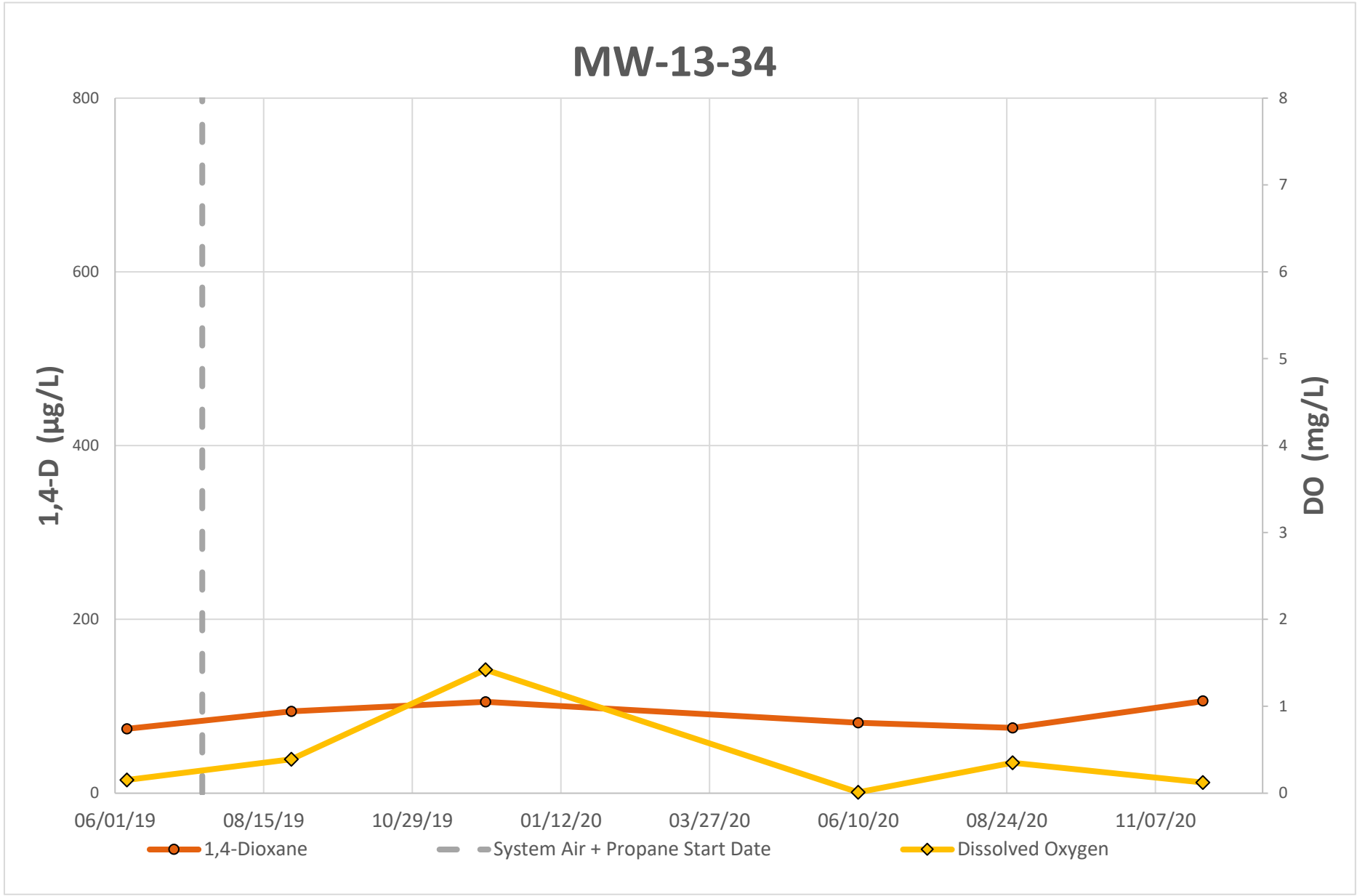
Plant 3 Transect A Downgradient Well 35 ft
Performance Graph



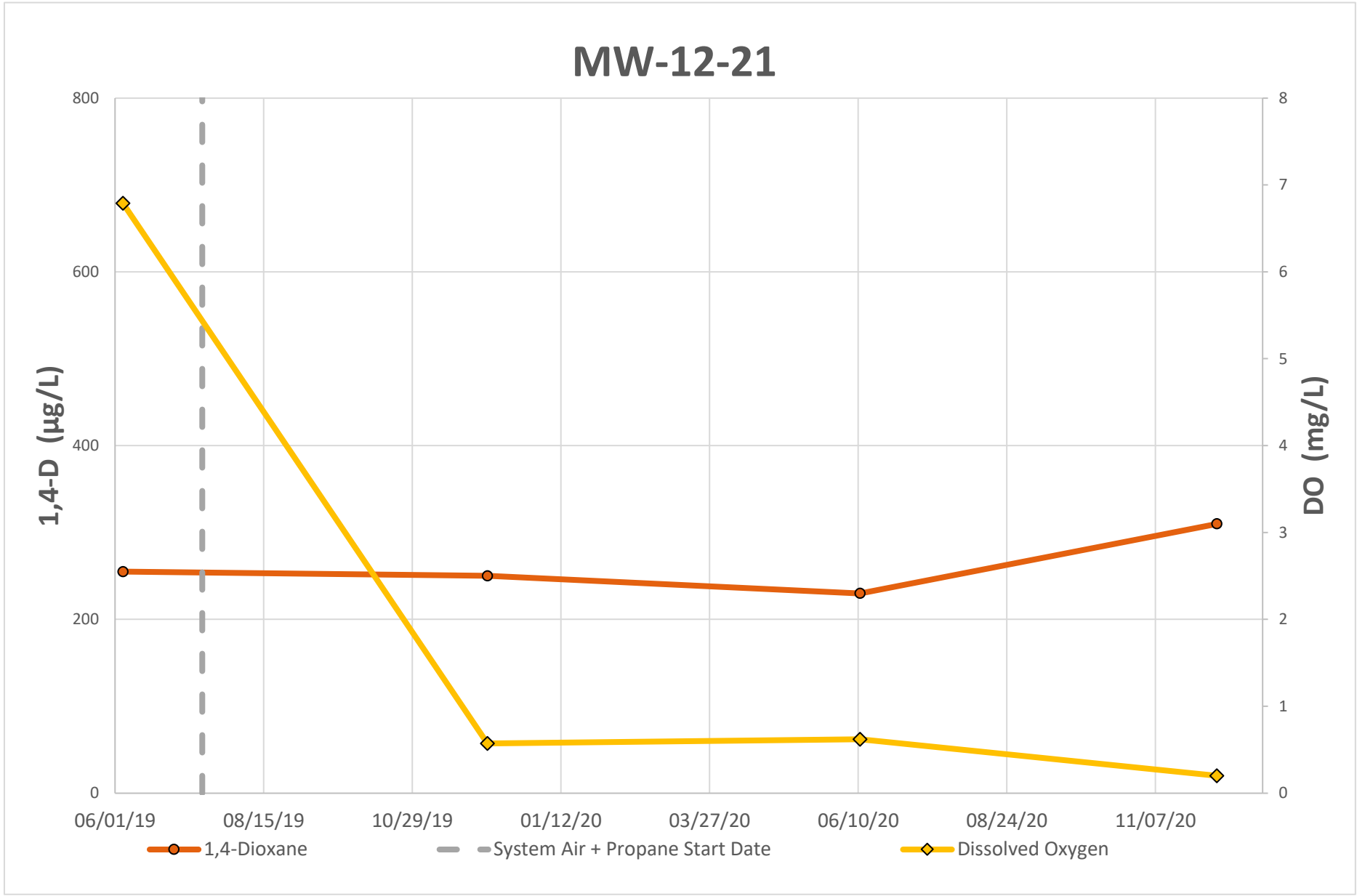
Plant 3 Transect A Downgradient Well 40 ft
Performance Graph



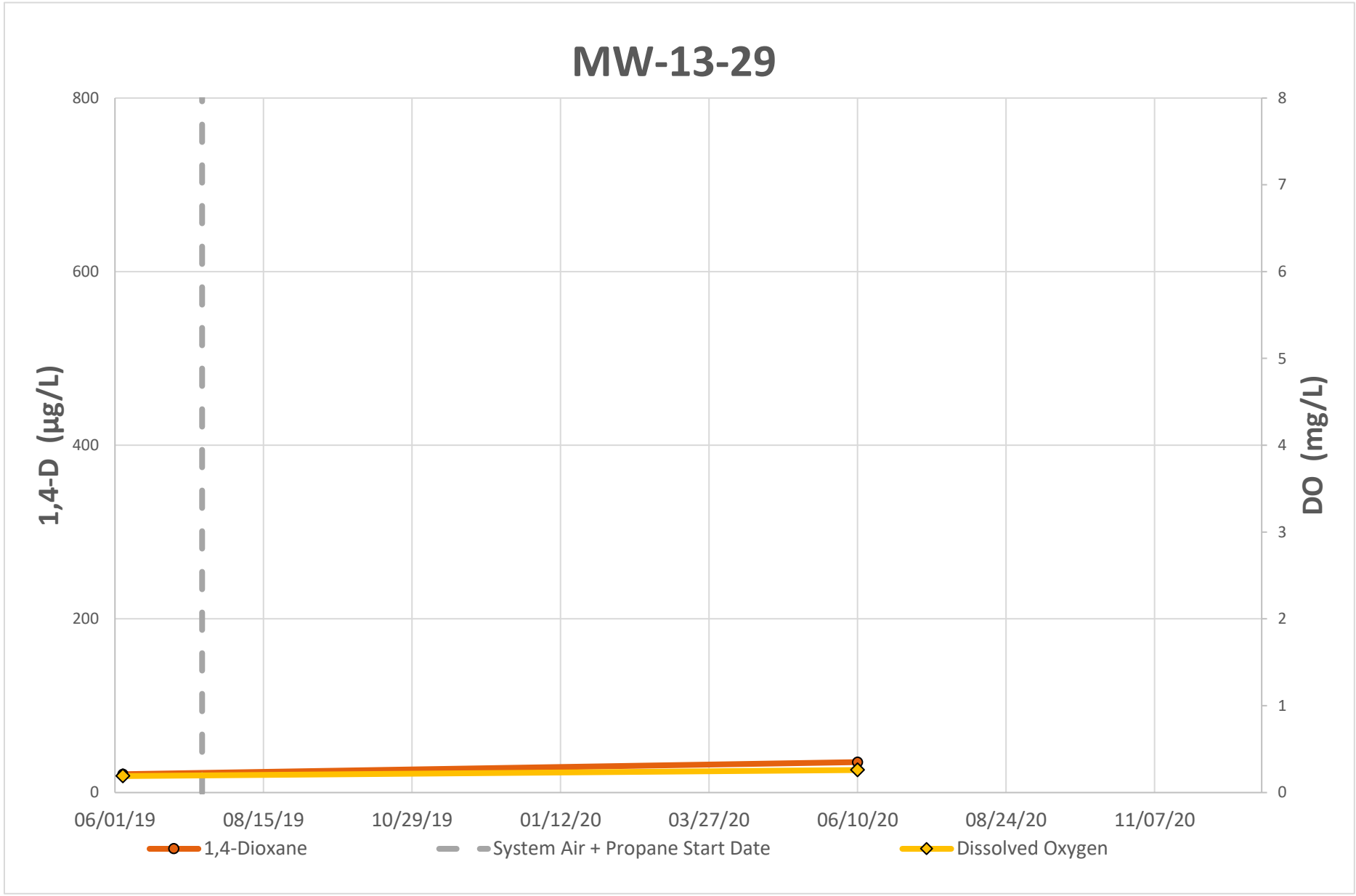
Plant 3 Transect A Downgradient Well 460 ft
Performance Graph



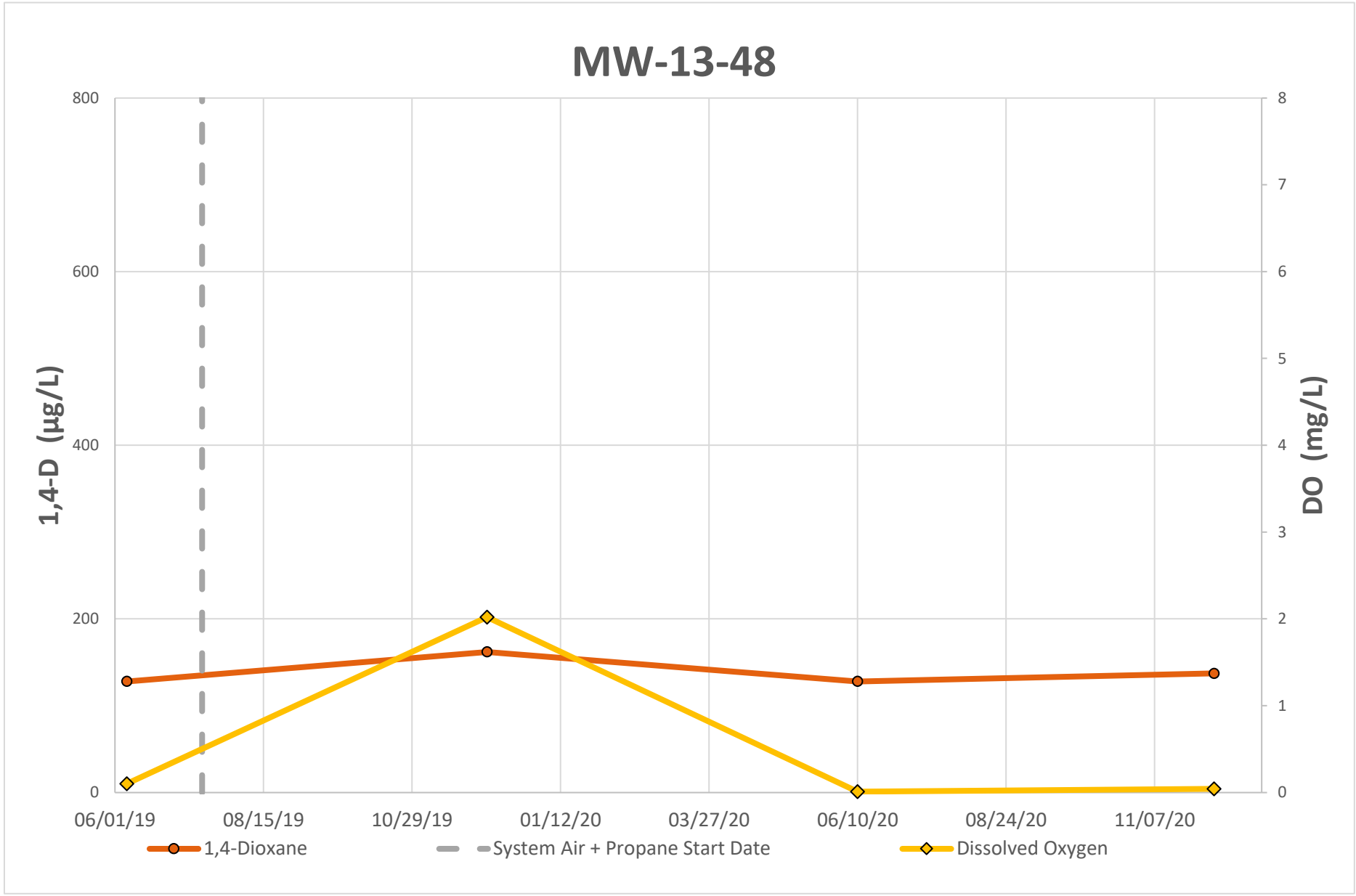
Plant 3 Transect A Well
Performance Graph



Plant 2 Transect A Well
Performance Graph



Plant 2 Transect A Well
Performance Graph



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