1985475

REMEDIAL ACTION AND OPERATIONS & MAINTENANCE STATUS REPORT JULY THROUGH DECEMBER 2021 LOWRY LANDFILL SUPERFUND SITE

Prepared for:

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LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
Δh	Change in head
µg/L	Micrograms per liter
14X	1,4-Dioxane
3DVA	3-Dimensional Data Visualization and Analysis
5YRR	Five Year Review Report
amsl	Above mean sea level
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	Below ground surface
BTS	Biological Treatment System
°C	Degrees Centigrade
CD	Consent Decree
CDPHE	Colorado Department of Public Health and Environment
CFM	Chloroform
Chem Rec	Chemical recovery
CSE	Containment System Evaluation
CSM	Conceptual Site Model
cy	Cubic yards
d	Distance
DADS	Denver-Arapahoe Disposal Site
DBF	DADS Blower/Flare
DCA	Dichloroethane
DCE	Dichloroethene
Denver	City and County of Denver
DNAPL	Dense non-aqueous-phase liquid
DQA	Data Quality Assessment
DQO	Data quality objective
DVR	Data Validation Report
EB	Equipment blank
EBEW	East boundary extraction well
EMSI	Engineering Management Support, Inc.
ESW	East/South/West
EW	Extraction well
EWMP	Early Warning Monitoring Plan
ºF	Degrees Fahrenheit
Fm	Formation
FS3	Flare Station 3
Ft	Feet
ft/ft	Foot per foot
GAC	Granular activated carbon
GC	Gas chromatograph
gpd	Gallons per day

LIST OF ACRONYMS AND ABBREVIATIONS

gpm	Gallons per minute
GTEP	Gas-to-Energy Plant
GWMP	Groundwater Monitoring Plan
H	Hour
HMI	Human-machine interface
in wc	Inches of water column
IRA	Initial Response Action
IX	Ion exchange
L_c	Critical value
LBF	Lowry Blower/Flare
LCL	Lower confidence limit
LCS	Laboratory control sample
LEL	Lower explosive limit
LFG	Landfill gas
LNAPL	Light non-aqueous-phase liquid
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols
MB	Method blank
MDL	Method detection limit
Metro	Metro Wastewater Reclamation District (now Metro Water Recovery)
M-K	Mann-Kendall
mS/cm	micro-Siemens per centimeter
M	minute
mg/L	Milligrams per liter
MS/MSD	Matrix spike/matrix spike duplicate
mV	Millivolt
NA	Not applicable
NAPL	Non-aqueous-phase liquid
NBBW	North Boundary Barrier Wall
ND	Non-detect/not detected
NGVD	National Geodetic Vertical Datum
NTES	North Toe Extraction System
NV	Not validated
O&M	Operations and maintenance
OS	Optimization Study
PARCC	Precision, accuracy, representativeness, comparability, completeness
PCR	Periodic Compliance Report
PCE	Tetrachloroethene
PID	Photo-ionization detector
PLC	Programmable logic controller
POC	Point of compliance
POTW	Publicly-owned treatment works
Ppb	Parts per billion
PPE	Personal protective equipment
Ppm	Parts per million
PS	Performance standard

LIST OF ACRONYMS AND ABBREVIATIONS

psi	Pounds per square inch
PWI	Potable water injection
QAPP	Quality Assurance Project Plan
RA	Remedial action
RAWP	Response Action Work Plan
RI	Remedial investigation
ROD	Record of Decision
RPD	Relative percent difference
RWST	Raw water storage tank
scfm	Standard cubic feet per minute
SDG	Sample delivery group
SIM	Selected Ion Monitoring
Site	Lowry Landfill Superfund Site
SOW	Statement of Work
Surr	Surrogate
SVOC	Semi-volatile organic compound
SWRA	Surface Water Removal Action
TB	Trip blank
TCA	Trichloroethane
TCE	Trichloroethene
TCHD	Tri County Health Department
TCLP	Toxicity characteristic leaching procedure
TDS	Total dissolved solids
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
THF	Tetrahydrofuran
THM	Trihalomethane
TM	Technical Memorandum
tpy	Tons per year
TSDF	Treatment, Storage and Disposal Facility
TSS	Total suspended solids
U	Non-detect
UCL	Upper confidence limit
UD	Unweathered Dawson formation
UPS	Uninterruptable power supply
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UV-Ox	Ultraviolet Oxidation
VFD	Variable frequency drive
VOC	Volatile organic compound
WAP	Water Augmentation Plan
WD	Weathered Dawson formation
WM	Waste Management
WMP	Waste Management Plan
WSDs	Work Settling Defendants
WTP	Water treatment plant

LOWRY LANDFILL

www.lowrylandfill.com

Executive Summary: Status of Operations, Maintenance and Remedial Actions

March 31, 2022

INTRODUCTION

Since the last report six months ago, EPA has published a Fifth Five-Year Review (2022) that determined the remedy at the site is protective in the long term. Just prior to the release of the 5th FYR, EPA also amended the Fourth Five-Year Review with a short-term protectiveness finding. These determinations were made as a result of the routine operations and maintenance (O&M) activities at and north of the Superfund Site completed by the City and County of Denver, Waste Management of Colorado, Inc., and Chemical Waste Management Inc.,(collectively referred to as the Work Settling Defendants (WSDs.) This work allowed for the WSDs to resolve all of the Fourth Five-Year Review deferred protectiveness findings in collaboration with EPA, CDPHE, and the Tri-County Health Department. Further, the remaining studies were finalized and incorporated by EPA into the 5th FYR which found the remedy protective in the long term. A brief summary of the protectiveness finding of the Fifth Five-Year Review and details of the O&M activities are presented in this Status Report.

The Fifth Five-Year Review (2022) determined that the remedy is protective of human health and the environment and that no other information has come to light that could call this into question. Specifically, EPA has determined that the remedy is functioning as intended by the decision documents, and that the exposure assumptions, toxicity data, and cleanup levels and Remedial Action Objectives used at the time of the remedy selection are still valid. Therefore, the remedy for Lowry Landfill is protective of human health and the environment.

The O&M activities that allowed for EPA to resolve all Fourth Five-Year Review issues as well as issue a determination of protectiveness for the Fifth Five-Year Review consisted of extracting and treating approximately 9.1 million gallons of groundwater

from several onsite and offsite extraction systems in full compliance with the Industrial Discharge Permit from Metro Water Recovery; collection and analyses of 122 samples from 75 groundwater monitoring wells; continuous operations of the Landfill Gas Extraction and Treatment system in full compliance with decision documents; collection and analyses of soil gas samples from 64 subsurface gas monitoring probes surrounding the Lowry Landfill; maintenance of stormwater conveyance ditches; and inspection and maintenance of landfill covers and buffer properties contiguous to the Superfund Site.

During the reporting period all Fourth Five-Year review issues were resolved including 1) EPA approval of the North End Groundwater Monitoring Plan (added additional monitoring wells); 2) publication and EPA approval of the Containment System Evaluation (CSE) for the fifth groundwater remedy component that concluded the NBBW which was demonstrated to achieve containment along the Target Zone of Containment; and 3) EPA published the Final Updated Conceptual Site Model to describe the current understanding of site conditions. The Fourth Five Year Review determined that Operable Unit 1 (OU1) (Shallow Groundwater and Subsurface Liquids) and OU6 (Deep Groundwater) were short-term protective and protective, respectively, because there are no completed exposure pathways for 1,4-dioxane in shallow groundwater and the deep groundwater plume is delineated. In September of 2020 EPA determined that the North End 1,4-dioxane plume does not pose an unacceptable risk to human health, and that no additional institutional controls are necessary north of the Superfund Site. However, WSDs will continue to voluntarily extract groundwater from the North End to accelerate 1,4-dioxane mass removal.

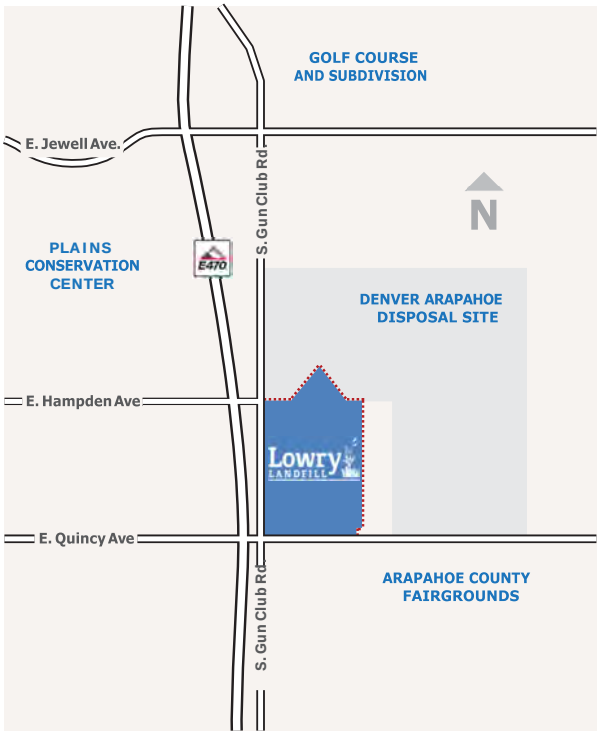
As part of the WSDs ongoing commitment to transparency and community engagement, several outreach opportunities were provided. During this reporting period, the WSDs provided

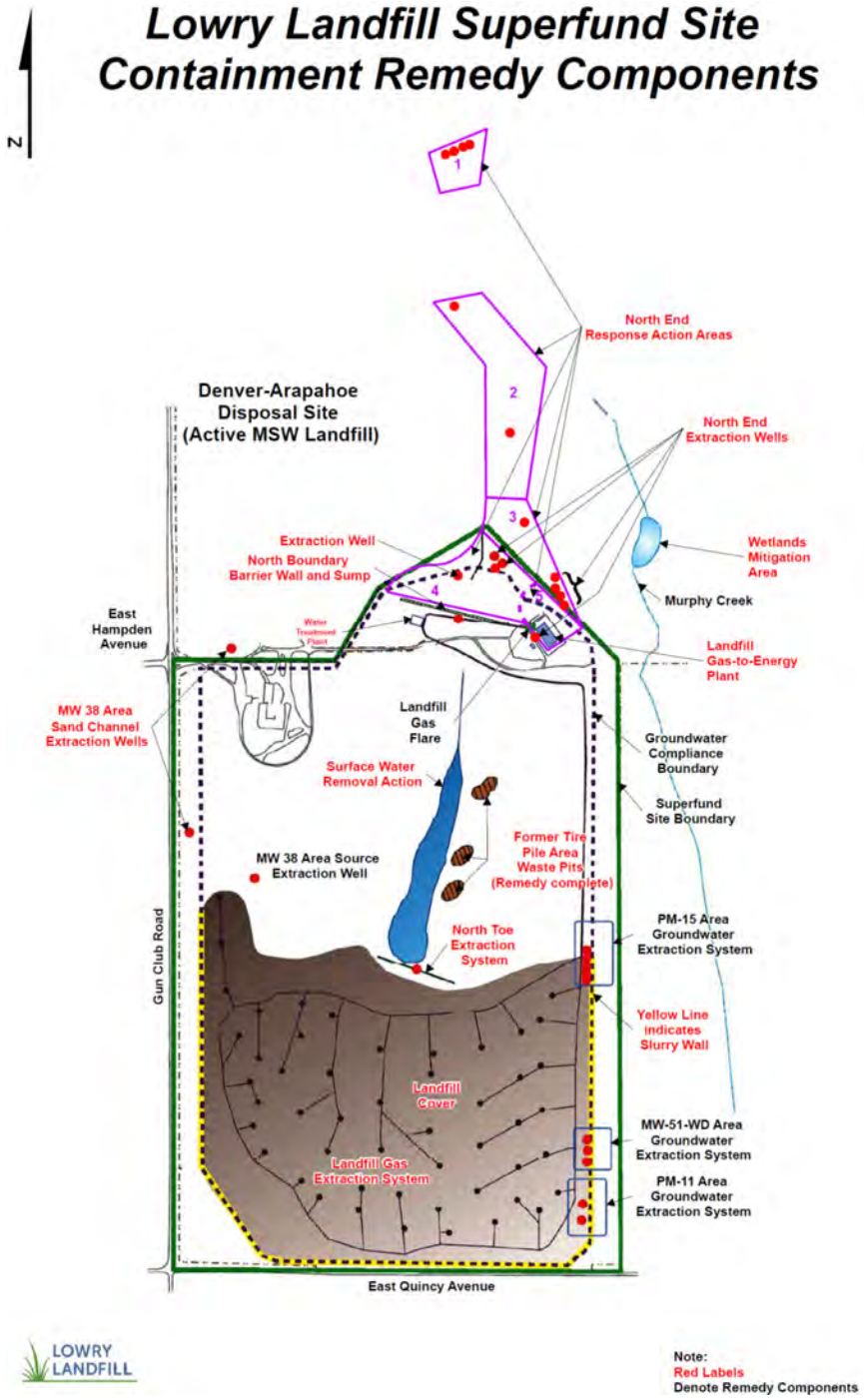
community outreach by participating in five meetings with the Lowry Landfill Community Advisory Group with presentations given regarding stratigraphy, groundwater flow direction and dewatered areas of the weathered Dawson in the area north of the NBBW.

Progress at Lowry

- ✔ Upgrading the WTP and POTW discharge line: **DONE**
- ✔ Obtain approval from the State Engineer's Office to allow higher flow rates through the plant and new locations for release of augmentation water on a permanent basis: **DONE**
- ✓ Sampling private wells within/adjacent to the 1,4-dioxane plume and confirming they are not impacted, **DONE**
- ✓ Evaluating effectiveness of five groundwater remedy components: **DONE**
- ✔ Updating the Groundwater Monitoring Plan to add 1,4-dioxane, delete iron, and incorporate the most recent Colorado Basic Standards for Groundwater : **DONE**
- ✔ Identifying and sampling potentially at-risk off-site private wells in the vicinity of the 1,4-dioxane plume and updating the North End Groundwater Monitoring Plan: **DONE**
- ✔ Confirming the lateral and vertical extent of the off-site 1,4-dioxane plume: **DONE**
- ✔ Updating performance standards for landfill gas in subsurface soils: **DONE**

LOCATION & CONTAINMENT REMEDY MAPS





GROUNDWATER MONITORING

More than 500 monitoring wells extending into both shallow and deep aquifers have been installed within and outside the site to ensure the community is protected. Well inspections are a routine part of the monitoring program. Data shows that the monitoring system continues to be effective.

Groundwater remedy component effectiveness evaluations conducted in 2021 as part of the fourth five-year review determined that the remedial components are effective and achieve objectives. Specifically, the slurry wall – a vertical barrier wall made of clay that prevents groundwater flow – continues to effectively contain contamination inside the eastern, southern and western limits of the landfill as designed. The North Toe Extraction System, which collects and pumps water to the treatment plant at less than 1 gallon per minute, continues to capture the most contaminated groundwater emanating from the landfill. The 960-foot long North Boundary Barrier Wall (NBBW) located at the north end of the site is the most significant groundwater extraction feature, removing 6 to 10 gallons per minute, which effectively prevents contamination from migrating offsite. Finally, groundwater extraction in the northwest corner of the site, known as the MW38 area, captures contaminated groundwater flowing through this area and prevents offsite migration.

Vertical migration monitoring shows vertical migration wells are in compliance with groundwater performance standards and that contaminated groundwater has not migrated to the deeper aquifers.

There are 60 compliance wells in the network, which are monitored for 29 different chemicals. There are 52 wells in compliance or potentially in compliance, and 8 wells are out of compliance or potentially out of compliance for chemicals such as 1,4-dioxane, PCE, nitrate, nitrite, and chloroform. The 8 wells that are out, or potentially out of, compliance are being addressed by continuing to pump contaminated water to the treatment plant, as discussed above. This method has proven to be effective at stopping groundwater flow in these areas and reducing the chemical concentrations.

FACTORS AFFECTING CONTAMINANTS IN GROUNDWATER

1,4-dioxane and the North End

In 2005, the Colorado Water Quality Control Commission established a new groundwater standard for 1,4-dioxane. At that time, new technological advancements capable of detecting and measuring 1,4-dioxane at the new standards found 1,4-dioxane north of the site. That standard has been revised over the past 13 years, and the current standard is now 0.35 parts per billion (ppb). Current best available analytical technology is not able to reliably detect 1,4-dioxane at this concentration in site groundwater so a site-specific standard for Lowry Landfill is set at 0.9 ppb.

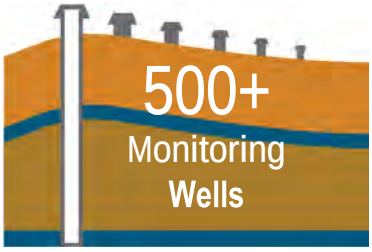
Numerous response action work plans have been implemented that have effectively reduced the extent of 1,4-dioxane in the North End Area, and

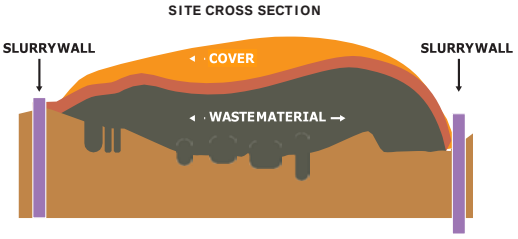


Water Treatment

1.5 million gallons per month

In compliance with discharge standards







1,4-dioxane

- Synthetic industrial chemical sometimes added to solvents to prolong their useful life
- Used in some consumer products such as cosmetics, deodorants, soaps, toothpaste, anti-freeze and paint

- Site groundwater standard = .9 ppb

there is a comprehensive monitoring program in place. Of the 37 current North End monitoring wells, 36 have sufficient data to determine 1,4-dioxane trends. Of those, 86% are decreasing, 11% are flat, and 1,4-dioxane concentrations at one well (3%) are increasing. The observed concentration declines in all areas shows the effectiveness of the ongoing response actions and demonstrates that groundwater quality in this area is improving. Data shows that the groundwater extraction response at the site continues to significantly decrease the 1,4-dioxane concentrations, as well as the width and length of the contamination to the north. An animation of the North End plume over time is available at www.lowrylandfillinfo.com.

MW38 Sand Channel

Remedial actions to contain groundwater and reduce contaminant concentrations in the sand channel have also been successful. Water is pumped out of the sand channel to maintain inward groundwater flow directions and prevent offsite migration of contaminants and the extracted water is sent to the treatment plant ensuring the surrounding groundwater is always flowing inward. Levels of 1,4-dioxane have been reduced by 98% since May 2005 in this area. Chloroform and trichloroethene concentrations have also been reduced by 94%. See graph at right.

Nitrate in the NBBW Area

One well is exceeding the nitrite and nitrate standards and another exceeds nitrate only in an area where sewage sludge was historically land farmed to cultivate and enhance microbial degradation of the sludge. These wells are located along the northern boundary of the Site. There does not appear to be a potential for significant off-Site migration of nitrate or nitrite at concentrations greater than the performance standard and monitoring is ongoing. Additionally, groundwater extraction from the North End wells further downgradient would capture any potential migration of these compounds if it were to occur.

WATER TREATMENT PLANT

The water treatment plant uses a natural biological process and advanced oxidation treatment to destroy more than 92% of the organic compounds coming into the plant. An ion-exchange system is used to reduce molybdenum by an average of 99%. The pretreated water is then discharged to a publicly-owned wastewater treatment plant for further treatment. The on-site treatment plant removes all site chemicals to safe standards and leaves a minimal environmental foot-print. It treats approximately 1.5 million gallons of contaminated groundwater every month. The data show the plant continues to operate as designed in compliance with discharge standards.



At Lowry

- Extraction and treatment continues to decrease concentrations.
- North End Area: 38 Wells

86% *show declining concentrations*

11% *remain flat*

- MW38 Channel:

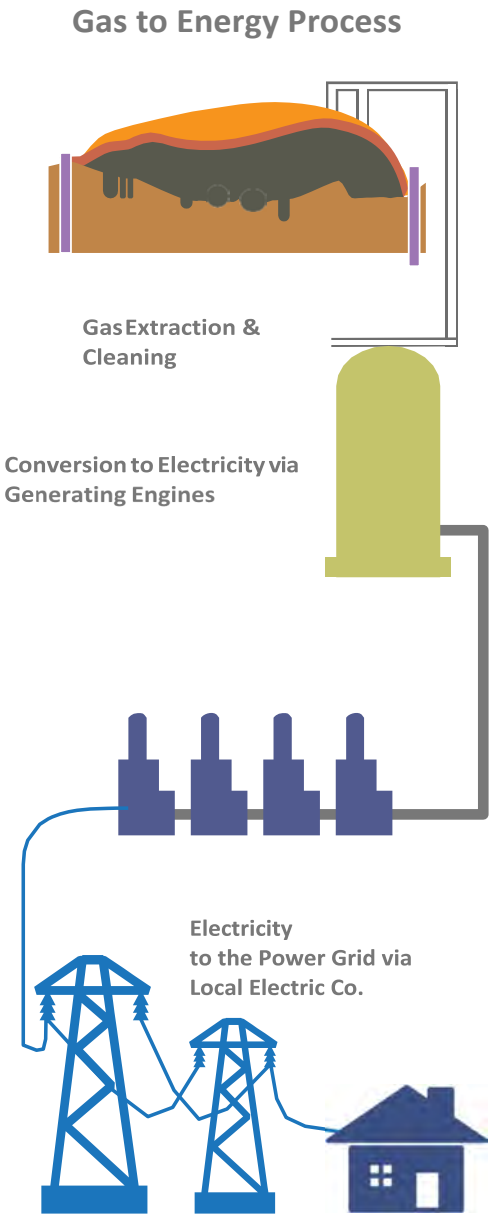
98% *reduction of 1,4 dioxane since May 2005*

LANDFILL GAS REMEDY

Landfill gas—made up of methane, carbon dioxide, nitrogen and other gases—is created naturally by the biological decomposition of organic matter in landfills under low-oxygen conditions. The Site's landfill gas extraction, collection and treatment system continues to be effective and in compliance, including the gas-to-energy treatment plant, which removes roughly 5,000 tons of methane annually. This equates to removing more than 22,000 cars from the road each year. The on-site power plant, constructed in 2008, uses landfill gas to fuel four internal combustion engines that generate electricity for a local utility company. The electrical power generated is enough to supply 2,500 to 3,000 households.

LANDFILL COVER

The former landfill is covered by 4 to 12 feet of compacted clay and soil. The "cap" reduces infiltration of rain and snow into the soil, which minimizes further groundwater contamination. The cover continues to effectively drain rain and snow, keeping it from penetrating the soil. The cap is routinely monitored for any depressions that may form due to settlement that would cause rainwater to pond, among other issues. No cap settlement issues were identified in this report.



LOWRY LANDFILL

Visit the Lowry Landfill website for detailed information and contact information.
www.lowrylandfill.com

1.0 INTRODUCTION

This Remedial Action (RA) and Operations & Maintenance (O&M) Status Report was prepared on behalf of the City and County of Denver (Denver), Chemical Waste Management, Inc., and Waste Management of Colorado, Inc. (WM), collectively Work Settling Defendants (WSDs), pursuant to Subsection 2.1 of the Statement of Work (SOW) attached as Exhibit C to the Consent Decree (CD) entered by the U.S. District Court for the District of Colorado on 28 September 2005 (and reentered on 16 November 2005) in Civil Action No. 02-CV-01341-EWN-MJW regarding the Lowry Landfill Superfund Site (the Site).

No RA activities were performed during the reporting period.

O&M activities consisted of operations, maintenance, and monitoring associated with the Site Water Treatment Plant (WTP), groundwater, surface water, landfill gas (LFG), and landfill covers. These activities were performed in accordance with *Addendum 7, Operation and Maintenance Manual, Water Treatment Plant* (Parsons/Engineering Management Support, Inc [EMSI], 2021); *Revision 3, Operations and Maintenance Manual, Groundwater Extraction* (Parsons, 2021a); *Revision 2 Groundwater Monitoring Plan* (GWMP) (EMSI/Parsons, 2018); the *Stormwater Monitoring Plan* (EMSI, 2008a); *Revision 3, Operations and Maintenance Manual, LFG Remedy* (EMSI, 2021); *Revision 4, Updated Compliance Monitoring Plan LFG Remedy* (EMSI, 2020a); and the *Final Operations and Maintenance Manual, Covers and Stormwater* (EMSI, 2007a). In addition, groundwater extraction from North End and MW77 Area response actions and monitoring of North End groundwater were implemented in accordance with the *Revised North End Initial Response Action (IRA) Work Plan Addendum* (EMSI, 2008b) as conditionally approved by United States Environmental Protection Agency (USEPA) on March 24, 2008; the *North End Groundwater Monitoring Plan* (EMSI, 2007b); the *North End Groundwater Monitoring Plan Update No.2* (EMSI, 2020b); the *North End Groundwater Monitoring Plan Update No. 3* (Parsons, 2021b); the *Response Action Work Plan to Extract Additional Groundwater from Upgradient of MW77-WD* (EMSI, 2011); the *Response Action Workplan for the B-326-UD and B-313 Areas* (EMSI, 2013); and the *Revised Work Plan to Further Assess the North End 1,4-Dioxane Plume and Update Conceptual Model for North End Area* (EMSI, 2018a). The status of North End activities is described in Subsections 4.8 and 4.9.

1.1 Purpose and Scope

This report summarizes results of O&M activities performed from 01 July 2021 through 31 December 2021 (reporting period).

1.2 General Site Description

The Site is located in Section 6, Township 5 South, Range 65 West, and in the southern portion of Section 31, Township 4 South, Range 65 West in west central Arapahoe County, approximately 15 miles east of downtown Denver, Colorado. The Site occupies approximately 508 acres within an unnamed north-south trending valley located west of Murphy Creek and east of East Toll Gate Creek. The North End study area extends for approximately three miles north of the Site and is coincident with the unnamed creek and Murphy Creek drainages.

1.3 Report Organization

This report contains ten sections and seven appendices. The remainder of this report is organized as follows:

- Section 2 and Appendix A contain a summary of WTP operations and monitoring. Appendices F and G contain electronic analytical data packages and data validation reports (DVRs) for the WTP, the Data Quality Assessment (DQA), and the database. The database has been updated for routine database checks and should replace any previous versions still in use.
- Section 3 and Appendix B contain a summary of waste management activities, including: waste storage, treatment, disposal, and maintenance.
- Section 4 and Appendix C contain a summary of groundwater monitoring activities and evaluations of monitoring results, including: well inspections, sitewide groundwater level data, analytical results, and statistical evaluations. Appendices F and G contain electronic analytical data packages, DVRs, the DQA, and the database for groundwater. The database has been updated for routine database checks and should replace any previous versions still in use.
- Section 5 and Appendix D contain a summary of LFG monitoring, extraction, collection, and treatment activities performed during the reporting period, and an evaluation of gas monitoring results and collection system performance. Appendix G contains the database for landfill gas, the Gas-to-Energy Plant (GTEP), and flare gas.
- Section 6 contains a summary of stormwater sampling activities and results. Appendix G contains the database for storm and surface water.
- Section 7 and Appendix E present activities and results related to cover monitoring and maintenance.
- Section 8 presents the status of RA activities.
- Section 9 presents problems encountered and recommendations for each component of this Status Report.
- Section 10 presents the references cited in this report.

2.0 WATER TREATMENT PLANT

This section summarizes WTP O&M activities for the reporting period.

2.1 Operations and Maintenance

Operations of the WTP during the reporting period were limited to treatment of Site waters originating from the North Boundary Barrier Wall (NBBW), North Toe Extraction System (NTES) sump, east boundary extraction wells (EBEWs – PM-11, PM-15 and MW-51 areas), MW38 area extraction wells, on- and off-Site North End Response Action wells, the decontamination pad at the GTEP complex, LFG condensate, and miscellaneous sources such as well sampling purge waters and potable water used for plant wash-down. Following treatment, all of these waters were discharged to the publicly-owned treatment works (POTW) pipeline.

The treatment protocols, process monitoring, and effluent quality monitoring were performed in accordance with Industrial Discharge Permit No. 2360-6, effective January 5, 2020.

Throughout the reporting period, the WTP was discharging to the POTW 99 percent (%) of the calendar time. Downtime was caused by the reasons listed below, in order of decreasing significance. No discharge occurred during these downtimes.

- Power interruption: Plant discharge stopped on seven occasions for power grid interruptions. Plant discharge was interrupted for a scheduled outage on August 4 for a high voltage line relocate near Denver-Arapahoe Disposal Site's (DADS) Scale house (9 hours 47 minutes). Other outages occurred on August 30 (1 hour 22 minutes), September 7 (2 hours 43 minutes), September 13 (2 hours 43 minutes), September 23 (2 hours 50 minutes), October 7 (2 hours 55 minutes) and November 7 (3 hours 57 minutes) for a total of 26 hours 17 minutes.
- Annual device calibrations: Plant operations were stopped on one occasion while the calibrations of critical devices were confirmed [scheduled - November 15 (1 hour and 23 minutes)].
- Routine O&M: Effluent pH probe calibration, quarterly POTW discharge line valve exercising and granular activated carbon (GAC) vessel back-flushing (scheduled – all less than one day).
- Automatic shutdown tests of auto-alarm sensors and shutdown circuits (scheduled – all less than one day).
- Main WTP programmable logic controller (PLC) network switch upgrade: Plant operations were stopped on one occasion while the network switch linking the main PLC to other PLCs and Human-Machine Interface (HMI) computers was upgraded (scheduled – 35 minutes).
- Main WTP PLC logic fault: Plant operations stopped when the Main PLC faulted when an out-of-range setpoint was input for the newly programmed P-114 Ion Exchange feed pump and resulted in a logic error. Plant operations stopped automatically until the fault could be cleared [September 21 (17 minutes)]. Changes were made to the programming to prevent this occurrence in the future.

- Daylight savings time to standard time adjustment: Plant operations were stopped while the PLC and plant computers were adjusted to standard time [November 8 (15 minutes)].
- Main WTP PLC uninterruptable power source (UPS) replacement: Plant operations were stopped on one occasion to replace an eight-year-old UPS on its second set of batteries (scheduled – 7 minutes).

All O&M activities were documented on checklists, in the daily operator logs, and/or electronic logs entered automatically into the WTP databases by the operating software. Completed daily operator logs and weekly checklists of pertinent information are provided in Appendix A-1.

2.1.1 NBBW System

As shown in Appendix A-2, groundwater elevations in the NBBW sump fluctuated between 5685.4 feet (ft) above mean sea level (amsl) and 5685.6 ft amsl. The average groundwater elevation was 5685.5 ft amsl, which is the set-point water level in the sump. Throughout the reporting period, groundwater was extracted from the NBBW sump at an average rate of 7.1 gallons per minute (gpm) while pumping.

The significance of groundwater elevations at the extraction sump and in the overall vicinity of the NBBW system relative to hydraulic containment is evaluated in Subsection 4.5.3 of this report.

2.1.2 North End Extraction System

Extraction wells in the North End include on-Site wells located near the northern boundary of the Site and off-Site wells located north of the Site in Section 31 (Figure 4.34). North End on-Site and off-Site extracted groundwater was conveyed to the main WTP through dedicated North End pipelines. On-Site and off-Site North End groundwaters are introduced to the WTP at the feed surge tank where they are blended with pre-treated on-Site waters, treated by GAC, then discharged to the POTW pipeline. Rates of North End on-Site and off-Site groundwater extraction are presented in more detail in Subsection 4.8.

2.1.3 Liquid Volumes and Flow Rates

The following table summarizes the types, flow rates, and volumes of waters treated during the reporting period.

Water Source	Average Flow Rates (gpm)	Total Volume (gallons)
NBBW Water [total of volume sent directly to WTP plus volume temporarily routed to raw water storage tanks (RWSTs)]	7.1	1,888,320
MW38 area (includes automatic pumping from the sand channel wells and the source-control well)	2.2 (calendar)	582,728
NTES Water	0.5 (calendar)	135,364
LFG Condensate from Tank 530 (treated in WTP from July 1 through December 31, 2021)	0.02 (calendar)	5,399
PM-11 Area	NA[a/]	50,536
MW51 Area	NA	64,690
PM-15 Area	NA	3,600

Water Source	Average Flow Rates (gpm)	Total Volume (gallons)
Decontamination Water and Precipitation	NA	2,563
North End On-Site Water[b/]	15.9 (calendar)	4,207,147
North End Off-Site Water[b/]	8.3 (calendar)	2,169,008
Potable Water [for plant wash-down, pipeline flushing and Gas Chromatographs (GCs)]	NA	22,005
Total Influent[c/]	34.5 (calendar)	9,131,360
Discharge to POTW[c/]	34.5 (calendar)	9,126,699

calendar - timeframe used to derive average flow rate. For example, total volume during the reporting period (gallons) divided by number of calendar-minutes during the reporting period equals average flow rate in gpm.

a/ Not applicable – batch transfer to RWSTs, feed surge tank, or clear well, then treatment in WTP.

b/ See Subsection 4.8 for extraction rates from individual North End wells.

c/ The difference between the total influent volume and the volume discharged to the POTW is accounted for in total tank storage capacity associated with the WTP (including temporary storage in external tanks) and in measurement error of the totalizers. Totalizer error is as much as +/-0.5% on each totalizer (10 totalizers are used to generate the volumes above). For example, the effluent totalizer range of error is +/- 45,657 gallons over the reporting period.

2.1.4 pH System

During the reporting period, the pH of WTP effluent was measured every minute at the last pH monitoring probe in the plant (probe pH-740 located in the effluent surge tank). Average, minimum, and maximum pH readings during plant operations for the reporting period are summarized below. These represent normal pH readings.

Month	Control pH Set-Point	Average pH Reading	Minimum pH Reading	Maximum pH Reading
July	7.0	6.8	6.5	7.3
August	7.0	6.7	6.5	7.2
September	7.0	6.7	6.0	7.6
October	7.0	6.7	6.5	7.0
November	7.0	6.7	6.5	7.0
December	7.0	6.8	6.7	7.1

2.1.5 Removal of Volatile Organic Compounds

Removal of volatile organic compounds (VOCs) within the WTP is accomplished by biological treatment, UV-Oxidation (UV-Ox), and GAC. Biological treatment occurred in the Biological Treatment System (BTS) when treating a blend of approximately 6% NTES water, 21% MW38 area groundwater, 5% LFG condensate (when processing), and 68% softened water from the chemical precipitation process. The operating temperature of the BTS was maintained at 23.5 degrees Centigrade (°C).

While the BTS remained the primary process for VOC removal this reporting period, a parallel slip-stream of approximately 7.5 to 8.3 gpm of softened, non-NTES water was treated with UV-Ox to increase BTS removal efficiencies and biosolids handling by increasing the retention time within the BTS. The longer retention time in the BTS also allowed for increased flow from the MW38 Source well through the BTS.

The on-line GCs monitor eight target VOCs at least once per day for real-time monitoring at TP-3350 (BTS effluent) and TP-730 (UV-Ox effluent). The following compounds are monitored:

- 1,1-Dichloroethene (DCE)
- trans-1,2-DCE
- 1,1-Dichloroethane (DCA)
- Chloroform (CFM)
- Tetrahydrofuran (THF)
- Benzene
- 1,2-DCA
- 1,4-Dioxane

GC monitoring of GAC efficiencies at TP-710, TP-740, and TP-750 occurs once per week. Due to the large volume of data produced by the three GCs, those data are not included here but are available upon request.

Destruction efficiencies of the VOC compounds that have exceeded their discharge limits in **plant influent** in at least one sampling event since monitoring began are calculated below. Although the permit no longer includes discharge limits for these compounds (except 1,4-dioxane), they are routinely monitored in plant influent per the *Updated Early Warning Monitoring Plan* (EWMP) (EMSI, 2008c) and in plant effluent per the discharge permit (Metro Wastewater Reclamation District [Metro], 2020)]. Approximate destruction efficiencies for these compounds for the WTP as a whole are summarized below. These destruction efficiencies were calculated based on differences between mass loading to the plant from all influent streams and mass remaining in plant effluent.

Organic Destruction Efficiencies across Entire WTP

Compound	Average Efficiency (%) July through December 2021
1,1-DCE	92%
1,2-DCA	99%
1,4-dioxane	97%
Benzene	100%
Vinyl Chloride	100%

Analytical results from MP-001 (plant effluent, Appendix A-4.1.1 and A-4.1.2) and influent composite sampling (Appendix A-4.2.1) indicate that some breakthrough of target

compounds through GAC contactors occurred during the reporting period (as shown in the table above). 1,4-Dioxane showed breakthrough over the entire reporting period. Note: GAC is not intended to remove 1,4-dioxane. However, 1,4-dioxane breakthrough concentrations were less than 85% of the discharge limit at all times (85% criterion is used as a trigger level to change out carbon, per Section 3.11 of the WTP O&M Manual).

2.1.6 Sludge Production

During the reporting period, approximately 25 cubic yards (cy) of dry sludge was produced and placed into a lined roll-off box located adjacent to the WTP. Fifteen cy each of the sludge were disposed at DADS in August and in November in accordance with the *Updated Waste Management Plan* (WMP) (EMSI, 2020c). The remaining sludge will be disposed of in the first half of 2022. The non-hazardous waste manifests for the sludge are presented in Appendix B-2. Analytical results for radiological and toxicity characteristic leaching procedure (TCLP) analyses of the sludge are presented in Appendix A-3. Analytical and screening results confirmed the sludge remains a non-hazardous, solid waste.

WTP sludge was also sampled for technologically enhanced naturally occurring radioactive material (TENORM) according to 6 CCR 1007-1 Part 20. The goal of the regulation is to determine if naturally occurring radioactive material concentrations are increased by, or as a result of, past or present human practices i.e., the processes within the WTP. The sludge was sampled in triplicate for Radium-226, Radium-228, Polonium-210, and Lead-210 (Appendix A-3). All sample results were below the exemption limit (5 pCi/g for each isotope) therefore Lowry WTP sludge material is exempted from the rule.

2.1.7 Maintenance and Calibration

Routine servicing and maintenance of plant equipment included the following:

- Serviced liquid transfer pumps, chemical feed pumps, and mixers;
- Quarterly bag filter inspections;
- Replenished chemical storage totes;
- Added and mixed chemical polymer;
- Serviced the HMR-30 mixing, flocculation, settling, and clear-well chambers;
- Serviced the sludge thickener and holding tanks;
- Serviced the plate and frame filter press;
- Back-flushed the GAC contactors to prevent fines accumulation and hydraulic packing of the carbon;
- Serviced air compressors (Ingersoll Rand);
- Cleaned pump strainers;
- Serviced BTS air blowers; and
- Quarterly UV-Ox unit inspection and test run (when on standby).

Routine maintenance and calibration of plant instrumentation included the following:

- Daily cleaning of pH probe at TP-315;

- Weekly calibration (and cleaning as necessary) of pH probes at TP-315, TP-365, TP-670, and TP-740;
- Weekly cleaning and monthly calibration of pH probes in the BTS;
- Weekly servicing, data backup, and calibration of on-line GCs;
- Weekly data backup and archiving of WTP operating database;
- Annual flow and level device calibration checks; and
- Monthly calibration of lower explosive limit (LEL) meter (LEL-740).

All maintenance and calibration activities were documented on checklists and in the daily operator logs provided in Appendix A-1.

2.2 Monitoring

2.2.1 Summary of Activities

Compliance monitoring during the reporting period consisted of sampling WTP effluent (MP-001) per the discharge permit (Metro, 2020). Other monitoring included sampling the molybdenum IX system to measure efficiencies; monitoring of NBBW-IW-3 for molybdenum and 1,4-dioxane; performance monitoring of the BTS; and Early Warning monitoring per the EWMP (EMSI, 2008c) to measure performance of the WTP treatment systems.

2.2.1.1 WTP Effluent Compliance Monitoring

All WTP effluent (MP-001) analytical results for the reporting period were reported in monthly Periodic Compliance Reports (PCRs) that are submitted to Metro, Aurora, USEPA, Colorado Department of Public Health and Environment (CDPHE), and Tri County Health Department (TCHD). Analytical results for MP-001 monitoring are reported in Appendix A-4.1.

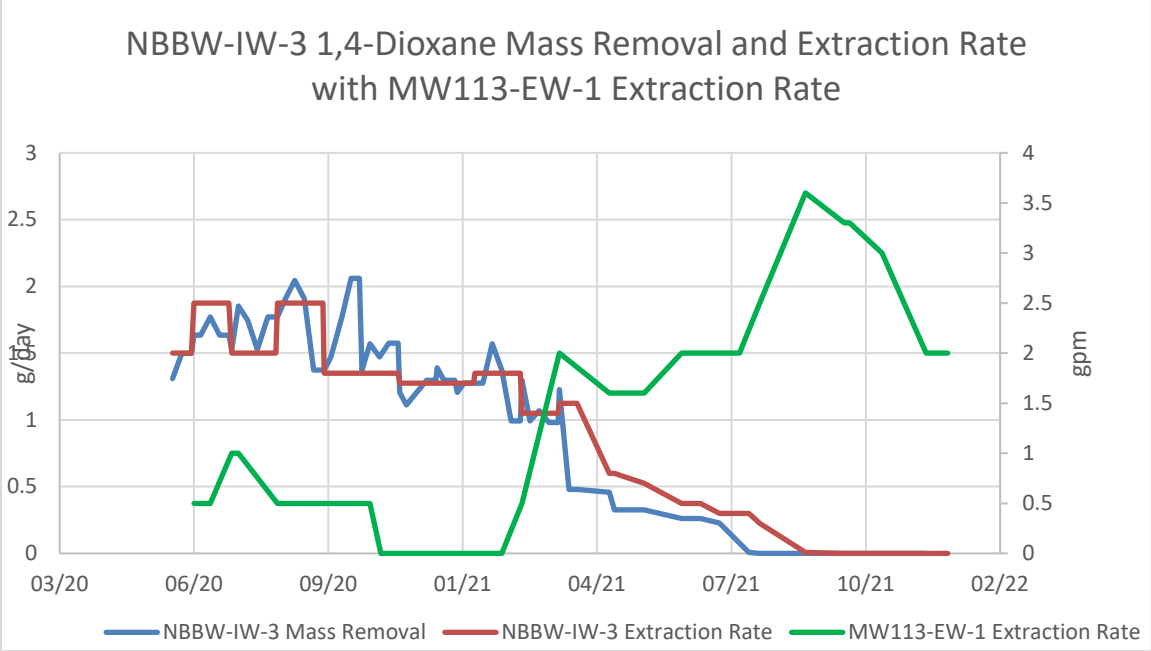
2.2.1.2 Ion Exchange Monitoring for Molybdenum

Performance monitoring for the molybdenum ion exchange (IX) treatment system included weekly monitoring (while pumping) of MW113-EW-1 influent at plant sampling port TP-170 plus multiple sample ports located on the IX treatment system. The IX treatment system is used to manage the molybdenum in the WTP effluent (MP-001). The rate of extraction at MW113-EW-1 at the beginning of the period was approximately 2 gpm until it was increased from 2 gpm to 4 gpm on August 18, 2021. As the level of the alluvium in the MW113 area dropped, so did the extraction rate. The steady decline in both level and extraction rate continued throughout the period to near the base of the MW113-EW-1 well screen. The extraction rate was approximately 2 gpm by the end of the period. A high percentage of molybdenum continues to be efficiently removed by the IX system as the molybdenum concentration entering the IX treatment system remained relatively stable throughout the period.

2.2.1.3 Monitoring of NBBW-IW-3

Performance monitoring at extraction well NBBW-IW-3 was also performed to monitor molybdenum concentrations and mass removal of 1,4-dioxane. On May 25, 2020 WSDs began pumping NBBW-IW-3 at 2 gpm into temporary tanks with weekly sampling of molybdenum and 1,4-dioxane to monitor their concentrations before pumping to the WTP. Only low-level concentrations (<45 micrograms per liter [µg/L]) of molybdenum have

been detected in well NBBW-IW-3 since extraction began while 1,4-dioxane concentrations ranged from 100 to 170 µg/L. On July 8, 2020 WSDs began pumping groundwater from NBBW-IW-3 directly to the WTP via the North End On-Site conveyance pipeline. Analysis frequency for molybdenum was increased to every other day using a field colorimeter to monitor for changes in molybdenum concentrations at this well. Field monitoring (with confirmation through weekly lab analysis) continued until April 27, 2021. As IX treatment of MW113-EW-1 groundwater allowed for higher extraction rates (2 gpm), the potential for molybdenum migration to NBBW-IW-3 from the MW113 area was reduced. As a result, field monitoring for molybdenum and weekly lab analysis from well NBBW-IW-3 was discontinued on March 31, 2021. Instead, monitoring for molybdenum was performed from North End On-Site sample port TP-150 where NBBW-IW-3 along with other On-Site North End groundwater enters the plant. Sampling molybdenum from TP-150 transitioned from daily to weekly early second half 2021 as NBBW-IW-3 groundwater production continued to decline. Sampling of TP-150 has returned to monthly as part of the EWMP. The 1,4-dioxane results from well NBBW-IW-3 indicate that the rate of 1,4-dioxane removal from the B-326-WD area continues to be enhanced while extracting. As shown in the graph below, water elevations in the area lowered due to increased extraction from MW113-EW-1. The effectiveness of NBBW-IW-3 1,4-dioxane removal declined due to lower extraction rates at this well (from 0.5 gpm in June 2021 to 0 gpm in September). The effect of MW113-EW-1 extraction continued to impact the extraction rate at NBBW-IW-3 and eventually groundwater production at NBBW-IW-3 ceased in September 2021.



2.2.1.4 BTS Performance Monitoring

Performance monitoring of the BTS involved collection of samples for 1,4-dioxane, VOCs, total phosphorus, total volatile suspended solids, nitrate, and nitrite. Analytical results are used to measure organic loading, biomass and efficiency of the biological system. BTS performance monitoring data may be found in the Access© database in Appendix G.

2.2.1.5 Early Warning Monitoring

Early Warning monitoring for this reporting period involved monthly sampling of WTP influent according to the EWMP (EMSI, 2008c) and *Metro Letter of Understanding* (EMSI, 2015). Influent samples from TP-110 (RWSTs), TP-120 (NBBW), TP-150 (North End on-Site and NBBW-IW-3), TP-170 (MW113 Area), TP-160 (North End off-Site and MW77 area) and TP-3310 (BTS influent) were collected for analysis of VOCs, 1,4-dioxane, and molybdenum (Appendix A-4.2).

2.2.2 Sampling

WTP effluent (MP-001) and Early Warning influent samples were collected according to the schedule and analytical protocol presented in Table 2.1. A sampling schedule for the next reporting period for compliance and Early Warning is also provided in the table.

Performance monitoring for molybdenum in the IX system was performed weekly. Performance monitoring for molybdenum and 1,4-dioxane at NBBW-IW-3 was performed once in third quarter 2021 and ceased when the well stopped producing groundwater in fourth quarter 2021. Performance monitoring for the BTS was performed weekly. Appendix F-1 lists the samples collected for performance and compliance monitoring and Appendix F-2 contains the data packages from the laboratories.

2.2.3 Laboratory Analyses

Eurofins/TestAmerica (Denver) analyzed the samples collected from the WTP for non-radiological parameters. Eberline Services (Oak Ridge, Tennessee) analyzed the radiological samples. Analytical data packages and DVRs for the reporting period are presented in Appendix F-2.

2.2.4 Data Validation

All effluent (MP-001) sample results were validated according to USEPA *National Functional Guidelines for Organic and Inorganic Data Review* (USEPA, 1994a and b) as amended, by SW-846 guidelines specific to the method or as directed by USEPA. All radionuclide results that were less than the critical value (L_C) were qualified as non-detects (U). Radionuclides were validated according to the guidelines and criteria specified in the *Multi-Agency Radiological Laboratory Analytical Protocols* (MARLAP) *Manual* (USEPA, 2004).

Validation is complete for all July through December 2021 compliance sampling events. All compliance data packages were received with no major quality issues except for recurring matrix spike failure of benzidine due to the inadequacy of method 625 to extract this compound without oxidative losses. This problem is discussed in more detail in the DQA report (Appendix F-3). Performance and Early Warning samples are not validated.

2.2.5 Monitoring Results

Compliance, Early Warning, and performance monitoring for the WTP were performed in this period as detailed below.

2.2.5.1 Compliance Monitoring

WTP effluent (sample port MP-001) was sampled according to the schedule in Section E.1 of the discharge permit (Metro, 2020) and results are presented in Appendix A-4.1. All validated results from WTP effluent sample port MP-001 were below the industrial wastewater discharge permit limits.

2.2.5.2 Early Warning Monitoring

The Updated EWMP (EMSI, 2008c) requires annual sampling for a comprehensive list of parameters from Section E.1 of the discharge permit per the *Metro Letter of Understanding* (EMSI, 2015). Any compound in the **influent** whose concentration exceeds the discharge limit requires periodic follow-up sampling to monitor for statistical trends. An annual influent sampling event for the parameters listed below is required to determine if influent concentrations are less than discharge limits.

- VOCs (E624) (including 1,4-dioxane),
- 1,4-dioxane (8260B Selected Ion Monitoring [SIM])
- Semi-Volatile Organic Compounds (SVOCs) (E625),
- Metals (E200.7 and E200.8),
- Mercury (E245.1),
- Nonylphenol (D7065),
- Gross Alpha/Beta (E900.0),
- Radium-226 and total (SM 7500-RA-B)
- Radium-228 (EPA-RA-05),
- Plutonium-238, -239, -240 (EPA 600/7-79-081), and
- Americium-241 (ER110 LANL).

The annual influent sampling event was performed on April 5, 2021 and indicated 1,4-dioxane and molybdenum were the only **influent** compounds exceeding **discharge** limits. Consequently, these compounds were selected as compounds of concern for monthly influent monitoring. These compounds were collected as grab samples to monitor the concentration in each influent source. Influent sampling involved collecting grab samples from each of seven sources (RWSTs, NBBW, MW38, North End on-Site water, North End off-Site water, MW113 water and BTS influent) and compositing the results based on flow-weighted percentages. VOCs are sampled quarterly for performance monitoring. Appendix A-4.2 presents the individual results for each influent grab, the percentage of total flow, and the flow-weighted total concentrations for VOCs (A-4.2.1), 1,4-dioxane (A-4.2.2), and molybdenum (A-4.2.3).

As mentioned above, two compounds exceeded the discharge limit in the influent (1,4-dioxane and molybdenum). Statistical trending analyses (Sen's test) for 1,4-dioxane is presented in Appendix A-4.2.2.2 and for molybdenum in Appendix A-4.2.3.2. There were no statistically significant increasing trends for these analytes. The WTP can readily treat 1,4-dioxane to below discharge limits. Molybdenum treatability is discussed in Section 2.3.

2.2.5.3 Performance Monitoring

Performance monitoring results for molybdenum and BTS testing may be found in the database in Appendix G.

2.3 Treatability

As discussed in Section 2.2.1.2, an IX system for molybdenum removal from MW113-EW-1 groundwater was brought online to manage the molybdenum in the WTP effluent (MP-001). At 1.9 gpm to 4.0 gpm extraction rates, influent molybdenum concentrations to the IX system ranged between 3,300 and 7,200 µg/L and discharge from the IX treatment system ranged from 120 to 400 µg/L during the reporting period.

An evaluation of the operational performance of the IX system for molybdenum treatment was performed in the reporting period and is presented in *Anion Exchange Operational Performance at Lowry Landfill Superfund Site* (Parsons, 2021c), included in this report as Appendix A-5.

3.0 WASTE MANAGEMENT

Waste management activities during the reporting period were performed in accordance with the *Updated Waste Management Plan* (EMSI, 2020c) and are described below.

3.1 Drill Cuttings and Well Abandonment Wastes

No drill cuttings or well abandonment wastes were generated during the reporting period.

3.2 NTES Recovery Wastes

Non-liquid wastes were generated by activities at the NTES totaling less than one drum of non-liquid waste, personal protective equipment (PPE), absorbent pads, and paper. The partially filled drum of non-liquid waste is temporarily stored in a satellite accumulation area at the NTES.

No liquid skimming wastes were generated from the NTES during the reporting period. Partially filled drums of liquid waste are temporarily stored in satellite accumulation areas at the NTES and will be disposed when the drums are full.

Decontamination liquids and solids that originate from NTES activities are managed as a potentially hazardous substance. No decontamination liquids or solids were generated during the reporting period.

3.3 Treatment Plant Wastes

WTP waste typically consists of spent carbon, chemical precipitation sludge, general trash, and PPE.

Approximately 25 cy of dry chemical precipitation sludge was produced and placed into a lined roll-off box next to the WTP. Approximately 15 cy each of the sludge were disposed at DADS in August 2021 and November 2021 (Appendix B-1). The non-hazardous waste manifests for these shipments are presented in Appendix B-2.

Trash and PPE that were visually clean were managed as non-hazardous debris and accumulated in the roll-off adjacent to the WTP. No trash was disposed of during the reporting period.

3.4 Decontamination Pad Wastes

Approximately 564 gallons of decontamination liquids from the decontamination pad sump were transported to and pumped into the RWSTs for processing through the WTP. This liquid was generated by storm events and decontamination activities. No decontamination solids were generated or disposed during the reporting period.

3.5 Site Monitoring Waste

Purge liquids from groundwater sampling were transported to and pumped into the WTP wet well for processing through the WTP.

4.0 GROUNDWATER MONITORING

This section summarizes groundwater characterization, compliance, and effectiveness activities conducted during the second half of 2021.

4.1 Well Inspections, Maintenance, Installation and Development

Well inspections, maintenance, installation, and development activities performed during the reporting period are discussed below.

4.1.1 Well Inspections and Maintenance

Well inspections are completed as a routine part of the monitoring program. The general condition of each well and any necessary repairs are recorded in a comment field on the water level measurement form and electronically transferred to a separate data table stored in the Site database. The following items were identified:

Location	Comments	State of Repair
BM-4X-10S	Needs new pad - cracked, does not affect well integrity	New pad was installed on 9/22/2021
MW38-100S-195W	Needs new outer flush mount casing	New pad and casing installed on 9/29/2021
MW38-1100N-326E	Needs new outer flush mount casing	New pad installed on 9/29/2021
MW38-1175N-300E	Needs new outer flush mount casing	New pad and casing installed on 9/21/2021
MW38-200S-195W	Needs new outer flush mount casing	New casing installed on 9/21/2021
MW38-275S-195W	Needs new outer flush mount casing	New pad installed on 9/21/2021
MW38-325S-195W	Needs new outer flush mount casing	New casing installed on 9/21/2021
MW38-400S-195W	Needs new outer flush mount casing	New casing installed on 9/29/2021
MW38-840S-325E	Needs new pad due to landfill cover repairs in that area	Well pad replacement on hold, awaiting further precipitation before finalizing pad repair
MW38-995N-475E	Needs new outer flush mount casing	New sprinkler box and pad installed on 9/29/2021
MW120-WD	Needs new pad - cracked, does not affect well integrity	New pad was installed on 9/22/2021
MW135-WD	Loose pad, locking bolts stripped, needs new outer flush mount casing, well lid not lockable, locked at J plug	New pad and casing were installed on 9/15/2021
MW136-WD	Loose pad, locking bolts stripped, needs new outer flush mount casing, well lid not lockable, locked at J plug	New pad and casing were installed on 9/20/2021
MW137-WD	Locking bolts rusting, needs new outer flush mount casing	New bolts and threads were installed on 9/20/2021
MW138-WD	Locking bolts rusting, needs new outer flush mount casing	New pad and casing were installed on 9/20/2021

Location	Comments	State of Repair
MW139-WD	Locking bolts rusting, needs new outer flush mount casing	New bolts and threads were installed on 9/20/2021
MW140-WD	Locking bolts rusting, needs new outer flush mount casing, well lid not lockable, locked at J plug	New pad and casing were installed on 9/20/2021
MW141-WD	Locking bolts rusting, needs new outer flush mount casing and new pad (cracked), well lid not lockable, locked at J plug	New pad and casing were installed on 9/20/2021
MW177-DEN	Needs new pad - Driven over and now cracked, does not affect well integrity	New pad installed on 9/22/2021
NTES-EW-2	Well needs repair as the well casing is settling into the ground and the well lid does not close anymore, removal of section of casing will be required, locked at J plug	To be repaired
PTP-26	Bailer stuck in well, retrieval attempt recovered pipe nipple (bailer weight)	Not repairable but will continue use as quarterly water level measurement point
PZ-101A	Pad broken, does not affect well integrity	New pad installed on 9/22/2021

Labels were replaced on 51 wells. The labels on five more wells need replacing due to wearing. Well caps were replaced on seven wells with in-house inventory; five more wells still require new well caps. Due to schedule, inventory, and weather limitations some of these repairs were delayed and will be performed in the next reporting period.

4.1.2 Well Installation and Development

No new wells were installed, and no existing wells were abandoned during this reporting period, as indicated on Table 4.1.

4.2 Sitewide Groundwater Elevations

Groundwater elevations were measured in both the third and fourth quarters of 2021. Due to the number of water elevations recorded, Table 4.2 presents only one record for each location per quarter, with measurements taken in July and October 2021. Water level measurements were recorded on a PC tablet containing water level data from previous quarters. Data entry screens prompted the field technician to recheck the measurement if the reading was <0.25 or >0.25 ft from the previous quarter's measurement. Data from the tablet were then downloaded to a desktop computer and appended to the main database.

Hydrographs for the majority of the wells/piezometers in which water levels were gauged are presented in Appendix C-2. Due to the density of monitoring wells in the MW38 area, hydrographs were developed only for representative wells in that portion of the Site.

Discussion of potentiometric surfaces for the alluvium/weathered Dawson (WD), unweathered Dawson (UD), upper Denver, and lignite layer formations are presented in the following subsections. Lateral and vertical hydraulic gradients are also discussed (Subsection 4.2.5).

4.2.1 Alluvium/Weathered Dawson Formation Groundwater Elevations

The sitewide alluvium/weathered Dawson groundwater potentiometric surfaces for the third and fourth quarters of 2021 are shown on Figures 4.1 and 4.2, respectively. Groundwater at the Site occurs under water table conditions within the alluvial deposits along the Unnamed Creek drainage and within the weathered portion of the Dawson Formation (Fm.). Groundwater generally occurs at relatively shallow depths beneath drainages and at greater depths beneath topographic highs. The depth to groundwater in the alluvium and weathered Dawson ranges from approximately 2.2 ft below ground surface (bgs) in the detention basin along the T1 transect and MW132-WD in Section 31, to greater than 40 ft bgs along the unnamed creek drainage in the NBBW area (B-319), to approximately 62 ft bgs in the southwestern corner of the Site (RDPZ-102 area). The depth to groundwater has increased in areas of groundwater extraction such as the MW38 area where pumping in the MW38 sand channel has lowered the water table at the southern end of the sand channel (at pumping well MW38-170S-140W) by approximately 11.7 ft below the original static level, and by about 20 ft below the original water table at the northern sand-channel pumping well (MW38-1028N-256E). Continued groundwater extraction and cessation of potable water injection at the NBBW has contributed to declining groundwater elevations in the NBBW area as demonstrated by the absence of saturated weathered Dawson at B-305WD, B-307, B-311, B-312, B-318, B-319, B-319-25S, B-319-26W, B-319-50S, B-319-50W, B-319-75S, B-323-WD, GW-109, NBBW-IW-1, MW-1000, PTP-14, PTP-15, PTP-15S, PTP-16, PTP-17S, PTP-18, PTP-19, PTP-20, PTP-20S, PTP-22S, TR-1, and U-701-WD during this reporting period.

In general, groundwater associated with the alluvium and weathered Dawson moves from south to north beneath the Site (Figures 4.1 and 4.2). However, the direction of groundwater movement may deviate locally near drainages and ridgelines as a consequence of the movement of groundwater away from topographic ridges; convergent flow toward drainages; variations in stratigraphy such as depositional sand channels; and/or groundwater extraction and voluntary actions. Groundwater extraction from wells along the perimeter slurry wall (PM-11, PM-15, and MW51-WD areas), NTES, NBBW, and MW38 channel areas also influences local potentiometric surfaces as discussed in Subsections 4.5.1 through 4.5.4, respectively. Details of pumping from the MW38, PM-11, PM-15, and MW51-WD areas are also discussed in Subsection 4.6. Pumping for response actions in the North End, NBBW, and GTEP areas are discussed in Subsections 4.8. and 4.9.

In some instances, water level data from some wells were not used for potentiometric surface interpretations. For example, the water level for MW38-320N-305E was not used because the sandy zone in the screened interval is deeper and does not correlate to sandy zones screened in nearby wells. A similar situation occurs at MW38-1373N-180W. Cross Section H-H' in the *Final MW38 Area Pilot Test Report* (Parsons, 2005; Figure 2.10) shows there is no saturated weathered Dawson sand that correlates to the MW38 channel sand.

Overall, the lateral hydraulic gradient within the alluvium/weathered Dawson beneath the Site is approximately 0.021 foot per foot (ft/ft) directed generally to the north-northeast (between PM-8I and A-115 [change in head, Δh = 119.69 ft; distance, d = 5580 ft] in October 2021). The depth to groundwater, groundwater flow directions, and lateral hydraulic gradients observed during this reporting period are similar to those recorded in previous reporting periods.

4.2.2 Unweathered Dawson Formation Groundwater Elevations

The sitewide unweathered Dawson groundwater potentiometric surfaces for the third and fourth quarters of 2021 are shown on Figures 4.3 and 4.4, respectively. The depth to the unweathered Dawson potentiometric surface ranges from approximately 16 ft bgs in the NBBW area (B-306) and along the unnamed creek drainage, to approximately 77 ft bgs in the MW38 area (MW38-410N-180W), to approximately 89 ft below the landfill mass (B-708). In general, the groundwater gradient associated with the unweathered Dawson trends from south-southwest to north-northeast beneath the Site. The lateral hydraulic gradient within the unweathered Dawson beneath the Site is approximately 0.017 ft/ft directed generally to the northeast (between PM-6X-UD and MW-EW-2LC [Δh = 97.17 ft; d = 5,720 ft]) (using October 2021 water levels). The depths to groundwater, groundwater flow direction, and lateral hydraulic gradient observed during the second half of 2021 in the unweathered Dawson are similar to those recorded in previous reporting periods.

Examination of hydrographs (Appendix C-2) for several wells along the western boundary of the Site indicates groundwater levels that are not stable due to slow recovery since installation development or from sample purging. Similarly, the hydrograph for MW37-UD in the NBBW area (Appendix C-2) shows a steadily increasing trend through January 2020 from a sampling event that occurred in January 2005. Groundwater in the well now appears to be in equilibrium with the unweathered Dawson. This slow recovery is not uncommon for a well completed in claystone. In addition, well MW-1 shows a steadily increasing (rising) trend since 1982 probably due to the low hydraulic properties of the screened interval, while other wells (MW-2 and MW-3) show no trend. For these reasons, groundwater levels measured at MW-1 and MW-2 were not used to interpret the potentiometric surfaces shown on Figures 4.3 or 4.4, as noted on the figures. The groundwater elevation for MW-3 was honored for contouring but may not be completely representative due to long screen intervals.

Several well pairs exist with both wells screened in the unweathered Dawson. The water level in MW38-1064N-655E is utilized for the potentiometric surface, but the level in MW38-1064N-660E is not honored because the sand unit in the shallower well (MW38-1064N-655E) is more closely related stratigraphically to adjacent wells than the sand unit in the deeper MW38-1064N-660E well. The weathered and unweathered sand units in the MW38-1064N area are interpreted to be part of the west to east trending "C"-sand (see *Final Remedial Investigation Report for the Shallow Groundwater and Subsurface Liquids and Deep Groundwater Operable Units [Harding Lawson Associates, 1992]*; Section 4.3.2.2.1, Channel Deposits within the Dawson Formation, p. 4-28). The potentiometric "trough" trending east-northeast from MW38-410N-180W is interpreted to be a result of this stratigraphic condition. Similarly, wells B-712-UD and B-712-LD, situated near the east end of the NTES, are both completed in the unweathered Dawson. However, only B-712-UD was honored for contouring the unweathered potentiometric surface because it is screened in the uppermost sandstone unit of the unweathered Dawson, which is the criterion used for contour-well selection, whereas B-712-LD is screened in a lower portion of the unweathered Dawson.

4.2.3 Upper Denver Groundwater Elevations

Potentiometric data from monitoring wells screened in the upper Denver are shown on Figures 4.5 and 4.6 for the July and October 2021 measurements, respectively. It should

be recognized that the design criteria for constructing wells in the upper Denver was to set the screen in the first clean sand (i.e., minimal fines) below the clay separation unit. Because of geologic heterogeneity, the screen intervals are not always completed at the same stratigraphic level. As a result, the potentiometric contours shown on Figures 4.5 and 4.6 should be considered approximate, as variations in the elevations of screen intervals (shown on the figures) can introduce potentiometric variability. Stabilized water levels from the second half of 2021 are consistent with those measured in previous reporting periods.

The potentiometric level in monitoring well MW112-DEN, located in the southwest corner of the Site, has been slowly rising, consistent with the rest of the Denver Basin, since its installation in June 2005. However, interpretation of the potentiometric levels continues to suggest a northeast trending potentiometric trough. This well is screened in a thick, coarse-grained, porous sand unit. The hydraulic gradient along the trough is relatively flat (0.0046 ft/ft between MW112-DEN and MW71-DENR [Δh = 27.72 ft; d = 5,975 ft]) (using October 2021 water levels).

4.2.4 Lignite Layer Groundwater Elevations

Figures 4.7 and 4.8 show the locations of the 12 wells completed in the Lignite layer and their potentiometric levels for July and October 2021, respectively. The levels indicate that the potentiometric surface is nearly flat with a very low hydraulic gradient of 0.00133 ft/ft between B-506 and MW71-LIG (Δh = 6.85 ft; d = 5,160 ft) (using October 2021 water levels) to the east-northeast, similar to previous reporting periods. Hydrographs of lignite wells GW-120, GW-121, GW-122, and C-702Q1 (Appendix C-2) installed at least 15 years ago indicate that the potentiometric surface of the lignite layer had gradually and steadily dropped 13 to 22 ft, until mid-2006 when the levels stabilized or even rebounded by approximately one to two feet.

Unlike the Upper Denver, the elevation and stratigraphy of the lignite layer is fairly consistent and predictable across the Site. Except for B-506, all lignite wells are screened across the full saturated thickness of this layer. Monitoring well B-506, located hydraulically upgradient southwest of the Site, has a 40-foot screen that spans the lignite layer and the underlying shale and sandstones of the Lower Denver hydrostratigraphic unit. Consequently, the potentiometric data from this well should be used with caution. Nonetheless, taken as a whole, the potentiometric contours illustrated on Figures 4.7 and 4.8 may be viewed with a relatively high degree of confidence.

4.2.5 Vertical Hydraulic Gradients

Vertical hydraulic gradients between the weathered and unweathered Dawson hydrostratigraphic units were calculated by dividing the head difference between the midpoints of the saturated well screens associated with weathered and unweathered Dawson well pairs. To the extent that they are available, measured water levels and calculated vertical gradients are summarized in Table 4.3.

Upward hydraulic gradients, indicated by positive values (pink highlight) on Table 4.3, occur in 30.4% of the well pairs (not including well pairs where the WD was dry) during the fourth quarter 2021.

Areas of upward potential occur around the NBBW groundwater extraction trench and the GTEP extraction well where groundwater is extracted from the weathered Dawson. Other areas with upward gradients are in the vicinity of the PM-15 and MW51 pumping

systems where groundwater extraction has lowered the weathered Dawson potentiometric surface. Downward potential occurs along the MW38 sand channel.

The upward and downward vertical gradient directions observed during the second half of 2021 are generally consistent with those previously observed. However, as extraction from the NBBW and GTEP areas continue, additional wells in these areas may become dry.

4.3 Groundwater Sampling

Table 4.4 and Figures 4.9 and 4.10 present the 75 compliance, North End Monitoring, effectiveness, and investigation monitoring wells and 122 samples collected during the reporting period. One sample was from an upper Denver well, 111 samples were from weathered Dawson wells, and 9 samples were from unweathered Dawson wells with one sample from an unweathered Denver well. Table 4.4 presents the wells sampled during the reporting period and their classifications, i.e., compliance (18 wells), compliance/effectiveness (8 wells), effectiveness (5 wells), North End Monitoring (34 wells), and investigation (10 wells). Water bearing units, sampling dates, and frequency of sampling are also included in the table. The table also shows sampling scheduled for the next two quarters in conformance with the updated GWMP and North End GWMP. Table 4.5 presents a summary of detected constituents at each location.

4.3.1 Laboratory Analyses

Analyte lists for groundwater compliance and performance monitoring are presented below.

Classification	Analytical Methods	Analytes
Compliance, Vertical Migration, and NTES, NBBW & MW38 Effectiveness	8260B 8260SIM 6010B 300.0A	(25) VOCs 1,4-Dioxane (2) Dissolved metals Nitrate and Nitrite
Perimeter Effectiveness	8260B 8260SIM	(4) VOCs 1,4-Dioxane
North End Monitoring/Investigation	8260SIM	1,4-Dioxane
MW77 Response Action	8260B 8260SIM 300.0A	1,1-DCE (VOCs) 1,4-Dioxane Nitrate
B-313/B-326-UD Response Action	8260SIM 300.0A	1,4-Dioxane Nitrate
NBBW-IW-3 Response Action	8260SIM 6010B	1,4-Dioxane Molybdenum

Indicator chemicals for the compliance wells are listed below:

- 1,1,1-Trichloroethane
- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- 1,1-Dichloroethane
- 1,1-Dichloroethene
- 1,2-Dichloroethane
- Chlorobenzene
- Chloroform
- cis-1,2-Dichloroethene
- Dibromochloromethane
- Ethylbenzene
- Methylene Chloride

- 1,2-Dichloropropane
- 1,4-Dioxane
- Acetone
- Arsenic
- Benzene
- Bromodichloromethane
- Bromoform
- Cadmium
- Carbon Tetrachloride
- Naphthalene
- Nitrogen, Nitrate
- Nitrogen, Nitrite
- Tetrachloroethene
- Toluene
- Trans-1,2-Dichloroethene
- Trichloroethene
- Vinyl Chloride

Perimeter effectiveness wells are sampled for 1,1,1-trichloroethane (TCA), 1,1-DCA, trichloroethene (TCE), and tetrachloroethene (PCE) plus low-level 1,4-dioxane. Wells in the NBBW, NTES and MW38 areas are being sampled for all the compliance analytes listed above in the event that indicator chemicals for effectiveness need to be determined.

Sample and data tracking information including the dates of sample collection, sample delivery group (SDG) number, laboratory, and validation reference, are summarized in Appendix F-1. Analytical data packages and DVRs for the reporting period are presented in Appendix F-2. The DQA report is presented in Appendix F-3. The analytical database is presented in Appendix G.

4.3.2 Data Validation

Validation results are presented in the DQA report in Appendix F-3. Data quality was acceptable, and no major issues were encountered except for holding time violations for nitrate.

4.4 Compliance Evaluation

This subsection presents an assessment of compliance with groundwater performance standards along the point of compliance (POC). Sixty monitoring wells are included in the compliance monitoring network (EMSI/Parsons, 2018). Compliance evaluations are performed using the procedures set forth in Appendix C of the updated GWMP (EMSI/Parsons, 2018).

4.4.1 Procedures Used to Assess Compliance

Compliance with groundwater performance standards is assessed at each compliance well for each chemical identified in the updated GWMP as an "indicator of compliance" (listed in Section 4.3.1). Evaluation of compliance at a well is performed by comparing the 90% upper confidence limit (UCL) and, if necessary, the 90% lower confidence limit (LCL) of the chemical concentration in groundwater to its performance standard. A well is statistically in compliance if the 90% UCL is less than its performance standard and a well is out of compliance if the 90% LCL is greater than its performance standard. If the performance standard lies within the confidence interval (i.e., between the UCL and LCL), it is unknown whether the well is in or out of compliance. In some cases (i.e., where a trend is present in the data), a determination may be made as to potentially in or out of compliance based on empirical evidence such as concentration and trend (see Step 9 of Section 7.3.1 of the revised GWMP (EMSI/Parsons, 2018).

The data evaluation procedures consist of a number of statistical tests (Mann-Kendall [M-K] trend analysis, outlier test, goodness-of-fit test, regression analysis, and calculation of UCLs) which are performed using USEPA's ProUCL software package (version 5.1) or manually in the case of regression analysis. In order to minimize the impact of potential

temporal trends, calculation of the 90% LCL and 90% UCL is based on the results of the ten most recent sampling events (with the additional caveat that only samples obtained no more frequently than quarterly intervals will be considered in the identification of the ten most recent sample results). The UCL and LCL are then used to evaluate compliance with the groundwater performance standards. The data evaluation procedures described in the updated GWMP (EMSI/Parsons, 2018) result in calculation of long term (ten most recent events) average concentrations as well as the upper and lower confidence limits. A summary of the data used for the evaluation procedures is presented in Appendix C-3.1.

The sampling results for each compliance monitoring well for each indicator chemical with a reported result greater than the performance standard are analyzed using the M-K test for the presence of temporal trends. If no trend is present, the UCL and mean are determined using the ProUCL software. If an increasing or decreasing trend is determined to be present, compliance is evaluated using linear regression to estimate the mean value and the 90% upper and lower confidence levels for the most recent sample date. This result is a mean value for the most recent sampling date and is not the same as, and should not be confused with, an overall arithmetic or geometric mean of all sampling results.

At least four sample results are necessary to evaluate the long-term average, UCL, and LCL concentrations in a well relative to performance standards. At least four samples have been collected from each well and analyzed for all the 29 indicator chemicals of compliance.

4.4.2 Results of Compliance Evaluations

Tabular and graphical summaries of the results of the compliance monitoring evaluations are presented in Table 4.6 and on Figure 4.11, respectively. Complete copies of the results of the statistical evaluations are contained in Appendix C-3.

Based on the statistical tests, water quality for one or more compliance monitoring parameters at six of the 60 compliance monitoring locations exceeded performance standards (Table 4.6). The locations and the parameters found to exceed performance standards consist of the following:

Well	Compound
B-313	Nitrate
B-313	1,4-Dioxane
B-326-UD	1,4-Dioxane
B-326-WD	1,4-Dioxane
BM-11X-100N	Tetrachloroethene
MW62-WDR	1,4-Dioxane
MW62-WDR	Nitrate
MW77-WD	1,4-Dioxane

Statistically-based compliance determinations could not be made for some indicator chemicals in the following monitoring wells although subjective determinations may be possible, and are discussed below:

Well	Compound
B-326-UD	Nitrate
BM-11X-100N	Trichloroethene
BM-15N6	Nitrate
GW-109	1,4-Dioxane

Well	Compound
GW-109	Chloroform
GW-109	Bromodichloromethane
MW23-C-SD	1,4-Dioxane
MW38-830N-230E	1,4-Dioxane
MW38-830N-230E	Chloroform
MW62-WDR	Nitrite
MW106-UD	1,4-Dioxane

B-326-UD Nitrate: A statistically-based compliance determination could not be made for nitrate in B-326-UD because the data displayed a decreasing trend and the requirements for use of linear regression to estimate the confidence limits were not met. Procedures to be used when this condition occurs are included in Step 9 of Section 7.3.1 of the updated GWMP (EMSI/Parsons, 2018). B-326-UD is considered to be potentially in compliance for nitrate because it had a decreasing trend and the last six results were less than the performance standard (28,000 µg/L) including the last two samples that did not contain detectable levels of nitrate. WSDs will continue monitoring at B-326-UD and attempt to determine compliance for this constituent.

BM-11X-100N TCE: A statistically-based compliance determination could not be made for TCE in BM-11X-100N because the groundwater performance standard for this chemical (5 µg/L) falls between the 90% UCL and the 90% LCL values. As per Step 8, Section 7.3.1 of the GWMP, no conclusion can be reached regarding compliance with the groundwater performance standard because the ten most recent results, which range from 3.6 to 5.7 µg/L, are all very near the groundwater performance standard (5 µg/L). WSDs will continue monitoring at BM-11X-100N and attempt to determine compliance for this constituent.

BM-15N6 Nitrate: A statistically-based compliance determination could not be made for nitrate in BM-15N6 because the data displayed a decreasing trend and the requirements for use of linear regression to estimate the confidence limits were not met. Procedures to be used when this condition occurs are included in Step 9 of Section 7.3.1 of the updated GWMP (EMSI/Parsons, 2018). BM-15N6 is considered to be potentially out of compliance for nitrate because all results were greater than the performance standard (28000 µg/L). The last statistically-based compliance determination (second half 2020) determined that nitrate was out of compliance in this well. WSDs will continue monitoring at BM-15N6 and attempt to determine compliance for this constituent.

GW-109 1,4-Dioxane: The water levels in this well have dropped to the point that there was not enough water available to collect a sample from this well since 6/1/20. Consequently, a formal statistical-based compliance determination could not be made; however, because the measured water level is below the base of the screened interval, the well is considered to be dry and GW-109 is considered to be in compliance. Previous determinations in this well indicated that 1,4-dioxane was indeterminant with a high degree of variability in the 1,4-dioxane results. The most recent concentrations in this well (41 µg/L, 3/2/20 and 20 µg/L, 6/1/20), may be caused by variations in groundwater levels and/or flow directions in the vicinity of this well resulting from historical cessation of potable water injection and historical or ongoing changes in pumping rates in nearby

extraction wells affecting the data set. WSDs will continue monitoring at GW-109 and attempt to determine compliance for this constituent.

GW-109 Chloroform and Bromodichloromethane: As stated above the water levels in this well have dropped to the point that there was not enough water available to collect a sample from this well since 6/1/20. Consequently, a formal statistical-based compliance determination could not be made; however, because the measured water level is below the base of the screened interval, the well is considered to be dry and GW-109 is considered to be in compliance. Furthermore, the last time that these parameters were detected at levels above their respective performance standards (1.0 µg/L for bromodichloromethane and 3.5 µg/L for chloroform) was November 2015. In addition, the eight most recent results for bromodichloromethane and the seven most recent results for chloroform were not detected in this well. WSDs will continue monitoring at GW-109 and continue to evaluate this wells compliance with the performance standards

MW23-C-SD 1,4-Dioxane: A compliance determination could not be made for 1,4-dioxane in MW23-C-SD because 90% of the results were not detected. The single detected value of 1.4 µg/L (9/15/20) is an outlier, but data validation could not find a reason to exclude this value from the statistics. If the outlier value is removed and replaced with an earlier value (0.5 U, 9/15/05) to have ten results, all ten results are not detected; therefore, the well would be in compliance with the performance standard for 1,4-dioxane. A confirmation sample was collected in 1st quarter 2021 that did not contain a detectable level of 1,4-dioxane (MDL = 0.09 µg/L). Although formal statistical testing could not be performed, this well is considered to be potentially in compliance with the 1,4-dioxane standard based on the preponderance of non-detect results from this well and because the single detect was not confirmed by a sample collected in first quarter 2021 (0.9 U µg/L).

MW38-830N-230E 1,4-Dioxane: A statistically-based compliance determination could not be made for 1,4-dioxane in MW38-830N-230E because the data displayed a decreasing trend and the requirements for use of linear regression to estimate the confidence limits were not met. Procedures to be used when this condition occurs are included in Step 9 of Section 7.3.1 of the updated GWMP (EMSI/Parsons, 2018). MW38-830N-230E is considered to be potentially out of compliance for 1,4-dioxane because all results were greater than the performance standard (0.9 µg/L). The last statistically-based compliance determination (first half 2020) determined that 1,4-dioxane was out of compliance in this well. WSDs will continue monitoring at MW38-830N-230E and attempt to determine its statistical compliance, but for practical purposes, this well is considered to be potentially out of compliance.

MW38-830N-230E Chloroform: A statistically-based compliance determination could not be made for chloroform in MW38-830N-230E because the data displayed a decreasing trend and the requirements for use of linear regression to estimate the confidence limits were not met. Procedures to be used when this condition occurs are included in Step 9 of Section 7.3.1 of the updated GWMP (EMSI/Parsons, 2018). MW38-830N-230E is considered to be potentially out of compliance for chloroform because, although it had a decreasing trend, seven of ten results were greater than the performance standard (3.5 µg/L) including the last two samples. The last statistically-based compliance determination (second half 2020) determined that chloroform was out of compliance in this

well. WSDs will continue monitoring at MW38-830N-230E and attempt to determine its statistical compliance, but for practical purposes, this well is considered to be potentially out of compliance.

MW62-WDR Nitrite: A statistically-based compliance determination could not be made for nitrite in MW62-WDR because the data displayed a decreasing trend and the requirements for use of linear regression to estimate the confidence limits were not met. Procedures to be used when this condition occurs are included in Step 9 of Section 7.3.1 of the updated GWMP (EMSI/Parsons, 2018). Although the results displayed a decreasing trend, MW62-WDR is considered to be potentially out of compliance for nitrite because eight of 10 results were greater than the performance standard (1000 µg/L). The high degree of variability in the nitrite results for well MW62-WDR, which range from not detected to 5,400 µg/L, may be caused by variations in groundwater levels and/or flow directions in the vicinity of this well resulting from percolation of precipitation through the shallow layer of nitrite impacted soils, historical cessation of potable water injection, and changes in pumping rates in nearby extraction wells. WSDs will continue monitoring at MW62-WDR and attempt to determine compliance for this constituent, but for practical purposes, this well is considered to be potentially out of compliance.

MW106-UD 1,4-Dioxane: A statistically-based compliance determination could not be made for 1,4-dioxane in MW106-UD because 90% of the results were not detected. The single detected value of 6.5 µg/L (2/28/07) is an outlier, but data validation could not find a reason to exclude this value from the statistics. If the outlier value is removed and replaced with an earlier value (0.5 U, 7/21/06) to have ten results, all ten results are not detected; therefore, the well would be in compliance with the performance standard for 1,4-dioxane. Although formal statistical testing could not be performed, this well is considered to be potentially in compliance with the 1,4-dioxane standard based on the preponderance of non-detect results from this well.

The eight wells determined to be statistically out of compliance or potentially out of compliance are summarized below. Recommendations relative to non-compliance with performance standards at these locations follow the summary.

Well	Compound	Compliance Decision	Trend
B-313	1,4-Dioxane	Out of compliance	No trend
B-313	Nitrate	Out of compliance	No trend
B-326-UD	1,4-Dioxane	Out of compliance	Decreasing
B-326-WD	1,4-Dioxane	Out of compliance	No trend
BM-11X-100N	PCE	Out of compliance	No trend
BM-15N6	Nitrate	Potentially Out of compliance	Decreasing
MW38-830N-230E	1,4-Dioxane	Potentially Out of compliance	Decreasing
MW38-830N-230E	Chloroform	Potentially Out of compliance	Decreasing
MW62-WDR	1,4-Dioxane	Out of compliance	Decreasing
MW62-WDR	Nitrate	Out of compliance	No trend
MW62-WDR	Nitrite	Potentially Out of compliance	Decreasing
MW77-WD	1,4-Dioxane	Out of compliance	No trend

The above compliance determination summary list is the same as that from the first half of 2021, with exception of three wells: well B-313 nitrate was previously indeterminant

and is now out of compliance; BM-11X-100N tetrachloroethene was previously potentially out of compliance and is now out of compliance; well MW62-WDR, which was potentially out of compliance but is now determined to be out of compliance for 1,4-dioxane. Also note that MW74-WD and BM-15E2 nitrate are now in compliance because the last ten sample results were less than the performance standard (28000 µg/L). Wells can change their compliance determination from one reporting period to the next because the 10 most-recent sample dataset moves over time and new data are always being incorporated. If the data are trending or fluctuating over time as some of these wells are, the compliance statistics will also change.

Based on the current findings, the necessity and scope of potential corrective actions for the eight monitoring locations identified above are assessed below in accordance with the procedures established in the updated GWMP.

4.4.2.1 1,4-Dioxane in the NBBW Area

Based on the results of the statistical tests, 1,4-dioxane occurs in excess or potentially in excess of its performance standard in five NBBW-area compliance monitoring wells (B-313, B-326-UD, B-326-WD, MW62-WDR, and MW77-WD) (Figure 4.11).

In accordance with the Response Action Work Plan (RAWP) in the B-326-UD and B-313 areas (EMSI, 2013), the WSDs initiated groundwater extraction from well B-321 in the area of compliance well B-313 in June 2013 to address occurrences of nitrate and 1,4-dioxane in well B-313. The concentration of 1,4-dioxane at compliance well B-313 was 39 µg/L on May 7, 2013, before the response action began. The most recent (November 2021) 1,4-dioxane concentration in this well was 17 µg/L.

With regard to B-326-UD, groundwater extraction has been ongoing from nearby unweathered Dawson well MW113-UD since July 11, 2013 in accordance with the same RAWP. Groundwater extraction at MW113-UD along with groundwater extraction from adjacent weathered zone wells MW113-WD and MW113-EW-1 which began in 2007, resulted in a long-term downward trend in the water level in B-326-UD over the period from 2007 through 2018. Cessation of potable water injection in October 2018, resulted in a further significant decline in water levels in this well (approximately 21 feet between October 2018 through October 2021) and development of a steep cone of depression in the unweathered zone potentiometric surface around the MW113-UD extraction well and B-326-UD (see Figure 4.23). During this same timeframe (October 2018 through October 2021), concentrations of 1,4-dioxane increased slightly to 7.7 µg/L (2/12/20) then declined to 5 µg/L (10/12/21). Relationships between the groundwater level declines and 1,4-dioxane concentration changes were addressed in the Revised Final Cessation Report (EMSI/CDM-Smith, 2020a).

The presence of 1,4-dioxane in B-326-WD at concentrations greater than the groundwater performance standard was the basis for previous determinations that a Case 3 condition (the presence of an out-of-compliance condition with the potential for migration beyond the site boundary) exists in this area. To address this condition, the WSDs have been extracting groundwater from MW113-EW-1 (alluvial/weathered Dawson groundwater) and MW113-UD (unweathered Dawson groundwater) in accordance with USEPA-approved work plans.

The table below shows the changing concentrations of 1,4-dioxane in B-326-WD. These changes of 1,4-dioxane in B-326-WD most likely reflect the effects of cessation and extraction at nearby wells.

Well	Date	Conc (µg/L)
B-326-WD	8/26/2019	10
B-326-WD	12/11/2019	8.8
B-326-WD	2/12/2020	10
B-326-WD	5/28/2020	11
B-326-WD	8/26/2020	3.5
B-326-WD	11/23/2020	3.9
B-326-WD	2/3/2021	17
B-326-WD	6/1/2021	7.5
B-326-WD	8/30/21	0.77 J
B-326-WD	10/12/21	1.0

The changing concentrations of 1,4-dioxane in B-326-WD are believed to be affected by changes in groundwater extraction in nearby MW113-EW-1. With the continued absence of injection water, presumably this extraction well is pulling water from a different area when pumping, likely from the east, which contains lower levels of 1,4-dioxane. When extraction from MW113-EW-1 was temporarily suspended on November 4, 2020 and restarted on January 27, 2021 to allow for treatment of water contained in temporary storage tanks, 1,4-dioxane concentration in B-326-WD increased to 17 µg/L on February 3, 2021. This may be the result of less flushing of residual 1,4-dioxane contained in the capillary fringe/vadose zone. After extraction of MW113-EW-1 resumed (March 11, 2021), the 1,4-dioxane concentration in B-326-WD dropped to below the performance standard (0.9 µg/L) in August 2021 (0.77 µg/L). The latest sampling result (October 2021) was slightly above the performance standard at 1 µg/L.

Like B-326-UD, relationships between the groundwater level declines and changes in 1,4-dioxane concentrations in well B-326-WD were addressed in the Revised Final Cessation Report (EMSI/CDM-Smith, 2020a). The WSDs will continue to monitor both the 1,4-dioxane concentrations and the water level in these wells and continue to evaluate conditions in this area.

With regard to MW62-WDR and MW77-WD, a Case 3 condition exists in the vicinity of these wells. WSDs have implemented four RAWPs (EMSI, 2006a, 2007c, 2008b, and 2010a) to reduce the levels of 1,4-dioxane in these areas and are currently implementing the *Response Action Work Plan to Extract Additional Groundwater from Upgradient of MW77-WD* (EMSI, 2011) to bring these wells into compliance. Visually declining trends in 1,4-dioxane, 1,1-DCE, and nitrate are apparent in compliance well MW77-WD since the start of response action implementation in 2008. 1,4-Dioxane has decreased from 120 µg/L in May 2008 to 11 µg/L in October 2021. Similar trends are apparent for nitrate (160,000 µg/L to 12,000 µg/L) and 1,1-DCE (22 µg/L to 1.7 µg/L) for the same sampling dates.

In MW62-WDR, 1,4-dioxane is out of compliance and exceeds the performance standard in all of the ten most recent samples (3.2 µg/L to 4.6 µg/L) with a decreasing trend. Although the trend is decreasing, the slow decline indicates that 1,4-dioxane will potentially continue to be out of compliance in this area. The well lies within the zone of containment caused by groundwater extraction from the NBBW and Response Actions

north and east of the NBBW (see Figures 4.16 and 4.17). Consequently, the exceedances may be a Case 2 condition, which require only long-term monitoring. As required by the Fourth Five-Year Review Report (5YRR) (USEPA, 2017), the WSDs conducted additional evaluations of the effectiveness of the NBBW containment system and the Response Actions in the NBBW area as part of the NBBW Containment System Evaluation (CSE) Plan (EMSI/CDM/Parsons, 2019). That evaluation (EMSI/CDM/Parsons, 2021) determined that the NBBW effectively contains flow of contaminated groundwater within the alluvium/weathered bedrock groundwater unit. Any residual 1,4-dioxane remaining north of the containment zone will be captured by ongoing Response Action pumping north of the containment zone.

4.4.2.2 Nitrate and Nitrite in the NBBW Area

Nitrate is out of compliance in monitoring wells B-313 and MW62-WDR (Figure 4.11). Nitrite is potentially out of compliance in well MW62-WDR. These wells are located along the northern boundary of the Site, in an area where sewage sludge was historically land farmed. Statistical testing of potential temporal trends in the results (Appendix C-3.2) indicates that there is no trend in the nitrate concentrations in B-313 and MW62-WDR and a decreasing trend in nitrite concentrations in MW62-WDR. Based on the decision rules established in the GWMP, occurrences of nitrate and nitrite in these wells may be classified as a Case 3 condition. As discussed below and in Subsection 4.9, response actions are being implemented in this area. Other wells located in Section 31 north of the NBBW area were previously sampled in 2006 and analyzed for nitrate, nitrite, and VOCs. These compounds were not detected at concentrations greater than performance standards in any of the wells located along unnamed creek, immediately upgradient of the confluence with Murphy Creek (MW115-WD, MW116-WD, MW117-WD, MW118-WD, MW119-WD, and MW120-WD), or in any of the DADS wells located along unnamed creek or Murphy Creek (MW02-AD, MW05-WD, MW07-AD, MW08-WD, MW09-WD, and MW80-WD). Wells located south of the Yale Avenue extension along the northern boundary of Section 31 (MW121-WDR, MW122-WDR, MW123-WD, MW124-WD, MW125-WD, MW126-WD, MW127-WD, MW129-WD, MW130-WD and MW131-WD) were sampled for VOCs and nitrate in 2006 and were resampled in 2016 as part of the *Work Plan to Sample North End Wells, Piezometers and Surface Water* (EMSI, 2016) or *Work Plan for 3DVA Synoptic Sampling Event* (EMSI, 2018b, as amended in EMSI, 2018c), and again no nitrate, nitrite, or VOCs were detected above performance standards in any of these wells. Based on these results, the extent of nitrate and nitrite exceedances has been determined to be limited to the area immediately to the north of the NBBW (i.e., in the immediate vicinity of compliance monitoring wells B-313 and MW62-WDR. Based on the results of the prior sampling and the limited area of nitrate exceedance, there does not appear to be a potential for significant off-Site migration of nitrate or nitrite at concentrations greater than the performance standard.

As discussed above, the WSDs prepared, implemented, and updated various RAWPs to address 1,4-dioxane occurrences east and downgradient of the NBBW. To the extent that the nitrate and nitrite occurrences do not result from a source in the immediate vicinity of these wells (i.e., impacts from prior land farming of sewage sludge in this area), implementation of response actions for 1,4-dioxane should also address nitrate occurrences in these areas. To the extent that the cause of the nitrate and nitrite occurrences in these wells is due to impacts from prior land farming of sewage sludge in this area, the response actions being undertaken in this area may or may not reduce their concentrations in

groundwater. Nonetheless, groundwater extraction from North End wells further downgradient should capture any potential migration of nitrate and nitrite from the NBBW area if northern migration were to occur.

4.4.2.3 Chloroform and 1,4-Dioxane MW38-830N-230E

Chloroform and 1,4-dioxane concentrations in monitoring well MW38-830N-230E potentially exceed the groundwater performance standard. Decreasing trends in the concentrations of these chemicals were identified in this well. This well is located along the POC at the north end of the MW38 channel. The hydraulic gradient within the channel at this location is to the north so migration of these chemicals crosses the POC. As part of the groundwater containment remedy for the Site, groundwater extraction is conducted from the MW38 channel at two locations, including a location approximately 200 ft north of well MW38-830N-230E, which is downgradient from and beyond the POC relative to the compliance monitoring well. Therefore, although chloroform or 1,4-dioxane may migrate across the POC, impacted groundwater is hydraulically contained within, and removed from, the sand channel in the area immediately north of well MW38-830N-230E as depicted on Figures 4-24 and 4-25. Consequently, no action other than continued extraction from the MW38 channel and monitoring of the compliance well is required for these occurrences.

4.4.2.4 Nitrate in BM-15N6

Nitrate occurs in well BM-15N6 at concentrations greater than its performance standard. Statistical testing of potential temporal trends (Appendix C-3.2) indicates that there is a decreasing trend in nitrate concentrations in well BM-15N6. Each of the last 10 results for nitrate in this well are above the performance standard (28,000 µg/L). Therefore, although the trend is decreasing, the compound is considered potentially out of compliance in this well.

This well is located in an area where sewage sludge had historically been land-farmed. USEPA positioned the compliance boundary within the land farming area such that it straddles the land farming area. That, coupled with an absence of 1,4-dioxane and only low-level detections of VOCs below performance standards since 2003 in this well, would indicate the source of nitrates is not from landfill mass or waste pit contaminant migration; rather, it is likely from the past land farming activities inside and outside the compliance boundary. Groundwater sampling conducted in June 2017 and October 2018 indicated that nitrate has been observed in surrounding wells BM-15N2 (43,000 µg/L), BM-15NE1 (26,000 µg/L), BM-15N5 (68,000 µg/L), BM-15N1 (25,000 µg/L), BM-15I-15N (54,000 µg/L), BM-15I-50S (9,300 µg/L), and BM-15X-50S (38,000 µg/L).

The spatial randomness of nitrate detections in and around well BM-15N6 as compared to other compliance wells in this vicinity is similar to that observed near the NBBW where sewage sludge was land farmed. The randomness is likely attributable to a number of hydrogeochemical variables associated with the leaching, transport, and attenuation of nitrates that can differ significantly from location to location. Nitrate concentrations can also fluctuate with precipitation and rate of groundwater pumping from the PM-15 Area wells.

Because 1) the source of the nitrate in well BM-15N6 is most likely a result of sewage sludge land farming in this area, 2) the presence of active groundwater extraction in this area, and 3) the distance between this well and the Site boundary is approximately 200 feet,

(see Figure 4.11), the occurrence of nitrate in well BM-15N6 is considered to be a Case 2 condition as defined in the GWMP (EMSI/Parsons, 2018). Consequently, no action other than continued groundwater monitoring is recommended.

4.4.2.5 BM-11X-100N Tetrachloroethene

PCE in BM-11X-100N is out of compliance with an no statistical trend. The ten most recent PCE concentrations in this well range from 4.6 µg/L to 7.2 µg/L with the most recent sample containing a PCE concentration of 5.4 µg/L (October 28, 2021). PCE levels appeared to slowly increase from October 2017 to November 2020 but have dropped in the last two sampling events. The variation in PCE concentrations appears to be related to changes in the water level in this well. Prior to the summer of 2015, the water level in this well was relatively stable ranging from approximately 5,790 to 5,795 ft amsl. Beginning in the summer of 2015, the water level in this well increased, peaking at a high of just over 5,800 ft amsl in July 2017. Since that time, the water level in this well has declined back below 5,792 ft amsl. Consequently, it is likely that the increase in PCE levels in this well may be the result of flushing of residual PCE contained in the capillary fringe/vadose zone. If this is the case, then the PCE level in this well should decline over time which has been observed in the most recent PCE results (7.2 µg/L in November 2020 to 5.4 µg/L in October 2021). The well is located outside of the perimeter slurry wall in an area where the hydraulic gradient across the slurry wall is inward due to groundwater extraction along the interior of the slurry wall, but with increasing distance away from the slurry wall the hydraulic gradient becomes outward to the northeast toward the Site boundary (Figures 4.1 and 4.2). Well MW50-WD, a weathered Dawson well positioned approximately 150 ft north of well BM-11X-150N and outside the slurry wall, has never contained PCE at concentrations above the method detection limit. Similarly, wells located further to the north and northeast have always been in compliance with the PCE groundwater performance standard (see Figure 4.11). The overall low concentration of PCE in well BM-11X-100N, in addition to an inward gradient across the wall at this location, and no or very low PCE detections in groundwater to the north and northeast of the well indicate that the PCE occurrences in this area represent a Case 2 condition (little or no downward trend with a low potential for off-Site migration) as defined in the GWMP (EMSI/Parsons, 2018). The WSDs previously completed a Case 2 evaluation for this well (EMSI, 2006b). Results indicated that it is unlikely that the PCE occurrences above the performance standard in this area will migrate to the Site boundary. Rather, PCE occurrences in this area will likely attenuate naturally over time. Consequently, the recommended action is to continue monitoring.

4.5 Effectiveness Evaluation

Four components of the groundwater containment remedy (perimeter slurry wall, NTES, NBBW, and MW38 channel) are intended to provide hydraulic control and contaminant containment in the shallow (alluvium/weathered Dawson) groundwater at the Site. The effectiveness of these features is demonstrated either by hydraulic (water level) monitoring or water quality monitoring, in accordance with Sections 3.2, 4.2, 5.2, and 7.3 of the Revised GWMP (EMSI/Parsons, 2018). The effectiveness of these remedial components was assessed in detail in 2021 and continues to be monitored regularly (EMSI/Parsons, 2021a and b). The four components are discussed below.

4.5.1 Perimeter Slurry Wall

The primary criterion for assessment of the effectiveness of the perimeter slurry wall is the presence of an inward hydraulic gradient across the slurry wall. In the event an outward hydraulic gradient is determined to be present at a particular location along the wall, water quality data obtained from outside the wall are used to assess the effectiveness of the slurry wall at containing Site contaminants.

The presence of an inward hydraulic gradient is determined by reviewing the water level measurements from the weathered Dawson wells located in a paired configuration inside and outside of the perimeter slurry wall. Fifteen well pairs (PM-1 through PM-15) are used for this assessment. Results of the evaluations of the hydraulic gradients across the perimeter slurry wall are summarized in Table 4.7. Hydrographs for the fifteen well pairs are presented on Figure 4.12. A complete set of hydrographs along with results of statistical testing of the water level data are presented in Appendix C-4.1.

Water level data indicate the presence of inward hydraulic gradients across the perimeter slurry wall at eleven of the fifteen well pairs. Outward hydraulic gradients exist across the slurry wall along the southern part of the western portion of the wall in the PM-3 and PM-6 areas and along the northern part of the eastern portion of the slurry wall in the PM-14 area. The gradient calculation for the PM-13 well pair could not be performed because PM-13I was dry, likely due to purging associated with attempts to sample this well. This well was part of the 2018 Synoptic sampling event (EMSI, 2018b and 2018c) and was dewatered during purging before a sample could be collected. The last 13 attempts to measure the water level in PM-13I revealed no recharge at this well since the October 2018 sampling event. PM-13X has been intermittently dry since the 2018 synoptic sampling event including in July 2021.

Where the water level data indicate the presence of an outward gradient, the effectiveness of the perimeter slurry wall is assessed using water quality data for five indicator compounds (1,1,1-TCA, 1,1-DCA, TCE, PCE, and 1,4-dioxane) obtained from wells located outside of the slurry wall in these areas. The presence of no trend or decreasing trend in water quality data indicates the slurry wall is effective at containing Site contaminants, while the presence of an increasing trend indicates the slurry wall may not be effectively containing Site contaminants.

In accordance with the updated GWMP, a minimum of four sample results is necessary to evaluate water quality trends for the effectiveness evaluation when inward gradients cannot be demonstrated (gradient data for each well is presented in Appendix C-4.1). For wells with 4 to 8 sample results (Appendix C-4.2), Sen's test is used to assess trends (Appendix C-4.3) for the compounds. A minimum of nine sample results is required to perform more rigorous statistical testing including calculation of Shewhart-CUSUM control limits (Appendix C-4.4). Sen's test is performed on the background data sets used to calculate the Shewhart-CUSUM control limits to verify that no temporal trends exist in the background data.

PM-3X has been sampled 36 times for VOCs and nine times for 1,4-dioxane (Appendix C-4.2). 1,4-Dioxane has never been detected in this well. TCE, 1,1,1-TCA and 1,1-DCA have never been detected above their RLs in this well. PCE has been detected in this well at concentrations substantially below its groundwater performance standard of 5 µg/L. The background data set for 1,1,1-TCA and TCE includes 32 samples. The background data set for 1,1-DCA and PCE includes 12 and 20 samples, respectively. The data sets for 1,1-

DCA and PCE were adjusted because they indicated trending data when the number of samples was increased in the baseline data set. No increasing trends were identified in the background data sets and the most recent results for 1,1,1-TCA, 1,1-DCA, TCE, and PCE are below the Shewhart-CUSUM control limit (Appendix C-4.4). These VOC results, plus the 1,4-dioxane non-detect results, indicate the slurry wall is effective at this location.

PM-6X has been sampled 38 times for VOCs and nine times for 1,4-dioxane (Appendix C-4.2). None of the five indicator compounds have ever been detected in this well. These results indicate the slurry wall is effective in this area.

PM-13X has been sampled 37 times for VOCs and nine times for 1,4-dioxane (Appendix C-4.2). 1,4-Dioxane has only been detected once in PM-13X (0.35J). It was not detected in the three most recent samples. The other four indicator VOCs have been detected in this well during each of these sampling events, but concentrations have always been less than performance standards. When the background VOC data set is set to more than 16 sampling events, 1,1,1-TCA shows a decreasing trend in the background data set. When the background VOC data set is set to more than 20 sampling events, 1,1-DCA shows a decreasing trend in the background data set. Therefore, it was necessary to revert to the prior background data for these compounds in order to not include trending data in the background data sets. The other two detected VOC compounds had no trend in the background set of 32 results. No increasing trends were identified in the background data sets and the 21 most recent results for 1,1,1-TCA, the 17 most recent results for 1,1-DCA, and the five most recent samples for PCE and TCE are below the Shewhart-CUSUM control limit (Appendix C-4.4). These VOC results, plus the 1,4-dioxane results of less than the RL, indicate the perimeter slurry wall is effective at this location.

PM-14X has been sampled 39 times for 1,1,1-TCA, 1,1-DCA, TCE, and PCE and 36 times for 1,4-dioxane (Appendix C-4.2). PCE has never been detected at this location. 1,4-Dioxane was detected once at a trace detect of 0.1 J µg/L (12/15/20). 1,1,1-TCA, 1,1-DCA, and TCE have been detected in this well at concentrations substantially below their respective groundwater performance standards. When the background VOC data set is set to more than 24 sampling events, 1,1-DCA shows a decreasing trend in the background data set. Therefore, the background data set included 24 samples for 1,1-DCA. The most recent 15 samples for 1,1-DCA are below the Shewhart-CUSUM control limit. No increasing or decreasing trends in the background data set of 36 samples were identified for 1,1,1-TCA, TCE and PCE and the three most recent results for each compound are below the Shewhart-CUSUM control limit. 1,4-Dioxane background set is 32 samples with no trends and the most recent four samples are below the Shewhart-CUSUM control limit (Appendix C-4.4). Therefore, the analytical chemistry data indicate the perimeter slurry wall is effective at this location.

Based on evaluation of the water level and water quality data, the perimeter slurry wall is effective at containing contamination inside the eastern, southern, and western limits of the landfill footprint.

Effectiveness of the perimeter barrier wall (EMSI/Parsons, 2021a) surrounding the eastern, southern, and western sides of the Section 6 landfill at the Site was evaluated as it related to findings and recommendations in USEPA's Fourth 5YRR (USEPA, 2017). It was concluded that successful operation of the perimeter barrier wall in conjunction with operations of the other remedial components at the Site address the remedial action objectives for protection of human health and the environment.

4.5.2 North Toe Extraction System

Effectiveness of the NTES is demonstrated based on hydraulic monitoring alone if either of the following conditions occurs:

1. Pumping from the NTES results in continuous decline of trench water levels as demonstrated by the well hydrographs for MPZ-10R, NTES-180W, and MPZ-11; or
2. Trench water levels (as measured in MPZ-10R, NTES-180W, and MPZ-11) remain below the base of alluvium (elevation of 5,740 ft amsl).

Figure 4.13 shows the water level data from piezometers NTES-180W, MPZ-10R, MPZ-11 and the extraction sump, and indicates that trench water levels remained below the base of alluvium throughout the reporting period. This is displayed by the potentiometric surfaces for the alluvium/weathered Dawson in the NTES area (Figures 4.14 and 4.15 for the third and fourth quarters of 2021, respectively) showing convergent groundwater flow to the trench. As indicated by Figures 4.13, 4.14, and 4.15, the NTES is effective at capturing contaminated groundwater emanating from the toe of the landfill.

Effectiveness of the MW38 Area, NTES, and North End Response Actions, (EMSI/Parsons, 2021b) at the Site were evaluated as it related to findings and recommendations in USEPA's Fourth 5YRR (USEPA, 2017). The measure of effectiveness for the NTES prescribed in the GWMP is being met by ongoing groundwater extraction from NTES trench wells.

4.5.3 North Boundary Barrier Wall

The presence, location, and extent of the containment area created by the NBBW systems are defined by the weathered Dawson potentiometric surface in the NBBW area. Figures 4.16 and 4.17 present the potentiometric surfaces for the alluvium/weathered Dawson in the NBBW area for the third and fourth quarters of 2021, respectively.

The NBBW zone of containment is highlighted in yellow on Figures 4.16 and 4.17. After potable water injection ceased on October 2, 2018, the water table between the NBBW and MW113 area has been flattening and a clear groundwater divide cannot be definitely demonstrated. Instead, a larger containment area north of the NBBW caused by cessation of potable water injection in conjunction with Response Action extraction has developed as shown on Figures 4.16 and 4.17 and has encompassed compliance wells B-313, GW-109, and B-326-WD, plus monitoring wells PTP-14, PTP-15, PTP-16, PTP-17S, PTP-18, PTP-19, PTP-20, and TR-1. Directions of groundwater flow into cones of depression within the enhanced Containment Zone are shown on both figures.

Since potable water injection stopped north of the NBBW, capture of contaminated groundwater migrating from the Site does not appear to have been compromised and the NBBW continues to function as intended. Flattening of the water table north (downgradient) of the wall is expected to continue. VOC and 1,4-dioxane concentrations provide an additional line of evidence that the NBBW is effectively performing as intended and containing contamination within the alluvium/weathered Dawson Formation that might otherwise migrate across the POC along the northern boundary of the Site.

Extraction of groundwater north of the NBBW continued during the reporting period. The extraction rates (gpm) from the four extraction wells are shown below.

Well	7/1 – 7/13//21	7/14 – 8/12/21	8/13 – 9/15/21	9/16 – 10/14/21	10/15 – 11/11/21	11/12- 12/14/21	12/15 – 12/31/21
MW113-EW-1	2.0	2.0	2.5 to 4	3.6	3.3	3.0	2.0
B-321	0.1	0.08	0.08	0.08	0.0	0.0	0.0
MW113-UD	0.03	0.03	0.03	0.03	0.02	0.02	0.02
NBBW-IW-3	0.5	0.4	0.3	0.01	0.0	0.0	0.0
Total Extraction	**2.63**	**2.51**	**2.91 to 4.41**	**3.72**	**3.32**	**3.02**	**2.02**

Fluctuations in groundwater levels and 1,4-dioxane concentrations were observed in most weathered and unweathered Dawson monitoring wells in the NBBW area. As the water levels declined in the area, from both seasonal water decline and cessation of injection, the ability of extraction wells to remove groundwater from the system was affected, as discussed below.

The saturated thickness (defined as the water present in a well between the top of the water column and bottom of the well screen) in MW113-EW-1 has decreased since cessation of potable water injection. Historically, this well was able to sustain extraction in the 3 to 4 gpm range. With decreasing saturated thicknesses, sustained yields from this well are expected to decline.

On November 18, 2019, total molybdenum was detected in WTP effluent above its permitted limit, which led to a temporary shut-down of the WTP. After sampling all waters entering the WTP, the source was determined to be from extraction well MW113-EW-1.

Flow from that well was decreased to 1 gpm on November 18, 2019 and the WTP was returned to service. Due to continued increases in molybdenum concentrations in that well, and to ensure no additional effluent exceedances occurred in WTP effluent, the extraction rate from MW113-EW-1 was reduced to 0.5 gpm, on June 16, 2020. On July 30, 2020 a recently installed packer in the well was adjusted to a depth of 5664 feet amsl and the extraction pump inlet was raised to 5664.5 feet amsl to increase groundwater extraction from the interval above the packer. The MW113-EW-1 extraction rate remained at 0.5 gpm through November 3, 2020. Extraction from MW113-EW-1 was terminated on November 4, 2020 to allow the WTP to treat groundwater stored in a Baker tank prior to freezing weather. No additional extraction from MW113-EW-1 occurred between November 9, 2020 through January 26, 2021 to allow for the installation of the IX system. Extraction from MW113-EW-1 resumed on January 27, 2021 (extraction rate between 0.5 and 1 gpm) and was increased on March 11, 2021 to 2 gpm to increase mass removal. Because of decreasing water levels in NBBW area, the packer in MW113-EW-1 was removed on June 7, 2021. The extraction pump inlet was lowered to 6 inches above the bottom of MW113-EW-1's 5-foot sump and extraction resumed on June 8, 2021. An investigation of the extent and possible sources of elevated molybdenum in groundwater was presented in a Technical Memorandum, *Evaluation of Potential Sources of Elevated Molybdenum in Wells MW113-WD and MW113-EW-1* (EMSI/CDM Smith, 2020b).

The evaluation found the source of molybdenum appears to be naturally-occurring, coincident with fine to coarse-grained sands and clay clasts, deposited at the top of the bedrock interface. Plausible sources are Pike's Peak Granite (primary source of Dawson Formation) and/or rhyolite from the Castle Rock Formation deposited as Eocene age alluvium. Molybdenum is not a compound of concern for the Site but is regulated in the WTP effluent by the Metro permit. On January 27, 2021, an IX treatment system was brought online to treat the molybdenum from well MW113-EW-1. Since January 27 the total molybdenum concentration has dropped from 17000 µg/L to 3400 µg/L (10/19/21). The decrease in concentration indicates that the source is limited and appears to be depleting.

Figure 4.18 shows water elevations at monitoring well MW113-WD and dissolved molybdenum concentrations in compliance wells B-326-WD and B-326-UD and monitoring wells MW113-EW-1, MW113-WD, MW113-UD, and MW113-LD. Extraction from MW113-EW-1 was increased to 4 gallon per minute on August 19, 2021. The additional extraction from the weathered Dawson resulted in an increased rate of dewatering of the MW113 area as shown by a steepening of MW113-WD water elevations on Figure 4.18. Dissolved molybdenum concentrations gradually increased in MW113-WD until the well's water elevations flattened in mid-November. Following stabilization of water elevation, the dissolved molybdenum concentration increased until stabilizing around 20,000 µg/L. Stabilization of both water elevation and groundwater extraction rate suggest the area has reached equilibration under the current precipitation conditions.

To continue, and possibly increase, removal of 1,4-dioxane mass from the MW113 and B-326 areas, former injection well NBBW-IW-3 was converted to an extraction well and groundwater extraction began at 2 gpm on May 25, 2020. Following additional modifications to the well and conveyance system, extraction was increased to 2.5 gpm on June 17, 2020. Groundwater extraction from NBBW-IW-3 ranged between 2.5 and 1.7 gpm until MW113-EW-1 extraction was increased on March 11, 2021. Following the increase in extraction at MW113-EW-1, NBBW-IW-3 became formation limited and the extraction rate decreased to 0.5 gpm. Varying extraction rates during this period are the result of pump cycling, groundwater sampling and mechanical improvements to the well or WTP. After September 2021, no water was available for extraction from NBBW-IW-3.

Figure 4.19 shows water elevations following cessation for extraction well and companion monitoring well pairs MW113-EW-1/MW113-WD and NBBW-IW-3/B-319. Since cessation began, water levels decreased while extracting at 3.7 gpm from well MW113-EW-1. When extraction was reduced to 1 gpm, water levels rebounded (raised) immediately and slowly approached a steady-state (not increasing or decreasing) over time. To increase mass removal, extraction was increased to 2 gpm on May 25, 2020 in NBBW-IW-3 and water levels rapidly declined. Review of the graph shows a steady and continuing water level decline following reduced extraction at 0.5 gpm in MW113-EW-1 and increased extraction to 2.5 gpm in NBBW-IW-3. Extraction from MW113-EW-1 was terminated on November 4, 2020 while extraction at NBBW-IW-3 became formation limited with an average extraction rate at 1.7 gpm. Increased extraction at MW113-EW-1 on March 11, 2021 resulted in decreased extraction at formation limited well NBBW-IW-3 at 0.5 gpm. Following this extraction modification, water level decreases were observed in B-319, MW113-WD and MW113-EW-1. From March 17, 2021 to August 19, 2021, the

water level in MW113-WD decreased at an average rate of approximately 0.15 feet per week. MW113-EW-1 extraction was increased to 4 gpm resulting in a water level in MW113-WD decreasing at approximately 0.41 feet per week (August 19, 2021 through November 19, 2021). The extraction rate at MW113-EW-1 steadily decreased and slowly approached a steady-state of 1.9 gpm at the end of the reporting period. During this period, November 19, 2021 through December 22, 2021, the water level in MW113-WD declined at a rate of approximately 0.05 feet per week. As previously mentioned, stabilization of water elevation and groundwater extraction rate suggest the area has reached equilibrium (i.e., pumping rate and current precipitation conditions).

Future extraction rates will be dictated by the ability of the wells to maintain yield, balanced against the ability of the WTP to meet its discharge limit for molybdenum (see Section 2.2.1 - Summary of Activities and Section 2.3 - Treatability).

Figure 4.20 shows the effect of the remedial action implemented in this area on 1,4-dioxane concentrations. The graph shows overall declining 1,4-dioxane trends for compliance wells B-326-WD and B-326-UD and nearby extraction wells MW113-EW-1 and MW113-UD prior to cessation of potable water injection. Since cessation began, concentrations in the compliance wells have generally remained constant, while concentrations in the nearby extraction wells have generally increased. Following identification of MW113-EW-1 as the source of the elevated molybdenum concentrations in the WTP effluent, extraction from this well was decreased to 1 gpm on November 18, 2019. Following reduced groundwater extraction from this well, the 1,4-dioxane concentration decreased. Extraction from NBBW-IW-3 beginning on May 28, 2020 and modifications to extraction at MW113-EW-1 did not appear to have any effect on concentrations in compliance wells B-326-WD and B-326-UD. Concentrations of 1,4-dioxane in MW113-UD have increased since cessation of potable water and are generally similar to concentrations prior to the start of extraction at MW113-UD on September 27, 2011. It is antipicated that concentrations in both MW113-WD and MW113-UD will gradually decrease as residual 1,4-dioxane present in the weathered Dawson is removed.

Groundwater levels north of the NBBW have declined since cessation began as shown on Figure 4.19. Correlations among groundwater levels, pumping rates, and 1,4-dioxane concentrations are further addressed in the *Revised Final Report on Pilot Test for Cessation of Potable Water Injection* (EMSI/CDM-Smith, 2020a).

As a result of cessation of injection, availability of water in B-321 is formation limited and the extraction rate is dictated by the groundwater flow rate into the well. Extraction at B-321 remained at 0.001 gpm until November 3, 2020 when extraction was stopped to allow groundwater to enter the well for the fourth quarter sampling event in 2020. Insufficient water entered the well for sampling. Following the attempted sampling, groundwater extraction from the well was no longer possible due to lack of enough water entering the well to allow pump cycling and no additional extraction has occurred since November 3, 2020. Lack of groundwater entering the well reflects continued dry conditions in this area until June 7, 2021 when the B-321 produced enough water to resume extraction and continued through October 14, 2021. To the extent that seasonal precipitation events raise the groundwater table in this area, extraction will continue as long as sufficient groundwater is present in the well for extraction.

Figure 4.21 shows an overall declining 1,4-dioxane trend for compliance well B-313 prior to and following the start of cessation. It also shows the duration and rates of groundwater extraction from nearby extraction well B-321, and concentrations of 1,4-dioxane in the extraction well over time. As shown, between 2010 and the start of cessation in 2018, 1,4-dioxane concentrations in the extraction well varied between 16 and 45 µg/L, with no apparent trend. Since the start of cessation, 1,4-dioxane concentrations became more variable ranging between 8.3 and 97 µg/L again with no apparent trend. The increased variability is believed to be attributed to changes in the direction and rate of groundwater movement caused by cessation of potable water injection, changes in groundwater pumping rates, and changes in groundwater levels. The extraction rate from well B-321 is formation limited and dictated by groundwater availability, so that 1,4-dioxane concentration variability is anticipated to continue. Lack of groundwater entering B-321 reflects continued dry conditions at this area until June 7, 2021 when the B-321 produced enough water to resume extraction, albeit at less than 0.10 gpm for only four months. Since 3rd quarter 2020, 1,4-dioxane concentrations in compliance well B-313 have stabilized to approximately 17 µg/L. Further discussion is provided in the Revised Final Cessation Report (EMSI/CDM-Smith, 2020a).

Figures 4.22 and 4.23 show the potentiometric surfaces of the unweathered Dawson in the NBBW area. As shown, there appear to be two potentiometric lows, sloped from south to north beneath the eastern, and to a lesser extent, western side of the NBBW. Both lows correspond to the presence of sandstones within the unweathered Dawson in the vicinity of the NBBW. An evaluation of the nature and extent of these sandstones and their influence on groundwater flow conditions are further evaluated as part of the NBBW CSE (EMSI/CDM-Smith/Parsons, 2021).

4.5.4 MW38 Channel

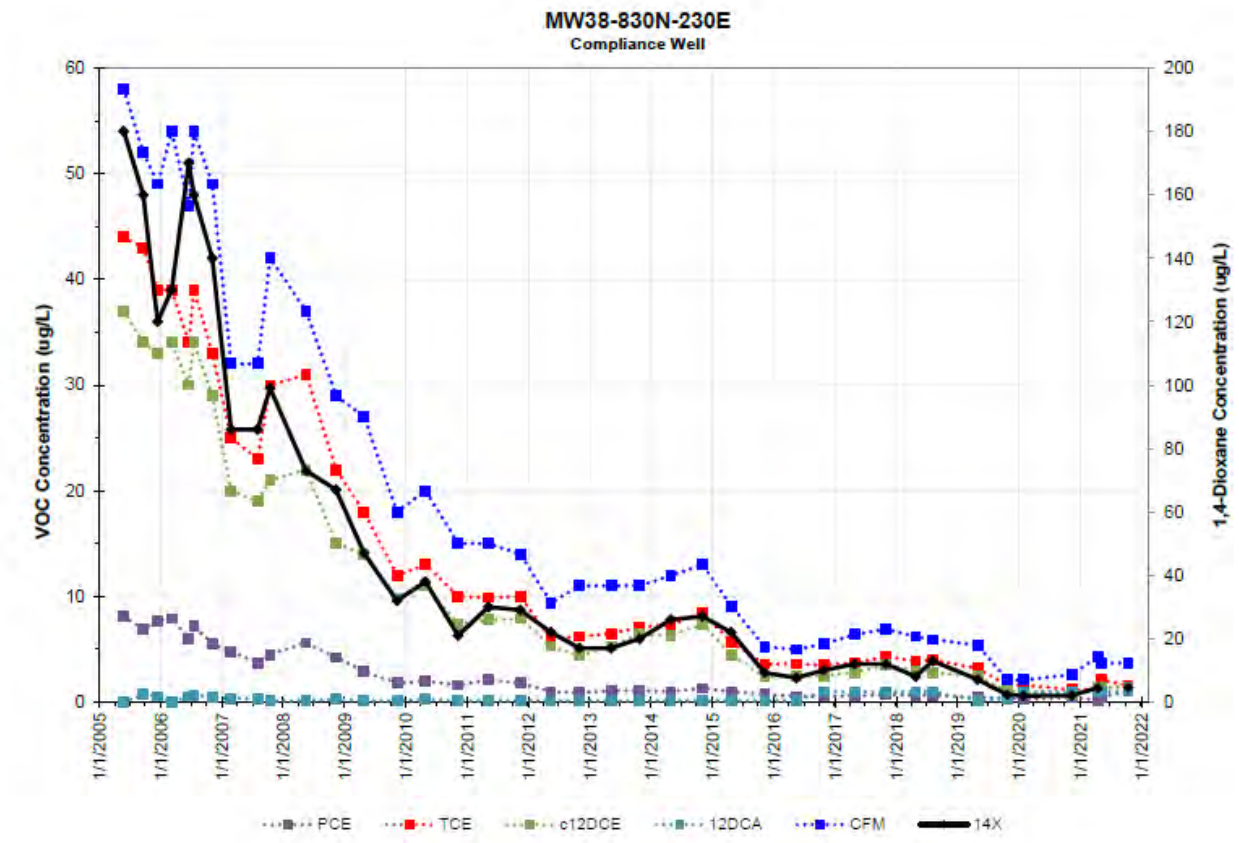
Groundwater extraction continued from wells MW38-170S-140E and MW38-1028N-256E located in the MW38 channel sand (Figures 4.24 and 4.25). Pumping from these two wells is performed to maintain an inward hydraulic gradient toward the sand channel. Pumping occurs on an intermittent basis because the sand channel has been essentially dewatered and it takes several days for sufficient water to accumulate in the areas of these two wells to activate pumping.

Hydraulic (water level) monitoring is used to demonstrate the effectiveness of the MW38 sand channel at containing groundwater in the MW38 area. These data were used to prepare potentiometric maps of the MW38 area (Figures 4.24 and 4.25). Review of these maps indicates the presence of convergent groundwater flow along the entire length of the MW38 channel, as indicated by the flow direction arrows on these two figures. The presence of convergent flow into the MW38 channel indicates that the channel effectively prevents shallow contaminated groundwater within the channel from migrating to the west, east, north, or south from the sand channel.

It should be noted that the northern extraction well (MW38-1028N-256E) is positioned 100 ft north of the Site boundary to take advantage of the thicker and deeper extent of porous channel sand at this location. As a result, groundwater quality from the compliance well (MW38-830N-230E), which is positioned within the sand channel near the Site boundary and south of MW38-1028N-256E, is representative of groundwater that will be

extracted by extraction well MW38-1028N-256E and will not migrate beyond the sand channel.

The concentration time-series graph below shows that hydraulic gradient control pumping at channel wells MW38-170S-140W and MW38-1028N-256E and source control pumping at MW38-825N-445E have successfully reduced contaminant concentrations in MW38-830N-230E where the 1,4-dioxane concentration has declined by 97.4% in this compliance well.



PCE = Tetrachloroethene TCE = Trichloroethene c12DCE = cis-1,2-Dichloroethene
12DCA = 1,2-Dichloroethane CFM –=Chloroform 14X = 1,4-Dioxane

It should be noted that on December 11, 2019, a leak from DADS' buried potable water supply pipe was identified near MW38-500N-396E. Potable water is believed to have preferentially flowed along the pipeline bedding and was observed in the pipeline trench 50 feet east of MW38-680N-419E. From this area the pipeline heads eastward, parallel to the DADS main access road. The pipeline is located about 40 feet south of MW76-WD and MW75-WD. Potable water was observed daylighting between MW75-WD and MW74-WD. DADS repaired the leak in January 2020. By April 2020, the higher groundwater elevation at MW38-680N-419E observed in January 2020 had declined to within a few feet of historical water elevations and during this reporting period water levels have returned to historical water elevations.

Effectiveness of the MW38 Area, NTES, and North End Response Actions, (EMSI/Parsons, 2021b) at the Site were evaluated as it related to findings and

recommendations in USEPA's Fourth 5YRR (USEPA, 2017). The measure of effectiveness for the MW38 area prescribed in GWMP is being met by ongoing groundwater extraction from the MW38 sand channel.

4.5.5 Vertical Migration Assessment in Deep Groundwater (OU6)

The presence of a downward component to the hydraulic gradient at the Site indicates that there is a potential for downward migration of contamination from source area(s) into the underlying unweathered Dawson and potentially the upper Denver and lignite layers (Table 4.3). Although there may be a downward component to the hydraulic gradient, this downward component is wholly or partially offset by the lower permeability of the deeper bedrock units compared to that of the alluvium and weathered bedrock. This section describes the vertical migration assessment performed using data from four specific non-compliance program wells and a review of deep groundwater compliance wells that are monitored for compounds of concern.

4.5.5.1 Vertical Migration Wells

Monitoring of the 29 water quality parameters that are indicators of compliance with groundwater standards is performed in selected unweathered Dawson and upper Denver wells **inside of the POC**. Contaminant concentrations are monitored for trends and compared to performance standards to assess if contaminants are potentially migrating vertically. The goal for vertical migration monitoring is to show that groundwater contaminant concentrations will be below performance standards, and if present, will exhibit stable or decreasing concentration trends over time. These conditions would indicate no vertical migration of contamination is occurring.

Monitoring for potential vertical migration is separate and distinct from compliance monitoring and monitoring performed to demonstrate the effectiveness of the various remedy components. The purpose of monitoring for potential vertical migration is to allow for ongoing assessment of the well network and sampling frequency used for the deeper compliance monitoring wells at the Site. Water quality data obtained from the interior deeper monitoring wells will be used to identify any modifications to the compliance monitoring network and/or sampling frequencies for the deeper units, if any, that may be necessary to ensure detection of possible occurrences of contamination above performance standards in the deeper units that may be migrating towards either the horizontal or vertical POC.

Although not compliance wells, vertical migration wells (B-504A, B-712-LD, C-702P3, and GW-113) are subject to the same statistical tests used in Section 4.4.1 for comparison of UCLs and LCLs to performance standards. Upper Denver wells B-504A, C-702P3, and GW-113 are sampled every five years and unweathered Dawson well B-712-LD is sampled every two years. These wells were not sampled during the reporting period. The results and statistical analyses for these wells as previously reported in the first half 2021 Status Report are summarized below:

- For wells B-504A, C-702P3 and GW-113, the maximum concentrations for all compounds for each well were less than their respective performance standards; therefore, statistical analyses to determine the UCL and LCL for comparison to performance standards did not need to be performed (Appendix C-5.1).

- For well B-712-LD, the historical maximum concentrations of all compounds were also less than their respective performance standards except for one detect of 1,4-dioxane (0.95 µg/L) in 2007. The eight subsequent samples obtained from this well were all reported as not detected for 1,4-dioxane, down to a method detection limit (MDL) of 0.09 µg/L. A compliance determination could not be made for 1,4-dioxane because 90% of the results were not detected. The single detected value of 0.95 µg/L was determined to be an outlier (Appendix C-5.3). If the outlier is removed and replaced with an earlier value (0.5 U, 6/19/06) in order to have ten results, all ten results are not detected: therefore, the well would be in compliance with the groundwater performance standard for 1,4-dioxane.

No significant increasing trends were identified for any of the indicator chemicals of compliance in any of these wells (Appendix C-5.2). Based on evaluation of the results obtained from the last sampling event, there is no evidence of vertical migration of contamination beneath and north of the landfill. The WSDs recommend no changes in the frequency of monitoring of the vertical migration wells.

4.5.5.2 Deep Groundwater Water Quality

Thirty-four deep wells (unweathered Dawson, Upper Denver, and Lignite layer) are part of the compliance monitoring network (EMSI/Parsons, 2018) and are sampled routinely for 29 compounds of concern. Although trace or low concentration detects of multiple compounds of concern have been detected over time, only three unweathered Dawson compliance wells have detections of compounds of concern at concentrations greater than performance standards.

- B-326-UD for 1,4-dioxane and nitrate,
- MW23-C-SD for 1,4-dioxane, and
- MW106-UD for 1,4-dioxane

Section 4.4 discusses compliance statistical testing for these wells and compounds and determined 1,4-dioxane in MW23-C-SD and MW106-UD were potentially in compliance due to the preponderance of nondetects and because each well had only one detect of 1,4-dioxane not confirmed by subsequent samples.

B-326-UD nitrate is potentially in compliance because it displays a decreasing trend and the last six results were less than the performance standard. The decrease in nitrate in the deeper monitoring well B-326-UD correlates with the declining water level observed post-cessation and could suggest a change in flow path with non-nitrate impacted water now being monitored by this well.

1,4-Dioxane is out of compliance in B-326-UD with a decreasing trend. This unweathered Dawson well is paired with B-326-WD allowing calculation of vertical gradients. There is an upward gradient at this location meaning that vertical migration in this area is currently upward. B-326-WD is also out of compliance for 1,4-dioxane although no trend is indicated. Water elevations in the B-326-WD/B-326-UD well pair generally mirror each other. As water levels in both wells declined following cessation, an upward vertical gradient developed at the end of May 2019 that continued through October 2021. Therefore, if vertical migration is occurring, the direction of migration is upward from the unweathered bedrock in the B-326 area as shown in Figure 4.26.

In contrast, vertical downward gradients were identified at other locations in the NBBW area. Each of the following well pairs displayed vertical gradients with a downward hydraulic gradient indicating a potential for downward migration of groundwater and contaminants; however, water quality monitoring has not detected the presence of site-related contaminants in the deeper well while at least one compound was out of compliance in the paired weathered Dawson well.

- **B-313/B-313-UD**: B-313 is out of compliance for 1,4-dioxane (17 µg/L on the last sampling date of 11/16/21) and nitrate (55000 µg/L, 8/12/21). 1,4-dioxane has never been detected in B-313-UD and nitrate has only been detected at 100 J µg/L (7/27/20).
- **MW62-WDR/MW62-UD**: MW62-WDR is out of compliance for 1,4-dioxane (3.2 µg/L, 10/27/21) and nitrate (110,000 µg/L, 10/27/21). 1,4-dioxane has never been detected in MW62-UD and nitrate has only been detected once at 110 J µg/L. 1,4-Dioxane has never been detected in MW62-DENR or MW62-LIG also. Nitrate has been detected in MW62-DENR ranging from 57 J (8/14/18) to 180 J µg/L (9/2/05).
- **MW77-WD/MW77-UD**: MW77-WD is out of compliance for 1,4-dioxane (11 µg/L, 10/27/21) and has only been detected once in MW77-UD at 0.38 J µg/L (8/20/18).

Outside of the NBBW area, there are two weathered Dawson compliance wells paired with unweathered wells that have detected compounds at concentrations above performance standards in the past; however, those compounds are not present or are present at low concentrations in their associated deeper unweathered Dawson well. GW-114A has a downward gradient and the well's last exceedance was methylene chloride at 12 µg/L (11/5/02). This chemical was not detected (reporting limit of 1 U µg/L) in the associated deep well GW-108A (a compliance well) when this well last sampled on 8/19/20. MW74-WD has a downward gradient and the most recent exceedance is nitrate at 30,000 µg/L (5/17/17). Nitrate was not detected in the associated unweathered bedrock well (MW74-UD) the last time it was sampled on 8/6/20. Most unweathered Dawson wells that are located in a paired configuration with a weathered Dawson compliance well have never detected chemicals at levels above the performance standards.

The low or not detected concentrations in the deeper (unweathered Dawson) compliance wells in areas of downward vertical gradient where elevated concentrations of site-related chemicals are present in the paired weathered Dawson well indicate there is little or no downward migration of contaminants in this area.

In conclusion, with the exception of B-326-UD, monitoring of deeper groundwater at Lowry demonstrates that deeper groundwater meets the groundwater performance standards in compliance wells and that significant vertical migration of site contaminants is not occurring. 1,4-Dioxane in the B-326-UD area is out of compliance but located in an area where both weathered and unweathered Dawson groundwater are captured by groundwater extraction at MW113-EW-1 and MW113-UD and cessation. Overall, the evidence indicates that vertical migration of contaminants to deeper groundwater is not occurring.

4.6 Voluntary Actions – MW38 and Perimeter Systems

Voluntary measures are being implemented at the Site 1) for source control associated with the MW38 sand channel; 2) to induce inward hydraulic gradients across the perimeter

slurry wall; and 3) to remove VOCs from groundwater outside the slurry wall. The systems are located in the following areas, starting on the west side and progressing counterclockwise around the Site:

- MW38-WD - groundwater extraction from an upgradient (source-control) well;
- PM-11 - groundwater extraction from two internal wells (gradient control);
- MW51-WD - groundwater extraction from three internal wells (gradient control) and air sparge at one well (VOC removal outside the wall); and
- PM-15 - groundwater extraction from six internal or northern wells (gradient control) and air sparge at one well (VOC removal outside the wall).

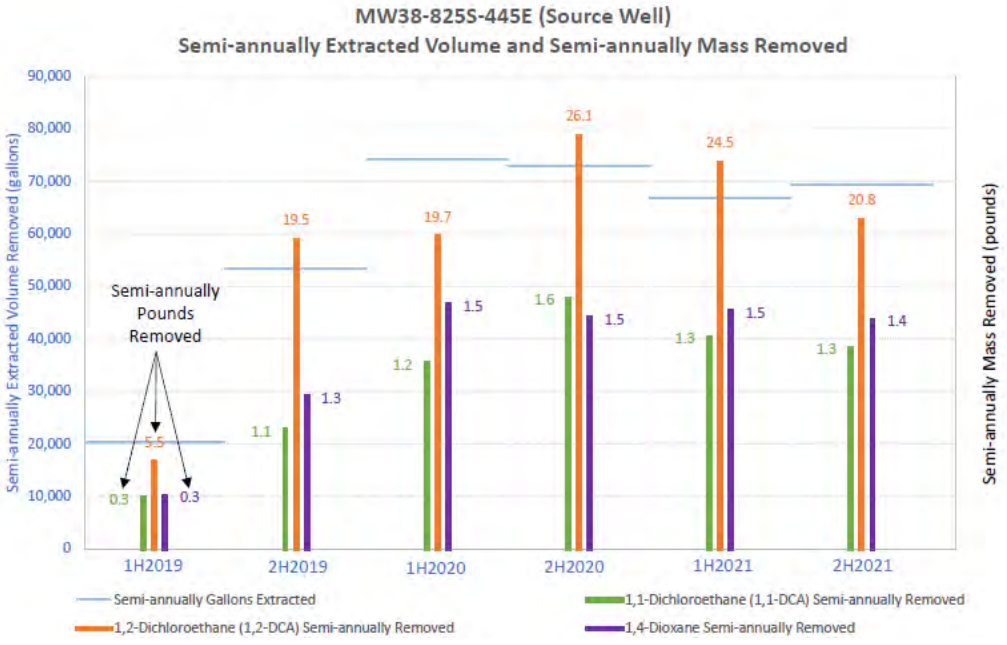
The status of each of these voluntary actions is discussed below.

4.6.1 MW38 Source Control

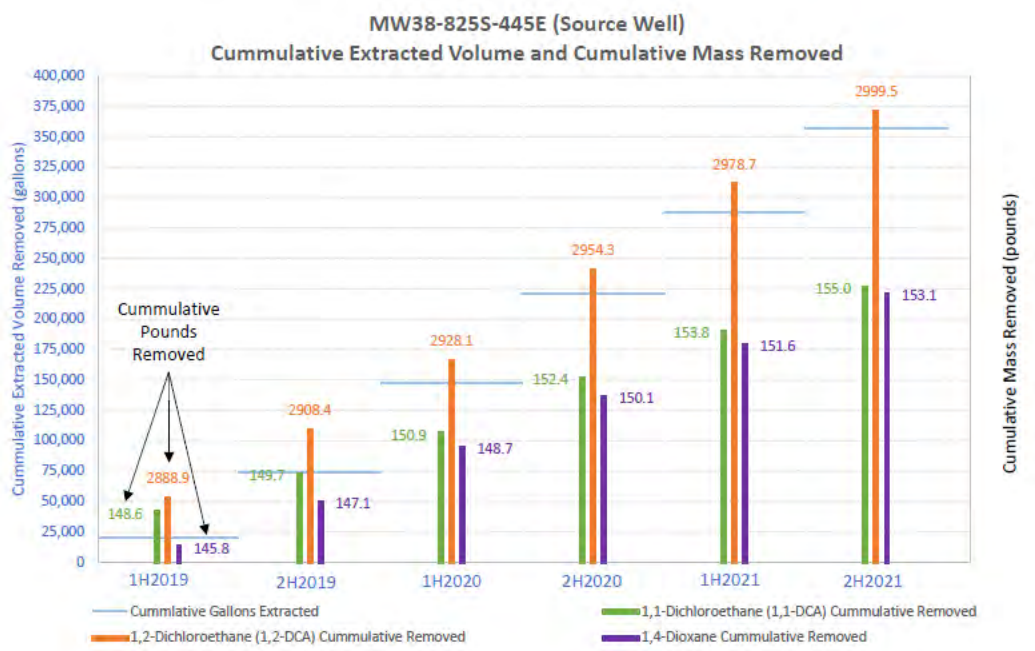
Voluntary pumping of the source well (MW38-825S-445E) resumed in the first half of 2019 following completion of upgrades to the WTP and installation of the new POTW pipeline. In the second half of 2021, total extracted groundwater from the source well was 69,302 gallons and reflects six months of continuous pumping.

The primary constituents detected in the November 8, 2021 sample were 1,2-DCA at 36,000 µg/L; 1,1-DCA at 2,200 µg/L; and 1,4-dioxane at 2,500 µg/L. Continued extraction resulted in contaminant mass removal of 20.78 pounds of 1,2-DCA; 1.27 pounds of 1,1-DCA; and 1.44 pounds of 1,4-dioxane during the second half of 2021. Cumulative mass removed from this well since pumping began in October 2004 is 2,999.5 pounds of 1,2-DCA; 155.0 pounds of 1,1-DCA; and 153.1 pounds of 1,4-dioxane.

The source well time-series graphs below show volume of groundwater extracted and mass removed semi-annually for 1,1-DCA, 1,2-DCA, and 1,4-dioxane as well as



cumulative volume and mass removed semi-annually. The response action at MW38-825S-445E has been successful at reducing contaminant mass in this area.



4.6.2 PM-11

Groundwater extraction from wells PM-11I and BM-11I-100N (see Figure 4.2) was conducted to induce an inward hydraulic gradient by lowering the water table inside the slurry wall relative to outside of the wall. The combined extraction rate from the two PM-11 area wells was 276 gallons per day (gpd). Approximately 50,536 gallons of water were transferred to the WTP during the reporting period. Well BM-11I-100N produces approximately 60% of the combined volume, which has remained fairly consistent over the past several years.

4.6.3 MW51-WD

Voluntary measures in the MW51-WD area (see Figure 4.2) include groundwater extraction from three interior wells and air sparging from one well outside the wall. Groundwater extraction has been on-going since February 2003 and air sparging has been intermittent since 2002. Both measures are discussed below.

4.6.3.1 Groundwater Extraction

Groundwater extraction continued from wells MW51I-WD-15N, MW51I-WD, and MW51I-WD-35S, which are all positioned inside the slurry wall. The cumulative second half of 2021 production from these three wells was 64,690 gallons or 352 gpd. Based on totalizer logs, approximately 72% was from well MW51I-WD-35S and 27% was from well MW51I-WD-15N. Less than one percent was from the middle extraction well MW51I-WD where only saturated clays are present.

4.6.3.2 Air Sparge

Air sparging from MW70-WD, which began in May 2002, was terminated in March 2013 because four quarterly sampling events following cessation of sparging confirmed no VOC detections above performance standards in this well. However, the concentration of PCE in MW70-WD increased to 5.1 µg/L on November 19, 2014, so air sparging was resumed on December 15, 2014. MW70-WD showed a decreased concentration of PCE (0.5 J µg/L) and TCE (0.26 J µg/L) in the May 14, 2020 groundwater sample and neither compound was detected in the groundwater sampled on December 8, 2020, May 27, 2021 or November 9, 2021. Compliance well MW60-WD, located downgradient from MW70-WD is also sampled semi-annually. Neither PCE nor TCE have been detected in MW60-WD since April 17, 2000.

4.6.4 PM-15

Voluntary measures in the PM-15 area (see Figures 4.27 and 4.28) included groundwater extraction from six wells and air sparging from one well. Groundwater extraction has been on-going since February 2000, and air sparging has been ongoing since June 2003. Both measures are discussed below.

4.6.4.1 Groundwater Extraction

Six extraction wells were pumped during the reporting period: five interior wells (PM-15I, BM-15I-25S, BM-15I-50S, BM-15I-100S, and BM-15I-150S) and one well positioned 15 ft north of the end of the slurry wall (BM-15I-15N). A total volume of 3,783 gallons or 21 gpd was transferred from PM-15 area storage tank to the RWST at the WTP during the second half of 2021. Based on totalizer logs, BM-15I-25S and BM-15I-15N produce the majority of the groundwater.

Groundwater extraction has maintained an inward hydraulic gradient across the northeast end of the slurry wall ranging from 0.29 ft/ft at the extraction pairs to 0.001 ft/ft at the non-extraction well pairs, as can be checked by comparison of paired wells on Figure 4.12, Figure 4.27, and Table 4.2. At non-extraction well pairs, the hydraulic gradient is small, but inward.

4.6.4.2 Air Sparge

Well BM-15N5 has been air sparged since June 2003 and throughout the reporting period to remove low-level residual VOCs from groundwater north of the slurry wall in the PM-15 area. The air sparge well BM-15N5 is positioned downgradient from PM-15X. Ongoing groundwater extraction from wells inside the slurry wall is inducing inward gradients across the wall that will further minimize the potential for migration of residual VOCs outside the wall.

4.7 NTES Area NAPL Skimming

During the reporting period, no light non-aqueous phase liquid (LNAPL) extraction was necessary from the sump riser, MPZ-10R or MPZ-11 based on monitoring of the thickness of the LNAPL layer. A measured product thickness of greater than six inches is used to trigger non-aqueous phase liquid (NAPL) extraction. The last LNAPL extraction from the NTES took place September 13, 2011.

Visual inspection of the groundwater pumped from the NTES to the WTP indicated no LNAPL or dense non-aqueous phase liquid (DNAPL) were present in the extracted groundwater, as there were no visible globules present in the pumped groundwater.

A discussion on the effectiveness and operations at the NTES was provided in Subsection 4.5.2.

4.8 North End Response Actions and Investigations

The following sections describe the monitoring and extraction response actions for the North End (land sections 31, 30, 19, 18, and 24) and progress made to date.

4.8.1 North End Monitoring Results

North End groundwater levels and groundwater quality were monitored during the reporting period in accordance with the *North End Groundwater Monitoring Plan* (EMSI, 2007b and updates EMSI, 2020b and Parsons, 2021b) (collectively, North End GWMP). Depths to groundwater are measured quarterly from all North End investigation wells installed in Section 31. Water levels in North End wells in Sections 30, 19, and 24 are measured semiannually during the first and third quarters of each year. Figures 4.29 and 4.30 show the potentiometric surface in Section 31 for July and October 2021, respectively. Although well control is sparse in Sections 19 and 30, Figure 4.31 shows the interpreted potentiometric surface in the vicinity of Murphy Creek Golf Course during July 2021.

Available nitrate and 1,4-dioxane analytical results from existing North End investigation wells are presented in Table 4.8. Table C-6.1 (Appendix C-6) presents all organic and nitrate data collected from the north end wells in the reporting period. Table C-6.2 (Appendix C-6) presents all organic and nitrate data collected in Area 3 during the reporting period. Section 31 1,4-dioxane concentrations are shown on Figures 4.32 and 4.33 for the third and fourth quarters of 2021, respectively. Section 31 wells are sampled quarterly. Figure 4.34 shows the spatial distribution of 1,4-dioxane in shallow groundwater in Sections 19 and 30 in the third quarter of 2021; wells are sampled semi-annually in this area. No data are available in Section 19 and 30 for the fourth quarter 2021.

Two private domestic wells located along East Jewel Avenue, have been sampled annually each spring (second quarter) since 2006 for 1,4-dioxane and were last sampled on May 19, 2021. The wells are perforated from depths of 357 to 600 ft bgs. Sampling of these wells is intended to provide assurances to the well owners that are proximal to the shallow groundwater plume that their drinking water does not contain 1,4-dioxane at concentrations above acceptable levels. Sampling of these wells is not for compliance monitoring purposes. 1,4-Dioxane has never been detected in either of these wells above an MDL of 0.5 µg/L (from March 28, 2006 through July 16, 2015), above an MDL of 0.15 µg/L (July 16, 2015 to May 23, 2019), or above an MDL of 0.09 µg/L (June 25, 2020). The two domestic wells were also sampled on May 19, 2021 for total dissolved solids, alkalinity, metals, VOCs, SVOCs, sulfate, chloride, nitrate, nitrite, and fecal coliform to update the assessment of groundwater quality in the wells and determine if shallow groundwater is potentially being drawn down into the well screens. Fecal coliform was not detected in the wells and groundwater geochemistry was similar to historical deep groundwater conditions. These results indicate that these wells are unlikely to draw shallow groundwater down into the well screens and that the groundwater being extracted by the wells is coming from the screened intervals (e.g., deeper than 350 feet bgs).

4.8.2 Groundwater Extraction in the North End, NBBW and GTEP Area

Groundwater was extracted from the four areas illustrated on Figures 4.32 and 4.33, and described below:

- In Area 1, groundwater extraction is ongoing at three wells (MW153-EW-1, MW154-EW-1, and MW155-EW-1) at a combined rate of between 6.8 and 7.3 gpm during the reporting period. Extraction from MW156-EW-1 was suspended on March 22, 2012 because the 1,4-dioxane concentration dropped to below the performance standard in effect at that time (5 µg/L). 1,4-Dioxane was detected at 1.1 µg/L in groundwater sampled on July 21, 2021 and at an estimated concentration of 0.48 J µg/L in the most recent groundwater sample collected on November 22, 2021.
- In Area 2, pumping from one well (MW160-WD) was conducted. Groundwater extraction from this well is limited by the formation and pumping was limited to 0.5 gpm. The most recent (fourth quarter 2021) 1,4-dioxane concentrations detected at this well and adjacent well MW132-WD were 3.3 µg/L and 14 µg/L, respectively – both above the current performance standard. No extraction occurred from MW118-WD (extraction suspended on 3/19/11). The most recent (November 2021) 1,4-dioxane concentration in this well is 0.26 J µg/L.
- In Area 3 (MW77 area), three wells (MW102-WD, MW77-EW-1 and MW98-WD) were pumped at a combined rate of 0.65 to 1.09 gpm during the reporting period. Extraction was stopped at MW77-EW-2 on June 24, 2011 because the 1,4-dioxane concentration decreased to below the previous 5.0 µg/L performance standard. The most recent (November 2021) concentration detected at this well was 0.12 J µg/L. Pumping was also suspended at MW114-WD on October 7, 2009 for the same reason. The most recent (November 2021) concentration in this well is 0.96 µg/L – slightly above the current performance standard. Pumping from well MW114-WD was not initiated during this reporting period because of its low concentration and low mass removal potential.
- Groundwater extraction in Area 4 (NBBW area) was discussed in Subsections 4.4.2.1 and 4.4.2.2 relative to compliance with groundwater standards and in effectiveness at reducing 1,4-dioxane and nitrate concentrations. WSDs will continue to optimize pumping from the weathered and unweathered Dawson wells in accordance with the RAWP protocols to meet the removal action objectives (Section 4.5.3).
- Area 5 (GTEP Area) activities are discussed in Subsection 4.9.

4.8.3 Progress from Response Actions and Investigations

Approximately 6.5 million gallons of groundwater were pumped from twelve active North End response action wells during the reporting period. Based on the number of gallons pumped and the concentrations at each extraction well, approximately 490 grams (1.08 pounds) of 1,4-dioxane were removed during the reporting period as shown in Table 4.9. The cumulative volume removed since inception of the response actions is about 154.4 million gallons, with a cumulative mass removal of 9,589 grams (21.1 pounds) of 1,4-dioxane. Table 4.9 lists the groundwater volume removed and the 1,4-dioxane mass removed from each north end extraction well.

Trend analyses for the 37 wells being monitored in the North End Area are illustrated in Figures 4.35 through 4.40. Trend analysis was performed on four compliance wells and presented in Appendix C-3.2. Two of these compliance wells are not listed in the North End GWMP Update No. 3 (Parsons, 2021b) but are included here (B-313 and MW77-WD) because they are good indicators of 1,4-dioxane mass removal occurring over time. One well recently added to North End GWMP (MW179-UDEN) does not have enough samples to perform trend analysis (requires a minimum of four samples).

All trend results are summarized in the table below. Of the 39 wells where trend analysis was performed, 32 (82%) are showing declining trends and 6 (15%) are showing no trends. PTP-14 is showing an increasing trend for 1,4-dioxane through June 2020 and has been dry since that date. The decreasing trends in all four Areas are evidence that the ongoing response actions are effective at removing mass from within Section 31. Extraction well B-321 is showing an increasing trend in nitrate. This increase may be caused by variations in groundwater levels and/or flow directions in the vicinity of this extraction well resulting from cessation of potable water injection.

Results of 1,4-Dioxane and Nitrate Trend Analysis in North End Wells

Well	Trend[1/]	Extraction Well?	Well	Trend	Extraction Well?
1,4-Dioxane					
B-321	Decreasing	Yes	MW142-WD	Decreasing	No
B-326-UD*	Decreasing	No	MW144-WD	Decreasing	No
B-326-WD*	No trend	No	MW151-WD	Decreasing	No
MW05-WD	Decreasing	No	MW153-EW-1	Decreasing	Yes
MW102-WD	Decreasing	Yes	MW154-EW-1	Decreasing	Yes
MW103-WD	No Trend	No	MW155-EW-1	Decreasing	Yes
MW113-UD	Decreasing	Yes	MW156-EW-1	Decreasing	Yes
MW113-EW-1	Decreasing	Yes	MW156-WD	Decreasing	No
MW114-WD	Decreasing	Yes	MW157-WD	Decreasing	No
MW117-WD	Decreasing	No	MW160-WD	Decreasing	Yes
MW118-WD	Decreasing	Yes	MW176-DEN	No trend	No
MW121-WDR	Decreasing	No	MW179-UDEN	Insufficient Data	No
MW122-WDR	Decreasing	No	MW77-EW-1	Decreasing	Yes
MW123-WD	Decreasing	No	MW77-EW-2	Decreasing	Yes
MW124-WD	Decreasing	No	MW77-WD*	No trend	No
MW125-WD	Decreasing	No	MW98-WD	Decreasing	Yes
MW129-WD	Decreasing	No	PTP-12	No Trend	No
MW132-WD	Decreasing	No	PTP-13	Decreasing	No
MW135-WD	Decreasing	No	PTP-14	Increasing	No
MW141-WD	Decreasing	No	B-313*	No trend	No
Nitrate					
B-321	Increasing*	Yes	MW113-EW-1	No trend	Yes

1/ Trend for the compliance wells uses the last ten sampling events. Trend for all other wells uses all sampling events. Compliance wells are indicated by a *. Trend is determined by Mann-Kendall trend test for compliance wells only, remaining well trends determined by Sen's test. MW77-WD and B-313 are not North End Monitoring wells but are listed here for additional information only.

Figure 4.41 depicts the concentration trends spatially with the use of different colored dots to signify increasing, decreasing, and no trend. Inset graphs for wells MW103-WD and B-326-WD which exhibit no trend, are shown on the figure. B-326-WD is a compliance well with no trend over the last 10 samples. An inset on Figure 4.41 displays all data for B-326-WD to demonstrate how 1,4-dioxane has decreased over time. MW77-WD and B-313 have no trend also but display similar results as B-326-WD. Figure 4.41 shows the lateral extent of the 1,4-dioxane plume in Sections 31, 30, and 19.

The following table summarizes the status of each task specified in the ongoing RAWPs and Monitoring Plans.

Summary of Progress to Date

Revised North End IRA Work Plan Addendum (EMSI, 2008b)	**Status**
Continue pumping from extraction wells in Areas 1, 2, 3, and 4.	Ongoing.

Work Plans for Area 4 Response Action (EMSI, 2008b and 2010b)	**Status**
Extraction coupled with potable water injection upgradient of extraction well MW113-EW-1 is intended to mobilize and recover mass from this otherwise "stagnant zone" of groundwater contamination. Continue pumping from extraction well MW113-EW-1 as deemed appropriate to achieve objectives.	Potable water injection was discontinued on October 2, 2018. Extraction from MW113-EW-1 is ongoing. NBBW-IW-3 was converted to an extraction well and was initially pumping at a rate of about 2 gpm to enhance mass removal from this Area. Water levels continue to decrease in the area and NBBW-IW-3 has become formation limited resulting in an extraction rate of 0.5 gpm through the first half of 2021. Extraction rates continued to decline and the well became dry in September 2021.

Work Plans to Extract Additional Groundwater from Area 3 and 5 of the North End Response Action (EMSI, 2010a and 2011)	**Status**
Assess the presence (or absence) of a preferential pathway beneath the GTEP pad toward MW77-WD, the lateral limits of the pathway (if present), the direction and rate of groundwater movement, and potential yield from an extraction well. Design and install a new extraction well and collection system to best intercept the flow of contaminated groundwater toward MW77-WD.	Initial investigation work complete. Extraction from MW170-EW-1 is ongoing - see Subsection 4.9, below.

North End Groundwater Monitoring Plan and Update No. 3 (EMSI, 2007b and Parsons, 2021b)	**Status**
Assess results and modify plan as appropriate.	Ongoing. quarterly and semiannual monitoring of North End wells will continue in accordance with *Update No. 3.*

Response Action Work Plan for B-326-UD and B-313 Area (EMSI, 2013)	**Status**
Extract groundwater from MW113-UD to remediate contamination in the vicinity of B-326-UD. Extract groundwater from B-321 to remediate contamination in the vicinity of B-313.	Ongoing. An unweathered Dawson monitoring well MW115-UD was sampled for 1,4-dioxane on August 20, 2013 and March 4, 2014. No 1,4-dioxane was detected in either sample. Groundwater extraction from wells MW113-UD and B-321 commenced in June and July 2013, respectively, in accordance with the RAWP.

Work Plan to Assess Northern Extent of 1,4-Dioxane in Shallow Groundwater (North of Well MW144-WD) (EMSI, 2014)	**Status**
Install four piezometers along western extension of Mississippi Avenue. Sample groundwater and collect confirmation samples. Recommend location for permanent sentry well. Install additional piezometers to delineate lateral extent if 1,4-dioxane concentrations are greater than the performance standard.	Piezometers NEPZ-100 through NEPZ-103 were installed and sampled for 1,4-dioxane. Initial and confirmation sampling results were less than the performance standard of 0.9 µg/L. A sentry well location was recommended.

Work Plan to Sample North End Wells, Piezometers, and Surface Water (EMSI, 2016)	**Status**
Sample existing monitoring wells, piezometers, and surface water stations for 1,4-dioxane, VOCs, metals, nitrate, and nitrite beginning at the Yale Avenue extension well transect and extending northward up to and including the recently-installed piezometers along Mississippi Avenue.	Field investigation work complete. Analytical results have been validated and are consistent with previous sampling results.

In addition, one surface water sampling station (SW-3) is located south of the Yale Avenue extension.	

Revision 1, Addendum to Work Plan to Assess Northern Extent of 1,4-Dioxane (EMSI, 2017)	**Status**
The second phase of the work to delineate lateral extent of 1,4-dioxane concentrations across the NEPZ transect involved extending the Mississippi transect to the east and west and sampling for 1,4-dioxane and VOCs. A location for a permanent sentry well was determined in accordance with the Work Plan.	Additional piezometers to the east and west were installed in 2nd half 2017. Based on assessment of geological and chemical results from the piezometers, a permanent sentry well was installed, developed, and ultimately added to the North End GWMP.

Work Plan to Cease Potable Water Injection at North Boundary Barrier Wall (EMSI, 2018d)	**Status**
Cease potable water injection to evaluate the effectiveness of the NBBW without Potable Water Injection (PWI), as directed by USEPA in the fourth five-year review (USEPA, 2017).	WSDs began baseline sampling in June 2018 and continued sampling and collection of water levels through the first half of 2020. The cessation pilot-test was terminated in July 2019.

Revised Work Plan to Further Assess the North End 1,4-Dioxane Plume (EMSI, 2018a)	**Status**
Assess the northern and vertical extent of the 1,4-dioxane plume and update the Conceptual Site Model (CSM) of the North End area. Work scope includes Installing six wells (shallow and deep), collecting samples, and performing slug tests.	The Work Plan was implemented in 2018 and 2019 and a final report was prepared in 2020. The final report was approved by USEPA in September 2020.

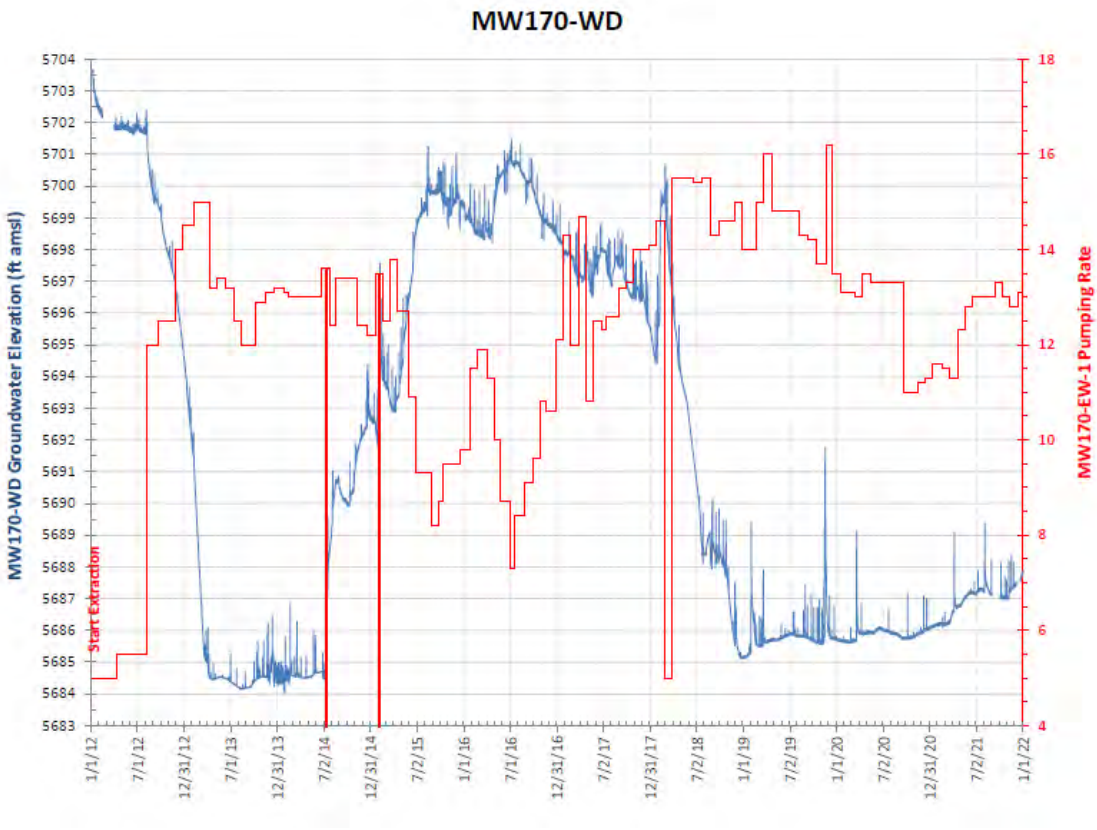
Effectiveness of the MW38 Area, NTES, and North End Response Actions, (EMSI/Parsons, 2021b) at the Site were evaluated as it related to findings and recommendations in USEPA's Fourth 5YRR (USEPA, 2017). Response Action objectives prescribed in work plans and notification documents for the North End are being met by ongoing groundwater extraction from the Response Actions and ongoing monitoring and sampling programs. System optimization is an ongoing component of operations and includes, but is not limited to, maximizing pumping from wells with the highest 1,4-dioxane concentrations; and cyclical pumping from wells whose concentrations meet the performance standard then rebound to above the performance standard.

4.9 GTEP Area Response Actions

Pumping from the GTEP extraction well (MW170-EW-1, Figure 4.33, Area 5) was initiated on January 9, 2012 and continued throughout the reporting period. During this reporting period, the pumping rate ranged between 12.8 gpm and 13.3 gpm, with

approximately 3.4 million gallons pumped during the period. Approximately 64.2 million gallons have been extracted since the start of pumping.

Figures 4.16 and 4.17 show the potentiometric surface configuration of the GTEP area during July and October 2021, respectively. In the center of the GTEP area, groundwater levels at MW170-WD (adjacent to extraction well MW170-EW-1) have been lowered by approximately 16 ft, compared to the January 2012 pre-pumping groundwater elevation of 5703.12 ft amsl. A hydrograph of MW170-WD (below) shows that hydraulic equilibrium was established at a pumping rate of about 13 gpm.



Figures 4.16 and 4.17 indicate that a cone of depression beneath the GTEP area remained throughout the reporting period. The 360-degree capture zone continued to prevent contaminants from migrating toward MW77-WD and MW62-WDR. Pumping rates were sustained during this reporting period.

MW171-WD located along the surface water diversion ditch east of the GTEP area shows a rise of 5 feet in groundwater level in response to March 2021 precipitation events. This well generally has a rapid rise in groundwater levels following precipitation events greater than ¾ of inch. Groundwater level response to is due to location of the well adjacent to diversion ditch, a 4-foot thick fine to very coarse sand interval intersected by the well screen, and surface water present in the diversion ditch. Groundwater levels in MW171-WD generally return to 5700 ft amsl following seasonal reduction of precipitation in the 3rd quarter of each year and does not stabilize until fourth quarter. For these reasons, groundwater level measured at MW171-WD in third quarter of 2021 was not used to interpret the potentiometric surface shown on Figure 4.16 and noted on the figure.

The inferred flow lines on Figure 4.17 indicate inward flow toward extraction well MW170-EW-1 from all directions. This hydraulic condition is meeting the specific response action objective of the RAWP (EMSI, 2011) "…to cease the potential seepage of contaminated groundwater from the sand channel toward well MW77-WD". The 1,4-dioxane concentration at compliance well MW77-WD has steadily decreased from 41 µg/L just prior to GTEP pumping to 11 µg/L on October 27, 2021. Baseline/initial and subsequent analytical results for all GTEP area wells are shown in Table 4.10. These results indicate that groundwater quality within and adjacent to the GTEP sand channel has improved since pumping began.

With regard to MW62-WDR, the well lies within the NBBW zone of containment shown on Figures 4.16 and 4.17. The NBBW CSE (EMSI/CDM/Parsons, 2021) determined that the NBBW effectively contains flow of contaminated groundwater within the alluvium/weathered bedrock groundwater unit. Any residual 1,4-dioxane remaining north of the containment zone will be captured by ongoing Response Action pumping north of the containment zone.

Statistical trend analyses of VOCs, 1,4-dioxane, and nitrate in well MW170-EW-1 are presented in Figure 4.42 and in the table below. 1,1-DCA, 1,1-DCE, 1,4-dioxane, PCE, and TCE showed statistically significant decreasing trends while cis-1,2-dichloroethene (cis-1,2-DCE) is showing an increasing trend; all other analytes were not trending.

Trends in MW170-EW-1

Compound	Trend
1,4-Dioxane	Decreasing
1,1-DCA	Decreasing
1,1-DCE	Decreasing
cis-1,2-DCE	Increasing
TCE	Decreasing
PCE	Decreasing

5.0 LANDFILL GAS REMEDY

The current LFG extraction, collection and treatment system consists of the following components: 64 vertical gas extraction wells (EWs), header and lateral piping, three automatic and nine manual condensate traps, two flares, and the GTEP.

The original system began operation in October 1996. All LFG was treated by the Lowry Blower/Flare (LBF) station, which burned LFG in an enclosed flare. Since then, the system has been expanded to include additional extraction wells in both the Lowry and DADS landfills. Additional treatment devices have also been added to treat the combined gas flows from Lowry and DADS landfills.

The GTEP began operation in July 2008 and is a beneficial use treatment system that uses LFG to produce electricity. The DADS Blower/Flare (DBF) station, installed in 2010, burns LFG in an open flare. It began operation in August 2010.

In March 2015, the Lowry/DADS treatment system was updated with the installation of large capacity candlestick flare, referred to as Flare Station 3 (FS3). At that time, FS3 replaced the LBF station, which is currently decommissioned.

On June 4, 2019 the CDPHE approved a Title V Permit modification request to allow operation of the GTEP, DBF, and FS3 at full capacity, full time. The combined capacity of the three treatment units is approximately 3,800 standard cubic feet per minute (scfm). The modification was necessary to accommodate increasing gas volume generated from the DADS Section 32 landfill. This operational change is a departure from the previous routine of operating the DBF on an as needed basis only.

5.1 LFG Extraction, Collection, and Treatment System Operations

The current LFG extraction, collection and treatment system consists of vertical gas extraction wells and condensate traps and the GTEP and blower/flare stations.

5.1.1 Extraction Wells and Collection System

The Lowry LFG extraction and collection system was monitored monthly (Appendix D-1). Of the sixty-four EWs at Lowry, sixty-one were online and three were shut down due to lack of gas production. Adjustments were made to wellhead valves as needed to compensate for changing methane, oxygen, carbon dioxide, and balance gas levels. Gas temperatures at the extraction wells remained stable during the reporting period with no initial gas temperature exceeding 101 degrees Fahrenheit (°F).

5.1.1.1 Wellhead Vacuums

LFG extraction vacuums were monitored at both the wellhead and the collection system piping. Measurements and adjustments made to maintain system balance were recorded on the LFG Extraction Well Monitoring forms (summarized as Appendix D-1).

5.1.1.2 Wellhead Gas Quality

LFG quality measurements (including methane, carbon dioxide, oxygen, and balance gas [mostly nitrogen]) were collected monthly from the 64 EWs. The overall gas quality remained stable within the well field and at the GTEP, DBF, and FS3 stations, as shown in Appendices D-1 and D-2.

5.1.1.3 Collection Piping

The table below shows the LFG oxygen concentrations measured at the Lowry Header Pipe and at each treatment device during the reporting period.

LFG Oxygen Concentrations (% Volume)			
Sample Point	**Minimum**	**Average**	**Maximum**
Lowry Header Pipe	0.8	2.2	3.5
GTEP	0.1	0.4	0.9
DBF	0.4	0.7	1.2
FS3	0.1	0.5	0.9

Generally, oxygen readings up to 3% indicate integrity of the gas collection network. Monitoring data are provided in Appendices D-2.1 through D-2.4.

5.1.1.4 Condensate Traps

Automatic condensate traps were inspected weekly. Pulse counter and totalizing flow meter readings were recorded on the Weekly Service Records on file at the WTP. Monthly automatic condensate volumes measured at the T505 flow meter in the WTP are summarized below:

Period	Condensate Processed (Gallons)
July	948
August	1,035
September	755
October	1,562
November	666
December	430
Total	**5,396**

The integrity of the automatic traps and conveyance line to the WTP was monitored approximately weekly for volume production and pressure changes. All inspections and testing were documented on WTP checklists and/or in the daily operator logs. Completed checklists are provided in Appendix A-1. No operational problems were observed.

Manual condensate traps were inspected monthly. All manual traps appeared to be collecting condensate. No condensate was removed from the manual traps during the reporting period.

5.1.1.5 Gas Collection System Maintenance

During the reporting period, minor maintenance was performed such as refreshing gas well ID markings.

5.1.2 GTEP and Blower/Flare Stations

During the reporting period, the GTEP, DBF, and FS3 stations provided treatment of extracted LFG. The GTEP, DBF, and FS3 operated for approximately 4,196 hours, 4,087 hours, and 4,180 hours, respectively.

During the reporting period, routine preventive maintenance such as fluid changes and engine overhauls were performed. On July 13, 2021, RKA performed a field calibration of the ABB flow meter at the GTEP. The flow meter was found to be in good working order with only minor adjustments needed to maintain accurate flow readings.

While the DBF and FS3 stations were operating, flare temperature, flow rate, methane content, and maintenance activities were recorded and are discussed below. Similar data were collected for the GTEP in accordance with the *Modified Construction Permit No. 06AR1264* issued by the CDPHE Air Pollution Control Division. Those data are retained at the GTEP and are available for inspection by USEPA and CDPHE.

5.1.2.1 Flare Temperature

While combustion temperature was recorded, DBF and FS3 are open flares and not subject to combustion temperature requirements - only visual presence of a flame.

5.1.2.2 Gas Flow Rate

For the reporting period, the combined average LFG flow from both Lowry and DADS Landfills was approximately 2,729 scfm. The combined average LFG flow was calculated by first summing the volume of LFG consumed by the GTEP, DBF, and FS3 stations. The sum was then divided by the difference between the total time during the reporting period and the total time that no treatment device was operating. Volume data for each treatment device were collected by fixed instruments on the discharge side of the blower or compressor.

The Lowry well field contributed approximately 5.7% of this flow and 94.3% was contributed by the DADS well field, as described in the Daily Status Reports in Appendix D-2.5. For the reporting period, the average flows for Lowry and DADS were 156 and 2,573 scfm, respectively.

5.1.2.3 Methane Content

Methane content at the Lowry Header Pipe and at each treatment device was measured at least twice weekly when the treatment device was operating during regular business hours. The table below shows the LFG methane concentrations measured at the Lowry Header Pipe and at each treatment device during the reporting period.

LFG Methane Concentrations (% Volume)

Sample Point	Minimum	Average	Maximum
Lowry Header Pipe	23.9	28.4	39.4

Sample Point	Minimum	Average	Maximum
GTEP	50.8	53.5	57.4
DBF	32.6	39.2	48.4
FS3	45.7	49.8	55.7

Monitoring data are provided in Appendices D-2.1 through D-2.4.

5.1.2.4 Blower/Flare Station Maintenance

Routine preventive maintenance such as blower rotations and lubrication were performed throughout the reporting period.

5.1.2.5 Additional Reporting Requirements

(1) Value and length of time for exceedance of parameter(s) being monitored. There were no events during the reporting period where vacuum was not observed at an extraction well.

In March 2013, a new operating procedure was approved for EWs-09, -10, and -23 due to oxygen concentrations exceeding 5.0%. The new operating procedure allows the wells to remain fully closed unless a gas concentration of greater than 30% methane and less than 2.0% oxygen are detected. The wells are temporarily opened to collect the gas readings each month. During the reporting period, EWs-09, -10, and -23 remained closed because they did not meet these operating criteria. The wells were turned on only to collect readings.

(2) Description and duration of all periods when the gas stream is diverted from the treatment device through a bypass line or the indication of bypass flow as specified under §60.756. There were no diversions during the reporting period.

(3) Description and duration of all periods when the treatment device was not operating for a period exceeding 1 hour and length of time the treatment device was not operating. There were three occurrence when all treatment devices were simultaneously offline (total system shutdown) for one hour or more during the reporting period.

Treatment Device Shutdown Time

Date	Total Shutdown Time (hours)	Description
9/7/21	5.17	Power interruption
9/6/21	19.58	Power interruption
8/30/21	1.08	Power interruption

(4) All periods when the collection system was not operating in excess of 5 days. There were no periods where the collection system was not operational in excess of 5 days during the reporting period.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in §60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous quarter. This requirement is not applicable to Lowry.

(6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of §60.755. No collection system expansion activities occurred during the reporting period.

5.2 LFG Extraction, Collection, and Treatment System Monitoring

Monitoring activities during the reporting period consisted of collecting gas composition samples at the GTEP, DBF, and FS3 as well as POC probes as discussed in the following subsections.

5.2.1 Flare Sampling

Methane, carbon dioxide, oxygen, and balance gas monitoring at the Lowry header pipe, DBF and FS3 stations was performed at least once weekly during regular business hours while the treatment devices were operating and a technician was available. Results are summarized in Appendices D-2.1 through D-2.4. Monitored parameters were generally within normal historical ranges.

No other gas sampling was performed during the reporting period. No odor evaluation was performed at the flares during the reporting period.

5.2.2 GTEP Inlet Sampling

Methane, carbon dioxide, oxygen, and balance gas monitoring were performed at the GTEP at least twice weekly during regular business hours while the treatment device was operating, and a technician was available. A summary of GTEP monitoring results is provided in Appendix D-2. Monitored parameters were within normal historical ranges.

No inlet gas sampling was performed during the reporting period. No odor evaluation was performed at the GTEP during the reporting period.

5.2.3 GTEP Outlet Sampling

No outlet sampling at the GTEP exhaust was performed during the reporting period.

5.2.4 POC Probe Sampling

POC probe locations are shown in Figure 5.1. The last biennial sampling event for VOCs was performed in May 2021. POC probes were not sampled for VOCs this reporting period.

The POC probes were sampled quarterly for methane (Appendix D-3). All concentrations were below the methane performance standard of 5% by volume.

6.0 STORMWATER

The following subsections discuss performance monitoring of the Surface Water Removal Action (SWRA) and stormwater monitoring.

6.1 Surface Water Removal Action

As discussed in Subsection 4.2.1, the depth to groundwater within the alluvium/weathered Dawson beneath the SWRA (which extends between the NTES and WTP access road) is approximately 10 ft bgs. The SWRA blanket drain typically lies between two and four ft bgs. Consequently, the water table is beneath the base of the SWRA blanket drain, so clogging of the drain is not a concern.

6.2 Stormwater Monitoring

Annual stormwater sampling in accordance with the *Stormwater Monitoring Plan* (EMSI, 2008a) was not performed during the reporting period. Stormwater will be sampled in the next reporting period if sufficient flow is available to activate the stormwater sampler. The stormwater sampling location (SWMP-1) is shown on Figure 6.1.

6.2.1 Sampling

Stormwater sampling was not performed during this reporting period.

6.2.2 Stormwater Discharge Rate

A stormwater discharge rate was not estimated because sampling was not performed during this reporting period.

7.0 COVER MONITORING

Inspection and maintenance of the Site is required by the *Final Operations and Maintenance Manual, Covers and Stormwater* (EMSI, 2007a). Inspections are conducted to identify and repair problems arising from nuisance conditions, settlement, cover or ditch erosion, ditch sedimentation, and damage to security fences and gates. The following sections discuss the Site and buffer zone inspections and maintenance performed during this reporting period.

7.1 Landfill Cover

7.1.1 Site and Landfill Cover Inspection

A Site-wide inspection is required annually and after any event that may cause release of waste material. The following remedial components are inspected:

- The landfill prism;
- The traffic cap covering the East/South/West (ESW) slurry wall;
- The SWRA collection system cover (including surface features of the NTES trench);
- The waste pit area; and
- The stormwater conveyance ditches.

No formal inspections were warranted in the second half of 2021, as the site experienced dry and warm drought conditions during the reporting period. However, some preventive maintenance was performed and is discussed in more detail below. Larger areas of thistle noted on the June 21, 2021 formal cover inspection were treated with herbicide in August 2021.

7.1.2 Landfill Cover Maintenance Activities

Cover maintenance during the second half 2021 was performed to fill shallow areas noted as near flat or possibly low in the form of importing approximately 930 cy of clean topsoil to fill shallow areas with the greatest potential for ponding. Weed mitigation in the form of spot spraying was performed as necessary in accordance with the *Integrated Weed Management Plan for Lowry Landfill Superfund Site and Buffer Properties* (Parsons, 2009).

Due to a noticeable decline in the prairie dog population due to control measures performed in November 2020 in surrounding areas and within Section 6, mitigation was not required during the reporting period.

7.2 Buffer Zones

7.2.1 Buffer Zone Inspections

Formal quarterly inspections of the buffer zones surrounding the Site were conducted in August and November 2021 (Appendices E-2.1 and E-2.2, respectively). Inspections focused on the integrity of security fencing, removal of trash and debris, potential soil erosion, wildlife management, and noxious weed management. Items of concern included areas of damaged barbed wire fencing.

Inspection reports provide photographs of items of concern and their locations on a property map (Appendices E-2.1 and E-2.2).

7.2.2 Buffer Zone Maintenance Activities

Fence repairs in areas of concern were successfully performed during the reporting period.

A noticeable increase in the prairie dog population within the buffer zone property warrants mitigation to resume in the Spring of 2022.

8.0 REMEDIAL ACTION

Remedial actions have been completed for all remedy components except for groundwater, which has received Interim Completion for the groundwater monitoring program. Groundwater monitoring is continuing in accordance with the USEPA-approved GWMP (EMSI/Parsons, 2018).

9.0 PROBLEMS ENCOUNTERED, RECOMMENDATIONS, AND MASTER SCHEDULE

Problems and recommendations associated with ongoing O&M activities are presented in this section, as well as an updated Master Schedule for Site activities and action items associated with USEPA's 2017 5YRR. The master schedule is presented as Figure 9.1.

9.1 Problems Encountered

The status of issues and recommendations identified in USEPA's Fourth Five Year Review is summarized below:

Issue Number	Recommendation	Status
1	Cease potable water injection and evaluate effectiveness of NBBW groundwater extraction system.	WSDs submitted the *Revised Final Report on Pilot Test for Cessation of Potable Water Injection* (EMSI/CDM-Smith, 2020a). USEPA approved the document on June 26, 2020. WSDs submitted the *NBBW Containment System Evaluation* (EMSI/CDM-Smith/Parsons, 2021). USEPA approved the document on October 11, 2021.
2	Increase capacity of WTP.	Completed on February 1, 2019.
3	Evaluate effectiveness of groundwater remedy components on-site and off-site and optimize, as necessary	Effectiveness Evaluations for the MW38 Area, NTES, North End Response Actions, and Perimeter Barrier Wall were prepared during the reporting period. USEPA approval was achieved in January 2021. WSDs submitted the *NBBW Containment System Evaluation* (EMSI/CDM-Smith/Parsons, 2021). USEPA approved the document on October 11, 2021.
4	Sample and analyze four wells located within and immediately adjacent to the 1,4-dioxane plume and implement appropriate remedial actions. Clarify if closure of abandoned wells was performed in accordance with Rule 16 of the 2CCR 402-2. Provide a Work Plan for detailing how potential at-risk-receptors will be	WSDs submitted the *Final Technical Memorandum, Identification and Sampling of Water Supply Wells Within and Immediately Adjacent to Off-Site 1,4-Dioxane Plume* (EMSI, 2020d). USEPA approved the document on June 26, 2020.

Issue Number	Recommendation	Status
	effectively identified and addressed.	
5 and 6	Add 1,4-dioxane to the COC list for groundwater remedy effectiveness monitoring and remove iron from the COC list for groundwater compliance monitoring.	WSDs submitted *Groundwater Monitoring Plan, Revision 2 (*EMSI/Parsons, 2018). USEPA approved the document on September 6, 2018.
7 and 9	Develop an updated map and conceptual site model of the off-site 1,4-dioxane plume. Evaluate need for and scope of additional monitoring and additional institutional controls for the plume area.	WSDs submitted *Technical Memorandum, Updated 1,4-Dioxane Plume Map and North End Conceptual Model, 2017 Five-Year Review Issues #7 and #9* (EMSI/CDM-Smith, 2020c). The memorandum included a Risk Summary prepared by USEPA that concluded the plume posed no unacceptable risk to human health. USEPA approved the document. WSDs also submitted *North End Groundwater Monitoring Plan – Update No.2* (EMSI, 2020b). USEPA approved the document on October 16, 2020. WSDs also submitted *North End Groundwater Monitoring Plan – Update No. 3* (Parsons, 2021b). USEPA approved the document on September 22, 2021. USEPA, with support and concurrence from CDPHE, TCHD, and WSDs, prepared a Conceptual Site Model Update document to augment the response to Item 7. The CSM Update was finalized October 12, 2021. USEPA determined that no additional institutional controls are necessary.
8	Reevaluate subsurface gas performance standards utilizing updated toxicity values and Site-specific input data.	WSDs submitted *Revision 3, Updated Compliance Monitoring Plan, Landfill Gas Remedy* (EMSI, 2018e). USEPA approved the document on August 2, 2018

Thus, as of the end of this reporting period all Fourth FYR issues have been addressed.

During previous reporting periods, WSDs assessed vertical and lateral limits of elevated molybdenum in the B326/MW113 area, determined the source to be naturally-occurring, added a second extraction well to the B-326/MW113 groundwater area so that 1,4-dioxane mass from this area could continue to be removed, and conducted treatability studies to remove molybdenum from MW113-EW-1 water before it enters the main treatment train of the WTP. WSDs prepared *Technical Memorandum – Molybdenum in NBBW Groundwater, Evaluation of Potential Sources of Elevated Molybdenum in Wells MW113-WD and MW113-EW-1* (EMSI/CDM Smith, 2020b) documenting the extent and possible sources of molybdenum. The memorandum concluded that the source was naturally occurring. Monitoring and testing of the molybdenum pretreatment system were performed during the reporting period.

9.2 Recommendations

9.2.1 Recommendations for Slurry Wall Areas

Continue to monitor groundwater levels in all effectiveness monitoring well pairs. For well pairs that do not demonstrate inward gradients across the wall, collect water quality samples from the external well (PM-X series well) to assess the effectiveness of the perimeter slurry wall in these areas.

9.2.2 Recommendations for NTES, NBBW, and MW38 Areas

Continue to pump and treat groundwater from these areas. For the NTES, continue to operate the product skimming system when product thickness greater than six inches is observed in the trench.

For the NBBW area, continue to collect, evaluate, and report potentiometric and water quality data, per the *Final Technical Memorandum: Post-Cessation Pilot Test Monitoring* Plan (EMSI/CDM-Smith, 2020d)

9.2.3 Recommendations for Off-Site North End Response Actions

Continue to optimize ongoing groundwater extraction in off-Site Areas 1, 2, and 3 in accordance with their respective RAWPs. This may include increasing extraction rates, as discussed above.

9.2.4 Recommendations for Sitewide Monitoring Plan – Compliance Monitoring

As discussed in Subsections 4.4.2, eight monitoring locations were found to contain one or more compliance parameters in excess of a performance standard. The eight wells determined to be statistically out of compliance or potentially out of compliance are summarized below.

Well	Compound	Compliance Decision
B-313	1,4-Dioxane	Out of compliance
B-313	Nitrate	Out of compliance
B-326-UD	1,4-Dioxane	Out of compliance
B-326-WD	1,4-Dioxane	Out of compliance
BM-11X-100N	PCE	Potentially Out of compliance
BM-15N6	Nitrate	Potentially Out of compliance

Well	Compound	Compliance Decision
MW38-830N-230E	1,4-Dioxane	Potentially Out of compliance
MW38-830N-230E	Chloroform	Potentially Out of compliance
MW62-WDR	1,4-Dioxane	Potentially Out of compliance
MW62-WDR	Nitrate	Out of compliance
MW62-WDR	Nitrite	Potentially Out of compliance
MW77-WD	1,4-Dioxane	Out of compliance

Recommendations relative to non-compliance with performance standards at these locations are discussed in the following sections.

9.2.4.1 1,4-Dioxane in the NBBW Area

1,4-Dioxane occurs in excess or potentially in excess of its performance standard in five NBBW-area compliance monitoring wells (B-313, B-326-UD, B-326-WD, MW62-WDR, and MW77-WD).

The WSDs will continue to monitor both the 1,4-dioxane concentrations and the water level in these wells and continue to evaluate conditions in this area. Continued pumping from extraction wells MW113-EW-1, NBBW-IW-3, MW113-UD, B-321, MW170-EW-1, and MW-77 area wells is recommended.

With regard to the MW62-WDR area, this well lies within the zone of containment caused by groundwater extraction from the NBBW and Response Actions north and east of the NBBW (see Figures 4.16 and 4.17). Consequently, the exceedances may be a Case 2 condition, which requires only long-term monitoring. As required by the Fourth 5YRR (USEPA, 2017), the WSDs conducted additional evaluations of the effectiveness of the NBBW containment system and the Response Actions in the NBBW area as part of the CSE. That evaluation (EMSI/CDM-Smith/Parsons, 2021) determined that the NBBW effectively contains flow of contaminated groundwater within the alluvium/weathered bedrock groundwater unit. In the meantime, 1,4-dioxane that might have migrated north of the containment zone will be captured by ongoing Response Action pumping north of the containment zone.

9.2.4.2 Nitrate and Nitrite in the NBBW Area

Nitrate is out of compliance in monitoring wells B-313 and MW62-WDR (Figure 4.11). Nitrite is potentially out of compliance in well MW62-WDR. These wells are located along the northern boundary of the Site, in an area where sewage sludge was historically land farmed.

The extent of nitrate and nitrite exceedances has been determined to be limited to the eastern portion of the NBBW area (i.e., in the immediate vicinity of compliance monitoring wells B-313 and MW62-WDR). Therefore, there does not appear to be a potential for significant off-Site migration of nitrate or nitrite at concentrations greater than the performance standard.

To the extent that the nitrate and nitrite occurrences do not result from a source in the immediate vicinity of these wells (i.e., impacts from prior land farming of sewage sludge in this area), implementation of response actions for 1,4-dioxane should also address these compounds in this area. To the extent that the cause of the nitrate and nitrite occurrences in these wells is due to impacts from prior land farming of sewage sludge in this area, the

response actions being undertaken in this area may or may not reduce their concentrations in groundwater. Nonetheless, groundwater extraction from North End wells further downgradient should capture any potential migration of nitrate and nitrite from the NBBW area if northern migration were to occur.

9.2.4.3 MW38-830N-230E

Chloroform and 1,4-dioxane concentrations in monitoring well MW38-830N-230E potentially exceed their respective groundwater performance standards. Decreasing trends in the concentrations of these chemicals were identified in this well. This well is located along the POC at the north end of the MW38 channel. The hydraulic gradient within the channel at this location is to the north so migration of these chemicals crosses the POC. As part of the groundwater containment remedy for the Site, groundwater extraction is conducted from the MW38 channel at two locations, including a location approximately 200 ft north of well MW38-830N-230E, which is downgradient from and beyond the POC relative to the compliance monitoring well. Therefore, although these chemicals may migrate across the POC, impacted groundwater is hydraulically contained within the sand channel in the area immediately north of well MW38-830N-230E. No action other than continued extraction and monitoring of the compliance well is required for these occurrences.

9.2.4.4 Nitrate in BM-15N6

Nitrate occurs in well BM-15N6 at concentrations greater than its performance standard. Statistical testing indicates that there is a decreasing trend in nitrate concentrations in this well. As discussed in Subsection 4.4.2.4 of this report, this well is located in an area where sewage sludge had historically been land-farmed. USEPA positioned the compliance boundary within the land farming area such that it straddles the land farming area. That, coupled with an absence of 1,4-dioxane and only low-level detections of VOCs below performance standards since 2003 in this well, would indicate the source of nitrates is not from landfill mass or waste pit contaminant migration; rather, it is likely from the past land farming activities inside and outside the compliance boundary. Nitrate has been observed in surrounding wells BM-15N2 (43,000 µg/L), BM-15NE1 (26,000 µg/L), BM-15N5 (68,000 µg/L) and BM-15N1 (25,000 µg/L) (1st Half 2017) and BM-15I-15N (54000 µg/L), BM-15I-50S (9,300 µg/L), and BM-15X-50S (38,000 µg/L) (October 2018) The spatial randomness of nitrate detections in and around well BM-15N6 as compared to other compliance wells in this vicinity is similar to that observed near the NBBW where sewage sludge was land farmed.

Because 1) the source of the nitrate occurrences in well BM-15N6 is most likely a result of sewage sludge land farming in this area, 2) groundwater is actively being extracted from this area, and 3) the distance between this well and the Site boundary is approximately 200 feet, the occurrence of nitrate in well BM-15N6 is considered to be a Case 2 condition as defined in the GWMP (EMSI/Parsons, 2018). No action other than continued groundwater monitoring is recommended.

9.2.4.5 Tetrachloroethene in BM-11X-100N

PCE in BM-11X-100N is potentially out of compliance with an increasing trend. The ten most recent PCE concentrations in this well range from a low of 4.6 µg/L in October 2017 to a high of 7.2 µg/L (October 2020) with the most recent sample containing a PCE concentration of 5.4 µg/L (October 28, 2021). PCE levels appeared to slowly increase

from October 2017 to November 2020 but have dropped in the last two sampling events. The variation in PCE concentrations appears to be related to changes in the water level in this well. Prior to the summer of 2015, the water level in this well was relatively stable ranging from approximately 5,790 to 5,795 ft amsl. Beginning in the summer of 2015, the water level in this well increased, peaking at a high of just over 5,800 ft amsl in July 2017. Since that time, the water level in this well has declined back below 5,792 ft amsl. Consequently, it is likely that the increase in PCE levels in this well may be the result of flushing of residual PCE contained in the capillary fringe/vadose zone. If this is the case, then the PCE level in this well should decline over time as evidenced by the drop in concentration of the most recent PCE result from 7.2 µg/L in November 2020 to 5.4 µg/L in October 2021.

The overall low concentration of PCE in well BM-11X-100N, in addition to an inward gradient across the wall at this location, and no or very low PCE detections in groundwater to the north and northeast of the well indicate that the PCE occurrences in this area represent a Case 2 condition (little or no downward trend with a low potential for off-Site migration) as defined in the GWMP (EMSI/Parsons, 2018). The WSDs previously completed a Case 2 evaluation for this well (EMSI, 2006b). Results indicated that it is unlikely that the PCE occurrences above the performance standard in this area will migrate to the Site boundary. Rather, PCE occurrences in this area will likely attenuate naturally over time. Consequently, the recommended action is to continue monitoring.

9.2.5 Recommendations to Voluntary Actions

As discussed in Subsection 4.6 of this report, the following voluntary measures will continue to be implemented by the WSDs during the next reporting period:

1. Continue pumping of the MW38 Area source well (MW38-825S-445E).
2. Continue to operate groundwater extraction systems for gradient control in the PM-11, PM-15, and MW51 areas, as appropriate. In addition, continue to operate air sparging operations in the PM-15 and MW51 areas.
3. Continue to skim LNAPL from the surface of groundwater in the NTES trench, if present.
4. Continue to optimize removal of 1,4-dioxane within the WTP.

9.3 Schedule of Planned Activities

See Figure 9.1 Master Schedule for an update of planned activities. Please note that the timelines and milestone list in Gantt chart for the 5YRR are subject to change based on agency review timeframes and level of effort needed to respond to agency comments. The schedule reflects USEPA-approved revised 5YRR milestone dates.

10.0 REFERENCES

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TABLE 2.1
WATER TREATMENT PLANT SAMPLING SCHEDULE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

	MP-001 (WTP Effluent)					Early Warning Influent (grab) TP-110, TP-120, TP-140, TP-150, TP-160, TP-170, TP3310	Early Warning Influent (grab) TP-110, TP-120, TP-140, TP-150, TP-160, TP-170, TP3310	Early Warning Influent (grab) TP-110, TP-120, TP-140, TP-150, TP-160, TP-170, TP3310	Early Warning Influent (composite)
Sampling Date	**Monthly 24-Hour Grabs[a/]**	**Monthly Composite[b/]**	**Quarterly 24-Hour Grabs[a/]**	**Quarterly Composite[a/]**	**Yearly Composite[a/]**	**Monthly**	**Quarterly[c/]**	**Yearly**	**Yearly[d/]**
July 6, 7 2021	X		X	X		X	X		
August 2, 3 2021	X	X				X			
September 7, 8 2021	X	X				X			
October 4, 5 2021	X		X	X		X	X		
November 2, 3 2021	X	X				X			
December 6, 7 2021	X	X				X			
January 2022	X		X	X		X	X		
February 2022	X	X				X			
March 2022	X	X				X			
April 2022	X		X	X	X	X	X	X	X
May 2022	X	X				X			
June 2022	X	X				X			
Analytical Methods	1,4-Dioxane (8260 SIM) pH (pH-740 one time at start of 24 hours)	Molybdenum (200.8)	VOCs (EPA 624.1) Nonylphenols, Total (ASTM D7065_11)	SVOCs (EPA 625.1) Metals[e/] (200.7, 200.8) Gross alpha/beta Plutonium-238,239,240 Americium-241 Radium - 226,228,Total	Metals[e/] (200.7, 200.8) Mercury (245.1)	1,4-Dioxane (8260 SIM) Molybdenum (200.8)	VOCs (EPA 624.1)	Nonylphenols Total (ASTM D7065_11)	SVOCs (EPA 625.1) Metals[f/] (200.7, 200.8) Mercury (7470) Gross alpha/beta Americium-241 Plutonium-238,239,240 Radium - 226,228,Total

a/ Individual compounds and frequency are listed in Industrial Discharge Permit No. 2360-6, issued by the Metro Wastewater Reclamation District (Metro), effective January 5, 2020 to January 4, 2025

b/ monthly sampling of molybdenum performed for performance monitoring, not required by the Discharge Permit

c/ equivalent to MP-001 VOC quarterly list

d/ equivalent to MP-001 yearly list

e/ Quarterly Metals - Molybdenum, Zinc and Selenium

f/ Yearly Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Nickel and Silver

TABLE 4.1
SUMMARY OF DRILLING ACTIVITIES COMPLETED
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well/Boring ID	Date of Installation	Date Abandoned	Type[a/] of Well/Boring	Northing[b/]	Easting[b/]	Ground Surface Elevation	Measuring Point Elevation	Screened Interval	Total Depth
				(feet)	(feet)	(ft NGVD)[c/]	(ft NGVD)	(ft bgs)[d/]	(ft bgs)
Installed Wells									
None									
Abandoned Wells									
None									

a/ Type: BH = borehole, MW = monitoring well, TMW = temporary monitoring well, PZ = piezometer, EW = extraction well, MPE = multiphase extraction well

b/ Locations referenced to Modified State Plane Coordinate System (in feet).

c/ ft NGVD = elevation (in feet) referenced to the National Geodetic Vertical Datum of 1929.

d/ ft bgs = feet below ground surface.

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
A-102	7/8/2021	5,703.43	20.18	17.59	5,723.61	2.59	10.4-30.3	35	32	ALLUVIUM/WD
A-102	10/4/2021	5,703.42	20.19	17.6	5,723.61	2.59	10.4-30.3	35	32	ALLUVIUM/WD
A-115	7/7/2021	5,697.26	13.49	11.27	5,710.75	2.22	6.9-13.5	21	NE[f/], >21	ALLUVIUM/WD
A-115	10/4/2021	5,696.60	14.15	11.93	5,710.75	2.22	6.9-13.5	21	NE, >21	ALLUVIUM/WD
B-215-WD	7/7/2021	5,702.04	33.88	31.46	5,735.92	2.42	34-36	39	36.5	WD
B-215-WD	10/4/2021	5,701.99	33.93	31.51	5,735.92	2.42	34-36	39	36.5	WD
B-304	7/7/2021	5,699.20	27.59	27	5,726.79	0.59	24-34	39	37	WD
B-304	10/4/2021	5,697.00	29.79	29.2	5,726.79	0.59	24-34	39	37	WD
B-304-UD	7/7/2021	5,688.91	39.73	37.59	5,728.64	2.14	58-78	80	36.5	UNWD
B-304-UD	10/4/2021	5,687.91	40.73	38.59	5,728.64	2.14	58-78	80	36.5	UNWD
B-305R	7/7/2021	5,691.83	32.9	30.47	5,724.73	2.43	28-38	41	27	UNWD
B-305R	10/4/2021	5,691.76	32.97	30.54	5,724.73	2.43	28-38	41	27	UNWD
B-305WD	7/7/2021	Dry	Dry	Dry	5,723.77	1.87	13-23	28	23	WD
B-305WD	10/4/2021	Dry	Dry	Dry	5,723.77	1.87	13-23	28	23	WD
B-306	7/8/2021	5,690.82	18.75	15.88	5,709.57	2.87	28.5-38.5	43.5	22	UNWD
B-306	10/4/2021	5,690.23	19.34	16.47	5,709.57	2.87	28.5-38.5	43.5	22	UNWD
B-307	7/8/2021	Dry	Dry	Dry	5,708.83	1.34	15-20	22	NE, >22	WD
B-307	10/4/2021	Dry	Dry	Dry	5,708.83	1.34	15-20	22	NE, >22	WD
B-308	7/7/2021	5,693.70	28.86	26.8	5,722.56	2.06	23-33	37	33	WD
B-308	10/4/2021	5,692.74	29.82	27.76	5,722.56	2.06	23-33	37	33	WD
B-309	7/7/2021	5,687.02	29.39	26.48	5,716.41	2.91	17-27	31	26.5	WD
B-309	10/4/2021	5,687.02	29.39	26.48	5,716.41	2.91	17-27	31	26.5	WD
B-310	7/7/2021	5,687.33	29.82	27.47	5,717.15	2.35	21.5-31.5	34	31.3	WD
B-310	10/4/2021	5,687.53	29.62	27.27	5,717.15	2.35	21.5-31.5	34	31.3	WD
B-311	7/8/2021	Dry	Dry	Dry	5,718.56	2.66	18-23	25.7	23	WD
B-311	10/4/2021	Dry	Dry	Dry	5,718.56	2.66	18-23	25.7	23	WD
B-312	7/8/2021	Dry	Dry	Dry	5,711.24	2.64	21-31	35	31	WD
B-312	10/4/2021	Dry	Dry	Dry	5,711.24	2.64	21-31	35	31	WD
B-313	7/7/2021	5,691.88	24.04	21.52	5,715.92	2.52	20-27	30.1	26.5	WD
B-313	10/4/2021	5,689.53	26.39	23.87	5,715.92	2.52	20-27	30.1	26.5	WD
B-313-UD	7/7/2021	5,682.83	32.62	29.97	5,715.45	2.65	48-63	65	27	UNWD
B-313-UD	10/4/2021	5,681.71	33.74	31.09	5,715.45	2.65	48-63	65	27	UNWD
B-314	7/8/2021	5,696.45	45.68	43.15	5,742.13	2.53	32.5-47.5	51	47.5	WD
B-314	10/4/2021	5,696.45	45.68	43.15	5,742.13	2.53	32.5-47.5	51	47.5	WD
B-314-UD	7/8/2021	5,689.76	52.24	49.84	5,742.00	2.40	67-87	89	48.5	UNWD
B-314-UD	10/4/2021	5,689.08	52.92	50.52	5,742.00	2.40	67-87	89	48.5	UNWD
B-315	7/8/2021	5,697.16	40.8	38.24	5,737.96	2.56	28-43	46	43	WD
B-315	10/4/2021	5,697.01	40.95	38.39	5,737.96	2.56	28-43	46	43	WD
B-316	7/7/2021	5,696.08	22.58	20.02	5,718.66	2.56	20.5-30.5	34	30.5	WD
B-316	10/4/2021	5,695.84	22.82	20.26	5,718.66	2.56	20.5-30.5	34	30.5	WD
B-316-UD	7/7/2021	5,691.20	27.64	25.4	5,718.84	2.24	41-56	59	33	UNWD
B-316-UD	10/4/2021	5,691.43	27.41	25.17	5,718.84	2.24	41-56	59	33	UNWD
B-317	7/7/2021	5,689.79	21.03	18.51	5,710.82	2.52	18-24	28.1	24	WD
B-317	10/4/2021	5,690.34	20.48	17.96	5,710.82	2.52	18-24	28.1	24	WD
B-317-UD	7/7/2021	5,691.52	18.41	16.58	5,709.93	1.83	37-52	54.5	23.5	UNWD
B-317-UD	10/4/2021	5,691.01	18.92	17.09	5,709.93	1.83	37-52	54.5	23.5	UNWD
B-318	7/7/2021	Dry	Dry	Dry	5,728.49	2.59	18-25	28	25	WD
B-318	10/4/2021	Dry	Dry	Dry	5,728.49	2.59	18-25	28	25	WD
B-319	7/8/2021	5,670.26	43.14	40.22	5,713.40	2.80	21.5-41.5	44.1	42	WD
B-319	10/4/2021	Dry	Dry	Dry	5,713.40	2.80	21.5-41.5	44.1	42	WD
B-319-25S	7/8/2021	Dry	Dry	Dry	5,712.73	2.23	14-24	24	NE, >24	WD
B-319-25S	10/4/2021	Dry	Dry	Dry	5,712.73	2.23	14-24	24	NE, >24	WD
B-319-26W	7/8/2021	Dry	Dry	Dry	5,712.60	2.60	12.4-22.4	22.4	NE, >22.4	WD
B-319-26W	10/4/2021	Dry	Dry	Dry	5,712.60	2.60	12.4-22.4	22.4	NE, >22.4	WD
B-319-50S	7/8/2021	Dry	Dry	Dry	5,713.85	2.55	14-24	24	NE, >24	WD
B-319-50S	10/4/2021	Dry	Dry	Dry	5,713.85	2.55	14-24	24	NE, >24	WD
B-319-50W	7/8/2021	Dry	Dry	Dry	5,711.78	2.28	14-24	24	NE, >24	WD
B-319-50W	10/4/2021	Dry	Dry	Dry	5,711.78	2.28	14-24	24	NE, >24	WD
B-319-75S	7/8/2021	Dry	Dry	Dry	5,714.00	2.00	14-24	24	NE, >24	WD
B-319-75S	10/4/2021	Dry	Dry	Dry	5,714.00	2.00	14-24	24	NE, >24	WD
B-320	7/7/2021	5,695.13	27.89	25.47	5,723.02	2.42	19-34	38.5	34	WD
B-320	10/4/2021	5,693.64	29.38	26.96	5,723.02	2.42	19-34	38.5	34	WD
B-321	7/8/2021	5,686.47	26.42	24.63	5,712.89	1.79	12-27	30.5	27	WD
B-321	10/4/2021	5,686.27	26.62	24.83	5,712.89	1.79	12-27	30.5	27	WD
B-322	7/7/2021	5,688.43	31.51	28.73	5,719.94	2.78	15-30	33.5	30	WD
B-322	10/4/2021	5,688.35	31.59	28.81	5,719.94	2.78	15-30	33.5	30	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
B-323-WD	7/7/2021	Dry	Dry	Dry	5,732.01	2.01	23-33	35	33	WD
B-323-WD	10/4/2021	Dry	Dry	Dry	5,732.01	2.01	23-33	35	33	WD
B-324-WD	7/8/2021	5,703.83	31.18	27.67	5,735.01	3.51	28.5-43.5	46	43.5	WD
B-324-WD	10/4/2021	5,701.72	33.29	29.78	5,735.01	3.51	28.5-43.5	46	43.5	WD
B-325-WD	7/7/2021	5,696.17	37.79	35.13	5,733.96	2.66	29.5-39.5	43	39.5	WD
B-325-WD	10/4/2021	5,696.15	37.81	35.15	5,733.96	2.66	29.5-39.5	43	39.5	WD
B-326-UD	7/8/2021	5,672.35	42.11	39.45	5,714.46	2.66	60-80	83	48.5	UNWD
B-326-UD	10/4/2021	5,669.54	44.92	42.26	5,714.46	2.66	60-80	83	48.5	UNWD
B-326-WD	7/8/2021	5,670.17	43.41	41.23	5,713.58	2.18	24-49	51	49	WD
B-326-WD	10/4/2021	5,666.31	47.27	45.09	5,713.58	2.18	24-49	51	49	WD
B-327-UD	7/7/2021	5,692.79	30.74	28.71	5,723.53	2.03	50-65	67	19	UNWD
B-327-UD	10/4/2021	5,692.08	31.45	29.42	5,723.53	2.03	50-65	67	19	UNWD
B-327-WD	7/7/2021	5,697.30	26.09	23.6	5,723.39	2.49	18-28	30	28	WD
B-327-WD	10/4/2021	5,695.68	27.71	25.22	5,723.39	2.49	18-28	30	28	WD
B-502	7/15/2021	5,748.98	30.74	26.92	5,779.72	3.82	95-105	120	23	UNWD
B-502	10/11/2021	5,748.70	31.02	27.2	5,779.72	3.82	95-105	120	23	UNWD
B-504A	7/15/2021	5,717.53	34.65	34.27	5,752.18	0.38	105-125	126.5	36	UPPER DENVER
B-504A	10/11/2021	5,717.34	34.84	34.46	5,752.18	0.38	105-125	126.5	36	UPPER DENVER
B-506	7/6/2021	5,687.17	146.22	143.83	5,833.39	2.39	310-350	355	55	LIGNITE
B-506	10/1/2021	5,686.94	146.45	144.06	5,833.39	2.39	310-350	355	55	LIGNITE
B-518	7/9/2021	5,759.38	38.36	36.02	5,797.74	2.34	75-95	100	50	UNWD
B-518	10/5/2021	5,759.15	38.59	36.25	5,797.74	2.34	75-95	100	50	UNWD
B-519	7/8/2021	5,808.85	18.29	18.15	5,827.14	0.14	60-80	85	50	UNWD
B-519	10/1/2021	5,807.99	19.15	19.01	5,827.14	0.14	60-80	85	50	UNWD
B-520	7/8/2021	5,762.43	63.66	61.77	5,826.09	1.89	125-145	155	50	UPPER DENVER
B-520	10/1/2021	5,762.19	63.9	62.01	5,826.09	1.89	125-145	155	50	UPPER DENVER
B-706	7/21/2021	5,785.40	78.84	76.1	5,864.24	2.74	105-115	115	87.6	UNWD
B-706	10/1/2021	5,785.33	78.91	76.17	5,864.24	2.74	105-115	115	87.6	UNWD
B-708	7/8/2021	5,774.10	91.91	88.9	5,866.01	3.01	122-132	132	101	UNWD
B-708	10/1/2021	5,774.02	91.99	88.98	5,866.01	3.01	122-132	132	101	UNWD
B-712-25S-UD	7/15/2021	5,748.25	25.53	22.65	5,773.78	2.88	65-80	82	35.5	UNWD
B-712-25S-UD	10/11/2021	5,748.04	25.74	22.86	5,773.78	2.88	65-80	82	35.5	UNWD
B-712-LD	7/15/2021	5,741.42	31.44	28.98	5,772.86	2.46	100-115	119	36.5	UNWD
B-712-LD	10/11/2021	5,741.32	31.54	29.08	5,772.86	2.46	100-115	119	36.5	UNWD
B-712-UD	7/15/2021	5,747.92	24.62	22.38	5,772.54	2.24	56.5-71.5	74	36	UNWD
B-712-UD	10/11/2021	5,747.72	24.82	22.58	5,772.54	2.24	56.5-71.5	74	36	UNWD
BKGD-1WD	7/12/2021	5,842.85	32.33	30.1	5,875.18	2.23	44.5-54.5	55	54	WD
BKGD-1WD	10/8/2021	5,842.45	32.73	30.5	5,875.18	2.23	44.5-54.5	55	54	WD
BKGD-2UD	7/12/2021	5,801.49	50.01	48.06	5,851.50	1.95	58-68	68.5	47.6	UNWD
BKGD-2UD	10/8/2021	5,801.40	50.1	48.15	5,851.50	1.95	58-68	68.5	47.6	UNWD
BKGD-2WD	7/12/2021	5,840.28	11.14	9.24	5,851.42	1.90	33.6-48.6	48.6	47.6	WD
BKGD-2WD	10/8/2021	5,841.49	9.93	8.03	5,851.42	1.90	33.6-48.6	48.6	47.6	WD
BKGD-3UD	7/12/2021	5,785.54	56.63	54.57	5,842.17	2.06	94-104	105	70	UNWD
BKGD-3UD	10/8/2021	5,785.70	56.47	54.41	5,842.17	2.06	94-104	105	70	UNWD
BKGD-3WD	7/12/2021	5,785.08	57.5	54.57	5,842.58	2.93	55.5-70.5	71	70	WD
BKGD-3WD	10/8/2021	5,785.28	57.3	54.37	5,842.58	2.93	55.5-70.5	71	70	WD
BKGD-4UD	7/12/2021	5,822.65	29.05	26.99	5,851.70	2.06	60-75	75	30	UNWD
BKGD-4UD	10/8/2021	5,822.71	28.99	26.93	5,851.70	2.06	60-75	75	30	UNWD
BKGD-4WD	7/12/2021	5,832.56	19.33	17.08	5,851.89	2.25	21-30	31	30	WD
BKGD-4WD	10/8/2021	5,832.69	19.2	16.95	5,851.89	2.25	21-30	31	30	WD
BM-11I-100N	7/9/2021	5,773.92	43.26	40.26	5,817.18	3.00	18.5-50.5	56	50.5	WD
BM-11I-100N	10/5/2021	5,773.74	43.44	40.44	5,817.18	3.00	18.5-50.5	56	50.5	WD
BM-11I-100S	7/9/2021	5,797.50	24.73	22.23	5,822.23	2.50	19.2-51.2	57	51.2	WD
BM-11I-100S	10/5/2021	5,797.47	24.76	22.26	5,822.23	2.50	19.2-51.2	57	51.2	WD
BM-11I-150N	7/9/2021	5,790.13	25.78	23.67	5,815.91	2.11	17.5-47.5	54	46.5	WD
BM-11I-150N	10/5/2021	5,790.04	25.87	23.76	5,815.91	2.11	17.5-47.5	54	46.5	WD
BM-11I-200N	7/9/2021	5,790.82	24.13	21.54	5,814.95	2.59	19-44	49	44	WD
BM-11I-200N	10/5/2021	5,790.76	24.19	21.6	5,814.95	2.59	19-44	49	44	WD
BM-11I-50N	7/9/2021	5,792.24	26.75	23.75	5,818.99	3.00	17.5-47.5	53	47.5	WD
BM-11I-50N	10/5/2021	5,792.16	26.83	23.83	5,818.99	3.00	17.5-47.5	53	47.5	WD
BM-11I-50S	7/9/2021	5,794.65	26.91	23.91	5,821.56	3.00	18-48	53	47.7	WD
BM-11I-50S	10/5/2021	5,794.57	26.99	23.99	5,821.56	3.00	18-48	53	47.7	WD
BM-11X-100N	7/9/2021	5,792.73	22.78	20.28	5,815.51	2.50	19-46	50	46	WD
BM-11X-100N	10/5/2021	5,792.20	23.31	20.81	5,815.51	2.50	19-46	50	46	WD
BM-11X-100S	7/9/2021	5,805.15	14.6	12.1	5,819.75	2.50	18.5-48.5	53	47.5	WD
BM-11X-100S	10/5/2021	5,804.07	15.68	13.18	5,819.75	2.50	18.5-48.5	53	47.5	WD

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LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
BM-11X-150N	7/9/2021	5,792.30	22.16	19.75	5,814.46	2.41	19.5-44.5	49.5	44.5	WD
BM-11X-150N	10/5/2021	5,791.86	22.6	20.19	5,814.46	2.41	19.5-44.5	49.5	44.5	WD
BM-11X-200N	7/9/2021	5,791.90	21.09	18.65	5,812.99	2.44	19.5-44.5	50.5	44.5	WD
BM-11X-200N	10/5/2021	5,791.54	21.45	19.01	5,812.99	2.44	19.5-44.5	50.5	44.5	WD
BM-11X-50N	7/9/2021	5,795.17	22.11	19.61	5,817.28	2.50	17-47	50	47.5	WD
BM-11X-50N	10/5/2021	5,794.52	22.76	20.26	5,817.28	2.50	17-47	50	47.5	WD
BM-11X-50S	7/9/2021	5,804.16	15.08	12.58	5,819.24	2.50	19-46	50	44.5	WD
BM-11X-50S	10/5/2021	5,802.94	16.3	13.8	5,819.24	2.50	19-46	50	44.5	WD
BM-15E1	7/9/2021	5,731.51	33.44	31.86	5,764.95	1.58	20-40	45	40	WD
BM-15E1	10/5/2021	5,731.86	33.09	31.51	5,764.95	1.58	20-40	45	40	WD
BM-15E2	7/9/2021	5,731.33	36.4	34.07	5,767.73	2.33	31-43	46.8	43	WD
BM-15E2	10/5/2021	5,731.44	36.29	33.96	5,767.73	2.33	31-43	46.8	43	WD
BM-15E3	7/9/2021	5,731.33	37.82	35.27	5,769.15	2.55	31.5-46.5	49.6	46.7	WD
BM-15E3	10/5/2021	5,731.42	37.73	35.18	5,769.15	2.55	31.5-46.5	49.6	46.7	WD
BM-15E4	7/9/2021	5,736.11	36.08	33.39	5,772.19	2.69	34-49	54	49	WD
BM-15E4	10/5/2021	5,736.31	35.88	33.19	5,772.19	2.69	34-49	54	49	WD
BM-15E5	7/9/2021	5,737.60	32.97	30.2	5,770.57	2.77	31.5-46.5	53	46.5	WD
BM-15E5	10/5/2021	5,736.93	33.64	30.87	5,770.57	2.77	31.5-46.5	53	46.5	WD
BM-15E6	7/9/2021	5,737.56	35.56	32.74	5,773.12	2.82	29.5-49.5	52.7	49.5	WD
BM-15E6	10/5/2021	5,737.84	35.28	32.46	5,773.12	2.82	29.5-49.5	52.7	49.5	WD
BM-15I-100S	7/9/2021	5,725.99	52.56	49.2	5,778.55	3.36	19-51	56.8	50.8	WD
BM-15I-100S	10/5/2021	5,725.57	52.98	49.62	5,778.55	3.36	19-51	56.8	50.8	WD
BM-15I-125S	7/9/2021	5,739.26	39.39	37.28	5,778.65	2.11	19.5-50.5	53	49.8	WD
BM-15I-125S	10/5/2021	5,739.21	39.44	37.33	5,778.65	2.11	19.5-50.5	53	49.8	WD
BM-15I-150S	7/9/2021	5,725.57	54.78	51.55	5,780.35	3.23	20.5-50.5	55.5	50.5	WD
BM-15I-150S	10/5/2021	5,725.21	55.14	51.91	5,780.35	3.23	20.5-50.5	55.5	50.5	WD
BM-15I-15N	7/9/2021	5,725.22	50.27	47.48	5,775.49	2.79	17-47	52	47	WD
BM-15I-15N	10/5/2021	5,725.02	50.47	47.68	5,775.49	2.79	17-47	52	47	WD
BM-15I-175S	7/9/2021	5,741.33	39.34	37.48	5,780.67	1.86	19-51	55	50.8	WD
BM-15I-175S	10/5/2021	5,741.19	39.48	37.62	5,780.67	1.86	19-51	55	50.8	WD
BM-15I-200S	7/9/2021	5,745.49	36.17	33.9	5,781.66	2.27	20-50	55.5	48.2	WD
BM-15I-200S	10/5/2021	5,745.34	36.32	34.05	5,781.66	2.27	20-50	55.5	48.2	WD
BM-15I-25S	7/9/2021	5,720.97	56.59	52.73	5,777.56	3.86	21-51	56	52	WD
BM-15I-25S	10/5/2021	5,720.40	57.16	53.3	5,777.56	3.86	21-51	56	52	WD
BM-15I-37.5S	7/9/2021	5,723.05	52.63	50.25	5,775.68	2.38	24-54	59	54	WD
BM-15I-37.5S	10/5/2021	5,723.04	52.64	50.26	5,775.68	2.38	24-54	59	54	WD
BM-15I-50S	7/9/2021	5,723.76	53.73	50.37	5,777.49	3.36	17.7-52.7	59	53	WD
BM-15I-50S	10/5/2021	5,723.62	53.87	50.51	5,777.49	3.36	17.7-52.7	59	53	WD
BM-15I-75S	7/9/2021	5,738.09	38.86	37.42	5,776.95	1.44	19-51	55	51	WD
BM-15I-75S	10/5/2021	5,738.05	38.9	37.46	5,776.95	1.44	19-51	55	51	WD
BM-15N1	7/9/2021	5,736.95	34.13	32.25	5,771.08	1.88	22.3-52.3	60	52.3	WD
BM-15N1	10/5/2021	5,736.66	34.42	32.54	5,771.08	1.88	22.3-52.3	60	52.3	WD
BM-15N2	7/9/2021	5,743.72	25.94	23.47	5,769.66	2.47	19-39	45	39.2	WD
BM-15N2	10/5/2021	5,739.21	30.45	27.98	5,769.66	2.47	19-39	45	39.2	WD
BM-15N3	7/9/2021	5,741.61	24.97	22.57	5,766.58	2.40	19.5-39.5	45	39.5	WD
BM-15N3	10/5/2021	5,738.70	27.88	25.48	5,766.58	2.40	19.5-39.5	45	39.5	WD
BM-15N4	7/9/2021	5,734.79	30.77	28.06	5,765.56	2.71	17-37	44	37	WD
BM-15N4	10/5/2021	5,735.50	30.06	27.35	5,765.56	2.71	17-37	44	37	WD
BM-15N5	7/9/2021	5,735.98	36.72	34.42	5,772.70	2.30	31-56	62	56	WD
BM-15N5	10/5/2021	5,736.00	36.7	34.4	5,772.70	2.30	31-56	62	56	WD
BM-15N6	7/9/2021	5,737.37	35.22	30.63	5,772.59	4.59	16-46	51	47	WD
BM-15N6	10/5/2021	5,737.42	35.17	30.58	5,772.59	4.59	16-46	51	47	WD
BM-15NE1	7/9/2021	5,730.38	33.82	31.32	5,764.20	2.50	17.5-42.5	45	42.5	WD
BM-15NE1	10/5/2021	5,730.27	33.93	31.43	5,764.20	2.50	17.5-42.5	45	42.5	WD
BM-15NE2	7/9/2021	5,729.82	31.79	30.17	5,761.61	1.62	19-39	42.8	39	WD
BM-15NE2	10/5/2021	5,729.59	32.02	30.4	5,761.61	1.62	19-39	42.8	39	WD
BM-15NW1	7/9/2021	5,752.72	19.84	18.52	5,772.56	1.32	12-22	47	43.8	WD
BM-15NW1	10/5/2021	5,753.02	19.54	18.22	5,772.56	1.32	12-22	47	43.8	WD
BM-15NW2	7/9/2021	5,752.59	20.58	17.28	5,773.17	3.30	22-32	34.5	NE, >34.5	WD
BM-15NW2	10/5/2021	5,752.70	20.47	17.17	5,773.17	3.30	22-32	34.5	NE, >34.5	WD
BM-15X-100S	7/9/2021	5,738.47	37.38	34.88	5,775.85	2.50	18.5-52.5	55	52.6	WD
BM-15X-100S	10/5/2021	5,738.26	37.59	35.09	5,775.85	2.50	18.5-52.5	55	52.6	WD
BM-15X-125S	7/9/2021	5,739.10	37.65	35.56	5,776.75	2.09	19-50	55	49.9	WD
BM-15X-125S	10/5/2021	5,739.16	37.59	35.5	5,776.75	2.09	19-50	55	49.9	WD
BM-15X-150S	7/9/2021	5,739.95	37.69	35.19	5,777.64	2.50	20-50	54	50	WD
BM-15X-150S	10/5/2021	5,739.94	37.7	35.2	5,777.64	2.50	20-50	54	50	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
BM-15X-175S	7/9/2021	5,742.23	36.72	34.63	5,778.95	2.09	19-50	53	49.9	WD
BM-15X-175S	10/5/2021	5,741.99	36.96	34.87	5,778.95	2.09	19-50	53	49.9	WD
BM-15X-200S	7/9/2021	5,743.81	36.51	34.03	5,780.32	2.48	19.5-51.5	54.5	51.5	WD
BM-15X-200S	10/5/2021	5,743.44	36.88	34.4	5,780.32	2.48	19.5-51.5	54.5	51.5	WD
BM-15X-37.5S	7/9/2021	5,736.01	38.51	35.89	5,774.52	2.62	25-55	60	55	WD
BM-15X-37.5S	10/5/2021	5,736.37	38.15	35.53	5,774.52	2.62	25-55	60	55	WD
BM-15X-50S	7/9/2021	5,737.21	37.4	34.9	5,774.61	2.50	19-51	54	51.4	WD
BM-15X-50S	10/5/2021	5,737.66	36.95	34.45	5,774.61	2.50	19-51	54	51.4	WD
BM-15X-75S	7/9/2021	5,738.11	36.23	34.53	5,774.34	1.70	19-51	55	51	WD
BM-15X-75S	10/5/2021	5,738.44	35.9	34.2	5,774.34	1.70	19-51	55	51	WD
BM-4I-100N	7/6/2021	5,793.11	43.28	40.53	5,836.39	2.75	34-54	60	53.7	WD
BM-4I-100N	10/1/2021	5,792.98	43.41	40.66	5,836.39	2.75	34-54	60	53.7	WD
BM-4I-100S	7/6/2021	5,793.51	43.05	40.69	5,836.56	2.36	34-49	55	48.6	WD
BM-4I-100S	10/1/2021	5,793.48	43.08	40.72	5,836.56	2.36	34-49	55	48.6	WD
BM-4I-10S	7/6/2021	5,793.30	43.06	40.8	5,836.36	2.26	34-54	59.5	53.5	WD
BM-4I-10S	10/1/2021	5,793.26	43.1	40.84	5,836.36	2.26	34-54	59.5	53.5	WD
BM-4I-50N	7/6/2021	5,793.34	42.63	39.93	5,835.97	2.70	32-47	52.5	46.8	WD
BM-4I-50N	10/1/2021	5,793.24	42.73	40.03	5,835.97	2.70	32-47	52.5	46.8	WD
BM-4I-50S	7/6/2021	5,793.22	44.11	41.08	5,837.33	3.03	30.5-50.5	56	50.2	WD
BM-4I-50S	10/1/2021	5,793.15	44.18	41.15	5,837.33	3.03	30.5-50.5	56	50.2	WD
BM-4X-100N	7/6/2021	5,793.74	42.35	39.63	5,836.09	2.72	31-51	54	50.6	WD
BM-4X-100N	10/1/2021	5,793.69	42.4	39.68	5,836.09	2.72	31-51	54	50.6	WD
BM-4X-100S	7/6/2021	5,793.12	43.56	41.55	5,836.68	2.01	34-49	53	48.7	WD
BM-4X-100S	10/1/2021	5,793.27	43.41	41.4	5,836.68	2.01	34-49	53	48.7	WD
BM-4X-10S	7/6/2021	5,793.18	43.59	41.12	5,836.77	2.47	33.5-56.5	59	56.3	WD
BM-4X-10S	10/1/2021	5,793.16	43.61	41.14	5,836.77	2.47	33.5-56.5	59	56.3	WD
BM-4X-40S	7/6/2021	5,785.95	50.72	48.35	5,836.67	2.37	68-83	87	52	UNWD
BM-4X-40S	10/1/2021	5,785.94	50.73	48.36	5,836.67	2.37	68-83	87	52	UNWD
BM-4X-50N	7/6/2021	5,793.35	43.1	40.28	5,836.45	2.82	34-49	54	49	WD
BM-4X-50N	10/1/2021	5,793.28	43.17	40.35	5,836.45	2.82	34-49	54	49	WD
BM-4X-50S	7/6/2021	5,793.53	43.59	40.97	5,837.12	2.62	32.5-52.5	55	52.5	WD
BM-4X-50S	10/1/2021	5,793.52	43.6	40.98	5,837.12	2.62	32.5-52.5	55	52.5	WD
BW-PZ-1	7/7/2021	5,692.87	31.6	29.44	5,724.47	2.16	23-33	33	33	WD
BW-PZ-1	10/4/2021	5,692.86	31.61	29.45	5,724.47	2.16	23-33	33	33	WD
BW-PZ-1LC	7/7/2021	5,689.20	35.98	33.55	5,725.18	2.43	43-53	53	33	UNWD
BW-PZ-1LC	10/4/2021	5,688.64	36.54	34.11	5,725.18	2.43	43-53	53	33	UNWD
C-702P1	7/15/2021	5,688.67	41.71	39.33	5,730.38	2.38	196-201	237	31.5	UPPER DENVER
C-702P1	10/11/2021	5,688.44	41.94	39.56	5,730.38	2.38	196-201	237	31.5	UPPER DENVER
C-702P3	7/15/2021	5,711.89	17.48	15.21	5,729.37	2.27	90-100	102	60	UPPER DENVER
C-702P3	10/11/2021	5,711.83	17.54	15.27	5,729.37	2.27	90-100	102	60	UPPER DENVER
C-702P4	7/15/2021	5,713.95	15.92	13.85	5,729.87	2.07	47-52	53	NE, >37	UNWD
C-702P4	10/11/2021	5,714.22	15.65	13.58	5,729.87	2.07	47-52	53	NE, >37	UNWD
C-702Q1	7/15/2021	5,678.01	53.75	51.09	5,731.76	2.66	219-229	230	35	LIGNITE
C-702Q1	10/11/2021	5,677.92	53.84	51.18	5,731.76	2.66	219-229	230	35	LIGNITE
C-702Q3	7/15/2021	5,713.89	17.25	15.01	5,731.14	2.24	30-35	36	32.5	WD
C-702Q3	10/11/2021	5,713.67	17.47	15.23	5,731.14	2.24	30-35	36	32.5	WD
EAST CLEANOUT	7/15/2021	5,734.49	32.62	NA[/g]	5,767.11	--	--	--	--	NO GEOLOGIC LOG
EAST CLEANOUT	10/11/2021	5,734.60	32.51	NA	5,767.11	--	--	--	--	NO GEOLOGIC LOG
GW-101	7/9/2021	5,729.32	49.68	48.38	5,779.00	1.30	78.6-98.6	98.9	42	UNWD
GW-101	10/5/2021	5,729.15	49.85	48.55	5,779.00	1.30	78.6-98.6	98.9	42	UNWD
GW-101-DEN	7/9/2021	5,720.80	59.74	57.24	5,780.54	2.50	134 - 148.6	154	50	UPPER DENVER
GW-101-DEN	10/5/2021	5,720.49	60.05	57.55	5,780.54	2.50	134 - 148.6	154	50	UPPER DENVER
GW-103	7/6/2021	5,739.75	58.53	49.55	5,798.28	8.98	136-155.9	157	40	UPPER DENVER
GW-103	10/1/2021	5,739.55	58.73	49.75	5,798.28	8.98	136-155.9	157	40	UPPER DENVER
GW-104	7/6/2021	5,751.68	48.88	39.22	5,800.56	9.66	44.4-69.3	69.5	36.3	UNWD
GW-104	10/1/2021	5,751.65	48.91	39.25	5,800.56	9.66	44.4-69.3	69.5	36.3	UNWD
GW-106	7/8/2021	5,716.96	21.88	20.44	5,738.84	1.44	24.5-49.5	50.8	43	WD
GW-106	10/4/2021	5,716.46	22.38	20.94	5,738.84	1.44	24.5-49.5	50.8	43	WD
GW-106-DEN	7/8/2021	5,711.68	27.88	25.32	5,739.56	2.56	100.6 - 125	135	43	UPPER DENVER
GW-106-DEN	10/4/2021	5,711.53	28.03	25.47	5,739.56	2.56	100.6 - 125	135	43	UPPER DENVER
GW-106-LIG	7/8/2021	5,691.04	49.74	46.76	5,740.78	2.98	235-250	258	43.4	LIGNITE
GW-106-LIG	10/4/2021	5,690.88	49.9	46.92	5,740.78	2.98	235-250	258	43.4	LIGNITE
GW-107A	7/7/2021	5,699.80	26.59	25.1	5,726.39	1.49	15-35	59	32	WD
GW-107A	10/4/2021	5,698.54	27.85	26.36	5,726.39	1.49	15-35	59	32	WD
GW-107UD	7/7/2021	5,699.50	27.95	26.13	5,727.45	1.82	48.5-58.5	58.5	31.6	UNWD
GW-107UD	10/4/2021	5,701.19	26.26	24.44	5,727.45	1.82	48.5-58.5	58.5	31.6	UNWD

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WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
GW-107UDR	7/7/2021	5,677.11	50.18	47.89	5,727.29	2.29	47-62	64.5	34	UNWD
GW-107UDR	10/4/2021	5,678.65	48.64	46.35	5,727.29	2.29	47-62	64.5	34	UNWD
GW-108A	7/7/2021	5,688.70	43.79	41.1	5,732.49	2.69	52.6-87.6	99	42	UNWD
GW-108A	10/4/2021	5,687.98	44.51	41.82	5,732.49	2.69	52.6-87.6	99	42	UNWD
GW-109	7/8/2021	Dry	Dry	Dry	5,707.99	1.49	8.6-28.6	29	NE, >29	ALLUVIUM
GW-109	10/4/2021	Dry	Dry	Dry	5,707.99	1.49	8.6-28.6	29	NE, >29	ALLUVIUM
GW-112	7/15/2021	5,735.92	34.03	24.08	5,769.95	9.95	9.2-29.2	34.2	30.5	WD
GW-112	10/11/2021	5,736.11	33.84	23.89	5,769.95	9.95	9.2-29.2	34.2	30.5	WD
GW-113	7/15/2021	5,719.58	54.28	51.82	5,773.86	2.46	149.8-174.8	175.5	38	UPPER DENVER
GW-113	10/11/2021	5,719.46	54.4	51.94	5,773.86	2.46	149.8-174.8	175.5	38	UPPER DENVER
GW-114A	7/7/2021	5,695.99	36.31	34.31	5,732.30	2.00	29.5-39.5	40	NE, >40	WD
GW-114A	10/4/2021	5,695.97	36.33	34.33	5,732.30	2.00	29.5-39.5	40	NE, >40	WD
GW-120	7/15/2021	5,681.89	109.1	100.91	5,790.99	8.19	287.8-297.8	310	65	LIGNITE
GW-120	10/11/2021	5,681.38	109.61	101.42	5,790.99	8.19	287.8-297.8	310	65	LIGNITE
GW-121	7/15/2021	5,681.86	92.83	90.84	5,774.69	1.99	266.7-291.7	298	32	LIGNITE
GW-121	10/11/2021	5,680.98	93.71	91.72	5,774.69	1.99	266.7-291.7	298	32	LIGNITE
GW-122	7/9/2021	5,681.94	143.32	139.66	5,825.26	3.66	312.8-332.8	343	84	LIGNITE
GW-122	10/5/2021	5,681.03	144.23	140.57	5,825.26	3.66	312.8-332.8	343	84	LIGNITE
GW-POA1	7/14/2021	5,751.04	33.55	31.16	5,784.59	2.39	21.1-41.1	43.75	41.1	WD
GW-POA1	10/7/2021	5,751.04	33.55	31.16	5,784.59	2.39	21.1-41.1	43.75	41.1	WD
GW-POA-1N	7/14/2021	5,751.63	25.94	23.76	5,777.57	2.18	19.5-32	35	32.5	WD
GW-POA-1N	10/7/2021	5,751.60	25.97	23.79	5,777.57	2.18	19.5-32	35	32.5	WD
GW-POA-1NE	7/14/2021	5,749.00	24.08	21.44	5,773.08	2.08	17-32	34.5	32.6	WD
GW-POA-1NE	10/7/2021	5,749.33	23.75	21.11	5,773.08	2.08	17-32	34.5	32.6	WD
GW-POA2	7/15/2021	5,747.72	33.98	31.98	5,781.70	2.00	17.3-37.3	40.7	37.3	WD
GW-POA2	10/11/2021	5,747.70	34	32	5,781.70	2.00	17.3-37.3	40.7	37.3	WD
GW-POA3	7/15/2021	Dry	Dry	Dry	5,752.77	2.77	14.7-29.7	33	29.7	WD
GW-POA3	10/11/2021	Dry	Dry	Dry	5,752.77	2.77	14.7-29.7	33	29.7	WD
GW-POA4	7/15/2021	5,715.94	26.6	23.86	5,742.54	2.74	13.2-38.2	41.2	38.2	WD
GW-POA4	10/11/2021	5,716.21	26.33	23.59	5,742.54	2.74	13.2-38.2	41.2	38.2	WD
MNA-01	7/15/2021	5,737.67	23.98	21.23	5,761.65	2.75	15-35	37	33	WD
MNA-01	10/11/2021	5,738.00	23.65	20.9	5,761.65	2.75	15-35	37	33	WD
MNA-02	7/15/2021	5,739.14	20.19	17.66	5,759.33	2.53	12-32	34	32	WD
MNA-02	10/11/2021	5,739.52	19.81	17.28	5,759.33	2.53	12-32	34	32	WD
MNA-03	7/15/2021	5,739.31	18.72	15.99	5,758.03	2.73	10-35	37	35	WD
MNA-03	10/11/2021	5,739.56	18.47	15.74	5,758.03	2.73	10-35	37	35	WD
MNA-04	7/15/2021	5,739.07	17.56	14.83	5,756.63	2.73	14-34	39	34	WD
MNA-04	10/11/2021	5,739.20	17.43	14.7	5,756.63	2.73	14-34	39	34	WD
MNA-05	7/15/2021	5,738.19	16.49	14.21	5,754.68	2.28	9-34	37	34	WD
MNA-05	10/11/2021	5,738.32	16.36	14.08	5,754.68	2.28	9-34	37	34	WD
MNA-06	7/15/2021	5,742.82	22.57	19.88	5,765.39	2.69	13-28	30	28	WD
MNA-06	10/11/2021	5,743.36	22.03	19.34	5,765.39	2.69	13-28	30	28	WD
MNA-07	7/15/2021	5,743.00	22.06	19.6	5,765.06	2.46	17-37	39	37	WD
MNA-07	10/11/2021	5,743.10	21.96	19.5	5,765.06	2.46	17-37	39	37	WD
MNA-08	7/15/2021	5,722.63	17.02	14.67	5,739.65	2.35	12-32	34	32	WD
MNA-08	10/11/2021	5,722.24	17.41	15.06	5,739.65	2.35	12-32	34	32	WD
MNA-09	7/15/2021	5,717.49	15.95	13.11	5,733.44	2.84	8.5-38.5	41.5	38.5	WD
MNA-09	10/11/2021	5,716.09	17.35	14.51	5,733.44	2.84	8.5-38.5	41.5	38.5	WD
MNA-10	7/15/2021	5,713.49	14.46	11.71	5,727.95	2.75	9-34	39	34	WD
MNA-10	10/11/2021	5,713.33	14.62	11.87	5,727.95	2.75	9-34	39	34	WD
MNA-11	7/15/2021	5,706.83	17.89	14.87	5,724.72	3.02	9.5-29.5	33	29.5	WD
MNA-11	10/11/2021	5,706.93	17.79	14.77	5,724.72	3.02	9.5-29.5	33	29.5	WD
MNA-12	7/15/2021	5,704.23	15.66	13.07	5,719.89	2.59	8.5-28.5	31	28.5	WD
MNA-12	10/11/2021	5,704.30	15.59	13	5,719.89	2.59	8.5-28.5	31	28.5	WD
MNA-13	7/15/2021	5,699.27	17.74	15.63	5,717.01	2.11	10-25	29	25	WD
MNA-13	10/11/2021	5,698.91	18.1	15.99	5,717.01	2.11	10-25	29	25	WD
MPZ-1	7/15/2021	Dry	Dry	Dry	5,722.55	2.08	3.2-13.2	13.5	NE, >13.5	ALLUVIUM
MPZ-1	10/11/2021	Dry	Dry	Dry	5,722.55	2.08	3.2-13.2	13.5	NE, >13.5	ALLUVIUM
MPZ-10R	7/15/2021	5,729.01	33.64	32.59	5,762.65	1.05	16.8-36.8	37	NE, >	FILL
MPZ-10R	10/11/2021	5,728.67	33.98	32.93	5,762.65	1.05	16.8-36.8	37	NE, >	FILL
MPZ-11	7/15/2021	5,734.33	32.1	28.32	5,766.43	3.78	11-36	36	NE	FILL
MPZ-11	10/11/2021	5,734.45	31.98	28.2	5,766.43	3.78	11-36	36	NE	FILL
MPZ-12	7/15/2021	5,738.96	24.13	21.34	5,763.09	2.79	7-32	35	NE, >35	ALLUVIUM
MPZ-12	10/11/2021	5,739.30	23.79	21	5,763.09	2.79	7-32	35	NE, >35	ALLUVIUM
MPZ-13	7/15/2021	5,739.05	24.3	22.05	5,763.35	2.25	7.3-32.3	35	NE, >35	WD
MPZ-13	10/11/2021	5,739.72	23.63	21.38	5,763.35	2.25	7.3-32.3	35	NE, >35	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MPZ-2	7/15/2021	5,711.94	13.68	11.57	5,725.62	2.11	3.2-13.2	13.5	NE, >13.5	ALLUVIUM
MPZ-2	10/11/2021	5,711.82	13.8	11.69	5,725.62	2.11	3.2-13.2	13.5	NE, >13.5	ALLUVIUM
MPZ-3	7/15/2021	5,716.98	14.44	12.68	5,731.42	1.76	3.5-13.5	13.5	NE, >13.5	ALLUVIUM
MPZ-3	10/11/2021	5,716.64	14.78	13.02	5,731.42	1.76	3.5-13.5	13.5	NE, >13.5	ALLUVIUM
MPZ-4	7/15/2021	Dry	Dry	Dry	5,738.70	1.77	3.5-13.5	13.5	NE, >13.5	ALLUVIUM
MPZ-4	10/11/2021	Dry	Dry	Dry	5,738.70	1.77	3.5-13.5	13.5	NE, >13.5	ALLUVIUM
MPZ-5	7/15/2021	Dry	Dry	Dry	5,744.26	1.63	3.7-13.65	13.65	NE, >13.5	ALLUVIUM
MPZ-5	10/11/2021	Dry	Dry	Dry	5,744.26	1.63	3.7-13.65	13.65	NE, >13.5	ALLUVIUM
MPZ-6	7/15/2021	Dry	Dry	Dry	5,749.51	1.95	3.3-13.3	13.5	NE, >13.5	ALLUVIUM
MPZ-6	10/11/2021	Dry	Dry	Dry	5,749.51	1.95	3.3-13.3	13.5	NE, >13.5	ALLUVIUM
MPZ-7	7/15/2021	Dry	Dry	Dry	5,756.19	1.45	3.4-13.4	13.5	NE, >13.5	ALLUVIUM
MPZ-7	10/11/2021	Dry	Dry	Dry	5,756.19	1.45	3.4-13.4	13.5	NE, >13.5	ALLUVIUM
MPZ-8	7/15/2021	Dry	Dry	Dry	5,771.19	8.87	3.4-13.4	13.5	NE, >13.5	ALLUVIUM
MPZ-8	10/11/2021	Dry	Dry	Dry	5,771.19	8.87	3.4-13.4	13.5	NE, >13.5	ALLUVIUM
MPZ-9	7/15/2021	Dry	Dry	Dry	5,769.92	6.30	3.5-13.5	13.54	NE, >13.5	ALLUVIUM
MPZ-9	10/11/2021	Dry	Dry	Dry	5,769.92	6.30	3.5-13.5	13.54	NE, >13.5	ALLUVIUM
MW-1	7/12/2021	5,745.10	72.07	70	5,817.17	2.07	106-156	156	45	UNWD
MW-1	10/8/2021	5,744.91	72.26	70.19	5,817.17	2.07	106-156	156	45	UNWD
MW-1000	7/7/2021	Dry	Dry	Dry	5,717.68	2.34	18-28	28	26.5	WD
MW-1000	10/4/2021	5,687.60	30.08	27.74	5,717.68	2.34	18-28	28	26.5	WD
MW-1000LC	7/7/2021	5,686.87	30.5	28.07	5,717.37	2.43	37.5-47.5	47.5	26.5	UNWD
MW-1000LC	10/4/2021	5,686.26	31.11	28.68	5,717.37	2.43	37.5-47.5	47.5	26.5	UNWD
MW100-WD	7/2/2021	5,701.17	26.4	23.83	5,727.57	2.57	30-35	38.5	35	WD
MW100-WD	10/4/2021	5,700.76	26.81	24.24	5,727.57	2.57	30-35	38.5	35	WD
MW101-WD	7/2/2021	5,698.11	23.58	21.19	5,721.69	2.39	22.5-32.5	34	32	WD
MW101-WD	10/4/2021	5,697.75	23.94	21.55	5,721.69	2.39	22.5-32.5	34	32	WD
MW102-WD	7/2/2021	5,696.39	26.76	24.41	5,723.15	2.35	24-36	38.5	36	WD
MW102-WD	10/4/2021	5,695.91	27.24	24.89	5,723.15	2.35	24-36	38.5	36	WD
MW103-WD	7/2/2021	5,693.38	26.1	23.67	5,719.48	2.43	21.7 - 36.7	39	37	WD
MW103-WD	10/4/2021	5,693.08	26.4	23.97	5,719.48	2.43	21.7 - 36.7	39	37	WD
MW104-WD	7/2/2021	5,686.99	22.11	18.88	5,709.10	3.23	13.7 - 33.7	36	33.7	WD
MW104-WD	10/4/2021	5,686.38	22.72	19.49	5,709.10	3.23	13.7 - 33.7	36	33.7	WD
MW105-WD	7/9/2021	5,723.13	21.74	19.28	5,744.87	2.46	22 - 32	34.3	32	WD
MW105-WD	10/5/2021	5,722.43	22.44	19.98	5,744.87	2.46	22 - 32	34.3	32	WD
MW106-UD	7/9/2021	5,750.80	35.48	32.75	5,786.28	2.73	41 - 51	54	36	UNWD
MW106-UD	10/5/2021	5,750.88	35.4	32.67	5,786.28	2.73	41 - 51	54	36	UNWD
MW107-UD	7/9/2021	5,752.01	53.74	51.54	5,805.75	2.20	61.9 - 76.9	79.3	47	UNWD
MW107-UD	10/5/2021	5,751.96	53.79	51.59	5,805.75	2.20	61.9 - 76.9	79.3	47	UNWD
MW107-WD	7/9/2021	5,765.49	40.46	38.05	5,805.95	2.41	36 - 46	48.5	45	WD
MW107-WD	10/5/2021	5,765.26	40.69	38.28	5,805.95	2.41	36 - 46	48.5	45	WD
MW108-WD	7/8/2021	5,808.19	18.03	15.51	5,826.22	2.52	30 - 45	50	47.5	WD
MW108-WD	10/1/2021	5,807.34	18.88	16.36	5,826.22	2.52	30 - 45	50	47.5	WD
MW109-WD	7/6/2021	5,793.64	40.63	38.91	5,834.27	1.72	36 - 51	54	50.8	WD
MW109-WD	10/1/2021	5,793.55	40.72	39	5,834.27	1.72	36 - 51	54	50.8	WD
MW110-WD	7/6/2021	5,782.29	48.04	45.52	5,830.33	2.52	41.5 - 56.5	58.8	56.5	WD
MW110-WD	10/1/2021	5,782.25	48.08	45.56	5,830.33	2.52	41.5 - 56.5	58.8	56.5	WD
MW111-UD	7/6/2021	5,766.81	50	47.79	5,816.81	2.21	69 - 74	79.5	61	UNWD
MW111-UD	10/1/2021	5,766.58	50.23	48.02	5,816.81	2.21	69 - 74	79.5	61	UNWD
MW112-DEN	7/6/2021	5,737.88	105.13	102.64	5,843.01	2.49	174.6 - 204	209	50	UPPER DENVER
MW112-DEN	10/1/2021	5,737.53	105.48	102.99	5,843.01	2.49	174.6 - 204	209	50	UPPER DENVER
MW112-UD	7/6/2021	5,792.15	50.2	47.65	5,842.35	2.55	60 - 75	79	49	UNWD
MW112-UD	10/1/2021	5,791.90	50.45	47.9	5,842.35	2.55	60 - 75	79	49	UNWD
MW112-WD	7/6/2021	5,806.39	36.2	33.68	5,842.59	2.52	28.5 - 48.5	51	48.5	WD
MW112-WD	10/1/2021	5,806.45	36.14	33.62	5,842.59	2.52	28.5 - 48.5	51	48.5	WD
MW113-EW-1	7/8/2021	5,669.92	41.35	40.38	5,711.27	0.97	20-50	55.3	46	WD
MW113-EW-1	10/4/2021	5,663.83	47.44	46.47	5,711.27	0.97	20-50	55.3	46	WD
MW113-LD	7/8/2021	5,678.36	33.99	31.64	5,712.35	2.35	77.2-97.2	100	35.1	UNWD
MW113-LD	10/4/2021	5,676.69	35.66	33.31	5,712.35	2.35	77.2-97.2	100	35.1	UNWD
MW113-UD	7/8/2021	5,631.69	80.59	78.31	5,712.28	2.28	59-79	84	51.7	UNWD
MW113-UD	10/4/2021	5,631.71	80.57	78.29	5,712.28	2.28	59-79	84	51.7	UNWD
MW113-WD	7/8/2021	5,670.01	43.43	39.89	5,713.44	3.54	20-50	55	51.7	WD
MW113-WD	10/4/2021	5,666.00	47.44	43.9	5,713.44	3.54	20-50	55	51.7	WD
MW114-WD	7/2/2021	5,689.09	24.25	21.41	5,713.34	3.00	22-32	38	32	WD
MW114-WD	10/4/2021	5,688.73	24.61	21.77	5,713.34	3.00	22-32	38	32	WD
MW115-UD	7/2/2021	5,687.65	14.7	12.17	5,702.35	2.53	46.6-56.6	--	24	UNWD
MW115-UD	10/4/2021	5,687.17	15.18	12.65	5,702.35	2.53	46.6-56.6	--	24	UNWD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW115-WD	7/2/2021	5,687.51	20.86	13.52	5,708.37	2.25	11.3-26.3	30	26.3	WD
MW115-WD	10/4/2021	5,687.00	21.37	14.03	5,708.37	2.25	11.3-26.3	30	26.3	WD
MW116-WD	7/2/2021	5,687.74	26.73	24.08	5,714.47	2.65	24.9-39.9	45	39.9	WD
MW116-WD	10/4/2021	5,687.21	27.26	24.61	5,714.47	2.65	24.9-39.9	45	39.9	WD
MW117-WD	7/2/2021	5,686.14	14.18	11.76	5,700.32	2.42	10.5-30.5	33	30.5	WD
MW117-WD	10/4/2021	5,685.48	14.84	12.42	5,700.32	2.42	10.5-30.5	33	30.5	WD
MW118-UD	7/2/2021	5,687.50	17.66	15.1	5,705.16	2.56	62-77	80	34.9	UNWD
MW118-UD	10/4/2021	5,686.96	18.2	15.64	5,705.16	2.56	62-77	80	34.9	UNWD
MW118-WD	7/2/2021	5,685.29	20.05	17.45	5,705.34	2.60	20.1-35.1	37.5	35.1	WD
MW118-WD	10/4/2021	5,684.61	20.73	18.13	5,705.34	2.60	20.1-35.1	37.5	35.1	WD
MW119-WD	7/2/2021	5,688.23	16	14.17	5,704.23	1.83	18-28	31.5	29	WD
MW119-WD	10/4/2021	5,687.72	16.51	14.68	5,704.23	1.83	18-28	31.5	29	WD
MW120-WD	7/2/2021	5,687.15	15.02	12.75	5,702.17	2.27	18-28	32	30	WD
MW120-WD	10/4/2021	5,686.55	15.62	13.35	5,702.17	2.27	18-28	32	30	WD
MW121-WDR	7/1/2021	5,652.44	22.98	20.46	5,675.42	2.52	23.5-33.5	36	36.5	WD
MW121-WDR	10/6/2021	5,651.74	23.68	21.16	5,675.42	2.52	23.5-33.5	36	36.5	WD
MW122-WDR	7/1/2021	5,652.68	19.95	17.32	5,672.63	2.63	20.5-30.5	36	33	WD
MW122-WDR	10/6/2021	5,651.86	20.77	18.14	5,672.63	2.63	20.5-30.5	36	33	WD
MW123-WD	7/1/2021	5,653.16	18.88	16.14	5,672.04	2.74	22-32	36	33	WD
MW123-WD	10/6/2021	5,652.13	19.91	17.17	5,672.04	2.74	22-32	36	33	WD
MW124-WD	7/1/2021	5,653.72	18.31	16.08	5,672.03	2.23	23-33	39	34.5	WD
MW124-WD	10/6/2021	5,652.41	19.62	17.39	5,672.03	2.23	23-33	39	34.5	WD
MW125-WD	7/1/2021	5,654.83	18.07	14.87	5,672.90	3.20	22-32	37	36	WD
MW125-WD	10/6/2021	5,653.15	19.75	16.55	5,672.90	3.20	22-32	37	36	WD
MW126-WD	7/1/2021	5,655.54	17.61	14.66	5,673.15	2.95	20-30	34	33	WD
MW126-WD	10/6/2021	5,653.82	19.33	16.38	5,673.15	2.95	20-30	34	33	WD
MW127-WD	7/1/2021	5,655.98	16.38	14.02	5,672.36	2.36	20-30	34	32.5	WD
MW127-WD	10/6/2021	5,654.25	18.11	15.75	5,672.36	2.36	20-30	34	32.5	WD
MW129-WD	7/1/2021	5,649.91	21.2	18.89	5,671.11	2.31	20.8-30.5	34	31	WD
MW129-WD	10/6/2021	5,649.73	21.38	19.07	5,671.11	2.31	20.8-30.5	34	31	WD
MW130-WD	7/1/2021	5,649.60	23.43	21.2	5,673.03	2.23	21.3-31	37.5	32.4	WD
MW130-WD	10/6/2021	5,649.66	23.37	21.14	5,673.03	2.23	21.3-31	37.5	32.4	WD
MW131-WD	7/1/2021	5,649.40	26.85	24.9	5,676.25	1.95	23.3-33	36	34.3	WD
MW131-WD	10/6/2021	5,649.83	26.42	24.47	5,676.25	1.95	23.3-33	36	34.3	WD
MW132-WD	7/1/2021	5,674.88	3.76	1.42	5,678.64	2.34	4-14	24	21.5	WD
MW132-WD	10/6/2021	5,674.13	4.51	2.17	5,678.64	2.34	4-14	24	21.5	WD
MW133-WD	7/1/2021	5,636.10	12.5	12.4	5,648.60	0.10	14-24	27	24.5	WD
MW133-WD	10/6/2021	5,636.02	12.58	12.48	5,648.60	0.10	14-24	27	24.5	WD
MW134-WD	7/1/2021	5,637.68	18.89	16.42	5,656.57	2.47	15-30	33	30.5	WD
MW134-WD	10/6/2021	5,637.59	18.98	16.51	5,656.57	2.47	15-30	33	30.5	WD
MW135-WD	7/1/2021	5,638.95	19.08	19.5	5,658.03	-0.42	18-38	41.5	39	WD
MW135-WD	10/6/2021	5,638.88	19.15	19.57	5,658.03	-0.42	18-38	41.5	39	WD
MW136-WD	7/1/2021	5,638.69	20.61	21.01	5,659.30	-0.40	21-46	49	46.5	WD
MW136-WD	10/6/2021	5,638.49	20.81	21.21	5,659.30	-0.40	21-46	49	46.5	WD
MW137-WD	7/1/2021	5,638.46	16.42	16.8	5,654.88	-0.38	21-41	44	39.5	WD
MW137-WD	10/6/2021	5,638.22	16.66	17.04	5,654.88	-0.38	21-41	44	39.5	WD
MW138-WD	7/1/2021	5,638.29	15.51	15.81	5,653.80	-0.30	19-39	43	39.5	WD
MW138-WD	10/6/2021	5,637.89	15.91	16.21	5,653.80	-0.30	19-39	43	39.5	WD
MW139-WD	7/1/2021	5,638.77	10.93	11.13	5,649.70	-0.20	17-37	44	39.8	WD
MW139-WD	10/6/2021	5,638.16	11.54	11.74	5,649.70	-0.20	17-37	44	39.8	WD
MW140-WD	7/1/2021	5,607.51	18.06	18.39	5,625.57	-0.33	21-36	44	42.5	WD
MW140-WD	10/6/2021	5,607.05	18.52	18.85	5,625.57	-0.33	21-36	44	42.5	WD
MW141-UDEN	7/1/2021	5,605.32	18.2	18.66	5,623.52	-0.46	57-77	79	37.5	UNWEATHERED DENVER
MW141-UDEN	10/6/2021	5,604.83	18.69	19.15	5,623.52	-0.46	57-77	79	37.5	UNWEATHERED DENVER
MW141-WD	7/1/2021	5,607.33	17.4	17.67	5,624.73	-0.27	21-31	44	42	WD
MW141-WD	10/6/2021	5,606.81	17.92	18.19	5,624.73	-0.27	21-31	44	42	WD
MW142-WD	7/1/2021	5,589.62	8.98	9.38	5,598.60	-0.40	10-20	34	33.5	WD
MW142-WD	10/6/2021	5,589.46	9.14	9.54	5,598.60	-0.40	10-20	34	33.5	WD
MW144-WD	7/1/2021	5,568.43	13.94	14.11	5,582.37	-0.17	16.5-31.5	36	35.5	WD
MW144-WD	10/6/2021	5,567.79	14.58	14.75	5,582.37	-0.17	16.5-31.5	36	35.5	WD
MW145-WD	7/1/2021	5,568.45	11.39	11.66	5,579.84	-0.27	13-38	40.9	38	WD
MW145-WD	10/6/2021	5,567.85	11.99	12.26	5,579.84	-0.27	13-38	40.9	38	WD
MW151-WD	7/1/2021	5,662.98	16.52	14.02	5,679.50	2.50	17-27	39	36.6	WD
MW151-WD	10/6/2021	5,659.29	20.21	17.71	5,679.50	2.50	17-27	39	36.6	WD
MW153-EW-1	7/1/2021	5,663.44	10.95	8.76	5,674.39	2.19	13-23	29.5	28.7	WD
MW153-EW-1	10/6/2021	5,659.41	14.98	12.79	5,674.39	2.19	13-23	29.5	28.7	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW153-WD	7/1/2021	5,663.57	9.66	7.23	5,673.23	2.43	10-20	32	29.7	WD
MW153-WD	10/6/2021	5,659.37	13.86	11.43	5,673.23	2.43	10-20	32	29.7	WD
MW154-EW-1	7/1/2021	5,663.47	11	8.83	5,674.47	2.17	11.5-21.5	28	--	WD
MW154-EW-1	10/6/2021	5,659.56	14.91	12.74	5,674.47	2.17	11.5-21.5	28	--	WD
MW154-WD	7/1/2021	5,663.73	9.98	7.77	5,673.71	2.21	7-22	32	28.5	WD
MW154-WD	10/6/2021	5,659.59	14.12	11.91	5,673.71	2.21	7-22	32	28.5	WD
MW155-EW-1	7/1/2021	5,663.81	10.51	8.09	5,674.32	2.42	9.5-19.5	25	--	WD
MW155-EW-1	10/6/2021	5,659.47	14.85	12.43	5,674.32	2.42	9.5-19.5	25	--	WD
MW155-WD	7/1/2021	5,663.73	10.71	7.17	5,674.44	3.54	9-19	34	32.3	WD
MW155-WD	10/6/2021	5,659.38	15.06	11.52	5,674.44	3.54	9-19	34	32.3	WD
MW156-EW-1	7/1/2021	5,663.81	9.54	7.09	5,673.35	2.45	11-21	29	--	WD
MW156-EW-1	10/6/2021	5,659.31	14.04	11.59	5,673.35	2.45	11-21	29	--	WD
MW156-WD	7/1/2021	5,663.46	9.34	6.94	5,672.80	2.40	14-24	34	33	WD
MW156-WD	10/6/2021	5,658.83	13.97	11.57	5,672.80	2.40	14-24	34	33	WD
MW157-WD	7/1/2021	5,662.99	9.59	7.31	5,672.58	2.28	14-24	33.3	31.5	WD
MW157-WD	10/6/2021	5,658.29	14.29	12.01	5,672.58	2.28	14-24	33.3	31.5	WD
MW158-WD	7/1/2021	5,661.31	11.95	9.69	5,673.26	2.26	15-25	39	34	WD
MW158-WD	10/6/2021	5,657.74	15.52	13.26	5,673.26	2.26	15-25	39	34	WD
MW160-WD	7/1/2021	5,655.09	35.38	31.21	5,690.47	4.17	15-30	36	31	WD
MW160-WD	10/6/2021	5,654.32	36.15	31.98	5,690.47	4.17	15-30	36	31	WD
MW170-EW-1	7/2/2021	5,676.18	55.62	54	5,731.80	1.62	25-60	65	60	WD
MW170-EW-1	10/4/2021	5,676.43	55.37	53.75	5,731.80	1.62	25-60	65	60	WD
MW170-WD	7/2/2021	5,687.17	42.74	42.84	5,729.91	-0.10	20-55	58	55.5	WD
MW170-WD	10/4/2021	5,687.00	42.91	43.01	5,729.91	-0.10	20-55	58	55.5	WD
MW171-WD	7/2/2021	5,702.88	27.8	25.4	5,730.68	2.40	17.5-32.5	35	32.5	WD
MW171-WD	10/4/2021	5,700.50	30.18	27.78	5,730.68	2.40	17.5-32.5	35	32.5	WD
MW172-WD	7/2/2021	5,700.14	30.35	28.23	5,730.49	2.12	18-38	43	38	WD
MW172-WD	10/4/2021	5,699.80	30.69	28.57	5,730.49	2.12	18-38	43	38	WD
MW173-WD	7/2/2021	5,701.55	29.24	26.99	5,730.79	2.25	18-33	38	35.5	WD
MW173-WD	10/4/2021	5,701.21	29.58	27.33	5,730.79	2.25	18-33	38	35.5	WD
MW174-WD	7/2/2021	5,702.08	31.47	28.8	5,733.55	2.67	20.7-35.7	38	36	WD
MW174-WD	10/4/2021	5,701.77	31.78	29.11	5,733.55	2.67	20.7-35.7	38	36	WD
MW175-WD	7/2/2021	5,689.38	44.03	41.48	5,733.41	2.55	25.5-45.5	49	46	WD
MW175-WD	10/4/2021	5,688.92	44.49	41.94	5,733.41	2.55	25.5-45.5	49	46	WD
MW176-DEN	7/1/2021	5,558.58	15.55	15.88	5,574.13	-0.23	12-52	55	55	Upper Denver
MW176-DEN	10/6/2021	5,557.51	16.62	16.95	5,574.13	-0.23	12-52	55	55	Upper Denver
MW176-UDEN	7/1/2021	5,557.89	17.33	17.86	5,575.22	-0.53	74-94	109	51	UNWEATHERED DENVER
MW176-UDEN	10/6/2021	5,557.48	17.74	18.27	5,575.22	-0.53	74-94	109	51	UNWEATHERED DENVER
MW177-DEN	7/1/2021	5,569.35	12.85	13.29	5,582.20	-0.44	17.5-27.5	33	27.5	UPPER DENVER
MW177-DEN	10/6/2021	5,568.79	13.41	13.85	5,582.20	-0.44	17.5-27.5	33	27.5	UPPER DENVER
MW177-UDEN	7/1/2021	5,565.27	16.65	17.02	5,581.92	-0.37	47-62	69	27.5	UNWEATHERED DENVER
MW177-UDEN	10/6/2021	5,564.80	17.12	17.49	5,581.92	-0.37	47-62	69	27.5	UNWEATHERED DENVER
MW178-DEN	7/1/2021	5,559.89	17.6	17.96	5,577.49	-0.36	16-36	43	36	UPPER DENVER
MW178-DEN	10/6/2021	5,558.98	18.51	18.87	5,577.49	-0.36	16-36	43	36	UPPER DENVER
MW178-UDEN	7/1/2021	5,536.74	39.9	40.75	5,576.64	-0.85	67-97	99	36.5	UNWEATHERED DENVER
MW178-UDEN	10/6/2021	5,536.53	40.11	40.96	5,576.64	-0.85	67-97	99	36.5	UNWEATHERED DENVER
MW179-UDEN	7/1/2021	5,649.18	22.68	20.92	5,671.86	1.85	56-81	84	29	UNWEATHERED DENVER
MW179-UDEN	10/6/2021	5,648.79	23.07	21.31	5,671.86	1.85	56-81	84	29	UNWEATHERED DENVER
MW180-WD	7/1/2021	5,678.21	16.63	14.49	5,694.84	2.14	17-27	30	27	WD
MW180-WD	10/6/2021	5,677.86	16.98	14.84	5,694.84	2.14	17-27	30	27	WD
MW-2	7/12/2021	5,757.83	78.74	76.77	5,836.57	1.97	64-119	142	60	UNWD
MW-2	10/8/2021	5,757.75	78.82	76.85	5,836.57	1.97	64-119	142	60	UNWD
MW23-C-SD	7/2/2021	5,699.09	29.58	27.21	5,728.67	2.37	56-71	73	38	UNWD
MW23-C-SD	10/4/2021	5,698.56	30.11	27.74	5,728.67	2.37	56-71	73	38	UNWD
MW23-UPPER-C	7/2/2021	5,702.43	26.5	24.17	5,728.93	2.33	25-35	38	37	WD
MW23-UPPER-C	10/4/2021	5,702.03	26.9	24.57	5,728.93	2.33	25-35	38	37	WD
MW23-WD	7/2/2021	5,701.54	28.44	25.43	5,729.98	3.01	35-55	56.5	NE, >56.5	UNWD
MW23-WD	10/4/2021	5,701.18	28.8	25.79	5,729.98	3.01	35-55	56.5	NE, >56.5	UNWD
MW-3	7/12/2021	5,788.31	42.95	40.59	5,831.26	2.36	47-97	102	55	UNWD
MW-3	10/8/2021	5,787.34	43.92	41.56	5,831.26	2.36	47-97	102	55	UNWD
MW30-BU	7/9/2021	5,718.13	78.82	76.11	5,796.95	2.71	150-180	183	48	UPPER DENVER
MW30-BU	10/5/2021	5,717.81	79.14	76.43	5,796.95	2.71	150-180	183	48	UPPER DENVER
MW32-UD	7/6/2021	5,787.98	46.18	44.42	5,834.16	1.76	59.5-69.5	69.8	49	UNWD
MW32-UD	10/1/2021	5,787.26	46.9	45.14	5,834.16	1.76	59.5-69.5	69.8	49	UNWD
MW32-WD	7/6/2021	5,802.02	32.4	29.96	5,834.42	2.44	32.7 - 47.7	50	47.5	WD
MW32-WD	10/1/2021	5,803.19	31.23	28.79	5,834.42	2.44	32.7 - 47.7	50	47.5	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
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LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW33-UD	7/6/2021	5,788.72	56.16	54.18	5,844.88	1.98	62.5-72.5	75	51.5	UNWD
MW33-UD	10/1/2021	5,788.67	56.21	54.23	5,844.88	1.98	62.5-72.5	75	51.5	UNWD
MW33-WDR	7/6/2021	Dry	Dry	Dry	5,844.27	1.97	31.5-43.2	--	50.6	WD
MW33-WDR	10/1/2021	Dry	Dry	Dry	5,844.27	1.97	31.5-43.2	--	50.6	WD
MW34-UD	7/6/2021	5,787.22	48.99	46.58	5,836.21	2.41	64-74	74	54.5	UNWD
MW34-UD	10/1/2021	5,787.40	48.81	46.4	5,836.21	2.41	64-74	74	54.5	UNWD
MW34-WDR	7/6/2021	5,790.13	46.09	43.37	5,836.22	2.72	43 - 53	56	53.5	WD
MW34-WDR	10/1/2021	5,790.64	45.58	42.86	5,836.22	2.72	43 - 53	56	53.5	WD
MW35-UD	7/6/2021	5,759.34	58.91	56.76	5,818.25	2.15	69.79	79	59	UNWD
MW35-UD	10/1/2021	5,759.34	58.91	56.76	5,818.25	2.15	69.79	79	59	UNWD
MW35-WDR	7/6/2021	5,778.83	39.16	36.47	5,817.99	2.69	36.7 - 56.7	59	58	WD
MW35-WDR	10/1/2021	5,778.70	39.29	36.6	5,817.99	2.69	36.7 - 56.7	59	58	WD
MW36-UD	7/6/2021	5,767.32	33.74	31.78	5,801.06	1.96	56.5-66.5	66.5	46.1	UNWD
MW36-UD	10/1/2021	5,767.25	33.81	31.85	5,801.06	1.96	56.5-66.5	66.5	46.1	UNWD
MW36-WDR	7/6/2021	5,771.46	29.75	27.34	5,801.21	2.41	30.5-42.5	48.6	42.5	WD
MW36-WDR	10/1/2021	5,771.37	29.84	27.43	5,801.21	2.41	30.5-42.5	48.6	42.5	WD
MW37-UD	7/7/2021	5,699.23	28.11	26.17	5,727.34	1.94	38-53	59	32.5	UNWD
MW37-UD	10/4/2021	5,699.24	28.1	26.16	5,727.34	1.94	38-53	59	32.5	UNWD
MW37-WD	7/7/2021	5,695.85	32.56	29.56	5,728.41	3.00	22-32	35	32	WD
MW37-WD	10/4/2021	5,695.80	32.61	29.61	5,728.41	3.00	22-32	35	32	WD
MW38-0N-140W	7/13/2021	5,745.65	62.23	59.95	5,807.88	2.28	48-63	79	63	WD
MW38-0N-140W	10/8/2021	5,745.74	62.14	59.86	5,807.88	2.28	48-63	79	63	WD
MW38-1005N-150E	7/12/2021	5,734.36	41.92	39.44	5,776.28	2.48	36.5-56.5	61.4	56.5	WD
MW38-1005N-150E	10/8/2021	5,733.37	42.91	40.43	5,776.28	2.48	36.5-56.5	61.4	56.5	WD
MW38-100N-200E	7/13/2021	5,747.34	43.68	41.16	5,791.02	2.52	33-48	50.5	48	WD
MW38-100N-200E	10/8/2021	5,747.36	43.66	41.14	5,791.02	2.52	33-48	50.5	48	WD
MW38-100N-53W	7/13/2021	Dry	Dry	Dry	5,804.53	2.03	48-58	69	58	WD
MW38-100N-53W	10/8/2021	Dry	Dry	Dry	5,804.53	2.03	48-58	69	58	WD
MW38-100N-60E	7/13/2021	5,736.84	60.69	58.16	5,797.53	2.53	40-60	64.5	61.5	WD
MW38-100N-60E	10/8/2021	5,736.60	60.93	58.4	5,797.53	2.53	40-60	64.5	61.5	WD
MW38-100S-140W	7/14/2021	Dry	Dry	Dry	5,807.35	1.55	48.5-68.5	74	68.5	WD
MW38-100S-140W	10/7/2021	Dry	Dry	Dry	5,807.35	1.55	48.5-68.5	74	68.5	WD
MW38-100S-195W	7/13/2021	5,736.84	70.38	70.73	5,807.22	-0.35	51-71	73.5	71	WD
MW38-100S-195W	10/8/2021	Dry	Dry	Dry	5,807.22	-0.35	51-71	73.5	71	WD
MW38-100S-200E	7/14/2021	5,748.58	43.48	41.02	5,792.06	2.46	34-49	51.5	49	WD
MW38-100S-200E	10/7/2021	5,748.54	43.52	41.06	5,792.06	2.46	34-49	51.5	49	WD
MW38-100S-53W	7/14/2021	Dry	Dry	Dry	5,806.51	3.71	46-66	79	66	WD
MW38-100S-53W	10/7/2021	Dry	Dry	Dry	5,806.51	3.71	46-66	79	66	WD
MW38-1028N-256E	7/12/2021	5,719.67	52.13	50.03	5,771.80	2.10	28-53	56	NE, > 56	WD
MW38-1028N-256E	10/8/2021	5,719.68	52.12	50.02	5,771.80	2.10	28-53	56	NE, > 56	WD
MW38-1064N-650E	7/12/2021	5,739.20	21.68	19.2	5,760.88	2.48	20-35	39	35	WD
MW38-1064N-650E	10/8/2021	5,737.04	23.84	21.36	5,760.88	2.48	20-35	39	35	WD
MW38-1064N-655E	7/12/2021	5,726.88	33.72	31.52	5,760.60	2.20	40-55	57.5	35.5	UNWD
MW38-1064N-655E	10/8/2021	5,727.28	33.32	31.12	5,760.60	2.20	40-55	57.5	35.5	UNWD
MW38-1064N-660E	7/12/2021	5,717.37	43.17	40.93	5,760.54	2.24	60-75	77.5	35	UNWD
MW38-1064N-660E	10/8/2021	5,717.29	43.25	41.01	5,760.54	2.24	60-75	77.5	35	UNWD
MW38-1095N-226E	7/12/2021	5,720.74	50.57	48.76	5,771.31	1.81	23-53	69	52.5	WD
MW38-1095N-226E	10/8/2021	5,720.62	50.69	48.88	5,771.31	1.81	23-53	69	52.5	WD
MW38-1100N-0E	7/12/2021	5,745.20	34.56	32.1	5,779.76	2.46	32-47	54	47	WD
MW38-1100N-0E	10/8/2021	5,745.30	34.46	32	5,779.76	2.46	32-47	54	47	WD
MW38-1100N-326E	7/12/2021	5,728.17	38.22	38.23	5,766.39	-0.01	34.5-49.5	52.5	49.5	WD
MW38-1100N-326E	10/8/2021	5,728.61	37.78	37.79	5,766.39	-0.01	34.5-49.5	52.5	49.5	WD
MW38-1120N-1000E	7/13/2021	5,716.75	33.46	32.75	5,750.21	0.71	50-70	72.5	44	UNWD
MW38-1120N-1000E	10/8/2021	5,716.65	33.56	32.85	5,750.21	0.71	50-70	72.5	44	UNWD
MW38-1175N-300E	7/12/2021	Dry	Dry	Dry	5,767.86	-0.42	25.5-45.5	48.5	45.5	WD
MW38-1175N-300E	10/8/2021	5,723.06	44.8	45.22	5,767.86	-0.42	25.5-45.5	48.5	45.5	WD
MW38-1175N-518E	7/12/2021	5,736.51	29.9	30.09	5,766.41	-0.19	25.5-45.5	48	45.5	WD
MW38-1175N-518E	10/8/2021	5,735.76	30.65	30.84	5,766.41	-0.19	25.5-45.5	48	45.5	WD
MW38-1200N-226E	7/12/2021	5,709.85	62.24	60.65	5,772.09	1.59	45-70	74	69.5	UNWD
MW38-1200N-226E	10/8/2021	5,709.85	62.24	60.65	5,772.09	1.59	45-70	74	69.5	UNWD
MW38-1363N-180W	7/13/2021	5,724.73	46.11	46.37	5,770.84	-0.26	70-90	94.5	58	UNWD
MW38-1363N-180W	10/8/2021	5,724.61	46.23	46.49	5,770.84	-0.26	70-90	94.5	58	UNWD
MW38-1373N-180W	7/13/2021	5,722.91	49.18	46.39	5,772.09	2.79	36-51	54	51	WD
MW38-1373N-180W	10/8/2021	5,723.17	48.92	46.13	5,772.09	2.79	36-51	54	51	WD
MW38-150S-320W	7/12/2021	5,759.74	53.86	51.36	5,813.60	2.50	47-57	59.5	57	WD
MW38-150S-320W	10/8/2021	5,759.69	53.91	51.41	5,813.60	2.50	47-57	59.5	57	WD

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LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW38-170S-140W	7/14/2021	5,734.59	72.17	69.91	5,806.76	2.26	58-73	78.5	74	WD
MW38-170S-140W	10/7/2021	5,734.57	72.19	69.93	5,806.76	2.26	58-73	78.5	74	WD
MW38-200N-425E	7/13/2021	5,731.41	49.44	47.29	5,780.85	2.15	33-58	69	40	UNWD
MW38-200N-425E	10/8/2021	5,731.77	49.08	46.93	5,780.85	2.15	33-58	69	40	UNWD
MW38-200N-60E	7/13/2021	5,737.18	58.24	55.72	5,795.42	2.52	38.5-58.5	61.6	58.5	WD
MW38-200N-60E	10/8/2021	5,736.96	58.46	55.94	5,795.42	2.52	38.5-58.5	61.6	58.5	WD
MW38-200S-140W	7/14/2021	5,735.67	70.89	68.63	5,806.56	2.26	53-73	77	72	WD
MW38-200S-140W	10/7/2021	5,735.54	71.02	68.76	5,806.56	2.26	53-73	77	72	WD
MW38-200S-180W	7/14/2021	5,735.99	72.17	70.31	5,808.16	1.86	55-75	78.8	75	WD
MW38-200S-180W	10/7/2021	5,735.81	72.35	70.49	5,808.16	1.86	55-75	78.8	75	WD
MW38-200S-195W	7/13/2021	5,736.17	70.42	70.9	5,806.59	-0.48	53-73	76.5	73	WD
MW38-200S-195W	10/8/2021	5,735.99	70.6	71.08	5,806.59	-0.48	53-73	76.5	73	WD
MW38-250S-160W	7/14/2021	5,743.40	62.91	60.3	5,806.31	2.61	51-63	68	63	WD
MW38-250S-160W	10/7/2021	5,743.35	62.96	60.35	5,806.31	2.61	51-63	68	63	WD
MW38-250S-320W	7/12/2021	5,759.32	55.07	52.58	5,814.39	2.49	45-60	64	60	WD
MW38-250S-320W	10/8/2021	5,759.28	55.11	52.62	5,814.39	2.49	45-60	64	60	WD
MW38-250S-50W	7/14/2021	Dry	Dry	Dry	5,803.99	3.09	34-49	54	49	WD
MW38-250S-50W	10/7/2021	Dry	Dry	Dry	5,803.99	3.09	34-49	54	49	WD
MW38-275S-195W	7/13/2021	5,738.04	67.89	68.06	5,805.93	-0.17	50-70	72.5	69	WD
MW38-275S-195W	10/8/2021	5,738.01	67.92	68.09	5,805.93	-0.17	50-70	72.5	69	WD
MW38-300S-180W	7/14/2021	5,745.42	62.22	59.38	5,807.64	2.84	56-61	64	61	WD
MW38-300S-180W	10/7/2021	5,745.40	62.24	59.4	5,807.64	2.84	56-61	64	61	WD
MW38-300S-315W	7/12/2021	5,745.08	68.81	66.62	5,813.89	2.19	53.7-68.7	87	68	WD
MW38-300S-315W	10/8/2021	5,745.09	68.8	66.61	5,813.89	2.19	53.7-68.7	87	68	WD
MW38-300S-60E	7/14/2021	5,748.41	47.71	45.99	5,796.12	1.72	40-50	58	50	WD
MW38-300S-60E	10/7/2021	5,748.44	47.68	45.96	5,796.12	1.72	40-50	58	50	WD
MW38-302S-50W	7/14/2021	5,743.90	58.78	56.3	5,802.68	2.48	50-70	79	55	UNWD
MW38-302S-50W	10/7/2021	5,743.78	58.9	56.42	5,802.68	2.48	50-70	79	55	UNWD
MW38-320N-305E	7/13/2021	5,728.88	55.31	52.22	5,784.19	3.09	40-55	64	NE, >64	WD
MW38-320N-305E	10/8/2021	5,728.97	55.22	52.13	5,784.19	3.09	40-55	64	NE, >64	WD
MW38-325S-195W	7/13/2021	5,746.55	58.88	59.04	5,805.43	-0.16	48.5-63.5	66	62.5	WD
MW38-325S-195W	10/8/2021	5,746.55	58.88	59.04	5,805.43	-0.16	48.5-63.5	66	62.5	WD
MW38-350N-175E	7/13/2021	5,739.10	49.48	46.5	5,788.58	2.98	27-47	49.5	47	WD
MW38-350N-175E	10/8/2021	5,739.10	49.48	46.5	5,788.58	2.98	27-47	49.5	47	WD
MW38-350S-200E	7/14/2021	5,748.67	40.57	38.13	5,789.24	2.44	37.5-44.5	53.8	44.5	WD
MW38-350S-200E	10/7/2021	5,748.72	40.52	38.08	5,789.24	2.44	37.5-44.5	53.8	44.5	WD
MW38-350S-320W	7/12/2021	5,747.53	66.63	64.17	5,814.16	2.46	54-74	77	74	WD
MW38-350S-320W	10/8/2021	5,747.51	66.65	64.19	5,814.16	2.46	54-74	77	74	WD
MW38-350S-50W	7/14/2021	5,747.81	54.24	51.69	5,802.05	2.55	36-56	58.5	57	WD
MW38-350S-50W	10/7/2021	5,747.85	54.2	51.65	5,802.05	2.55	36-56	58.5	57	WD
MW38-350S-60E	7/14/2021	5,748.35	47.89	45.35	5,796.24	2.54	33.5-53.5	57.2	53.5	WD
MW38-350S-60E	10/7/2021	5,748.36	47.88	45.34	5,796.24	2.54	33.5-53.5	57.2	53.5	WD
MW38-360N-405E	7/13/2021	Dry	Dry	Dry	5,779.52	2.44	40-55	59	49	WD/UNWD
MW38-360N-405E	10/8/2021	Dry	Dry	Dry	5,779.52	2.44	40-55	59	49	WD/UNWD
MW38-390S-60E	7/14/2021	5,748.38	46.55	44.02	5,794.93	2.53	30.5-50.5	73	50.5	WD
MW38-390S-60E	10/7/2021	5,748.42	46.51	43.98	5,794.93	2.53	30.5-50.5	73	50.5	WD
MW38-400N-100E	7/13/2021	5,738.88	50.06	47.72	5,788.94	2.34	40-55	62	55	WD
MW38-400N-100E	10/8/2021	5,738.80	50.14	47.8	5,788.94	2.34	40-55	62	55	WD
MW38-400N-180W	7/13/2021	5,756.75	42.01	38.85	5,798.76	3.16	41.5-56.5	59	57	WD
MW38-400N-180W	10/8/2021	5,756.58	42.18	39.02	5,798.76	3.16	41.5-56.5	59	57	WD
MW38-400N-240E	7/13/2021	5,738.87	45.84	43.13	5,784.71	2.71	31-46	49.2	46	WD
MW38-400N-240E	10/8/2021	5,738.78	45.93	43.22	5,784.71	2.71	31-46	49.2	46	WD
MW38-400N-300E	7/13/2021	5,718.29	64.82	62.31	5,783.11	2.51	65.6-85.6	89	45	UNWD
MW38-400N-300E	10/8/2021	5,718.26	64.85	62.34	5,783.11	2.51	65.6-85.6	89	45	UNWD
MW38-400S-0W	7/14/2021	5,747.97	50.83	47.73	5,798.80	3.10	37.5-51.5	54	51.7	WD
MW38-400S-0W	10/7/2021	5,748.05	50.75	47.65	5,798.80	3.10	37.5-51.5	54	51.7	WD
MW38-400S-140W	7/14/2021	5,747.39	57.02	54.61	5,804.41	2.41	38.5-58.5	61.5	58.5	WD
MW38-400S-140W	10/7/2021	5,747.43	56.98	54.57	5,804.41	2.41	38.5-58.5	61.5	58.5	WD
MW38-400S-195W	7/13/2021	5,746.96	57.42	57.34	5,804.38	0.08	43.5-58.5	64	58.5	WD
MW38-400S-195W	10/8/2021	5,746.96	57.42	57.34	5,804.38	0.08	43.5-58.5	64	58.5	WD
MW38-400S-320W	7/12/2021	5,747.82	65.78	63.48	5,813.60	2.30	59.5-74.5	87	74.2	WD
MW38-400S-320W	10/8/2021	5,748.04	65.56	63.26	5,813.60	2.30	59.5-74.5	87	74.2	WD
MW38-400S-50W	7/14/2021	5,747.71	53.51	51.39	5,801.22	2.12	42-57	59.5	57	WD
MW38-400S-50W	10/7/2021	5,747.80	53.42	51.3	5,801.22	2.12	42-57	59.5	57	WD
MW38-410N-180W	7/13/2021	5,718.18	79.23	76.52	5,797.41	2.71	71.5-91.5	94	56	UNWD
MW38-410N-180W	10/8/2021	5,718.21	79.2	76.49	5,797.41	2.71	71.5-91.5	94	56	UNWD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW38-450S-200E	7/14/2021	5,748.67	40.72	37.93	5,789.39	2.79	45.5-48.5	48.8	45.5	WD/UNWD
MW38-450S-200E	10/7/2021	5,748.67	40.72	37.93	5,789.39	2.79	45.5-48.5	48.8	45.5	WD/UNWD
MW38-450S-320W	7/12/2021	5,750.73	62.02	59.37	5,812.75	2.65	50-70	73.2	70	WD
MW38-450S-320W	10/8/2021	5,751.03	61.72	59.07	5,812.75	2.65	50-70	73.2	70	WD
MW38-450S-60E	7/14/2021	5,748.91	45.33	42.89	5,794.24	2.44	31.5-51.5	54	52.5	WD
MW38-450S-60E	10/7/2021	5,748.94	45.3	42.86	5,794.24	2.44	31.5-51.5	54	52.5	WD
MW38-500N-396E	7/13/2021	5,740.54	34.55	31.96	5,775.09	2.59	24-39	44	40	WD
MW38-500N-396E	10/8/2021	5,740.46	34.63	32.04	5,775.09	2.59	24-39	44	40	WD
MW38-500S-320W	7/12/2021	5,750.89	60.72	58.61	5,811.61	2.11	55-70	87	69.3	WD
MW38-500S-320W	10/8/2021	5,751.16	60.45	58.34	5,811.61	2.11	55-70	87	69.3	WD
MW38-500S-50W	7/14/2021	5,749.76	51.02	48.41	5,800.78	2.61	36.5-51.5	54	51.5	WD
MW38-500S-50W	10/7/2021	5,749.82	50.96	48.35	5,800.78	2.61	36.5-51.5	54	51.5	WD
MW38-550S-200E	7/14/2021	5,750.78	35.29	32.82	5,786.07	2.47	34-49	54	44.5	WD
MW38-550S-200E	10/7/2021	5,750.80	35.27	32.8	5,786.07	2.47	34-49	54	44.5	WD
MW38-550S-320W	7/12/2021	5,751.54	59.15	57.16	5,810.69	1.99	58-68	72	68	WD
MW38-550S-320W	10/8/2021	5,751.87	58.82	56.83	5,810.69	1.99	58-68	72	68	WD
MW38-600N-250E	7/13/2021	5,738.76	38.22	35.74	5,776.98	2.48	27.5-42.5	45.1	42.5	WD
MW38-600N-250E	10/8/2021	5,738.66	38.32	35.84	5,776.98	2.48	27.5-42.5	45.1	42.5	WD
MW38-600S-320W	7/12/2021	5,752.23	58.63	56.17	5,810.86	2.46	52-62	69	61.5	WD
MW38-600S-320W	10/8/2021	5,752.51	58.35	55.89	5,810.86	2.46	52-62	69	61.5	WD
MW38-650S-200E	7/14/2021	5,751.03	35.51	31.77	5,786.54	3.74	42-47	53	47	WD
MW38-650S-200E	10/7/2021	5,751.04	35.5	31.76	5,786.54	3.74	42-47	53	47	WD
MW38-650S-400E	7/14/2021	5,750.89	26.04	23.71	5,776.93	2.33	16-36	38.5	36	WD
MW38-650S-400E	10/7/2021	5,750.87	26.06	23.73	5,776.93	2.33	16-36	38.5	36	WD
MW38-650S-50W	7/14/2021	5,752.07	48.34	45.83	5,800.41	2.51	35-55	58.5	55	WD
MW38-650S-50W	10/7/2021	5,752.16	48.25	45.74	5,800.41	2.51	35-55	58.5	55	WD
MW38-680N-419E	7/12/2021	5,749.35	22.91	20.77	5,772.26	2.14	25-40	43	40	WD
MW38-680N-419E	10/8/2021	5,747.89	24.37	22.23	5,772.26	2.14	25-40	43	40	WD
MW38-700S-320W	7/12/2021	5,765.80	44.68	41.8	5,810.48	2.88	54-59	64	58.9	WD
MW38-700S-320W	10/8/2021	5,765.99	44.49	41.61	5,810.48	2.88	54-59	64	58.9	WD
MW38-700S-400E	7/14/2021	5,750.90	26.36	24	5,777.26	2.36	20-35	38.3	35	WD
MW38-700S-400E	10/7/2021	5,750.87	26.39	24.03	5,777.26	2.36	20-35	38.3	35	WD
MW38-750S-400E	7/14/2021	5,750.90	26.82	24.8	5,777.72	2.02	18-33	37.4	33	WD
MW38-750S-400E	10/7/2021	5,750.91	26.81	24.79	5,777.72	2.02	18-33	37.4	33	WD
MW38-758N-277E	7/12/2021	5,738.55	32.83	30.35	5,771.38	2.48	24-36	49	36	WD
MW38-758N-277E	10/8/2021	5,738.39	32.99	30.51	5,771.38	2.48	24-36	49	36	WD
MW38-770S-60E	7/14/2021	5,761.29	32.13	29.61	5,793.42	2.52	25-45	48	45	WD
MW38-770S-60E	10/7/2021	5,761.38	32.04	29.52	5,793.42	2.52	25-45	48	45	WD
MW38-794N-383E	7/12/2021	5,749.49	22.91	20.47	5,772.40	2.44	25-40	42.5	40	WD
MW38-794N-383E	10/8/2021	5,747.57	24.83	22.39	5,772.40	2.44	25-40	42.5	40	WD
MW38-815S-445E	7/14/2021	5,751.03	29.28	26.49	5,780.31	2.79	21.7 - 36.7	38	36	WD
MW38-815S-445E	10/7/2021	5,751.03	29.28	26.49	5,780.31	2.79	21.7 - 36.7	38	36	WD
MW38-825S-445E	7/14/2021	5,750.98	30.16	26.62	5,781.14	3.54	26-36	41	36	WD
MW38-825S-445E	10/7/2021	5,750.97	30.17	26.63	5,781.14	3.54	26-36	41	36	WD
MW38-830N-230E	7/12/2021	5,738.48	35.09	33.5	5,773.57	1.59	28 - 38	43.4	40	WD
MW38-830N-230E	10/8/2021	5,738.29	35.28	33.69	5,773.57	1.59	28 - 38	43.4	40	WD
MW38-830S-380E	7/14/2021	5,751.13	28.94	26.77	5,780.07	2.17	17.5 - 32.5	34.8	33	WD
MW38-830S-380E	10/7/2021	5,751.08	28.99	26.82	5,780.07	2.17	17.5 - 32.5	34.8	33	WD
MW38-840S-325E	7/14/2021	5,752.55	27.88	25.38	5,780.43	2.50	19 - 34	39	36	WD
MW38-840S-325E	10/7/2021	5,752.72	27.71	25.21	5,780.43	2.50	19 - 34	39	36	WD
MW38-890S-385E	7/14/2021	5,751.62	32.03	29.43	5,783.65	2.60	21.3 - 36.3	39	37	WD
MW38-890S-385E	10/7/2021	5,751.62	32.03	29.43	5,783.65	2.60	21.3 - 36.3	39	37	WD
MW38-995N-228E	7/12/2021	5,720.79	53.63	50.91	5,774.42	2.72	24-64	74	64	WD
MW38-995N-228E	10/8/2021	5,720.68	53.74	51.02	5,774.42	2.72	24-64	74	64	WD
MW38-995N-300E	7/12/2021	5,720.75	50.66	48.15	5,771.41	2.51	27.5-57.5	60	57.5	WD
MW38-995N-300E	10/8/2021	5,720.69	50.72	48.21	5,771.41	2.51	27.5-57.5	60	57.5	WD
MW38-995N-375E	7/12/2021	5,735.00	33.89	30.7	5,768.89	3.19	29-49	51.5	49	WD
MW38-995N-375E	10/8/2021	5,734.27	34.62	31.43	5,768.89	3.19	29-49	51.5	49	WD
MW38-995N-475E	7/13/2021	5,738.51	21.97	22.49	5,760.48	-0.52	31-51	53.9	51	WD
MW38-995N-475E	10/8/2021	5,736.76	23.72	24.24	5,760.48	-0.52	31-51	53.9	51	WD
MW38-WD	7/14/2021	5,736.20	68.22	64.9	5,804.42	3.32	39.5-69.5	75	69.5	WD
MW38-WD	10/7/2021	5,735.91	68.51	65.19	5,804.42	3.32	39.5-69.5	75	69.5	WD
MW39I-WD	7/6/2021	5,772.17	33.51	30.73	5,805.68	2.78	31.1-41	48.8	41	WD
MW39I-WD	10/1/2021	5,772.49	33.19	30.41	5,805.68	2.78	31.1-41	48.8	41	WD
MW39-UD	7/6/2021	5,751.70	52.85	49.8	5,804.55	3.05	56-76	79	42.8	UNWD
MW39-UD	10/1/2021	5,751.69	52.86	49.81	5,804.55	3.05	56-76	79	42.8	UNWD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW39-WD	7/6/2021	5,773.33	31.92	29.17	5,805.25	2.75	24.1-44.1	48.7	44.1	WD
MW39-WD	10/1/2021	5,773.31	31.94	29.19	5,805.25	2.75	24.1-44.1	48.7	44.1	WD
MW40-WD	7/6/2021	5,777.60	43.06	40.4	5,820.66	2.66	31.7-61.7	65	61.8	WD
MW40-WD	10/1/2021	5,777.58	43.08	40.42	5,820.66	2.66	31.7-61.7	65	61.8	WD
MW41-WD	7/6/2021	5,787.73	45.19	42.77	5,832.92	2.42	25.3-55.3	61	55.3	WD
MW41-WD	10/1/2021	5,787.68	45.24	42.82	5,832.92	2.42	25.3-55.3	61	55.3	WD
MW42-UD	7/6/2021	5,788.06	47.74	45.34	5,835.80	2.40	70-90	92.5	60	UNWD
MW42-UD	10/1/2021	5,786.84	48.96	46.56	5,835.80	2.40	70-90	92.5	60	UNWD
MW42-WD	7/6/2021	5,789.27	46.94	44.33	5,836.21	2.61	23.3-48.3	52	48.3	WD
MW42-WD	10/1/2021	5,789.66	46.55	43.94	5,836.21	2.61	23.3-48.3	52	48.3	WD
MW43-WD	7/6/2021	5,791.22	51.55	49.08	5,842.77	2.47	19.5-54.5	60.5	55.1	WD
MW43-WD	10/1/2021	5,791.26	51.51	49.04	5,842.77	2.47	19.5-54.5	60.5	55.1	WD
MW44-WD	7/21/2021	5,788.89	60.36	57.81	5,849.25	2.55	26.4-66.4	69.7	66.4	WD
MW44-WD	10/1/2021	5,788.77	60.48	57.93	5,849.25	2.55	26.4-66.4	69.7	66.4	WD
MW45-WD	7/8/2021	5,806.42	49.12	46.98	5,855.54	2.14	35-65	70	65	WD
MW45-WD	10/1/2021	5,806.76	48.78	46.64	5,855.54	2.14	35-65	70	65	WD
MW46-WD	7/8/2021	5,825.88	22.57	19.92	5,848.45	2.65	15-65	70	65	WD
MW46-WD	10/1/2021	5,825.12	23.33	20.68	5,848.45	2.65	15-65	70	65	WD
MW47-WD	7/8/2021	5,827.13	14.88	12.37	5,842.01	2.51	10-45	45.3	NE, >45.3	WD
MW47-WD	10/1/2021	5,825.82	16.19	13.68	5,842.01	2.51	10-45	45.3	NE, >45.3	WD
MW48-WD	7/8/2021	5,826.04	11.82	9.56	5,837.86	2.26	9.7-49.7	55	49.7	WD
MW48-WD	10/1/2021	5,824.23	13.63	11.37	5,837.86	2.26	9.7-49.7	55	49.7	WD
MW49-WD	7/8/2021	5,808.22	16.72	14.48	5,824.94	2.24	19-54	58.5	54	WD
MW49-WD	10/1/2021	5,807.49	17.45	15.21	5,824.94	2.24	19-54	58.5	54	WD
MW50-WD	7/9/2021	5,790.79	20.16	17.61	5,810.95	2.55	15.2-45.2	50	45.2	WD
MW50-WD	10/5/2021	5,790.72	20.23	17.68	5,810.95	2.55	15.2-45.2	50	45.2	WD
MW51-10S	7/9/2021	5,753.00	43.32	40.9	5,796.32	2.42	51-61	64	44	UNWD
MW51-10S	10/5/2021	5,752.91	43.41	40.99	5,796.32	2.42	51-61	64	44	UNWD
MW51I-WD	7/9/2021	5,749.68	48.35	45.32	5,798.03	3.03	34-44	49	44	WD
MW51I-WD	10/5/2021	5,751.63	46.4	43.37	5,798.03	3.03	34-44	49	44	WD
MW51I-WD-10S	7/9/2021	5,756.49	41.42	38.71	5,797.91	2.71	40.5-41.5	44	NE, >44	WD
MW51I-WD-10S	10/5/2021	5,756.44	41.47	38.76	5,797.91	2.71	40.5-41.5	44	NE, >44	WD
MW51I-WD-15N	7/9/2021	5,747.34	49.27	47.23	5,796.61	2.04	29-44	49	44	WD
MW51I-WD-15N	10/5/2021	5,747.20	49.41	47.37	5,796.61	2.04	29-44	49	44	WD
MW51I-WD-35S	7/9/2021	5,746.30	51.64	49.28	5,797.94	2.36	26-46	51	46	WD
MW51I-WD-35S	10/5/2021	5,746.09	51.85	49.49	5,797.94	2.36	26-46	51	46	WD
MW51I-WD-65N	7/9/2021	5,752.04	43.18	41.46	5,795.22	1.72	28.5-43.5	50.5	44	WD
MW51I-WD-65N	10/5/2021	5,752.02	43.2	41.48	5,795.22	1.72	28.5-43.5	50.5	44	WD
MW51I-WD-80S	7/9/2021	5,756.73	41.71	39.77	5,798.44	1.94	39-54	59	52	WD
MW51I-WD-80S	10/5/2021	5,756.66	41.78	39.84	5,798.44	1.94	39-54	59	52	WD
MW51-WD	7/9/2021	5,753.69	42.71	40.41	5,796.40	2.30	16.2-41.2	45.1	41.2	WD
MW51-WD	10/5/2021	5,753.64	42.76	40.46	5,796.40	2.30	16.2-41.2	45.1	41.2	WD
MW51X-WD-100S	7/9/2021	5,751.73	46.9	44.17	5,798.63	2.73	46.5-48.5	51	52	WD
MW51X-WD-100S	10/5/2021	5,751.72	46.91	44.18	5,798.63	2.73	46.5-48.5	51	52	WD
MW51X-WD-35S	7/9/2021	5,751.98	44.07	42.06	5,796.05	2.01	28-43	45.5	43.5	WD
MW51X-WD-35S	10/5/2021	5,751.93	44.12	42.11	5,796.05	2.01	28-43	45.5	43.5	WD
MW51X-WD-65N	7/9/2021	5,751.98	43.27	39.93	5,795.25	3.34	21-41	44.5	41	WD
MW51X-WD-65N	10/5/2021	5,751.96	43.29	39.95	5,795.25	3.34	21-41	44.5	41	WD
MW51X-WD-90S	7/9/2021	5,751.80	46.03	44.1	5,797.83	1.93	38-53	56.5	52	WD
MW51X-WD-90S	10/5/2021	5,751.80	46.03	44.1	5,797.83	1.93	38-53	56.5	52	WD
MW52-DEN	7/9/2021	5,728.83	54.7	52.59	5,783.53	2.11	155-175	180	45	UPPER DENVER
MW52-DEN	10/5/2021	5,728.47	55.06	52.95	5,783.53	2.11	155-175	180	45	UPPER DENVER
MW52-LIG	7/9/2021	5,681.29	102.25	99.41	5,783.54	2.84	285-300	307	45	LIGNITE
MW52-LIG	10/5/2021	5,680.93	102.61	99.77	5,783.54	2.84	285-300	307	45	LIGNITE
MW52-UD	7/9/2021	5,748.40	35.74	32.9	5,784.14	2.84	65-85	88	45	UNWD
MW52-UD	10/5/2021	5,748.02	36.12	33.28	5,784.14	2.84	65-85	88	45	UNWD
MW52-WD	7/9/2021	5,751.43	33.44	30.57	5,784.87	2.87	25-45	50	45	WD
MW52-WD	10/5/2021	5,751.52	33.35	30.48	5,784.87	2.87	25-45	50	45	WD
MW53-WD	7/9/2021	5,748.32	36.39	34.88	5,784.71	1.51	17.5-52.5	55.5	52.5	WD
MW53-WD	10/5/2021	5,748.11	36.6	35.09	5,784.71	1.51	17.5-52.5	55.5	52.5	WD
MW54-UDR	7/9/2021	5,719.96	25.91	23.44	5,745.87	2.47	54-64	67	37	UNWD
MW54-UDR	10/5/2021	5,719.86	26.01	23.54	5,745.87	2.47	54-64	67	37	UNWD
MW54-WD	7/9/2021	5,720.24	25.03	22.41	5,745.27	2.62	16.8-36.8	40	36.8	WD
MW54-WD	10/5/2021	5,719.62	25.65	23.03	5,745.27	2.62	16.8-36.8	40	36.8	WD
MW55-WD	7/13/2021	5,754.14	37.13	34.26	5,791.27	2.87	28.4-48.4	54	48.4	WD
MW55-WD	10/8/2021	5,753.95	37.32	34.45	5,791.27	2.87	28.4-48.4	54	48.4	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW56-WD	7/14/2021	5,750.27	47.97	44.93	5,798.24	3.04	25-50	54	50	WD
MW56-WD	10/7/2021	5,750.32	47.92	44.88	5,798.24	3.04	25-50	54	50	WD
MW57-WD	7/14/2021	5,740.19	36.96	34.81	5,777.15	2.15	24-39	44	39	WD
MW57-WD	10/7/2021	5,740.06	37.09	34.94	5,777.15	2.15	24-39	44	39	WD
MW58-WD	7/13/2021	5,756.18	53.83	50.72	5,810.01	3.11	26-56	59	56	WD
MW58-WD	10/8/2021	5,756.61	53.4	50.29	5,810.01	3.11	26-56	59	56	WD
MW59-WD	7/13/2021	5,755.93	47.17	45.58	5,803.10	1.59	39.5-57	60	57	WD
MW59-WD	10/8/2021	5,756.00	47.1	45.51	5,803.10	1.59	39.5-57	60	57	WD
MW60-WD	7/9/2021	5,751.66	35.23	32.58	5,786.89	2.65	19-44	49	44	WD
MW60-WD	10/5/2021	5,751.68	35.21	32.56	5,786.89	2.65	19-44	49	44	WD
MW61-WD	7/9/2021	5,751.67	34.37	32.23	5,786.04	2.14	27-39	44	39	WD
MW61-WD	10/5/2021	5,751.68	34.36	32.22	5,786.04	2.14	27-39	44	39	WD
MW62-DENR	7/7/2021	5,698.83	29.52	27.52	5,728.35	2.00	124-144	149	35	UPPER DENVER
MW62-DENR	10/4/2021	5,698.43	29.92	27.92	5,728.35	2.00	124-144	149	35	UPPER DENVER
MW62-LIG	7/7/2021	5,674.58	52.72	51.02	5,727.30	1.70	208-223	227	30.5	LIGNITE
MW62-LIG	10/4/2021	5,674.28	53.02	51.32	5,727.30	1.70	208-223	227	30.5	LIGNITE
MW62-UD	7/7/2021	5,690.74	36.92	34.86	5,727.66	2.06	53.5-68.5	71	32	UNWD
MW62-UD	10/4/2021	5,690.44	37.22	35.16	5,727.66	2.06	53.5-68.5	71	32	UNWD
MW62-WDR	7/7/2021	5,697.12	31.13	28.81	5,728.25	2.32	20.4-30.4	33.5	30	WD
MW62-WDR	10/4/2021	5,697.08	31.17	28.85	5,728.25	2.32	20.4-30.4	33.5	30	WD
MW63-WD	7/6/2021	5,772.87	35.62	33.73	5,808.49	1.89	33-53	57.9	53	WD
MW63-WD	10/1/2021	5,772.96	35.53	33.64	5,808.49	1.89	33-53	57.9	53	WD
MW64-WD	7/6/2021	5,775.20	30.83	28.1	5,806.03	2.73	31-46	49	45.4	WD
MW64-WD	10/1/2021	5,775.32	30.71	27.98	5,806.03	2.73	31-46	49	45.4	WD
MW65-WD	7/6/2021	5,772.10	27.49	25.1	5,799.59	2.39	26-38	42	37.7	WD
MW65-WD	10/1/2021	5,772.03	27.56	25.17	5,799.59	2.39	26-38	42	37.7	WD
MW66-WD	7/9/2021	5,751.66	39.78	37.14	5,791.44	2.64	31.8-41.8	49	41	WD
MW66-WD	10/5/2021	5,751.66	39.78	37.14	5,791.44	2.64	31.8-41.8	49	41	WD
MW67-WD	7/6/2021	5,772.71	28.9	26.39	5,801.61	2.51	31-43	49	43	WD
MW67-WD	10/1/2021	5,772.77	28.84	26.33	5,801.61	2.51	31-43	49	43	WD
MW68-WD	7/6/2021	5,773.74	32.67	30.06	5,806.41	2.61	29-44	52.8	44	WD
MW68-WD	10/1/2021	5,773.69	32.72	30.11	5,806.41	2.61	29-44	52.8	44	WD
MW70-WD	7/9/2021	5,751.68	39.47	37.32	5,791.15	2.15	34.5-49.5	52.3	49	WD
MW70-WD	10/5/2021	5,751.65	39.5	37.35	5,791.15	2.15	34.5-49.5	52.3	49	WD
MW71-DENR	7/9/2021	5,710.05	22.86	20.4	5,732.91	2.46	102.1 -	130	41.5	UPPER DENVER
MW71-DENR	10/5/2021	5,709.81	23.1	20.64	5,732.91	2.46	102.1 -	130	41.5	UPPER DENVER
MW71-LIG	7/9/2021	5,680.24	52.45	49.76	5,732.69	2.69	208-223	228	33	LIGNITE
MW71-LIG	10/5/2021	5,680.09	52.6	49.91	5,732.69	2.69	208-223	228	33	LIGNITE
MW71-UD	7/9/2021	5,710.25	22.89	20.45	5,733.14	2.44	67.5-82.5	84	37	UNWD
MW71-UD	10/5/2021	5,709.84	23.3	20.86	5,733.14	2.44	67.5-82.5	84	37	UNWD
MW71-WD	7/9/2021	5,709.80	23.26	20.5	5,733.06	2.76	20.5-35.5	39.2	35.5	WD
MW71-WD	10/5/2021	5,709.21	23.85	21.09	5,733.06	2.76	20.5-35.5	39.2	35.5	WD
MW72-DEN	7/9/2021	5,716.32	40.41	37.83	5,756.73	2.58	109.4 - 124	128	42	UPPER DENVER
MW72-DEN	10/5/2021	5,716.04	40.69	38.11	5,756.73	2.58	109.4 - 124	128	42	UPPER DENVER
MW72-LIGR	7/9/2021	5,682.00	77.07	74.67	5,759.07	2.40	253-263	268	42	LIGNITE
MW72-LIGR	10/5/2021	5,681.03	78.04	75.64	5,759.07	2.40	253-263	268	42	LIGNITE
MW72-UD	7/9/2021	5,721.51	35.15	32.69	5,756.66	2.46	66-81	84	43	UNWD
MW72-UD	10/5/2021	5,721.06	35.6	33.14	5,756.66	2.46	66-81	84	43	UNWD
MW72-WD	7/9/2021	5,725.31	31.97	28.99	5,757.28	2.98	32.5-42.5	45	42.5	WD
MW72-WD	10/5/2021	5,724.66	32.62	29.64	5,757.28	2.98	32.5-42.5	45	42.5	WD
MW73-UD	7/8/2021	5,711.16	25.04	22.54	5,736.20	2.50	57.7-77.7	80	35	UNWD
MW73-UD	10/4/2021	5,710.97	25.23	22.73	5,736.20	2.50	57.7-77.7	80	35	UNWD
MW73-WD	7/8/2021	5,715.81	21.01	18.45	5,736.82	2.56	15.7-35.7	38	34.5	WD
MW73-WD	10/4/2021	5,715.26	21.56	19	5,736.82	2.56	15.7-35.7	38	34.5	WD
MW74-UD	7/13/2021	5,713.25	36.11	33.75	5,749.36	2.36	72.7-92.7	95	54	UNWD
MW74-UD	10/8/2021	5,713.15	36.21	33.85	5,749.36	2.36	72.7-92.7	95	54	UNWD
MW74-WD	7/13/2021	5,717.20	32.18	29.8	5,749.38	2.38	38-58	62	54	WD
MW74-WD	10/8/2021	5,716.73	32.65	30.27	5,749.38	2.38	38-58	62	54	WD
MW75-UD	7/12/2021	5,717.04	39.79	37.17	5,756.83	2.62	71.5-91.5	94	51	UNWD
MW75-UD	10/8/2021	5,716.98	39.85	37.23	5,756.83	2.62	71.5-91.5	94	51	UNWD
MW75-WD	7/12/2021	5,735.03	22.14	19.27	5,757.17	2.87	25-50	52.5	50	WD
MW75-WD	10/8/2021	5,732.29	24.88	22.01	5,757.17	2.87	25-50	52.5	50	WD
MW76-UD	7/12/2021	5,717.53	45.01	42.67	5,762.54	-0.16	60-80	83	34.5	UNWD
MW76-UD	10/8/2021	5,717.48	42.56	42.72	5,760.04	-0.16	60-80	83	34.5	UNWD
MW76-WD	7/12/2021	5,743.92	18.32	15.78	5,762.24	-0.06	20-35	38	34.5	WD
MW76-WD	10/8/2021	5,741.02	18.62	18.68	5,759.64	-0.06	20-35	38	34.5	WD

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WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
MW77-EW-1	7/2/2021	5,688.41	36.82	34.19	5,725.23	2.63	25-35	39	37.6	WD
MW77-EW-1	10/4/2021	5,688.38	36.85	34.22	5,725.23	2.63	25-35	39	37.6	WD
MW77-EW-2	7/2/2021	5,696.19	24.79	22.31	5,720.98	2.48	22-32	39	34.9	WD
MW77-EW-2	10/4/2021	5,695.87	25.11	22.63	5,720.98	2.48	22-32	39	34.9	WD
MW77-UD	7/2/2021	5,696.00	31.56	29.33	5,727.56	2.22	57-72	75	35	UNWD
MW77-UD	10/4/2021	5,695.35	32.21	29.98	5,727.56	2.22	57-72	75	35	UNWD
MW77-WD	7/2/2021	5,701.25	27	24.15	5,728.25	2.85	19.7-34.7	37	34.5	WD
MW77-WD	10/4/2021	5,700.00	28.25	25.4	5,728.25	2.85	19.7-34.7	37	34.5	WD
MW78-UD	7/9/2021	5,706.00	25.54	23.2	5,731.54	2.34	57-77	79.5	42.5	UNWD
MW78-UD	10/5/2021	5,705.34	26.2	23.86	5,731.54	2.34	57-77	79.5	42.5	UNWD
MW78-WD	7/9/2021	5,705.17	26.41	23.93	5,731.58	2.48	24-44	47.5	42.5	WD
MW78-WD	10/5/2021	5,704.70	26.88	24.4	5,731.58	2.48	24-44	47.5	42.5	WD
MW79-UD	7/9/2021	5,712.71	14.59	12.29	5,727.30	2.30	52-72	75	35	UNWD
MW79-UD	10/5/2021	5,712.80	14.5	12.2	5,727.30	2.30	52-72	75	35	UNWD
MW79-WD	7/9/2021	5,713.20	14.83	12	5,728.03	2.83	20-35	38	35	WD
MW79-WD	10/5/2021	5,712.74	15.29	12.46	5,728.03	2.83	20-35	38	35	WD
MW90-UD	7/9/2021	5,731.96	27.99	24.74	5,759.95	3.25	44-64	66.5	41	UNWD
MW90-UD	10/5/2021	5,731.23	28.72	25.47	5,759.95	3.25	44-64	66.5	41	UNWD
MW90-WD	7/9/2021	5,731.93	28.12	25.17	5,760.05	2.95	26-41	43.5	41	WD
MW90-WD	10/5/2021	5,731.21	28.84	25.89	5,760.05	2.95	26-41	43.5	41	WD
MW91-UD	7/9/2021	5,716.32	19.52	17.28	5,735.84	2.24	60-80	82.5	31.5	UNWD
MW91-UD	10/5/2021	5,716.03	19.81	17.57	5,735.84	2.24	60-80	82.5	31.5	UNWD
MW91-WD	7/9/2021	5,717.66	17.93	15.94	5,735.59	1.99	21.5-31.5	34	31.5	WD
MW91-WD	10/5/2021	5,717.18	18.41	16.42	5,735.59	1.99	21.5-31.5	34	31.5	WD
MW92-WD	7/9/2021	5,724.35	23.66	21.05	5,748.01	2.61	19.5-39.5	42	39.5	WD
MW92-WD	10/5/2021	5,723.66	24.35	21.74	5,748.01	2.61	19.5-39.5	42	39.5	WD
MW93-UD	7/9/2021	5,732.05	25.32	22.75	5,757.37	2.57	42-62	75	35	UNWD
MW93-UD	10/5/2021	5,731.29	26.08	23.51	5,757.37	2.57	42-62	75	35	UNWD
MW93-WD	7/9/2021	5,729.79	27.69	25.21	5,757.48	2.48	15-35	37.5	35	WD
MW93-WD	10/5/2021	5,729.37	28.11	25.63	5,757.48	2.48	15-35	37.5	35	WD
MW97-WD	7/2/2021	5,698.98	28.68	25.82	5,727.66	2.86	29-31	34	30.5	WD
MW97-WD	10/4/2021	5,698.30	29.36	26.5	5,727.66	2.86	29-31	34	30.5	WD
MW98-WD	7/2/2021	5,690.98	34.75	32.42	5,725.73	2.33	25.5-33	36	33	WD
MW98-WD	10/4/2021	5,691.01	34.72	32.39	5,725.73	2.33	25.5-33	36	33	WD
MW99-WD	7/2/2021	5,700.10	25.4	22.9	5,725.50	2.50	25.5-33	35.5	31.5	WD
MW99-WD	10/4/2021	5,699.69	25.81	23.31	5,725.50	2.50	25.5-33	35.5	31.5	WD
MW-EW-1	7/7/2021	5,697.61	15.91	12.99	5,713.52	2.92	7.8-17.8	17.8	NE, >17.8	ALLUVIUM
MW-EW-1	10/4/2021	5,697.14	16.38	13.46	5,713.52	2.92	7.8-17.8	17.8	NE, >17.8	ALLUVIUM
MW-EW-1LC	7/7/2021	5,695.10	17.87	15.93	5,712.97	1.94	28-38	38.1	23	UNWD
MW-EW-1LC	10/4/2021	5,694.68	18.29	16.35	5,712.97	1.94	28-38	38.1	23	UNWD
MW-EW-1LCRA	7/7/2021	5,692.97	19.89	17.53	5,712.86	2.36	46.5-61.5	64	23	UNWD
MW-EW-1LCRA	10/4/2021	5,692.51	20.35	17.99	5,712.86	2.36	46.5-61.5	64	23	UNWD
MW-EW-2	7/7/2021	5,697.64	16	12.98	5,713.64	3.02	8-18	18	NE, >18	ALLUVIUM
MW-EW-2	10/4/2021	5,697.00	16.64	13.62	5,713.64	3.02	8-18	18	NE, >18	ALLUVIUM
MW-EW-2LC	7/7/2021	5,695.62	18.79	15.73	5,714.41	3.06	28-38	38	25	UNWD
MW-EW-2LC	10/4/2021	5,695.03	19.38	16.32	5,714.41	3.06	28-38	38	25	UNWD
MW-EW-2LCR	7/7/2021	5,695.32	20.62	17.68	5,715.94	2.94	46.5-56.5	59	24.5	UNWD
MW-EW-2LCR	10/4/2021	5,694.88	21.06	18.12	5,715.94	2.94	46.5-56.5	59	24.5	UNWD
NBBW-IW-1	7/8/2021	Dry	Dry	Dry	5,709.43	2.61	10-20	27.5	22	WD
NBBW-IW-1	10/4/2021	Dry	Dry	Dry	5,709.43	2.61	10-20	27.5	22	WD
NBBW-IW-2	7/8/2021	5,686.48	22.62	19.46	5,709.10	3.16	12-22	28	23	WD
NBBW-IW-2	10/4/2021	5,686.17	22.93	19.77	5,709.10	3.16	12-22	28	23	WD
NBBW-IW-3	7/8/2021	5,668.38	43.36	41.09	5,711.74	2.27	11-41	47	42	WD
NBBW-IW-3	10/4/2021	5,666.88	44.86	42.59	5,711.74	2.27	11-41	47	42	WD
NEPZ-097	7/1/2021	5,553.88	24.61	24.81	5,578.49	-0.20	23-43	47.3	43.5	UPPER DENVER
NEPZ-097	10/6/2021	5,553.24	25.25	25.45	5,578.49	-0.20	23-43	47.3	43.5	UPPER DENVER
NEPZ-098	7/1/2021	5,554.88	21.75	21.74	5,576.63	0.01	16-46	49.5	45.5	UPPER DENVER
NEPZ-098	10/6/2021	5,554.12	22.51	22.5	5,576.63	0.01	16-46	49.5	45.5	UPPER DENVER
NEPZ-099	7/1/2021	5,556.66	18.8	18.76	5,575.46	0.04	12.5-42.5	48.5	43.5	UPPER DENVER
NEPZ-099	10/6/2021	5,555.69	19.77	19.73	5,575.46	0.04	12.5-42.5	48.5	43.5	UPPER DENVER
NEPZ-101	7/1/2021	5,560.75	11.65	12.33	5,572.40	-0.68	19-44	49	43	UPPER DENVER
NEPZ-101	10/6/2021	5,559.67	12.73	13.41	5,572.40	-0.68	19-44	49	43	UPPER DENVER
NEPZ-102	7/1/2021	5,563.38	10.22	10.66	5,573.60	-0.44	27-42	49	43	UPPER DENVER
NEPZ-102	10/6/2021	5,562.32	11.28	11.72	5,573.60	-0.44	27-42	49	43	UPPER DENVER
NEPZ-103	7/1/2021	5,564.66	9.62	10.16	5,574.28	-0.54	24-44	46	43	UPPER DENVER
NEPZ-103	10/6/2021	5,563.67	10.61	11.15	5,574.28	-0.54	24-44	46	43	UPPER DENVER

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
NEPZ-104	7/1/2021	5,564.95	9.68	9.9	5,574.63	-0.22	14.8-29.8	33	29.5	UPPER DENVER
NEPZ-104	10/6/2021	5,564.01	10.62	10.84	5,574.63	-0.22	14.8-29.8	33	29.5	UPPER DENVER
NEPZ-105	7/1/2021	5,566.35	9.83	10.06	5,576.18	-0.23	11.8-26.8	29.8	27.2	UPPER DENVER
NEPZ-105	10/6/2021	5,565.60	10.58	10.81	5,576.18	-0.23	11.8-26.8	29.8	27.2	UPPER DENVER
NTES SUMP	7/15/2021	5,729.16	28.77	32.64	5,757.93	-3.87	--	--	--	--
NTES SUMP	10/11/2021	5,729.14	28.79	32.66	5,757.93	-3.87	--	--	--	--
NTES-180W	7/15/2021	5,729.80	35.83	33.71	5,765.63	2.12	15-35	40.5	36	Fill (tire shreds)
NTES-180W	10/11/2021	5,729.80	35.83	33.71	5,765.63	2.12	15-35	40.5	36	Fill (tire shreds)
NTES-EW1	7/15/2021	5,749.38	28.9	27.32	5,778.28	1.58	41-51	53.5	50.5	WD
NTES-EW1	10/11/2021	5,749.50	28.78	27.2	5,778.28	1.58	41-51	53.5	50.5	WD
NTES-EW2	7/15/2021	5,745.62	32.44	29.86	5,778.06	2.58	30-50	55	52	WD
NTES-EW2	10/11/2021	5,745.72	32.34	29.76	5,778.06	2.58	30-50	55	52	WD
NTES-EW3	7/15/2021	5,748.20	31.8	28.5	5,780.00	3.30	27.5-37.5	40	37.5	WD
NTES-EW3	10/11/2021	5,748.45	31.55	28.25	5,780.00	3.30	27.5-37.5	40	37.5	WD
PM-10I	7/8/2021	5,815.01	19.47	16.89	5,834.48	2.58	11.7-49.2	55.25	49.2	WD
PM-10I	10/1/2021	5,814.28	20.2	17.62	5,834.48	2.58	11.7-49.2	55.25	49.2	WD
PM-10X	7/8/2021	5,820.68	13.71	10.92	5,834.39	2.79	11.7-41.7	45.6	41.7	WD
PM-10X	10/1/2021	5,818.97	15.42	12.63	5,834.39	2.79	11.7-41.7	45.6	41.7	WD
PM-11I	7/9/2021	5,773.53	46.49	44.07	5,820.02	2.42	12.5-52.5	58.5	52.5	WD
PM-11I	10/5/2021	5,773.39	46.63	44.21	5,820.02	2.42	12.5-52.5	58.5	52.5	WD
PM-11X	7/9/2021	5,795.56	21.91	20.14	5,817.47	2.44	16-51	55	50.8	WD
PM-11X	10/5/2021	5,794.85	22.62	20.85	5,817.47	2.44	16-51	55	50.8	WD
PM-12I	7/9/2021	5,762.86	41.77	39.04	5,804.63	2.73	23.2-43.2	49.2	43.2	WD
PM-12I	10/5/2021	5,762.69	41.94	39.21	5,804.63	2.73	23.2-43.2	49.2	43.2	WD
PM-12X	7/9/2021	5,767.15	36.36	33.85	5,803.51	2.51	17-47	50	44	WD
PM-12X	10/5/2021	5,767.00	36.51	34	5,803.51	2.51	17-47	50	44	WD
PM-13I	7/9/2021	Dry	Dry	Dry	5,791.09	2.89	14.5-34.5	41	34.5	WD
PM-13I	10/5/2021	Dry	Dry	Dry	5,791.09	2.89	14.5-34.5	41	34.5	WD
PM-13X	7/9/2021	Dry	Dry	Dry	5,789.76	2.86	15-35	35	35	WD
PM-13X	10/5/2021	5,752.11	37.65	34.79	5,789.76	2.86	15-35	35	35	WD
PM-14I	7/9/2021	5,748.97	33.47	30.94	5,782.44	2.53	11.6-56.6	62	56.6	WD
PM-14I	10/5/2021	5,749.09	33.35	30.82	5,782.44	2.53	11.6-56.6	62	56.6	WD
PM-14ID	7/9/2021	5,750.55	33.19	31.1	5,783.74	2.09	44.5-54.5	64	54.5	WD
PM-14ID	10/5/2021	5,750.68	33.06	30.97	5,783.74	2.09	44.5-54.5	64	54.5	WD
PM-14X	7/9/2021	5,747.90	33.28	30.62	5,781.18	2.66	26.3-51.3	55	51.3	WD
PM-14X	10/5/2021	5,748.11	33.07	30.41	5,781.18	2.66	26.3-51.3	55	51.3	WD
PM-15I	7/9/2021	5,723.61	53.31	49.79	5,776.92	3.52	18.6-48.6	54	48.6	WD
PM-15I	10/5/2021	5,723.20	53.72	50.2	5,776.92	3.52	18.6-48.6	54	48.6	WD
PM-15I-UD	7/9/2021	5,735.62	39.77	37.08	5,775.39	2.69	57.5-77.5	80	53.10	UNWD
PM-15I-UD	10/5/2021	5,735.55	39.84	37.15	5,775.39	2.69	57.5-77.5	80	53.10	UNWD
PM-15W	7/9/2021	5,746.24	34.11	31.19	5,780.35	2.92	22-32	54	53	WD
PM-15W	10/5/2021	5,746.19	34.16	31.24	5,780.35	2.92	22-32	54	53	WD
PM-15WR	7/9/2021	5,739.65	40.2	37.96	5,779.85	2.24	25-55	58	55.7	WD
PM-15WR	10/5/2021	5,739.62	40.23	37.99	5,779.85	2.24	25-55	58	55.7	WD
PM-15X	7/9/2021	5,736.91	37.73	34.89	5,774.64	2.84	29.3-49.3	52.5	49.4	WD
PM-15X	10/5/2021	5,737.04	37.6	34.76	5,774.64	2.84	29.3-49.3	52.5	49.4	WD
PM-1I	7/14/2021	5,771.24	22.82	19.86	5,794.06	2.96	15.5-35.5	41	35.5	WD
PM-1I	10/7/2021	5,771.72	22.34	19.38	5,794.06	2.96	15.5-35.5	41	35.5	WD
PM-1X	7/14/2021	5,774.02	17.91	15.28	5,791.93	2.63	14.5-34.5	38	34.5	WD
PM-1X	10/7/2021	5,773.19	18.74	16.11	5,791.93	2.63	14.5-34.5	38	34.5	WD
PM-2I	7/6/2021	5,769.95	46.95	44.15	5,816.90	2.80	30.2-65.2	71	65.2	WD
PM-2I	10/1/2021	5,769.92	46.98	44.18	5,816.90	2.80	30.2-65.2	71	65.2	WD
PM-2X	7/6/2021	5,776.96	38.26	36.14	5,815.22	2.12	28-63	68	63	WD
PM-2X	10/1/2021	5,776.91	38.31	36.19	5,815.22	2.12	28-63	68	63	WD
PM-3I	7/6/2021	5,778.64	48.9	46.26	5,827.54	2.64	29-64	70	64	WD
PM-3I	10/1/2021	5,778.60	48.94	46.3	5,827.54	2.64	29-64	70	64	WD
PM-3X	7/6/2021	5,778.07	48.95	46.43	5,827.02	2.52	28-68	71	68	WD
PM-3X	10/1/2021	5,778.13	48.89	46.37	5,827.02	2.52	28-68	71	68	WD
PM-4EW1	7/6/2021	5,794.62	43.32	40.68	5,837.94	2.64	32-45	48	45	WD
PM-4EW1	10/1/2021	5,794.49	43.45	40.81	5,837.94	2.64	32-45	48	45	WD
PM-4EW2	7/6/2021	5,794.57	43.35	40.73	5,837.92	2.62	45-52	54.5	52	WD
PM-4EW2	10/1/2021	5,794.43	43.49	40.87	5,837.92	2.62	45-52	54.5	52	WD
PM-4I	7/6/2021	5,793.20	43.52	40.9	5,836.72	2.62	22-57	62.9	57	WD
PM-4I	10/1/2021	5,793.14	43.58	40.96	5,836.72	2.62	22-57	62.9	57	WD
PM-4X	7/6/2021	5,793.59	43.6	41.01	5,837.19	2.59	28.8-48.8	51.9	48.8	WD
PM-4X	10/1/2021	5,793.52	43.67	41.08	5,837.19	2.59	28.8-48.8	51.9	48.8	WD

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LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
PM-5I	7/6/2021	5,799.84	37.57	35.46	5,837.41	2.11	22.4-52.4	59	51.4	WD
PM-5I	10/1/2021	5,799.04	38.37	36.26	5,837.41	2.11	22.4-52.4	59	51.4	WD
PM-5X	7/6/2021	5,799.81	38.24	35.69	5,838.05	2.55	22.9-47.9	51.9	47.9	WD
PM-5X	10/1/2021	5,799.93	38.12	35.57	5,838.05	2.55	22.9-47.9	51.9	47.9	WD
PM-6I	7/8/2021	5,797.80	54.38	51.8	5,852.18	2.58	43.9-63.9	69.9	63.9	WD
PM-6I	10/1/2021	5,797.76	54.42	51.84	5,852.18	2.58	43.9-63.9	69.9	63.9	WD
PM-6X	7/8/2021	5,793.81	57.86	55.29	5,851.67	2.57	36.5-61.5	65	61.5	WD
PM-6X	10/1/2021	5,793.76	57.91	55.34	5,851.67	2.57	36.5-61.5	65	61.5	WD
PM-6X-UD	7/8/2021	5,792.58	59.45	56.94	5,852.03	2.51	85 - 109.5	112.5	75	UNWD
PM-6X-UD	10/1/2021	5,792.20	59.83	57.32	5,852.03	2.51	85 - 109.5	112.5	75	UNWD
PM-7I	7/8/2021	5,810.82	42.13	40.08	5,852.95	2.05	27.5-62.5	68.75	62.5	WD
PM-7I	10/1/2021	5,810.79	42.16	40.11	5,852.95	2.05	27.5-62.5	68.75	62.5	WD
PM-7X	7/8/2021	5,818.26	35.35	32.54	5,853.61	2.81	16.5-66.5	70	66.5	WD
PM-7X	10/1/2021	5,818.13	35.48	32.67	5,853.61	2.81	16.5-66.5	70	66.5	WD
PM-8I	7/8/2021	5,816.84	26.58	24.36	5,843.42	2.22	12.3-64.8	71.3	64.8	WD
PM-8I	10/1/2021	5,816.29	27.13	24.91	5,843.42	2.22	12.3-64.8	71.3	64.8	WD
PM-8X	7/8/2021	5,826.77	17.05	14.23	5,843.82	2.82	10.2-65.2	70	65.2	WD
PM-8X	10/1/2021	5,825.60	18.22	15.4	5,843.82	2.82	10.2-65.2	70	65.2	WD
PM-9I	7/8/2021	5,816.62	24.81	22.38	5,841.43	2.43	12-44.5	50.25	44.5	WD
PM-9I	10/1/2021	5,816.02	25.41	22.98	5,841.43	2.43	12-44.5	50.25	44.5	WD
PM-9X	7/8/2021	5,826.89	14	10.81	5,840.89	3.19	11.75-46.75	50	46.8	WD
PM-9X	10/1/2021	5,824.98	15.91	12.72	5,840.89	3.19	11.75-46.75	50	46.8	WD
PTP-1	7/7/2021	5,695.74	36.93	33.16	5,732.67	3.77	25-40	40	NE, >40	WD
PTP-1	10/4/2021	5,695.74	36.93	33.16	5,732.67	3.77	25-40	40	NE, >40	WD
PTP-10C	7/7/2021	5,694.00	32.5	28.2	5,726.50	4.30	19-34	34	32	WD
PTP-10C	10/4/2021	5,693.95	32.55	28.25	5,726.50	4.30	19-34	34	32	WD
PTP-11	7/2/2021	5,687.52	22.66	19.08	5,710.18	3.58	12-22	23.9	22	WD
PTP-11	10/4/2021	5,687.32	22.86	19.28	5,710.18	3.58	12-22	23.9	22	WD
PTP-12	7/2/2021	5,688.73	24.4	21.57	5,713.13	2.83	12-27	27	26	WD
PTP-12	10/4/2021	5,688.51	24.62	21.79	5,713.13	2.83	12-27	27	26	WD
PTP-13	7/8/2021	5,688.25	25.31	23.15	5,713.56	2.16	12.5-27.5	27.5	27	WD
PTP-13	10/4/2021	5,687.57	25.99	23.83	5,713.56	2.16	12.5-27.5	27.5	27	WD
PTP-14	7/8/2021	Dry	Dry	Dry	5,709.05	2.25	12-27	27	26.5	WD
PTP-14	10/4/2021	Dry	Dry	Dry	5,709.05	2.25	12-27	27	26.5	WD
PTP-15	7/8/2021	Dry	Dry	Dry	5,704.94	2.84	7.5-22.5	23.7	22.5	WD
PTP-15	10/4/2021	Dry	Dry	Dry	5,704.94	2.84	7.5-22.5	23.7	22.5	WD
PTP-15S	7/8/2021	Dry	Dry	Dry	5,704.55	2.35	7-12	12	NE, >12	WD
PTP-15S	10/4/2021	Dry	Dry	Dry	5,704.55	2.35	7-12	12	NE, >12	WD
PTP-16	7/8/2021	Dry	Dry	Dry	5,703.46	0.36	4.5-14.5	17	NE, >17	WD
PTP-16	10/4/2021	Dry	Dry	Dry	5,703.46	0.36	4.5-14.5	17	NE, >17	WD
PTP-17S	7/8/2021	Dry	Dry	Dry	5,711.50	4.50	10-15	15	NE, >15	WD
PTP-17S	10/4/2021	Dry	Dry	Dry	5,711.50	4.50	10-15	15	NE, >15	WD
PTP-18	7/8/2021	Dry	Dry	Dry	5,712.55	3.85	15.5-30.5	30.5	30.5	WD
PTP-18	10/4/2021	Dry	Dry	Dry	5,712.55	3.85	15.5-30.5	30.5	30.5	WD
PTP-19	7/8/2021	Dry	Dry	Dry	5,715.56	3.86	9.5-24.5	39	38.8	WD
PTP-19	10/4/2021	Dry	Dry	Dry	5,715.56	3.86	9.5-24.5	39	38.8	WD
PTP-20	7/8/2021	Dry	Dry	Dry	5,707.16	3.66	6-21	23.5	21	WD
PTP-20	10/4/2021	Dry	Dry	Dry	5,707.16	3.66	6-21	23.5	21	WD
PTP-20S	7/8/2021	Dry	Dry	Dry	5,706.15	2.65	NA	--	NA	WD
PTP-20S	10/4/2021	Dry	Dry	Dry	5,706.15	2.65	NA	--	NA	WD
PTP-21	7/8/2021	5,688.86	21.75	19.34	5,710.61	2.41	7.5-22.5	22.5	21	WD
PTP-21	10/4/2021	5,688.58	22.03	19.62	5,710.61	2.41	7.5-22.5	22.5	21	WD
PTP-22	7/8/2021	5,688.75	23.42	20.55	5,712.17	2.87	6-21	21	21	WD
PTP-22	10/4/2021	5,688.70	23.47	20.6	5,712.17	2.87	6-21	21	21	WD
PTP-22S	7/8/2021	Dry	Dry	Dry	5,711.50	2.20	7-12	12	NE, >12	WD
PTP-22S	10/4/2021	Dry	Dry	Dry	5,711.50	2.20	7-12	12	NE, >12	WD
PTP-23	7/7/2021	5,693.25	32.08	28.27	5,725.33	3.81	23-33	33	32	WD
PTP-23	10/4/2021	5,693.24	32.09	28.28	5,725.33	3.81	23-33	33	32	WD
PTP-24	7/7/2021	5,692.55	28.68	25.48	5,721.23	3.20	22-32	32	29.5	WD
PTP-24	10/4/2021	5,692.45	28.78	25.58	5,721.23	3.20	22-32	32	29.5	WD
PTP-25	7/7/2021	5,688.11	25.28	23.31	5,713.39	1.97	18.3-28.3	28.29	27	WD
PTP-25	10/4/2021	5,688.10	25.29	23.32	5,713.39	1.97	18.3-28.3	28.29	27	WD
PTP-26	7/7/2021	5,689.15	35.44	32.54	5,724.59	2.90	24-34	34	34	WD
PTP-26	10/4/2021	5,689.24	35.35	32.45	5,724.59	2.90	24-34	34	34	WD
PTP-27	7/7/2021	5,693.90	33.64	30.94	5,727.54	2.70	24-34	34	34	WD
PTP-27	10/4/2021	5,694.01	33.53	30.83	5,727.54	2.70	24-34	34	34	WD

TABLE 4.2
WATER LEVEL ELEVATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Date of Measurement	Water-Surface Elevation (ft NGVD)[a/]	Measured Depth to Water (ft below MP)[b/]	Depth to Water (ft bgs)[c/]	Measuring Point Elevation (ft NGVD)	Stickup (ft)[d/]	Screened Interval (ft bgs)	Total Depth (ft bgs)	Base of Weathering (ft bgs)	Formation[e/]
PTP-2F	7/7/2021	5,692.84	36.28	32.26	5,729.12	4.02	22.5-37.5	37.5	36	WD
PTP-2F	10/4/2021	5,692.86	36.26	32.24	5,729.12	4.02	22.5-37.5	37.5	36	WD
PTP-3F	7/7/2021	5,690.96	34.08	30.44	5,725.04	3.64	16.5-31.5	31.5	NE, >31.5	WD
PTP-3F	10/4/2021	5,690.92	34.12	30.48	5,725.04	3.64	16.5-31.5	31.5	NE, >31.5	WD
PTP-4C	7/7/2021	5,690.90	29.57	25.7	5,720.47	3.87	17-27	27.2	NE, >27.2	WD
PTP-4C	10/4/2021	5,690.89	29.58	25.71	5,720.47	3.87	17-27	27.2	NE, >27.2	WD
PTP-5A	7/7/2021	Dry	Dry	Dry	5,717.37	3.37	15-25	25	NE, >25	WD
PTP-5A	10/4/2021	Dry	Dry	Dry	5,717.37	3.37	15-25	25	NE, >25	WD
PTP-6B	7/7/2021	5,688.67	24.39	20.43	5,713.06	3.96	9-24	24	NE, >24	WD
PTP-6B	10/4/2021	5,688.62	24.44	20.48	5,713.06	3.96	9-24	24	NE, >24	WD
PTP-7H	7/7/2021	5,689.03	23.5	20.07	5,712.53	3.43	12.5-22.5	22.5	NE, >22.5	WD
PTP-7H	10/4/2021	5,688.95	23.58	20.15	5,712.53	3.43	12.5-22.5	22.5	NE, >22.5	WD
PTP-8A	7/7/2021	5,689.81	28.05	25.09	5,717.86	2.96	16-26	26	NE, >26	WD
PTP-8A	10/4/2021	5,689.77	28.09	25.13	5,717.86	2.96	16-26	26	NE, >26	WD
PTP-9	7/7/2021	Dry	Dry	Dry	5,722.06	3.46	17-27	27	NE, >27	WD
PTP-9	10/4/2021	Dry	Dry	Dry	5,722.06	3.46	17-27	27	NE, >27	WD
PZ-101A	7/8/2021	5,681.15	145.05	142.75	5,826.20	2.30	314.6-325.1	328	48	LIGNITE
PZ-101A	10/1/2021	5,677.87	148.33	146.03	5,826.20	2.30	314.6-325.1	328	48	LIGNITE
PZ-103	7/6/2021	5,680.03	115.75	109.27	5,795.78	6.48	291.5-302	302.3	30	LIGNITE
PZ-103	10/1/2021	5,679.75	116.03	109.55	5,795.78	6.48	291.5-302	302.3	30	LIGNITE
RDPZ-102	7/6/2021	5,783.70	64.38	61.93	5,848.08	2.45	47.5-67	69.5	69.5	WD
RDPZ-102	10/1/2021	5,783.69	64.39	61.94	5,848.08	2.45	47.5-67	69.5	69.5	WD
SUMP	7/7/2021	5,685.77	26.97	27.87	5,712.74	-0.90	10-32.9	32.9	--	NO GEOLOGIC LOG
SUMP	10/4/2021	5,685.68	27.06	27.96	5,712.74	-0.90	10-32.9	32.9	--	NO GEOLOGIC LOG
T1-1	7/1/2021	5,674.97	3.3	1.23	5,678.27	2.07	7.5-17.5	17.5	--	ALLUVIUM
T1-1	10/6/2021	5,674.13	4.14	2.07	5,678.27	2.07	7.5-17.5	17.5	--	ALLUVIUM
T1-2	7/1/2021	5,675.89	9.13	5.81	5,685.02	3.32	10-20	20	--	WD
T1-2	10/6/2021	5,674.70	10.32	7	5,685.02	3.32	10-20	20	--	WD
T1-3	7/1/2021	5,675.74	3.72	0.26	5,679.46	3.46	6.4-16.4	16.4	--	WD
T1-3	10/6/2021	5,674.99	4.47	1.01	5,679.46	3.46	6.4-16.4	16.4	--	WD
T1-4	7/1/2021	5,676.25	3.84	0.45	5,680.09	3.39	4-14	14	--	WD
T1-4	10/6/2021	5,675.79	4.3	0.91	5,680.09	3.39	4-14	14	--	WD
T1-5	7/1/2021	5,677.82	14.88	11.48	5,692.70	3.40	14-24	24	--	WD
T1-5	10/6/2021	5,677.03	15.67	12.27	5,692.70	3.40	14-24	24	--	WD
TR-1	7/8/2021	Dry	Dry	Dry	5,706.65	1.72	8-18	18	NE, >18	WD
TR-1	10/4/2021	Dry	Dry	Dry	5,706.65	1.72	8-18	18	NE, >18	WD
U-518R-WD	7/9/2021	5,751.83	46.88	44.67	5,798.71	2.21	39.5 - 49.5	52.7	50.5	WD
U-518R-WD	10/5/2021	5,751.96	46.75	44.54	5,798.71	2.21	39.5 - 49.5	52.7	50.5	WD
U-701	7/7/2021	5,688.22	28.12	25.5	5,716.34	2.62	34-44	44	33.6	UNWD
U-701	10/4/2021	5,688.26	28.08	25.46	5,716.34	2.62	34-44	44	33.6	UNWD
U-701-WD	7/7/2021	Dry	Dry	Dry	5,716.24	2.23	12.7-22.7	22.7	34.9	WD
U-701-WD	10/4/2021	Dry	Dry	Dry	5,716.24	2.23	12.7-22.7	22.7	34.9	WD
WEST CLEANOUT	7/15/2021	Dry	Dry	Dry	5,772.41	--	--	--	--	NO GEOLOGIC LOG
WEST CLEANOUT	10/11/2021	Dry	Dry	Dry	5,772.41	--	--	--	--	NO GEOLOGIC LOG

a/ ft NGVD = elevation in feet referenced to the National Geodetic Vertical Datum of 1929.

b/ ft below MP = feet below measuring point

c/ ft bgs = feet below ground surface

d/ ft = feet

e/ Formation = formation or zone in which well screen is located. Formation/zone designations are as follow:

ALLUVIUM = Alluvium of un-named creek.
FILL = imported soils - not native
LIGNITE = "Lignite zone" in Denver Formation
UNWD = Unweathered Dawson Formation
UPPER DENVER = Upper part of Denver Formation
WD = Weathered Dawson Formation

f/ NE = Base of weathering not encountered during drilling of boring

g/ -- or NA = Information not available at this time

TABLE 4.3
SUMMARY OF VERTICAL HYDRAULIC GRADIENT CALCULATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		3rd Quarter 2021				4th Quarter 2021			
Shallow Well	Deep Well	Measure Date	Head Difference [a/] (ft)[b/]	Diff. in Saturated Screen Elev. [c/] (ft)	Vertical Gradient[d/] (ft/ft)	Measure Date	Head Difference (ft)	Diff. in Saturated Screen Elev. (ft)	Vertical Gradient (ft/ft)
B-304	B-304-UD	7/7/2021	-10.29	37.20	-0.277	10/4/2021	-9.09	36.10	-0.252
B-305WD	B-305-R	7/7/2021	B-305WD Dry			10/4/2021	B-305WD Dry		
B-307	B-306	7/8/2021	B-307 Dry			10/4/2021	B-307 Dry		
B-313	B-313-UD	7/7/2021	-7.05	29.84	-0.236	10/4/2021	-5.82	28.67	-0.203
B-314	B-314-UD	7/8/2021	-6.69	31.67	-0.211	10/4/2021	-7.37	31.67	-0.233
B-316	B-316-UD	7/7/2021	-4.88	22.80	-0.214	10/4/2021	-4.41	22.80	-0.193
B-317	B-317-UD	7/7/2021	1.73	23.44	0.074	10/4/2021	0.67	23.70	0.028
B-326-WD	B-326-UD	7/8/2021	2.18	24.48	0.089	10/4/2021	3.23	22.55	0.143
B-327-WD	B-327-UD	7/7/2021	-4.51	31.10	-0.145	10/4/2021	-3.60	30.29	-0.119
B-712-UD	B-712-LD	7/15/2021	-6.50	43.40	-0.150	10/11/2021	-6.40	43.40	-0.147
BKGD-2WD	BKGD-2UD	7/12/2021	-38.79	21.87	-1.774	10/8/2021	-40.09	21.87	-1.833
BM-4X-50S	BM-4X-40S	7/6/2021	-7.58	28.96	-0.262	10/1/2021	-7.58	28.96	-0.262
BW-PZ-1	BW-PZ-1LC	7/7/2021	-3.67	16.34	-0.225	10/4/2021	-4.22	16.34	-0.258
C-702Q3	C-702P4	7/15/2021	0.06	18.10	0.003	10/11/2021	0.55	18.10	0.030
GW-107A	GW-107UD	7/7/2021	-0.30	22.72	-0.013	10/4/2021	2.65	22.09	0.120
GW-114A	GW-108A	7/7/2021	-7.29	33.70	-0.216	10/4/2021	-7.99	33.69	-0.237
MW-1000	MW-1000LC	7/7/2021	MW-1000 Dry			10/4/2021	-1.34	42.63	-0.031
MW33-WDR	MW33-UD	7/6/2021	MW33-WDR Dry			10/1/2021	MW33-WDR Dry		
MW36-WDR	MW36-UD	7/6/2021	-4.14	24.70	-0.168	10/1/2021	-4.12	24.70	-0.167
MW37-WD	MW37-UD	7/7/2021	3.39	14.72	0.230	10/4/2021	3.45	14.69	0.235
MW38-1064N-650E	MW38-1064N-655E	7/12/2021	-12.32	20.00	-0.616	10/8/2021	-9.76	19.32	-0.505
MW38-1373N-180W	MW38-1363N-180W	7/13/2021	1.82	29.50	0.062	10/8/2021	1.44	29.64	0.049
MW38-350S-50W	MW38-302S-50W	7/14/2021	-3.91	8.61	-0.454	10/7/2021	-4.07	8.69	-0.469
MW38-400N-180W	MW38-410N-180W	7/13/2021	-38.57	35.91	-1.074	10/8/2021	-38.37	35.90	-1.069
MW38-400N-240E	MW38-400N-300E	7/13/2021	-20.58	32.43	-0.634	10/8/2021	-20.52	32.39	-0.634
MW39-WD	MW39-UD	7/6/2021	-21.63	30.36	-0.712	10/1/2021	-21.62	30.35	-0.712
MW42-WD	MW42-UD	7/6/2021	-1.21	33.89	-0.036	10/1/2021	-2.82	34.08	-0.083
MW49-WD	B-519	7/8/2021	0.63	29.20	0.022	10/1/2021	0.50	29.20	0.017
MW51-WD	MW51-10S	7/9/2021	-0.69	15.40	-0.045	10/5/2021	-0.73	15.37	-0.047
MW51X-WD-100S	B-518	7/9/2021	7.65	38.00	0.201	10/5/2021	7.43	38.00	0.196
MW52-WD	MW52-UD	7/9/2021	-3.03	37.92	-0.080	10/5/2021	-3.50	37.96	-0.092
MW54-WD	MW54-UDR	7/9/2021	-0.28	28.65	-0.010	10/5/2021	0.24	28.34	0.008
MW62-WDR	MW62-UD	7/7/2021	-6.38	31.73	-0.201	10/4/2021	-6.64	31.70	-0.209
MW71-WD	MW71-UD	7/9/2021	0.45	46.60	0.010	10/5/2021	0.63	46.31	0.014
MW72-WD	MW72-UD	7/9/2021	-3.80	36.10	-0.105	10/5/2021	-3.60	36.10	-0.100
MW73-WD	MW73-UD	7/8/2021	-4.65	41.18	-0.113	10/4/2021	-4.29	40.91	-0.105

TABLE 4.3
SUMMARY OF VERTICAL HYDRAULIC GRADIENT CALCULATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		3rd Quarter 2021				4th Quarter 2021			
Shallow Well	Deep Well	Measure Date	Head Difference [a/] (ft)[b/]	Diff. in Saturated Screen Elev. [c/] (ft)	Vertical Gradient[d/] (ft/ft)	Measure Date	Head Difference (ft)	Diff. in Saturated Screen Elev. (ft)	Vertical Gradient (ft/ft)
MW74-WD	MW74-UD	7/13/2021	-3.95	34.70	-0.114	10/8/2021	-3.58	34.70	-0.103
MW75-WD	MW75-UD	7/12/2021	-17.99	44.09	-0.408	10/8/2021	-15.31	44.09	-0.347
MW76-WD	MW76-UD	7/12/2021	-26.39	42.00	-0.628	10/8/2021	-23.64	42.00	-0.563
MW77-WD	MW77-UD	7/2/2021	-5.25	35.15	-0.149	10/4/2021	-4.65	34.52	-0.135
MW78-WD	MW78-UD	7/9/2021	0.83	32.90	0.025	10/5/2021	0.64	32.70	0.020
MW79-WD	MW79-UD	7/9/2021	-0.49	34.70	-0.014	10/5/2021	0.06	34.70	0.002
MW91-WD	MW91-UD	7/9/2021	-1.34	43.50	-0.031	10/5/2021	-1.15	43.50	-0.026
MW93-WD	MW93-UD	7/9/2021	2.26	22.10	0.102	10/5/2021	1.92	21.88	0.088
MW-EW-1	MW-EW-1LC	7/7/2021	-2.51	17.60	-0.143	10/4/2021	-2.46	17.37	-0.142
MW-EW-1	MW-EW-1LCRA	7/7/2021	-7.00	38.70	-0.181	10/4/2021	-6.99	38.47	-0.182
MW-EW-2	MW-EW-2LC	7/7/2021	-2.02	16.77	-0.120	10/4/2021	-1.97	16.45	-0.120
NTES-EW1	B-712-UD	7/15/2021	-1.46	24.40	-0.060	10/11/2021	-1.78	24.40	-0.073
BM-15I-15N	PM-15I-UD	7/9/2021	10.40	20.26	0.513	10/5/2021	10.53	20.16	0.522
U-701-WD	U-701	7/7/2021	U-701-WD Dry			10/4/2021	U-701-WD Dry		

a/ The midpoint of the saturated portion of the screen interval is used to calculate the vertical distance between well pairs.

b/ ft = feet

c/ Groundwater elevations are presented in Table 4.2.

d/ A negative value indicates a downward gradient and a positive value indicates an upward gradients.

Highlighted cells indicate upward gradients

TABLE 4.4
GROUNDWATER SAMPLING ACTIVITIES
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Sample ID	Sample Type	Location [a/]	Water-Bearing Unit[b/]	Sampling Frequency[c/]	Date of Last Sample Collection[d/]	3rd Quarter 2021	4th Quarter 2021	1st Quarter 2022[e/]	2nd Quarter 2022[e/]
B-313	Compliance/Effectiveness/B-326-UD & B-313 RAWP[f/]/1,4-Dioxane Resampling Event	NB	WD	Semi-annual (Compliance)/Quarterly (RAWP & North End Monitoring)	11/16/2021	8/12/2021 DRY[i/]	11/16/2021	X	X
B-314	Compliance/Effectiveness	NB	WD	Semi-annual	10/27/2021		10/27/2021		X
B-321	B-326-UD & B-313 RAWP/1,4-Dioxane Resampling Event	NB	WD	Quarterly	8/30/2021	8/11/2021 8/30/2021	DRY	X	X
B-326-UD	Compliance/B-326-UD & B-313 RAWP/North End Monitoring/Molybdenum Investigation/1,4-Dioxane Resampling Events	NB	UNWD	Biennial (Compliance)/Quarterly (RAWP, North End Monitoring & Molybdenum Investigation)	10/12/2021	8/12/2021 8/23/2021[h/] 8/30/2021	10/12/2021	X	X
B-326-WD	Compliance/Effectiveness/North End Monitoring/Molybdenum Investigation/1,4-Dioxane Resampling Events/1,4-Dioxane Confirmation Sample	NB	WD	Semi-annual (Compliance)/Quarterly (North End Monitoring & Molybdenum Investigation)	10/12/2021	8/12/2021 8/23/2021[h/] 8/30/2021 9/27/2021	10/12/2021	X	X
BKGD-3WD	Performance Evaluation Sample	EXT-S	WD	Annual	8/16/2021	8/16/2021			
BM-11X-100N	Compliance/Effectiveness	EB	WD	Semi-annual	10/28/2021		10/28/2021		X
BM-11X-100S	Compliance/Effectiveness	EB	WD	Semi-annual	10/28/2021		10/28/2021		X
BM-15E2	Compliance	EB	WD	Semi-annual	11/16/2021		11/16/2021		X
BM-15N6	Compliance/Effectiveness	EB	WD	Semi-annual	10/13/2021		10/13/2021		X
GW-106	Compliance	NB	WD	Semi-annual	10/13/2021		10/13/2021		X
GW-109	Compliance	NB	WD	Semi-annual	6/1/2020		DRY		X
MNA-01	Effectiveness	INT	WD	Semi-annual	11/23/2021		11/23/2021		X
MNA-03	Effectiveness	INT	WD	Semi-annual	11/23/2021		11/23/2021		X
MW05-WD	North End Monitoring	NE	WD	Semi-annual	8/18/2021	8/18/2021		X	
MW102-WD	North End Monitoring	NB	WD	Quarterly	11/18/2021	8/31/2021	11/18/2021	X	X
MW103-WD	North End Monitoring/1,4-Dioxane Resampling Event	NE	WD	Quarterly	11/2/2021	7/22/2021 8/5/2021	11/2/2021	X	X
MW105-WD	Compliance	EB	WD	Semi-annual	10/19/2021		10/19/2021		X
MW108-WD	Compliance	EB	WD	Semi-annual	11/1/2021		11/1/2021		X
MW113-EW-1	North End Monitoring/Molybdenum Investigation	NE	WD	Quarterly	10/19/2021	7/29/2021	10/19/2021	X	X
MW113-UD	North End Monitoring/Molybdenum Investigation	NE	UNWD	Quarterly (RAWP & North End Monitoring)/Monthly (Molybdenum Investigation)	12/15/2021	7/29/2021 8/25/2021 9/9/2021	10/19/2021 11/17/2021 12/15/2021	X	X
MW113-WD	Molybdenum Investigation	NE	WD	Bi-weekly	12/28/2021	Sampled 6 times	Sampled 7 times	X	X
MW114-WD	North End Monitoring/1,4-Dioxane Resampling Event	NE	WD	Quarterly	11/17/2021	7/22/2021 8/5/2021	11/17/2021	X	X

TABLE 4.4
GROUNDWATER SAMPLING ACTIVITIES
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Sample ID	Sample Type	Location [a/]	Water-Bearing Unit[b/]	Sampling Frequency[c/]	Date of Last Sample Collection[d/]	3rd Quarter 2021	4th Quarter 2021	1st Quarter 2022[e/]	2nd Quarter 2022[e/]
MW117-WD	North End Monitoring/1,4-Dioxane Resampling Event	NE	WD	Quarterly	11/17/2021	7/22/2021 8/5/2021	11/17/2021	X	X
MW118-WD	North End Monitoring	NE	WD	Quarterly	11/17/2021	8/9/2021	11/17/2021	X	X
MW121-WDR	North End Monitoring	NE	WD	Semi-annual	8/18/2021	8/18/2021		X	
MW122-WDR	North End Monitoring	NE	WD	Semi-annual	8/18/2021	8/18/2021		X	
MW123-WD	North End Monitoring	NE	WD	Semi-annual	8/18/2021	8/18/2021		X	
MW124-WD	North End Monitoring	NE	WD	Semi-annual	8/18/2021	8/18/2021		X	
MW125-WD	North End Monitoring/1,4-Dioxane Resampling Event	NE	WD	Semi-annual	8/30/2021	8/23/2021 8/30/2021		X	
MW129-WD	North End Monitoring	NE	WD	Semi-annual	9/7/2021	9/7/2021		X	
MW132-WD	North End Monitoring	NE	WD	Quarterly	11/2/2021	7/21/2021	11/2/2021	X	X
MW135-WD	North End Monitoring	NE	WD	Semi-annual	7/28/2021	7/28/2021		X	
MW141-WD	North End Monitoring	NE	WD	Semi-annual	7/28/2021	7/28/2021		X	
MW142-WD	North End Monitoring	NE	WD	Semi-annual	7/28/2021	7/28/2021		X	
MW144-WD	North End Monitoring	NE	WD	Semi-annual	8/4/2021	8/4/2021		X	
MW151-WD	North End Monitoring	NE	WD	Quarterly	11/11/2021	7/19/2021	11/11/2021	X	X
MW153-EW-1	North End Monitoring	NE	WD	Quarterly	11/8/2021	7/21/2021	11/8/2021	X	X
MW154-EW-1	North End Monitoring	NE	WD	Quarterly	11/11/2021	7/21/2021	11/11/2021	X	X
MW155-EW-1	North End Monitoring	NE	WD	Quarterly	11/22/2021	7/21/2021	11/22/2021	X	X
MW156-EW-1	North End Monitoring	NE	WD	Quarterly	11/22/2021	7/21/2021	11/22/2021	X	X
MW156-WD	North End Monitoring	NE	WD	Quarterly	11/11/2021	7/19/2021	11/11/2021	X	X
MW157-WD	North End Monitoring	NE	WD	Quarterly	11/11/2021	7/19/2021	11/11/2021	X	X
MW160-WD	North End Monitoring	NE	WD	Quarterly	11/8/2021	7/19/2021	11/8/2021	X	X
MW170-EW-1	RAWP/MW77 Response Action/Molybdenum Investigation	EB	WD	Quarterly	10/27/2021	8/9/2021	10/27/2021	X	X
MW176-DEN	North End Monitoring	NE	DEN	Semi-annual	8/4/2021	8/4/2021		X	
MW179-UDEN	North End Monitoring	NE	UDEN	Semi-annual	9/8/2021	9/8/2021		X	
MW23-UPPER-C	Compliance	EB	WD	Semi-annual	10/18/2021		10/18/2021		X
MW36-WDR	Compliance	WB	WD	Semi-annual	11/2/2021		11/2/2021		X
MW38-1028N-256E	MW38 Source Control	WB	WD	Semi-annual	11/10/2021		11/10/2021		X
MW38-170S-140W	MW38 Source Control	WB	WD	Semi-annual	11/9/2021		11/9/2021		X
MW38-825S-445E	MW38 Source Control	WB	WD	Semi-annual	11/8/2021		11/8/2021		X
MW38-830N-230E	Compliance	WB	WD	Semi-annual	10/14/2021		10/14/2021		X
MW43-WD	Compliance	WB	WD	Semi-annual	11/16/2021		11/16/2021		X
MW54-WD	Compliance	EB	WD	Semi-annual	10/14/2021		10/14/2021		X
MW60-WD	Compliance	EB	WD	Semi-annual	10/28/2021		10/28/2021		X
MW62-WDR	Compliance/Effectiveness	NB	WD	Semi-annual	10/27/2021		10/27/2021		X
MW70-WD	VES Performance	EB	WD	Semi-annual	11/9/2021		11/9/2021		X
MW71-WD	Compliance	EB	WD	Semi-annual	11/1/2021		11/1/2021		X
MW74-WD	Compliance	NB	WD	Semi-annual	10/14/2021		10/14/2021		X
MW77-EW-1	North End Monitoring	EB	WD	Quarterly	11/18/2021	8/31/2021	11/18/2021	X	X

TABLE 4.4
GROUNDWATER SAMPLING ACTIVITIES
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Sample ID	Sample Type	Location [a/]	Water-Bearing Unit[b/]	Sampling Frequency[c/]	Date of Last Sample Collection[d/]	3rd Quarter 2021	4th Quarter 2021	1st Quarter 2022[e/]	2nd Quarter 2022[e/]
MW77-EW-2	1,4-Dioxane Confirmation Sample/North End Monitoring	EB	WD	Quarterly	11/18/2021	9/1/2021 9/14/2021	11/18/2021	X	X
MW77-WD	Compliance	EB	WD	Semi-annual	10/27/2021		10/27/2021		X
MW78-WD	Compliance	EB	WD	Semi-annual	11/1/2021		11/1/2021		X
MW90-WD	Compliance	EB	WD	Semi-annual	10/13/2021		10/13/2021		X
MW91-WD	Compliance	EB	WD	Semi-annual	10/18/2021		10/18/2021		X
MW98-WD	North End Monitoring	NB	WD	Quarterly	11/18/2021	8/31/2021	11/18/2021	X	X
NBBW-IW-3[g/]	Molybdenum Investigation	NB	WD	Quarterly	8/5/2021	8/5/2021	DRY	X	X
Private Well 1	Residential Well	NE	DEN	Annual	5/19/2021				X
PM-13X	Effectiveness	EB	WD	Semi-annual	11/3/2021		11/3/2021		X
PM-14X	Compliance/Effectiveness	EB	WD	Semi-annual	10/26/2021		10/26/2021		X
PM-3X	Effectiveness	WB	WD	Semi-annual	11/3/2021		11/3/2021		X
PM-6X	Effectiveness	SB	WD	Semi-annual	11/3/2021		11/3/2021		X
PTP-11	Molybdenum Investigation	NB	WD	Quarterly	11/4/2021	8/26/2021	11/4/2021	X	X
PTP-12	Molybdenum Investigation	NB	WD	Quarterly	11/4/2021	8/26/2021	11/4/2021	X	X
PTP-13	North End Monitoring/Molybdenum Investigation	NB	WD	Quarterly	11/10/2021	8/25/2021	11/10/2021	X	X
PTP-14	Molybdenum Investigation	NB	WD	Quarterly	6/2/2020	DRY	DRY	X	X
Private Well 2	Residential Well	NE	DEN	Annual	5/19/2021				X
U-518R-WD	Compliance	EB	WD	Semi-annual	10/26/2021		10/26/2021		X

a/ Location = geographic location at the site
- EB = East Boundary
- WB = West Boundary
- SB = South Boundary
- INT = Interior
- NB = North Boundary
- NE = North End
- NT = North Toe
- EXT-S = Exterior South

b/ Water-bearing unit = formation or zone in which well screen is located
Formation/zone designations are as follow:
- Alluvium = Alluvium
- WD = Weathered Dawson Formation
- UNWD = Unweathered Dawson Formation
- DEN = Upper part of Denver Formation
- UDEN = Unweathered Denver Formation
- Lignite = "Lignite zone" in Denver Formation

c/ Represents frequency for long term monitoring.

d/ Last sampling date - may be for 1,4-dioxane only or for full contaminant of concern list

e/ An "x" indicates that the well is scheduled to be sampled during the 1st and/or 2nd quarter of 2022

f/ RAWP = Response Action Work Plan

g/ Weekly Molybdenum sampling was suspended after 1Q 2021 when sampling began at WTP sampling port

h/ Resample was attempted, but shipment to lab was delayed by air carrier and samples were cancelled due to high cooler temperatures, no sample data for this event

i/ Resample was attempted on 9/7/2021, but well was dry during resampling attempt, no sample data for this event

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
B-313	1,4-Dioxane	11/16/2021	17		µg/L	0.9
B-313	Nitrogen, Nitrate	8/12/2021	55000	J	µg/L	2500
B-314	1,1-Dichloroethane	10/27/2021	1.5		µg/L	1
B-314	Nitrogen, Nitrate	10/27/2021	160	J	µg/L	500
B-321	1,4-Dioxane	8/30/2021	9.7		µg/L	0.9
B-321	Nitrogen, Nitrate	8/11/2021	43000		µg/L	2500
B-326-UD	1,4-Dioxane	8/30/2021	6.1		µg/L	0.9
B-326-UD	1,4-Dioxane	10/12/2021	5		µg/L	0.9
B-326-UD	Molybdenum, Dissolved	8/12/2021	3	J	µg/L	20
B-326-UD	Molybdenum, Dissolved	10/12/2021	2.9	J	µg/L	20
B-326-WD	1,4-Dioxane	8/30/2021	0.77	J	µg/L	0.9
B-326-WD	1,4-Dioxane	9/27/2021	0.69	J	µg/L	0.9
B-326-WD	1,4-Dioxane	10/12/2021	1		µg/L	0.9
B-326-WD	Molybdenum, Dissolved	8/12/2021	54		µg/L	20
B-326-WD	Molybdenum, Dissolved	10/12/2021	30		µg/L	20
B-326-WD	Nitrogen, Nitrate	10/12/2021	9900		µg/L	2500
B-326-WD	Nitrogen, Nitrite	10/12/2021	150	J-	µg/L	500
BKGD-3WD	Nitrogen, Nitrate	8/16/2021	660		µg/L	500
BM-11X-100N	1,1,1-Trichloroethane	10/28/2021	0.71	J	µg/L	1
BM-11X-100N	1,1-Dichloroethane	10/28/2021	33		µg/L	1
BM-11X-100N	1,1-Dichloroethene	10/28/2021	1.2		µg/L	1
BM-11X-100N	Chloroform	10/28/2021	1.4		µg/L	1
BM-11X-100N	Nitrogen, Nitrate	10/28/2021	12000		µg/L	2500
BM-11X-100N	Tetrachloroethene	10/28/2021	5.4		µg/L	1
BM-11X-100N	Trichloroethene	10/28/2021	4.8		µg/L	1
BM-11X-100S	1,1-Dichloroethane	10/28/2021	4.8		µg/L	1
BM-11X-100S	Chloroform	10/28/2021	1.3		µg/L	1
BM-11X-100S	Nitrogen, Nitrate	10/28/2021	10000		µg/L	2500
BM-11X-100S	Tetrachloroethene	10/28/2021	1.2		µg/L	1
BM-11X-100S	Trichloroethene	10/28/2021	1.3		µg/L	1
BM-15E2	1,1-Dichloroethane	11/16/2021	1.5		µg/L	1
BM-15E2	1,1-Dichloroethene	11/16/2021	0.34	J	µg/L	1
BM-15E2	Nitrogen, Nitrate	11/16/2021	19000		µg/L	2500
BM-15E2	Tetrachloroethene	11/16/2021	0.34	J	µg/L	1
BM-15E2	Trichloroethene	11/16/2021	0.31	J	µg/L	1
BM-15N6	1,1-Dichloroethane	10/13/2021	2.6		µg/L	1
BM-15N6	Nitrogen, Nitrate	10/13/2021	30000		µg/L	5000
BM-15N6	Tetrachloroethene	10/13/2021	2.7		µg/L	1
BM-15N6	Trichloroethene	10/13/2021	0.71	J	µg/L	1
GW-106	Arsenic	10/13/2021	5	J	µg/L	15
GW-106	Nitrogen, Nitrate	10/13/2021	1400		µg/L	500
MNA-01	1,1-Dichloroethane	11/23/2021	59		µg/L	10
MNA-01	1,2-Dichloroethane	11/23/2021	30		µg/L	10
MNA-01	1,4-Dioxane	11/23/2021	10000		µg/L	2000
MNA-01	Benzene	11/23/2021	20		µg/L	10
MNA-01	cis-1,2-Dichloroethene	11/23/2021	1.6	J	µg/L	10

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MNA-03	1,1-Dichloroethane	11/23/2021	110		µg/L	10
MNA-03	1,4-Dioxane	11/23/2021	5300		µg/L	2000
MNA-03	Arsenic	11/23/2021	8.9	J	µg/L	15
MNA-03	Benzene	11/23/2021	100		µg/L	10
MW05-WD	1,4-Dioxane	8/18/2021	4.4		µg/L	0.9
MW102-WD	1,4-Dioxane	8/31/2021	1.7		µg/L	0.9
MW102-WD	1,4-Dioxane	11/18/2021	1.1		µg/L	0.9
MW103-WD	1,4-Dioxane	8/5/2021	0.45	J	µg/L	0.9
MW103-WD	1,4-Dioxane	11/2/2021	0.41	J	µg/L	0.9
MW105-WD	Arsenic	10/19/2021	4.9	J	µg/L	15
MW105-WD	Nitrogen, Nitrate	10/19/2021	130	J	µg/L	500
MW108-WD	Chloroform	11/1/2021	0.4	J	µg/L	1
MW108-WD	Nitrogen, Nitrate	11/1/2021	9700		µg/L	500
MW108-WD	Nitrogen, Nitrite	11/1/2021	330	J	µg/L	500
MW113-EW-1	1,4-Dioxane	7/29/2021	92		µg/L	0.9
MW113-EW-1	1,4-Dioxane	10/19/2021	120		µg/L	0.9
MW113-EW-1	Molybdenum, Dissolved	7/29/2021	6600		µg/L	20
MW113-EW-1	Molybdenum, Dissolved	10/19/2021	3300		µg/L	20
MW113-EW-1	Molybdenum, Total	7/29/2021	6500		µg/L	20
MW113-EW-1	Molybdenum, Total	10/19/2021	3400		µg/L	20
MW113-EW-1	Nitrogen, Nitrate	7/29/2021	1100		µg/L	500
MW113-EW-1	Nitrogen, Nitrate	10/19/2021	2000		µg/L	500
MW113-UD	1,4-Dioxane	7/29/2021	120		µg/L	0.9
MW113-UD	1,4-Dioxane	10/19/2021	94		µg/L	0.9
MW113-UD	Molybdenum, Dissolved	7/29/2021	970		µg/L	20
MW113-UD	Molybdenum, Dissolved	8/25/2021	830		µg/L	20
MW113-UD	Molybdenum, Dissolved	9/9/2021	730		µg/L	20
MW113-UD	Molybdenum, Dissolved	10/19/2021	720		µg/L	20
MW113-UD	Molybdenum, Dissolved	11/17/2021	730		µg/L	20
MW113-UD	Molybdenum, Dissolved	12/15/2021	870		µg/L	20
MW113-UD	Molybdenum, Total	7/29/2021	960		µg/L	20
MW113-UD	Molybdenum, Total	8/25/2021	890		µg/L	20
MW113-UD	Molybdenum, Total	9/9/2021	770		µg/L	20
MW113-UD	Molybdenum, Total	10/19/2021	740		µg/L	20
MW113-UD	Molybdenum, Total	11/17/2021	730		µg/L	20
MW113-UD	Molybdenum, Total	12/15/2021	900		µg/L	20
MW113-WD	Molybdenum, Dissolved	7/13/2021	18000		µg/L	20
MW113-WD	Molybdenum, Dissolved	7/29/2021	15000		µg/L	20
MW113-WD	Molybdenum, Dissolved	8/11/2021	14000		µg/L	20
MW113-WD	Molybdenum, Dissolved	8/25/2021	8700		µg/L	20
MW113-WD	Molybdenum, Dissolved	9/8/2021	2400		µg/L	20
MW113-WD	Molybdenum, Dissolved	9/23/2021	1600		µg/L	20
MW113-WD	Molybdenum, Dissolved	10/5/2021	2900		µg/L	20
MW113-WD	Molybdenum, Dissolved	10/19/2021	3500		µg/L	20
MW113-WD	Molybdenum, Dissolved	11/2/2021	5500		µg/L	20
MW113-WD	Molybdenum, Dissolved	11/17/2021	12000		µg/L	20

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MW113-WD	Molybdenum, Dissolved	11/30/2021	15000		µg/L	20
MW113-WD	Molybdenum, Dissolved	12/15/2021	20000		µg/L	200
MW113-WD	Molybdenum, Dissolved	12/28/2021	19000		µg/L	20
MW113-WD	Molybdenum, Total	7/13/2021	18000		µg/L	20
MW113-WD	Molybdenum, Total	7/29/2021	15000		µg/L	20
MW113-WD	Molybdenum, Total	8/11/2021	13000		µg/L	20
MW113-WD	Molybdenum, Total	8/25/2021	8800		µg/L	20
MW113-WD	Molybdenum, Total	9/8/2021	2400		µg/L	20
MW113-WD	Molybdenum, Total	9/23/2021	1600		µg/L	20
MW113-WD	Molybdenum, Total	10/5/2021	2800		µg/L	20
MW113-WD	Molybdenum, Total	10/19/2021	3500		µg/L	20
MW113-WD	Molybdenum, Total	11/2/2021	5500		µg/L	20
MW113-WD	Molybdenum, Total	11/17/2021	12000		µg/L	20
MW113-WD	Molybdenum, Total	11/30/2021	15000		µg/L	20
MW113-WD	Molybdenum, Total	12/15/2021	20000		µg/L	200
MW113-WD	Molybdenum, Total	12/28/2021	19000		µg/L	20
MW114-WD	1,4-Dioxane	8/5/2021	0.93		µg/L	0.9
MW114-WD	1,4-Dioxane	11/17/2021	0.96		µg/L	0.9
MW117-WD	1,4-Dioxane	8/5/2021	1.8		µg/L	0.9
MW117-WD	1,4-Dioxane	11/17/2021	1.5		µg/L	0.9
MW118-WD	1,4-Dioxane	8/9/2021	0.28	J	µg/L	0.9
MW118-WD	1,4-Dioxane	11/17/2021	0.26	J	µg/L	0.9
MW121-WDR	1,4-Dioxane	8/18/2021	2		µg/L	0.9
MW122-WDR	1,4-Dioxane	8/18/2021	2		µg/L	0.9
MW123-WD	1,4-Dioxane	8/18/2021	1.5		µg/L	0.9
MW124-WD	1,4-Dioxane	8/18/2021	0.49	J	µg/L	0.9
MW125-WD	1,4-Dioxane	8/30/2021	0.41	J	µg/L	0.9
MW129-WD	1,4-Dioxane	9/7/2021	5.3		µg/L	0.9
MW132-WD	1,4-Dioxane	7/21/2021	11		µg/L	0.9
MW132-WD	1,4-Dioxane	11/2/2021	14		µg/L	0.9
MW135-WD	1,4-Dioxane	7/28/2021	4.5		µg/L	0.9
MW141-WD	1,4-Dioxane	7/28/2021	2.3		µg/L	0.9
MW142-WD	1,4-Dioxane	7/28/2021	1.7		µg/L	0.9
MW151-WD	1,4-Dioxane	7/19/2021	1.7		µg/L	0.9
MW151-WD	1,4-Dioxane	11/11/2021	5.1		µg/L	0.9
MW153-EW-1	1,4-Dioxane	7/21/2021	1.5		µg/L	0.9
MW153-EW-1	1,4-Dioxane	11/8/2021	2		µg/L	0.9
MW154-EW-1	1,4-Dioxane	7/21/2021	1.2		µg/L	0.9
MW154-EW-1	1,4-Dioxane	11/11/2021	0.63	J	µg/L	0.9
MW155-EW-1	1,4-Dioxane	7/21/2021	1.1		µg/L	0.9
MW155-EW-1	1,4-Dioxane	11/22/2021	0.27	J	µg/L	0.9
MW156-EW-1	1,4-Dioxane	7/21/2021	1.1		µg/L	0.9
MW156-EW-1	1,4-Dioxane	11/22/2021	0.48	J	µg/L	0.9
MW156-WD	1,4-Dioxane	7/19/2021	0.88	J	µg/L	0.9
MW156-WD	1,4-Dioxane	11/11/2021	0.25	J	µg/L	0.9
MW157-WD	1,4-Dioxane	7/19/2021	0.19	J	µg/L	0.9

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MW157-WD	1,4-Dioxane	11/11/2021	0.1	J	µg/L	0.9
MW160-WD	1,4-Dioxane	7/19/2021	2.3		µg/L	0.9
MW160-WD	1,4-Dioxane	11/8/2021	3.3		µg/L	0.9
MW170-EW-1	1,1,1-Trichloroethane	8/9/2021	1.8		µg/L	1
MW170-EW-1	1,1,1-Trichloroethane	10/27/2021	2		µg/L	1
MW170-EW-1	1,1-Dichloroethane	8/9/2021	4		µg/L	1
MW170-EW-1	1,1-Dichloroethane	10/27/2021	4.6		µg/L	1
MW170-EW-1	1,1-Dichloroethene	8/9/2021	2.8		µg/L	1
MW170-EW-1	1,1-Dichloroethene	10/27/2021	3.4		µg/L	1
MW170-EW-1	1,4-Dioxane	8/9/2021	14		µg/L	0.9
MW170-EW-1	1,4-Dioxane	10/27/2021	12		µg/L	0.9
MW170-EW-1	cis-1,2-Dichloroethene	8/9/2021	9.5		µg/L	1
MW170-EW-1	cis-1,2-Dichloroethene	10/27/2021	11		µg/L	1
MW170-EW-1	Molybdenum, Dissolved	8/9/2021	2	J	µg/L	20
MW170-EW-1	Molybdenum, Total	8/9/2021	4.5	J	µg/L	20
MW170-EW-1	Molybdenum, Total	10/27/2021	6.3	J	µg/L	20
MW170-EW-1	Nitrogen, Nitrate	8/9/2021	9800		µg/L	500
MW170-EW-1	Nitrogen, Nitrate	10/27/2021	9900		µg/L	500
MW170-EW-1	Tetrachloroethene	8/9/2021	1		µg/L	1
MW170-EW-1	Tetrachloroethene	10/27/2021	0.93	J	µg/L	1
MW170-EW-1	Trichloroethene	8/9/2021	0.45	J	µg/L	1
MW170-EW-1	Trichloroethene	10/27/2021	0.33	J	µg/L	1
MW176-DEN	1,4-Dioxane	8/4/2021	0.49	J	µg/L	0.9
MW23-UPPER-C	Nitrogen, Nitrate	10/18/2021	100	J	µg/L	500
MW36-WDR	Arsenic	11/2/2021	5.9	J	µg/L	15
MW36-WDR	Cadmium	11/2/2021	0.83	J	µg/L	5
MW36-WDR	Nitrogen, Nitrate	11/2/2021	19000		µg/L	2500
MW38-1028N-256E	1,1-Dichloroethane	11/10/2021	1.5		µg/L	1
MW38-1028N-256E	1,2-Dichloroethene	11/10/2021	0.45	J	µg/L	1
MW38-1028N-256E	1,4-Dioxane	11/10/2021	2.1		µg/L	0.9
MW38-1028N-256E	Bromodichloromethane	11/10/2021	0.37	J	µg/L	1
MW38-1028N-256E	Chloroform	11/10/2021	1.9		µg/L	1
MW38-1028N-256E	cis-1,2-Dichloroethene	11/10/2021	0.45	J	µg/L	1
MW38-1028N-256E	Tetrachloroethene	11/10/2021	0.63	J	µg/L	1
MW38-1028N-256E	Trichloroethene	11/10/2021	0.99	J	µg/L	1
MW38-170S-140W	1,1-Dichloroethane	11/9/2021	10		µg/L	1
MW38-170S-140W	1,2-Dichloroethene	11/9/2021	2.6		µg/L	1
MW38-170S-140W	1,4-Dioxane	11/9/2021	14		µg/L	0.9
MW38-170S-140W	1,4-Dioxane	11/9/2021	15	J	µg/L	20
MW38-170S-140W	Carbon Disulfide	11/9/2021	0.32	J	µg/L	2
MW38-170S-140W	Chloroform	11/9/2021	1.7		µg/L	1
MW38-170S-140W	cis-1,2-Dichloroethene	11/9/2021	2.6		µg/L	1
MW38-170S-140W	Dichlorodifluoromethane	11/9/2021	1.5	J	µg/L	2
MW38-170S-140W	Tetrachloroethene	11/9/2021	0.95	J	µg/L	1
MW38-170S-140W	Tetrahydrofuran	11/9/2021	51		µg/L	7
MW38-170S-140W	Trichloroethene	11/9/2021	2.4		µg/L	1

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MW38-825S-445E	1,1-Dichloroethane	11/8/2021	2200		µg/L	400
MW38-825S-445E	1,1-Dichloroethene	11/8/2021	420		µg/L	400
MW38-825S-445E	1,2-Dichloroethane	11/8/2021	36000		µg/L	400
MW38-825S-445E	1,2-Dichloroethene	11/8/2021	410		µg/L	400
MW38-825S-445E	1,3-Dichlorobenzene	11/8/2021	100	J	µg/L	400
MW38-825S-445E	1,4-Dichlorobenzene	11/8/2021	710		µg/L	400
MW38-825S-445E	1,4-Dioxane	11/8/2021	2500		µg/L	9
MW38-825S-445E	Benzene	11/8/2021	170	J	µg/L	400
MW38-825S-445E	Chloroform	11/8/2021	140	J	µg/L	400
MW38-825S-445E	cis-1,2-Dichloroethene	11/8/2021	410		µg/L	400
MW38-825S-445E	m-Xylene & p-Xylene	11/8/2021	140	J	µg/L	800
MW38-825S-445E	o-Xylene	11/8/2021	96	J	µg/L	400
MW38-825S-445E	Tetrahydrofuran	11/8/2021	1300	J	µg/L	2800
MW38-825S-445E	Trichloroethene	11/8/2021	96	J	µg/L	400
MW38-825S-445E	Vinyl Chloride	11/8/2021	810		µg/L	400
MW38-825S-445E	Xylenes, Total	11/8/2021	240	J	µg/L	800
MW38-830N-230E	1,1-Dichloroethane	10/14/2021	3.5		µg/L	1
MW38-830N-230E	1,4-Dioxane	10/14/2021	4.6		µg/L	0.9
MW38-830N-230E	Bromodichloromethane	10/14/2021	0.75	J	µg/L	1
MW38-830N-230E	Chloroform	10/14/2021	3.7		µg/L	1
MW38-830N-230E	cis-1,2-Dichloroethene	10/14/2021	1.4		µg/L	1
MW38-830N-230E	Nitrogen, Nitrate	10/14/2021	7700		µg/L	500
MW38-830N-230E	Trichloroethene	10/14/2021	1.6		µg/L	1
MW43-WD	Nitrogen, Nitrate	11/16/2021	8600		µg/L	500
MW54-WD	Nitrogen, Nitrate	10/14/2021	2600		µg/L	500
MW62-WDR	1,4-Dioxane	10/27/2021	3.2		µg/L	0.9
MW62-WDR	Nitrogen, Nitrate	10/27/2021	110000		µg/L	25000
MW62-WDR	Nitrogen, Nitrite	10/27/2021	2200		µg/L	500
MW70-WD	1,1-Dichloroethane	11/9/2021	1.5		µg/L	1
MW71-WD	Nitrogen, Nitrate	11/1/2021	2200		µg/L	500
MW71-WD	Nitrogen, Nitrite	11/1/2021	150	J	µg/L	500
MW74-WD	Nitrogen, Nitrate	10/14/2021	5600		µg/L	500
MW77-EW-1	1,4-Dioxane	8/31/2021	3.7		µg/L	0.9
MW77-EW-1	1,4-Dioxane	11/18/2021	3		µg/L	0.9
MW77-EW-2	1,4-Dioxane	9/14/2021	0.13	J	µg/L	0.9
MW77-EW-2	1,4-Dioxane	11/18/2021	0.12	J	µg/L	0.9
MW77-WD	1,1-Dichloroethane	10/27/2021	0.99	J	µg/L	1
MW77-WD	1,1-Dichloroethene	10/27/2021	1.7		µg/L	1
MW77-WD	1,4-Dioxane	10/27/2021	11		µg/L	0.9
MW77-WD	Nitrogen, Nitrate	10/27/2021	12000		µg/L	2500
MW77-WD	Tetrachloroethene	10/27/2021	1.1		µg/L	1
MW78-WD	Nitrogen, Nitrate	11/1/2021	180	J	µg/L	500
MW78-WD	Nitrogen, Nitrite	11/1/2021	320	J	µg/L	500
MW90-WD	Cadmium	10/13/2021	0.45	J	µg/L	5
MW90-WD	Nitrogen, Nitrate	10/13/2021	840		µg/L	500
MW98-WD	1,4-Dioxane	8/31/2021	11		µg/L	0.9

TABLE 4.5
SUMMARY OF DETECTED CONSTITUENTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MW98-WD	1,4-Dioxane	11/18/2021	11		µg/L	0.9
NBBW-IW-3	1,4-Dioxane	8/5/2021	140		µg/L	5.6
NBBW-IW-3	Molybdenum, Dissolved	8/5/2021	32		µg/L	20
NBBW-IW-3	Molybdenum, Total	8/5/2021	33		µg/L	20
PM-13X	1,1-Dichloroethane	11/3/2021	22		µg/L	1
PM-13X	Chloroform	11/3/2021	0.65	J	µg/L	1
PM-13X	Tetrachloroethene	11/3/2021	0.3	J	µg/L	1
PM-13X	Trichloroethene	11/3/2021	0.66	J	µg/L	1
PM-14X	1,1-Dichloroethane	10/26/2021	4		µg/L	1
PM-14X	Chloroform	10/26/2021	0.29	J	µg/L	1
PM-14X	Nitrogen, Nitrate	10/26/2021	9100		µg/L	500
PM-3X	1,1-Dichloroethane	11/3/2021	0.37	J	µg/L	1
PTP-11	Molybdenum, Dissolved	8/26/2021	8	J	µg/L	20
PTP-11	Molybdenum, Dissolved	11/4/2021	8.2	J	µg/L	20
PTP-11	Molybdenum, Total	8/26/2021	9.4	J	µg/L	20
PTP-11	Molybdenum, Total	11/4/2021	9.1	J	µg/L	20
PTP-12	1,4-Dioxane	11/4/2021	9.1		µg/L	0.9
PTP-12	Molybdenum, Dissolved	8/26/2021	11	J	µg/L	20
PTP-12	Molybdenum, Dissolved	11/4/2021	11	J	µg/L	20
PTP-12	Molybdenum, Total	8/26/2021	12	J	µg/L	20
PTP-12	Molybdenum, Total	11/4/2021	12	J	µg/L	20
PTP-13	1,4-Dioxane	8/25/2021	4.8		µg/L	0.9
PTP-13	1,4-Dioxane	11/10/2021	6.9		µg/L	0.9
PTP-13	Molybdenum, Dissolved	8/25/2021	490		µg/L	20
PTP-13	Molybdenum, Dissolved	11/10/2021	620		µg/L	20
PTP-13	Molybdenum, Total	8/25/2021	570		µg/L	20
PTP-13	Molybdenum, Total	11/10/2021	630		µg/L	20
U-518R-WD	1,1-Dichloroethane	10/26/2021	4.4		µg/L	1
U-518R-WD	Tetrachloroethene	10/26/2021	0.38	J	µg/L	1
U-518R-WD	Trichloroethene	10/26/2021	0.8	J	µg/L	1

Shaded wells are compliance wells.

a/ Qualifiers:
- J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.
- J-= Same as J qualification but with an indication of negative bias in the sample concentration.
- J+= Same as J qualification but with an indication of positive bias in the sample concentration.

b/ Units
- µg/L = micrograms per liter
- pCi/L = picocuries per liter

TABLE 4.6
SUMMARY OF COMPLIANCE MONITORING EVALUATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well	Compound	Date Range		Trend[a/]	Distribution	90% UCL[b/]	Mean	90% LCL[c/]	Performance Standard	Compliance Decision
B-313	1,4-Dioxane	4/16/2019	11/16/2021	No trend	Normal	17.28	16.5	15.72	0.9	Out of Compliance
B-313	Nitrate	1/3/2019	8/12/2021	No trend	Normal	38613	33600	28587	28000	Out of Compliance
B-326-UD	1,4-Dioxane	8/26/2019	10/12/2021	Decreasing	NA[d/]	6.13	5.698	5.267	0.9	Out of Compliance
B-326-UD	Nitrate	4/28/2015	2/4/2021	Decreasing	NC[e/]	NC	NC	NC	28000	Not determined - Did not meet linear regression requirements, Potentially in compliance[f/]
B-326-WD	1,4-Dioxane	8/26/2019	10/12/2021	No trend	Normal	9.572	7.35	5.128	0.9	Out of Compliance
BM-11X-100N	Tetrachloroethene	4/20/2017	10/28/2021	No trend	Normal	6.437	6.07	5.703	5	Out of Compliance
BM-11X-100N	Trichloroethene	4/20/2017	10/28/2021	Increasing	NA	5.86	5.379	4.898	5	Indeterminant[g/]
BM-15N6	Nitrate	4/25/2017	10/13/2021	Decreasing	NC	NC	NC	NC	28000	Not determined - Did not meet linear regression requirements, Potentially out of compliance[h/]
GW-109	1,4-Dioxane	NA	NA	NC	NC	NC	NC	NC	0.9	Well was dry -no samples collected this period, statistical evaluation could not be performed, considered in compliance
GW-109	Chloroform	NA	NA	NC	NC	NC	NC	NC	3.5	Well was dry -no samples collected this period, statistical evaluation could not be performed, considered in compliance
GW-109	Bromodichloromethane	NA	NA	NC	NC	NC	NC	NC	1	Well was dry -no samples collected this period, statistical evaluation could not be performed, considered in compliance
MW23-C-SD	1,4-Dioxane	3/15/2006	2/18/2021	No trend	NC	NC	NC	NC	0.9	Potentially in compliance[f/], 90% Nondetects - data not processed - 4th quarter 2020 results > GWPS but not verified by comfirmation sample that was non detect.
MW38-830N-230E	1,4-Dioxane	4/26/2017	10/14/2021	Decreasing	NA	NC	NC	NC	0.9	Not determined - Did not meet linear regression requirements, Potentially out of compliance[h/]
MW38-830N-230E	Chloroform	4/26/2017	10/14/2021	Decreasing	NA	NC	NC	NC	3.5	Not determined - Did not meet linear regression requirements, Potentially out of compliance[h/]
MW62-WDR	1,4-Dioxane	10/13/2017	10/27/2021	Decreasing	NA	3.275	3.054	2.621	0.9	Out of Compliance
MW62-WDR	Nitrate	10/13/2017	10/27/2021	No trend	Nonparametric	123865	120000	116135	28000	Out of Compliance
MW62-WDR	Nitrite	10/13/2017	10/27/2021	Decreasing	NA	NC	NC	NC	1000	Not determined - Did not meet linear regression requirements, Potentially out of compliance[h/]
MW77-WD	1,4-Dioxane	4/24/2017	10/27/2021	No trend	Normal	11.39	8.82	6.25	0.9	Out of Compliance
MW106-UD	1,4-Dioxane	11/21/2006	8/26/2020	Decreasing	NC	NC	NC	NC	0.9	Not determined - Did not meet linear regression requirements, Potentially in compliance[f/], 90% Nondetects (decreasing trend due to decreasing MDL over time).

a/ Trend determined by Mann-Kendall trend test analysis. When there is an increasing or decreasing trend, least squares regression analysis is used to determine the UCL and LCL

b/ Upper Confidence Limit

c/ Lower Confidence Limit

d/ NA - Not applicable

e/ NC - Not calculated

f/ Potentially in compliance - a statistical determination could not be made but the preponderance of evidence (i.e., decreasing trend and recent results < performance standard) suggests the parameter is in compliance at this well.

g/ UCL above performance standard and LCL below performance standard - cannot determine potential for compliance

h/ Potentially out of compliance - a statistical determination could not be made but the preponderance of evidence (i.e., increasing trend and recent results > performance standard or all results > performance standard) suggests the parameter is out of compliance at this well.

Note: * Statistics performed per the 2018 GWMP

* For all other parameters for the above listed 11 wells and all 29 parameters in the other compliance monitoring wells, the maximum detection for any compound did not exceed the performance standard. Compliance statistics were not performed.

TABLE 4.7
SUMMARY OF SLURRY WALL GRADIENT CALCULATIONS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well Pair	Range of Head Differences (ft)		Mean of Differences	80% Lower Confidence Limit	95% Upper Confidence Limit	Gradient	Conclusion
	Minimum	Maximum	(ft)	(ft)	(ft)		
PM-1	-2.78	-0.31	-1.07	-1.38	-0.41	Inward Gradient exists	Wall is effective
PM-2	-7.70	-6.98	-7.10	-7.21	-6.86	Inward Gradient exists	Wall is effective
PM-3	0.47	0.78	0.67	0.54	0.95	Outward Gradient exists	Review water quality data
PM-4	-0.39	-0.21	-0.31	-0.43	-0.06	Inward Gradient exists	Wall is effective
PM-5	-1.22	0.03	-0.85	-1.06	-0.41	Inward Gradient exists	Wall is effective
PM-6	3.69	4.09	3.94	3.89	4.04	Outward Gradient exists	Review water quality data
PM-7	-7.44	-6.54	-7.10	-7.26	-6.77	Inward Gradient exists	Wall is effective
PM-8	-10.17	-8.51	-9.27	-9.59	-8.60	Inward Gradient exists	Wall is effective
PM-9	-10.90	-7.77	-9.22	-9.64	-8.33	Inward Gradient exists	Wall is effective
PM-10	-5.67	-3.36	-4.79	-5.19	-3.95	Inward Gradient exists	Wall is effective
PM-11	-22.03	-20.01	-21.45	-21.68	-20.95	Inward Gradient exists	Wall is effective
PM-12	-6.25	-4.29	-5.01	-5.23	-4.53	Inward Gradient exists	Wall is effective
PM-13	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	PM-13I was dry	Continue to review water quality data
PM-14	0.98	1.16	1.05	0.95	1.27	Outward Gradient exists	Review water quality data
PM-15	-13.84	-11.87	-12.58	-12.78	-12.18	Inward Gradient exists	Wall is effective

ft = feet

TABLE 4.8
NORTH END MONITORING - NITRATE AND 1,4-DIOXANE (NEW DATA ONLY)
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Sample Date	1,4-Dioxane (µg/L)[a/]	Nitrogen, Nitrate (µg/L)	VOCs[b/]	Anions	Metals
31	B-313	8/12/2021		55000 J			
31	B-313	11/16/2021	17				
31	B-314	10/27/2021	0.9 U	160 J	X[c/]	X	X
31	B-321	8/11/2021		43000			
31	B-321	8/30/2021	9.7				
31	B-326-UD	8/30/2021	6.1				X
31	B-326-UD	10/12/2021	5				X
31	B-326-WD	8/30/2021	0.77 J				
31	B-326-WD	9/27/2021	0.69 J				
31	B-326-WD	10/12/2021	200 U	9900	X	X	X
31	MW05-WD	8/18/2021	4.4				
31	MW113-EW-1	7/29/2021	92	1100			X
31	MW113-EW-1	10/19/2021	120	2000			X
31	MW113-UD	7/29/2021	120				X
31	MW113-UD	10/19/2021	94				X
31	MW114-WD	8/5/2021	0.93				
31	MW114-WD	11/17/2021	0.96				
31	MW117-WD	8/5/2021	1.8				
31	MW117-WD	11/17/2021	1.5				
31	MW118-WD	8/9/2021	0.28 J				
31	MW118-WD	11/17/2021	0.26 J				
31	MW121-WDR	8/18/2021	2				
31	MW122-WDR	8/18/2021	2				
31	MW123-WD	8/18/2021	1.5				
31	MW124-WD	8/18/2021	0.49 J				
31	MW125-WD	8/30/2021	0.41 J				
31	MW129-WD	9/7/2021	5.3				
31	MW132-WD	7/21/2021	11				
31	MW132-WD	11/2/2021	14				
30	MW135-WD	7/28/2021	4.5				
30	MW141-WD	7/28/2021	2.3				
19	MW142-WD	7/28/2021	1.7				
24	MW144-WD	8/4/2021	0.9 U				
31	MW151-WD	7/19/2021	1.7				
31	MW151-WD	11/11/2021	5.1				
31	MW153-EW-1	7/21/2021	1.5				
31	MW153-EW-1	11/8/2021	2				
31	MW154-EW-1	7/21/2021	1.2				
31	MW154-EW-1	11/11/2021	0.63 J				
31	MW155-EW-1	7/21/2021	1.1				
31	MW155-EW-1	11/22/2021	0.27 J				
31	MW156-EW-1	7/21/2021	1.1				
31	MW156-EW-1	11/22/2021	0.48 J				
31	MW156-WD	7/19/2021	0.88 J				
31	MW156-WD	11/11/2021	0.25 J				
31	MW157-WD	7/19/2021	0.19 J				
31	MW157-WD	11/11/2021	0.1 J				
31	MW160-WD	7/19/2021	2.3				
31	MW160-WD	11/8/2021	3.3				
13	MW176-DEN	8/4/2021	0.49 J				

TABLE 4.8
NORTH END MONITORING - NITRATE AND 1,4-DIOXANE (NEW DATA ONLY)
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Sample Date	1,4-Dioxane (µg/L)[a/]	Nitrogen, Nitrate (µg/L)	VOCs[b/]	Anions	Metals
31	MW179-UDEN	9/8/2021	0.9 U				
31	NBBW-IW-3	8/5/2021	140				X
31	PTP-12	11/4/2021	9.1				X
31	PTP-13	8/25/2021	4.8				X
31	PTP-13	11/10/2021	6.9				X

a/ µg/L = micrograms per liter

b/ VOCs = volatile organic compounds

c/ X = indicates the sample was analyzed for at least one compound within the group.

Final Q definitions:

J+ = a "J" qualifier indicating positive bias in the associated result

J=The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

U= The analyte was analyzed for and is not present above the level of the associated value. The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ=The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the s

TABLE 4.9
NBBW & NORTH END EXTRACTION SYSTEMS - VOLUME AND MASS REMOVED
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Mass Removal of 1,4-Dioxane from North End Groundwater Extraction July through December 2021 (2H21)			
Extraction Well	**Volume Removed (gallons)**	**Mass (grams)**	**Mass (pounds)**
MW153-EW-1	1,094,544	6.78	0.015
MW154-EW-1	333,360	1.46	0.003
MW155-EW-1	450,864	1.75	0.004
MW156-EW-1	0	0.00	0.000
MW160-WD	132,480	1.33	0.003
MW118-WD	0	0.00	0.000
MW114-WD	0	0.00	0.000
MW77-EW-2	0	0.00	0.000
MW102-WD	237,888	1.43	0.003
MW77-EW-1	12,442	0.16	0.000
MW98-WD	9,317	0.37	0.001
MW170-EW-1 *	3,449,808	176.48	0.389
MW113-EW-1 *	721,152	288.89	0.637
MW113-UD *	6,840	3.04	0.007
B-321 *	12,730	0.44	0.001
NBBW-IW-3*	16,618	7.85	0.017
TOTAL	6,478,042	489.99	1.080

Total Mass Removal of 1,4-Dioxane from North End Groundwater Extraction Cumulative through 12/31/21			
Extraction Well	**Volume Removed (gallons)**	**Mass (grams)**	**Mass (pounds)**
MW153-EW-1	21,536,472	415.6	0.916
MW154-EW-1	14,849,429	344.3	0.759
MW155-EW-1	13,751,344	212.4	0.468
MW156-EW-1	6,103,619	174.0	0.384
MW160-WD	6,082,354	257.5	0.568
MW118-WD	1,490,372	123.7	0.273
MW114-WD	805,136	58.4	0.129
MW77-EW-2	149,192	8.6	0.019
MW102-WD	7,268,780	256.5	0.566
MW77-EW-1	280,704	14.6	0.032
MW98-WD	754,257	119.1	0.263
MW170-EW-1 *	64,198,656	5381.2	11.864
MW113-EW-1 *	14,231,599	1544.1	3.404
MW113-UD *	161,658	40.8	0.090
B-321 *	1,777,661	158.4	0.349
NBBW-IW-3*	936,922	480.0	1.058
TOTAL	154,378,155	9,589.1	21.1

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW62-WDR	7/25/2016	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	5.6		130	
MW62-WDR	11/9/2016	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	4.4		150	
MW62-WDR	2/7/2017	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	5.2		140	
MW62-WDR	5/17/2017	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	5.3		110	
MW62-WDR	8/1/2017	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	5.8		110	
MW62-WDR	10/13/2017	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	4.6		120	
MW62-WDR	3/7/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.9		110	
MW62-WDR	5/10/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	4.2		120	
MW62-WDR	7/31/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.8		120	
MW62-WDR	5/14/2019	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.9		120	
MW62-WDR	12/17/2019	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.5		120	
MW62-WDR	5/14/2020	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.4		130	
MW62-WDR	11/11/2020	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.4		130	J
MW62-WDR	4/27/2021	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.3		120	
MW62-WDR	10/27/2021	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3.2		110	
B-323-WD	3/4/2011	1.5		0.85	J	0.98	J	2.5		2.2		0.13	U	3.7		53			
MW170-WD	3/7/2011	5.4		2.1		3.8		11		6.9		0.13	U	8.3		72			
MW170-EW-1	1/5/2012	11		3.6		8		26		11		0.55	J	15		150		110	
MW170-EW-1	8/22/2012	5		2		3.4		11		2.7		0.33	J	10		77		33	
MW170-EW-1	9/19/2012	4.5		2.2		3		11		3.1		0.35	J	9.3		72		27	
MW170-EW-1	10/22/2012	4.3		1.5		2.2		9.2		2		0.19	J	6.2		56		24	
MW170-EW-1	11/13/2012	3.8		1.5		2.2		8.7		1.9		0.13	U	5.9		46		19	
MW170-EW-1	12/10/2012	4.2		1.6		2		8		2.1		0.13	U	6.2		40		17	
MW170-EW-1	1/30/2013	5.2		1.8		1.9		11		2.7		0.17	J	6.9		45		13	
MW170-EW-1	2/20/2013	5.4		2.4		3.2		14		3.1		0.13	U	10		71		12	
MW170-EW-1	3/14/2013	8.3		3.5		4.6		21		4		0.34	J	15		79		8.8	
MW170-EW-1	4/22/2013	5.8		2.2		2.5		11		1.6		0.13	J	7.9		64		5.5	
MW170-EW-1	5/15/2013	5.2		2.1		2.7		9		1.6		0.13	U	8.1		50		5.5	
MW170-EW-1	6/17/2013	4.9		1.9		2.7		8		1.6		0.13	U	6.5		39		5.3	
MW170-EW-1	7/29/2013	4		1.4		2.1		6.2		1.2		0.13	U	5.1		32		5.3	
MW170-EW-1	8/21/2013	4.8		1.5		2		6.8		1.7		0.13	U	5.4		29		5	
MW170-EW-1	9/18/2013	3.3		1.1		1.6		4.4		0.93		0.13	U	3.7		32		5.3	
MW170-EW-1	11/11/2013	2.7		1.1		1.4		4.6		1		0.13	U	3.7		27		5.8	
MW170-EW-1	2/20/2014	1.7		0.64	J	0.8	J	2.5		0.72	J	0.13	U	2.6		15		5.1	
MW170-EW-1	5/28/2014	2.1		0.87	J	1		3.2		0.88	J	0.13	U	3.1		18		6.2	
MW170-EW-1	9/4/2014	2.3		0.86	J	1.9		4.3		1.1		0.13	U	3.1		22		14	
MW170-EW-1	12/3/2014	1.5		0.56	J	2		3.1		1.1		0.13	U	2.6		17		13	
MW170-EW-1	3/5/2015	1.7		0.59	J	2.3		2.9		1.3		0.13	U	2.2		12		14	
MW170-EW-1	6/18/2015	1.2		0.4	J	1.9		2.3		1.2		0.13	U	1.9		9.9		19	

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW170-EW-1	9/16/2015	1.1		0.43	J	1.4		1.8		0.98	J	0.13	U	1.6		8.8		22	
MW170-EW-1	12/10/2015	0.87	J	0.3	J	0.82	J	1.1		0.49	J	0.13	U	0.99	J	6.7		22	
MW170-EW-1	2/24/2016	0.76	J	0.23	J	0.8	J	0.94	J	0.48	J	0.13	U	0.82	J	5.3		18	
MW170-EW-1	6/23/2016	0.7	J	0.26	J	1.4		1.3		0.73	J	0.13	U	1.2		6		24	
MW170-EW-1	12/19/2016	0.56	J	0.19	J	0.69	J	0.79	J	0.42	J	0.13	U	0.69	J	3.9		21	
MW170-EW-1	3/13/2017	0.74	J	0.29	J	1.3		1.3		0.77	J	0.13	U	1.2		3.7		18	
MW170-EW-1	6/26/2017	0.61	J	0.21	J	0.98	J	1.2		0.55	J	0.13	U	0.92	J	4.6		15	
MW170-EW-1	9/11/2017	0.76	J	0.21	J	1.2		1.3		0.73	J	0.13	U	1.1		4.7		13	
MW170-EW-1	12/4/2017	0.67	J	0.26	J	2.7		1.6		0.98	J	0.13	U	1.4		5.5		11	
MW170-EW-1	3/7/2018	0.78	J	0.3	J	5.6		2.1		1.9		0.13	U	2.8		8.6		19	
MW170-EW-1	6/11/2018	1.3		0.53	J	17		5.4		5.1		0.16	J	6.8		15		12	
MW170-EW-1	9/5/2018	1.4		0.5	J	14		4.3		4.3		0.13	U	5.6		17		8.7	
MW170-EW-1	11/19/2018	1.7		0.65	J	17		5.5		5.5		0.2	J	7.1		20		7.7	
MW170-EW-1	2/8/2019	1.1		0.44	J	13		3.4		3.4		0.13	U	5.3		16		8.8	
MW170-EW-1	3/18/2019	1.6		0.63	J	13		4.4		3.1		0.13	U	5.6		18		8	
MW170-EW-1	4/18/2019	1.2		0.52	J	10		2.7		2.9		0.13	U	4.4		15		7.8	
MW170-EW-1	5/17/2019	1.2		0.49	J	10		2.8		2.8		0.13	U	4.6		15		8.4	
MW170-EW-1	6/14/2019	1		0.42	J	11		3.5		2.2		0.13	U	4		15		8.9	
MW170-EW-1	7/17/2019	1.4		0.62	J	14		4.7		3.8		0.13	U	6		30	J	7.8	
MW170-EW-1	8/19/2019	1.6		0.73	J	15		4.7		3.7		0.13	U	6.3		29	J	7.5	
MW170-EW-1	9/17/2019	1.1		0.43	J	12		3.5		2.5		0.13	U	4.8		17		7.4	
MW170-EW-1	10/15/2019	1.3		0.51	J	13		2.8		3.2		0.13	U	5.6		18		7.7	
MW170-EW-1	11/12/2019	1.2		0.48	J	12		3.4		2.6		0.13	U	4.8		19		7.8	
MW170-EW-1	12/10/2019	1.6		0.62	J	15		5		3.6		0.13	U	6.5		21		8.3	
MW170-EW-1	2/11/2020	1.3		0.5	J	13		4.3		2.8		0.14	J	5.1		18		8.1	
MW170-EW-1	5/12/2020	1.4		0.48	J	13		4.1		3.2		0.13	U	5.6		16		8.7	
MW170-EW-1	8/10/2020	1.1		0.42	J	11		3.7		2.4		0.28	J	4.9		19	U	9.2	
MW170-EW-1	8/20/2020															16			
MW170-EW-1	11/10/2020	1.6		0.64	J	12		3.6		2.6		0.13	U	4.7		16		8.8	
MW170-EW-1	2/4/2021	1.1		0.35	J	12		3.7		2.6		0.13	U	5.1		16		9.2	
MW170-EW-1	5/12/2021	0.95	J	0.38	J	9.8		2.8		1.8		0.13	U	4.1		15		11	J
MW170-EW-1	8/9/2021	1		0.45	J	9.5		2.8		1.8		0.13	U	4		14		9.8	
MW170-EW-1	10/27/2021	0.93	J	0.33	J	11		3.4		2		0.13	U	4.6		12		9.9	
MW171-WD	3/3/2011	1		0.65	J	0.36	J	2.1		1.1		0.13	U	2.8		21			
MW171-WD	1/4/2012	0.2	U	0.16	U	0.15	U	0.64	J	0.16	U	0.13	U	0.77	J	6.6		18	
MW171-WD	8/28/2012	0.3	J	0.21	J	0.15	U	0.71	J	0.24	J	0.13	U	0.93	J	8.4		15	
MW171-WD	1/31/2013	0.25	J	0.18	J	0.15	U	0.63	J	0.25	J	0.13	U	0.82	J	9.5		16	
MW171-WD	8/21/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	3		10	

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW172-WD	3/1/2011	1.7		0.83	J	0.86	J	6		1.3		0.13	U	6		51			
MW172-WD	1/4/2012	2.3		1.2		0.95	J	4.9		0.94	J	0.13	U	5.8		68		28	
MW172-WD	8/28/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.82	J	1.3	
MW172-WD	1/30/2013	0.62	J	0.26	J	0.15	U	1.1		0.26	J	0.13	U	1		16		8.1	
MW172-WD	9/19/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.6	J	2.1	
MW173-WD	3/1/2011	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U		
MW173-WD	8/24/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.15	U		
MW174-WD	1/5/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	10	
MW174-WD	9/6/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	6.7	
MW174-WD	2/5/2013	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	5.3	
MW174-WD	9/25/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.15	U	2.9	
MW175-WD	1/5/2012	3.5		2.1		3.5		13		0.42	J	0.27	J	12		76		62	
MW175-WD	9/6/2012	0.2	J	0.16	U	0.15	U	0.46	J	0.33	J	0.13	U	0.22	U	2.4	J	35	
MW175-WD	2/5/2013	0.2		0.47	J	0.61	J	2.3		0.24	J	0.13	U	2		15		19	
MW175-WD	9/19/2018	0.2		0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.53	J	28	
MW77-WD	12/19/2003	6.2		2.6		1.5		11		11		0.32	J	11		85	J	68	
MW77-WD	1/21/2004	6.7		2.9		1.6		12		11		0.13	U	11		76	J		
MW77-WD	5/26/2010	3.3		1.2		0.82	J	7		2.8		0.13	U	4.7		45		160	
MW77-WD	11/18/2010	2.3		0.9	J	0.66	J	4.2		1.7		0.13	U	3.5		37		120	
MW77-WD	3/2/2011	3		1.1		0.82	J	5.8		2		0.13	U	4.7		41			
MW77-WD	5/25/2011	4.6		2		1.3		10		3.5		0.13	U	7.2		61		170	
MW77-WD	11/15/2011	2.8		1.1		0.89	J	5.1		1.6		0.13	U	4.3		41		130	
MW77-WD	5/24/2012	1.6		0.46	J	0.15	U	2.1		0.76	J	0.13	U	1.6		23		42	
MW77-WD	11/8/2012	2.2		0.68	J	0.37	J	1.9		0.92	J	0.13	U	1.9		29		46	
MW77-WD	5/8/2013	2.1		0.55	J	0.22	J	1.9		0.67	J	0.13	U	1.3		27		65	
MW77-WD	11/12/2013	0.8		0.21	J	0.15	U	0.56	J	0.32	J	0.13	U	0.67	J	11		74	
MW77-WD	4/29/2014	1.6		1.49	J	0.17	J	1.4		0.58	J	0.13	U	1.1		23		63	
MW77-WD	11/18/2014	0.74	J	0.24	J	0.15	U	0.93	J	0.3	J	0.13	U	0.54	J	7.7		59	
MW77-WD	4/23/2015	0.57	J	0.16	U	0.15	U	0.37	J	0.17	J	0.13	U	0.28	J	5.8		53	
MW77-WD	11/12/2015	1.4		0.42	J	0.16	J	1.7		0.5	J	0.13	U	1.2		15		23	
MW77-WD	5/16/2016	0.36	J	0.16	U	0.15	U	0.24	J	0.16	U	0.13	U	0.22	U	3.5		35	
MW77-WD	10/31/2016	1.4		0.38	J	0.16	J	1.5		0.32	J	0.13	U	1		14		16	
MW77-WD	4/24/2017	1.3		0.51	J	0.19	J	1.9		0.44	J	0.13	U	1.7		20		24	
MW77-WD	10/26/2017	0.61	J	0.17	J	0.15	U	0.52	J	0.16	U	0.13	U	0.36	J	5.3		27	
MW77-WD	5/3/2018	0.98	J	0.22	J	0.15	U	0.75	J	0.16	U	0.13	U	0.51	J	9		26	
MW77-WD	8/2/2018	0.27	J	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	2.6		9.7	
MW77-WD	5/2/2019	0.48	J	0.16	U	0.15	U	0.26	J	0.16	U	0.13	U	0.22	U	3		17	
MW77-WD	10/22/2019	1.3		0.18	J	0.15	U	1.7		0.16	U	0.28	J	0.91	J	12		17	
MW77-WD	5/4/2020	0.61	J	0.18	J	0.15	U	0.43	J	0.16	U	0.13	U	0.22	U	5		18	

TABLE 4.10
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JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW77-WD	10/28/2020	1.7		0.47	J	0.15	U	2.1		0.31	J	0.13	U	1.1		16		12	
MW77-WD	4/21/2021	0.56	J	0.16	U	0.15	U	0.52	J	0.16	U	0.13	U	0.22	U	4.3		15	
MW77-WD	10/27/2021	1.1		0.16	U	0.15	U	1.7		0.16	U	0.13	U	0.99	J	11		12	
MW98-WD	3/8/2010															44			
MW98-WD	6/10/2010															42			
MW98-WD	9/7/2010															38			
MW98-WD	12/1/2010															34			
MW98-WD	3/9/2011															36			
MW98-WD	6/14/2011															35			
MW98-WD	8/30/2011															40			
MW98-WD	12/13/2011															29			
MW98-WD	3/20/2012															26			
MW98-WD	6/13/2012															24			
MW98-WD	9/5/2012															23			
MW98-WD	12/6/2012															22			
MW98-WD	3/6/2013															19			
MW98-WD	6/4/2013															20			
MW98-WD	9/10/2013															21			
MW98-WD	11/4/2013															17	J		
MW98-WD	2/13/2014															17			
MW98-WD	5/14/2014															18			
MW98-WD	8/13/2014															22			
MW98-WD	12/2/2014															19			
MW98-WD	2/9/2015															16			
MW98-WD	6/11/2015															21			
MW98-WD	9/3/2015															16			
MW98-WD	12/28/2015															16			
MW98-WD	3/1/2016															15			
MW98-WD	6/20/2016															16			
MW98-WD	12/28/2016															14			
MW98-WD	3/2/2017															13			
MW98-WD	6/27/2017															14			
MW98-WD	7/27/2017															14			
MW98-WD	11/30/2017															12			
MW98-WD	3/21/2018															12			
MW98-WD	5/24/2018															11			
MW98-WD	9/4/2018	0.82	J	0.24	J	0.15	U	0.69	J	0.29	J	0.13	U	0.83	J	11		4.40	
MW98-WD	11/20/2018															12			
MW98-WD	2/22/2019															11			

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW98-WD	5/16/2019															10			
MW98-WD	7/24/2019															11			
MW98-WD	10/23/2019															12			
MW98-WD	2/13/2020															11			
MW98-WD	5/21/2020															8.6			
MW98-WD	8/24/2020															9.8			
MW98-WD	11/18/2020															11			
MW98-WD	2/11/2021															6.3			
MW98-WD	6/7/2021															9.8			
MW98-WD	8/31/2021															11			
MW98-WD	11/18/2021															11			
MW102-WD	3/8/2010															29			
MW102-WD	6/10/2010															29			
MW102-WD	9/7/2010															25			
MW102-WD	12/1/2010															19			
MW102-WD	3/9/2011															20			
MW102-WD	6/14/2011															21			
MW102-WD	8/30/2011															21			
MW102-WD	12/13/2011															12			
MW102-WD	3/20/2012															9.7			
MW102-WD	6/13/2012															6.4			
MW102-WD	9/5/2012															5.8			
MW102-WD	12/6/2012															4	J		
MW102-WD	3/6/2013															3.3	J		
MW102-WD	6/4/2013															3.2	J		
MW102-WD	9/10/2013															2.8	J		
MW102-WD	11/4/2013															2.8	J		
MW102-WD	2/13/2014															2.4	J		
MW102-WD	5/14/2014															2.7	J		
MW102-WD	8/13/2014															5.2			
MW102-WD	12/2/2014															3.6	J		
MW102-WD	2/9/2015															2.8	J		
MW102-WD	6/11/2015															4.4	J		
MW102-WD	9/3/2015															3.3			
MW102-WD	12/28/2015															2.9			
MW102-WD	3/1/2016															2.2			
MW102-WD	6/20/2016															3.3			
MW102-WD	12/28/2016															2.5			
MW102-WD	3/2/2017															2.9			

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW102-WD	6/27/2017															2.5			
MW102-WD	7/27/2017															2.5			
MW102-WD	11/30/2017															1.3			
MW102-WD	3/21/2018															1.4			
MW102-WD	5/24/2018															0.81	J		
MW102-WD	9/4/2018	0.24	J	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	1.8		2.9	
MW102-WD	11/20/2018															1.8			
MW102-WD	2/22/2019															1.5			
MW102-WD	5/16/2019															1.5			
MW102-WD	7/24/2019															1.7			
MW102-WD	10/23/2019															1.5			
MW102-WD	2/13/2020															1.1			
MW102-WD	5/21/2020															1.3			
MW102-WD	8/24/2020															1.1			
MW102-WD	11/18/2020															0.99			
MW102-WD	2/11/2021															0.9			
MW102-WD	6/7/2021															1.8			
MW102-WD	8/31/2021															1.7			
MW102-WD	11/18/2021															1.1			
MW77-EW-1	3/8/2010															32			
MW77-EW-1	6/10/2010															33			
MW77-EW-1	9/7/2010															27			
MW77-EW-1	12/1/2010															24			
MW77-EW-1	3/9/2011															22			
MW77-EW-1	6/14/2011															23			
MW77-EW-1	8/30/2011															30			
MW77-EW-1	12/13/2011															18			
MW77-EW-1	3/20/2012															16			
MW77-EW-1	6/13/2012															12			
MW77-EW-1	9/5/2012															12			
MW77-EW-1	12/6/2012															10			
MW77-EW-1	3/6/2013															9.7			
MW77-EW-1	6/4/2013															8.6			
MW77-EW-1	9/10/2013															9.1			
MW77-EW-1	12/17/2013															7.6			
MW77-EW-1	2/13/2014															7.6			
MW77-EW-1	5/14/2014															7.1			
MW77-EW-1	8/13/2014															10			
MW77-EW-1	12/2/2014															7.5			

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																			
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW77-EW-1	2/9/2015															6.6			
MW77-EW-1	6/11/2015															9.5			
MW77-EW-1	9/3/2015															6.5			
MW77-EW-1	12/28/2015															8.4			
MW77-EW-1	3/1/2016															4.8			
MW77-EW-1	6/20/2016															5.8			
MW77-EW-1	12/28/2016															4.5			
MW77-EW-1	3/2/2017															11			
MW77-EW-1	6/27/2017															11			
MW77-EW-1	7/27/2017															5.4			
MW77-EW-1	11/30/2017															3.7			
MW77-EW-1	3/21/2018															3.5			
MW77-EW-1	5/24/2018															2.5			
MW77-EW-1	9/4/2018	0.43	J	0.16	U	0.15	U	0.23	J	0.16	J	0.13	U	0.55	J	10		3	
MW77-EW-1	11/20/2018															3.3			
MW77-EW-1	2/22/2019															2.9			
MW77-EW-1	5/16/2019															2.9			
MW77-EW-1	7/24/2019															3.3			
MW77-EW-1	10/23/2019															4.5			
MW77-EW-1	2/13/2020															3			
MW77-EW-1	5/21/2020															2.8			
MW77-EW-1	8/24/2020															3			
MW77-EW-1	11/18/2020															3.4			
MW77-EW-1	2/11/2021															2.7			
MW77-EW-1	6/7/2021															3.2			
MW77-EW-1	8/31/2021															3.7			
MW77-EW-1	11/18/2021															3			
MW77-EW-2	3/8/2010															9.4			
MW77-EW-2	6/10/2010															8.9			
MW77-EW-2	9/7/2010															8.6			
MW77-EW-2	12/1/2010															11			
MW77-EW-2	3/9/2011															6.3			
MW77-EW-2	6/14/2011															1.7	J		
MW77-EW-2	8/30/2011															1.5	J		
MW77-EW-2	12/13/2011															0.82	J		
MW77-EW-2	3/20/2012															0.7	J		
MW77-EW-2	6/13/2012															0.58	J		
MW77-EW-2	9/5/2012															0.85	J		
MW77-EW-2	12/6/2012															0.52	J		

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

		Compounds[a/]																			
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW77-EW-2	3/6/2013															0.5	U		
MW77-EW-2	6/4/2013															0.5	U		
MW77-EW-2	9/10/2013															0.5	U		
MW77-EW-2	12/17/2013															0.5	U		
MW77-EW-2	2/13/2014															0.5	U		
MW77-EW-2	5/14/2014															0.5	U		
MW77-EW-2	8/13/2014															0.5	U		
MW77-EW-2	12/2/2014															0.5	U		
MW77-EW-2	2/9/2015															0.68	J		
MW77-EW-2	6/11/2015															0.94	J		
MW77-EW-2	9/3/2015															0.65	J		
MW77-EW-2	12/28/2015															0.53	J		
MW77-EW-2	3/1/2016															0.5	J		
MW77-EW-2	6/20/2016															0.3	J		
MW77-EW-2	12/28/2016															0.6	J		
MW77-EW-2	3/2/2017															0.81	J		
MW77-EW-2	6/27/2017															0.44	J		
MW77-EW-2	7/27/2017															0.18	J		
MW77-EW-2	11/30/2017															0.15	U		
MW77-EW-2	3/21/2018															0.37	J		
MW77-EW-2	5/24/2018															0.15	U		
MW77-EW-2	9/4/2018	0.20	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.15	U	0.55	
MW77-EW-2	11/20/2018															0.15	U		
MW77-EW-2	2/22/2019															0.17	J		
MW77-EW-2	5/16/2019															0.15	J		
MW77-EW-2	7/24/2019															0.4	U		
MW77-EW-2	10/23/2019															0.4	U		
MW77-EW-2	2/13/2020															0.12	J		
MW77-EW-2	5/21/2020															0.17	J		
MW77-EW-2	8/24/2020															0.19	J		
MW77-EW-2	11/18/2020															0.19	J		
MW77-EW-2	2/11/2021															0.18	J		
MW77-EW-2	6/7/2021															2			
MW77-EW-2	9/14/2021															0.13	J		
MW77-EW-2	11/18/2021															0.12	J		
MW77-UD	1/4/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	0.5	U
MW77-UD	2/7/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	0.5	U
MW77-UD	9/6/2012	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.5	U	0.31	J

TABLE 4.10
SUMMARY OF GTEP AREA ANALYTICAL RESULTS SINCE 2010 VOCs AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

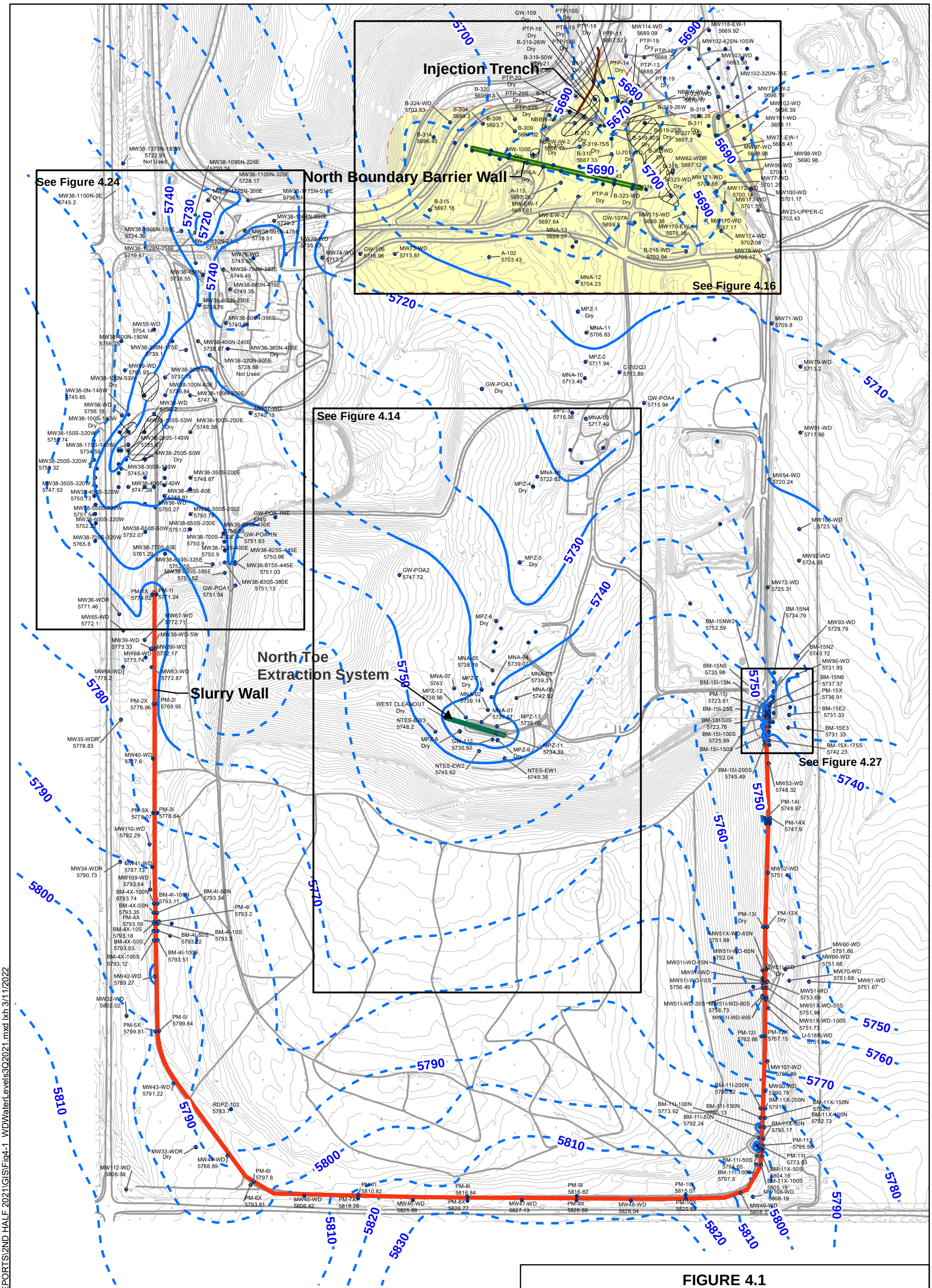
		Compounds[a/]																	
Well	**Sample Date**	**PCE**	**Q[b/]**	**TCE**	**Q**	**cis-1,2-DCE**	**Q**	**1,1-DCE**	**Q**	**1,1,1-TCA**	**Q**	**1,2-DCA**	**Q**	**1,1-DCA**	**Q**	**1,4-Dioxane**	**Q**	**NO3**	**Q**
Performance Standard→		**5**		**5**		**70**		**7**		**200**		**5**		**990**		**0.9**		**28**	
MW77-UD	8/20/2018	0.2	U	0.16	U	0.15	U	0.23	U	0.16	U	0.13	U	0.22	U	0.38	J	0.047	J

**All concentrations listed in µg/L, except nitrate (NO_3), which is listed in mg/L

**Yellow shaded cells indicate the concentration exceeds the performance standard

a/ PCE = tetrachloroethene
TCE = trichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene
1,1-DCE = 1,1-dichloroethene
1,1,1-TCA = 1,1,1-trichloroethane
1,2-DCA = 1,2-dichloroethane
1,1-DCA = 1,1-dichloroethane
NO3 = Nitrate

b/ Q = Final qualifier
Qualifiers J = estimated concentration below the reporting limit
U = undetected concentration below the method detection limit



Legend

- Weathered Dawson Well Location
- Dry area
- Water Elevation Contour (10-foot interval) (Dashed where inferred, queried where uncertain)
- Dry Area or Well labeled dry – Water Level Below Base of Well Screen
- (5790.09) Water levels recorded week of July 1, 2021

FIGURE 4.1

SITEWIDE POTENTIOMETRIC SURFACE ALLUVIUM/WEATHERED DAWSON July 2021

O&M Status Report - 2nd Half 2021 Lowry Landfill Superfund Site

PARSONS

Denver, Colorado

S:\ES\Mal\Proj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-1 WDWaterLevels3Q2021.mxd lxh 3/11/2022

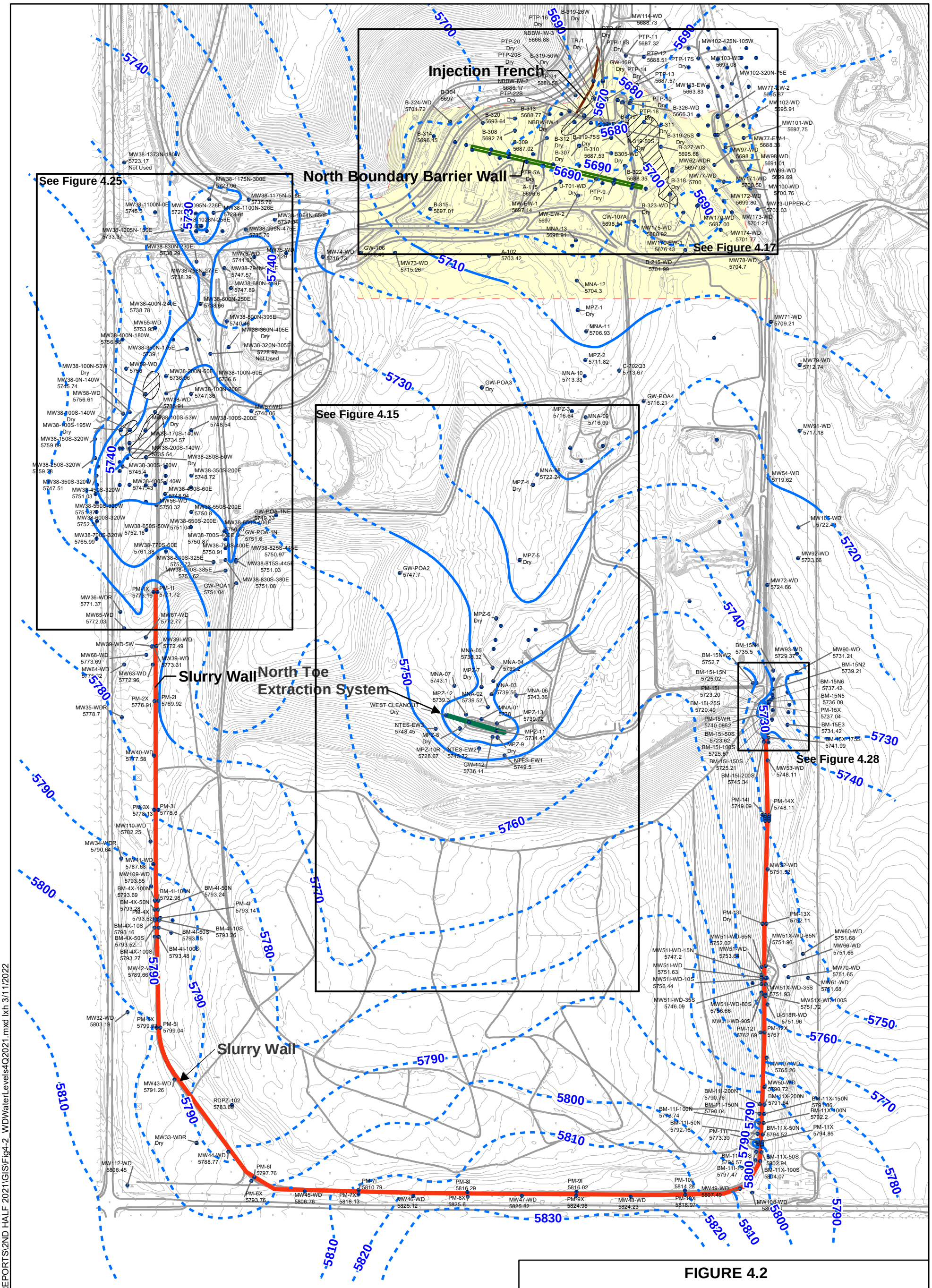

Injection Trench
North Boundary Barrier Wall
See Figure 4.25
See Figure 4.17
See Figure 4.15
See Figure 4.28
Slurry Wall
North Toe
Extraction System
Slurry Wall
WEST CLEANOUT
Dry
5700
5690
5740
5730
5670
5680
5710
5720
5750
5760
5770
5780
5790
5800
5810
5820
5830
PTP-16 Dry
B-319-26W Dry
MW114-WD 5688.73
NBBW-IW-3 5666.88
PTP-15 Dry
PTP-11 5687.32
MW102-425N-105W
PTP-20 Dry
PTP-15S Dry
TR-1 Dry
PTP-12 5688.51
PTP-17S Dry
MW103-WD 5693.08
PTP-20S Dry
B-319-50W Dry
GW-109 Dry
PTP-14 Dry
PTP-13 5687.57
MW102-320N-75E
PTP-21 5688.53
MW113-EW 5663.83
MW77-EW-2 5695.87
NBBW-IW-2 5686.17
PTP-22S Dry
B-304 5697
B-324-WD 5701.72
PTP-19 Dry
MW102-WD 5695.91
B-313 5688.77
B-326-WD 5666.31
B-320 5693.64
NBBW-IW-1 Dry
PTP-18 Dry
B-318
B-311 Dry
MW101-WD 5697.75
B-314 5696.45
B-308 5692.74
B-319-25S Dry
MW77-EW-1 5688.38
B-312 Dry
B-319-75S Dry
B-319-50S Dry
B-309 5687.02
B-307 Dry
B-310 5687.53
B305-WD Dry
B-327-WD 5695.68
MW97-WD 5698.1
MW98-WD 5691.01
MW62-WDR 5697.08
PTP-5A Dry
B-322 5688.35
MW99-WD 5699.69
MW77-WD 5700
B-316 Dry
MW171-WD 5700.50
MW100-WD 5700.76
A-115 5696.6
U-701-WD Dry
MW172-WD 5699.80
MW-EW-1 5697.14
PTP-9 Dry
MW23-UPPER-C 5701.03
B-315 5697.01
B-323-WD Dry
MW-EW-2 5697
GW-107A 5698.54
MW170-WD 5687.00
MW173-WD 5701.21
MNA-13 5698.91
MW175-WD 5688.92
MW174-WD 5701.77
MW170-EW-1 5676.43
GW-106 5716.16
MW74-WD 5716.73
A-102 5703.42
B-215-WD 5701.99
MW78-WD 5704.7
MW73-WD 5715.26
MNA-12 5704.3
MPZ-1 Dry
MW71-WD 5709.21
MNA-11 5706.93
MPZ-2 5711.82
C-702Q3 5713.67
MW79-WD 5712.74
MNA-10 5713.33
GW-POA3 Dry
GW-POA4 5716.21
MPZ-3 5716.64
MNA-09 5716.09
MW91-WD 5717.18
MNA-08 5722.24
MPZ-4 Dry
MW54-WD 5719.62
MW105-WD 5722.46
MW92-WD 5723.66
GW-POA2 5747.7
MPZ-5 Dry
MW72-WD 5724.66
MPZ-6 Dry
MNA-05 5738.32
MNA-04 5739.2
MPZ-7 Dry
MNA-07 5743.1
MNA-03 5739.56
MNA-06 5743.36
MPZ-12 5739.3
MNA-02 5739.52
MNA-01 5738
MPZ-13 5739.72
NTES-EW3 5748.45
MPZ-8 Dry
MPZ-11 5734.45
MPZ-10R 5728.67
NTES-EW2 5749.72
MPZ-9 Dry
GW-112 5736.11
NTES-EW1 5749.5
MW53-WD 5748.11
PM-14I 5749.09
PM-14X 5748.11
MW52-WD 5751.52
PM-13I Dry
PM-13X 5752.11
MW51I-WD-65N 5752.02
MW51X-WD-65N 5751.96
MW60-WD 5751.68
MW66-WD 5751.66
MW51I-WD-15N 5747.2
MW51I-WD 5753.64
MW70-WD 5751.65
MW51I-WD 5751.63
MW51I-WD-10S 5756.44
MW61-WD 5751.68
MW51X-WD-35S 5751.93
MW51I-WD-35S 5746.09
MW51X-WD-100S 5751.72
MW51I-WD-80S 5756.66
U-518R-WD 5751.96
MW51I-WD-90S
PM-12I 5762.69
PM-12X 5767
MW107-WD 5765.26
MW50-WD 5790.72
BM-11I-200N 5790.76
BM-11X-200N 5791.54
BM-11X-150N 5791.86
BM-11I-100N 5793.74
BM-11I-150N 5790.04
BM-11X-100N 5792.2
BM-11I-50N 5792.16
BM-11X-50N 5794.52
PM-11X 5794.85
PM-11I 5773.39
BM-11X-50S 5802.94
BM-11I-10S 5797.47
BM-11X-100S 5804.07
MW49-WD 5807.49
MW108-WD 580
PM-10I 5814.28
PM-10X 5818.97
PM-9X 5824.98
MW48-WD 5824.23
PM-9I 5816.02
MW47-WD 5825.82
PM-8X 5825.6
PM-8I 5816.29
MW46-WD 5825.12
PM-7X 5818.13
PM-7I 5810.79
MW45-WD 5806.76
PM-6X 5793.76
PM-6I 5797.76
MW112-WD 5806.45
MW33-WDR Dry
MW44-WD 5788.77
MW43-WD 5791.26
RDPZ-102 5783.68
MW32-WD 5803.19
PM-5X 5799.66
PM-5I 5799.04
MW42-WD 5789.66
MW41-WD 5787.68
MW109-WD 5793.55
BM-4X-100N 5793.69
BM-4I-100N 5792.98
BM-4I-50N 5793.24
BM-4X-50N 5793.23
PM-4I 5793.14
PM-4X 5793.52
BM-4X-10S 5793.16
BM-4I-50S 5793.15
BM-4I-10S 5793.26
BM-4X-50S 5793.52
BM-4X-100S 5793.27
BM-4I-100S 5793.48
MW34-WDR 5790.64
MW110-WD 5782.25
PM-3X 5778.13
PM-3I 5778.6
MW40-WD 5777.58
MW35-WDR 5778.7
PM-2X 5776.91
PM-2I 5769.92
MW64-WD 5775.12
MW63-WD 5772.96
MW68-WD 5773.69
MW39-WD 5773.31
MW39-WD-5W
MW39I-WD 5772.49
MW67-WD 5772.77
MW65-WD 5772.03
MW36-WDR 5771.37
PM-1X 5773.19
PM-1I 5771.72
GW-POA1 5751.04
MW38-830S-380E 5751.08
MW38-815S-445E 5751.03
MW38-825S-445E 5750.97
MW38-750S-400E 5750.91
MW38-770S-60E 5761.38
MW38-810S-325E 5752.72
MW38-790S-385E 575 62
MW38-700S-400E 5750.87
GW-POA-1N 5751.6
MW38-650S-400E 5750.87
MW38-650S-200E 5751.04
MW38-650S-50W 5752.16
GW-POA-1NE 5749.33
MW38-550S-200E 5750.8
MW38-600S-320W 5752.57
MW38-550S-320W 5751.87
MW38-700S-320W 5765.99
MW38-480S-60E 5748.94
MW56-WD 5750.32
MW38-450S-320W 5751.03
MW38-400S-140W 5747.43
MW38-350S-320W 5747.51
MW38-300S-160W 5745.4
MW38-250S-320W 5759.28
MW38-250S-50W Dry
MW38-350S-200E 5748.72
MW38-150S-320W 5759.09
MW38-100S-195W Dry
MW38-100S-140W Dry
MW38-100S-53W Dry
MW38-100S-200E 5748.54
MW38-170S-140W 5734.57
MW38-200S-140W 5735.54
MW38-0N-140W 5745.74
MW58-WD 5756.61
MW38-WD 5735.91
MW38-100N-200E 5747.36
MW59-WD 5756
MW38-200N-60E 5736.96
MW38-100N-60E 5736.6
MW38-100N-53W Dry
MW38-400N-180W 5756.58
MW38-350N-175E 5739.1
MW38-320N-305E 5728.97 Not Used
MW38-400N-240E 5738.78
MW55-WD 5753.95
MW38-360N-405E Dry
MW38-500N-396E 5740.46
MW38-600N-250E 5738.66
MW38-680N-419E 5747.89
MW38-794N-277E 5747.57
MW38-738N-277E 5738.39
MW38-830N-230E 5738.29
MW38-1064N-650E 5737.04
MW38-995N-475E 5736.76
MW38-1005N-150E 5733.37
MW38-1100N-0E 5745.3
MW38-1100N-326E 5728.61
MW38-1028N-256E 5728.88
MW38-1175N-300E 5723.06
MW38-1175N-5[illegible]E 5735.76
MW38-1373N-180W 5723.17 Not Used
MW76-WD 5741.02
MW75-WD 5742.29
GW-106 5716.16
MW74-WD 5716.73
MW73-WD 5715.26
MW-095N-226E 572[illegible]
MW-1028N-256E [illegible]
BKGD-1WD 5842.45
BKGD-2WD 5841.49
N
Feet
0
250
500
1 inch = 500 feet
Legend
Weathered Dawson Well Location
Dry area
Water Elevation Contour (10-foot interval)
(Dashed where inferred, queried where uncertain)
Dry Area or Well labeled dry –
Water Level Below Base of Well Screen
(5790.09) Water levels recorded week of October 01, 2021
FIGURE 4.2
SITEWIDE POTENTIOMETRIC SURFACE
ALLUVIUM/WEATHERED DAWSON
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site
PARSONS
Denver, Colorado
S:\ES\Maj\Proj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-2_WDWaterLevels4Q2021.mxd lxh 3/11/2022

Figure 4.22

Injection Trench

North Boundary Barrier Wall

MW113-LD 5678.36 Not Used
MW113-UD 5631.69
B-326-UD 5672.35
B-304-UD 5688.91
B-313-UD 5682.83
B-314-UD 5689.76
GW-108A 5688.7
MW-1000 5686.8
B-306 5690.82
B-327-UD 5692.79
BW-PZ-1LC 5689.2
B-317-UD 5691.52
U-701 5688.22
B-305R 5691.83
MW62-UD 5690.74
MW77-UD 5696.00
MW-EW-1LC 5695.1
MW-EW-1LCRA 5692.97 Not Used
B-316-UD 5691.2
MW23-C-SD 5699.09
MW37-UD 5699.23
MW23-WD 5701.54
MW-EW-2LC 5695.62
GW-107UD 5699.5
GW-107UDR 5677.11 Not Used
MW38-1363N-180W 5724.73
MW38-1200N-226E 5709.85
MW38-1120N-1000E 5716.75
MW38-1064N-660E 5717.37 Not Used
MW38-1064N-655E 5726.88
MW76-UD 5717.53
MW75-UD 5717.04
MW74-UD 5713.25
MW73-UD 5711.19
MW78-UD 5706
MW71-UD 5710.25
MW38-410N-180W 5718.18
MW38-400N-300E 5718.29
MW38-360N-405E Dry
MW38-200N-425E 5731.41
C-702P4 5713.95
MW79-UD 5712.71
MW91-UD 5716.32
MW38-302S-50W 5743.9
MW38-450S-200E 5748.67
MW54-UDR 5719.96
MW72-UD 5721.51
MW36-UD 5767.32
MW39-UD 5751.7
North Toe Extraction System
MW93-UD 5732.05
MW90-UD 5731.96
MW-1 5745.1 Not Used
MW35-UD 5759.34
GW-104 5751.68
B-502 5748.98
PM-15-UD 5735.52
MW111-UD 5766.81
B-712-LD 5741.42 Not Used
B-712-UD 5747.92
B-712-25S-UD 5748.25
GW-101 5729.32
MW-2 5757.83 Not Used
MW34-UD 5787.22
MW52-UD 5748.4
MW106-UD 5750.80
BM-4X-40S 5785.95
MW42-UD 5788.06
B-706 5785.4
MW-3 5788.31
MW32-UD 5787.98
MW51-10S 5753
B-518 5759.38
B-708 5774.1
MW107-UD 5752.01
Slurry Wall
MW33-UD 5788.72
MW112-UD 5792.15
PM-6X-UD 5792.58
B-519 5808.85
BKGD-2UD 5801.49 Not Used
5700
5710
5720
5730
5740
5750
5760
5770
5780
5790
5800
5810

Legend

- Unweathered Dawson Well Location
- Water Elevation Contour (10-foot interval) (Dashed where inferred)
- (5790.09) Water levels recorded week of July 01, 2021
- Dry — Water Level Below Base of Screen

N

0 250 500 Feet

1 inch = 500 feet

FIGURE 4.3

SITEWIDE POTENTIOMETRIC SURFACE UNWEATHERED DAWSON
July 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

PARSONS

Denver, Colorado

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Figure 4.23

Injection Trench

North Boundary Barrier Wall

MW113-LD 5676.69
MW113-UD 5631.71
B-326-UD 5669.54
B-313-UD 5681.71
B-304-UD 5687.91
B-314-UD 5689.08
GW-108A 5687.98
BW-PZ-1LC 5688.64
MW-1000 5686.27
B-306 5690.23
B-327-UD 5692.08
B-317-UD 5691.01
U-701 5688.26
B-305R 5691.76
MW62-UD 5690.44
MW77-UD 5695.35
MW-EW-1LC 5694.88
B-316-UD 5691.43
MW37-UD 5699.24
MW-EW-1LCRA 5692.51 Not Used
MW-EW-2LC 5695.03
GW-107UD 5701.19
GW-107UDR 5678.65 Not Used
MW23-C-SD 5698.56
MW23-WD 5701.18

MW38-1363N-180W 5724.61
MW38-1200N-226E 5709.85
MW38-1120N-1000E 5716.65
MW38-1064N-660E 5717.29 Not Used
MW38-1064N-655E 5727.26
MW76-UD 5717.48
MW75-UD 5716.98
MW74-UD 5713.15
MW73-UD 5710.97
MW78-UD 5705.34
MW71-UD 5709.84
MW38-410N-180W 5718.21
MW38-400N-300E 5718.26
MW38-360N-405E Dry
MW38-200N-425E 5731.77
C-702P4 5714.22
MW79-UD 5712.8
MW91-UD 5716.03
MW38-302S-50W 5743.78
MW38-450S-200E 5748.67
MW54-UDR 5719.86
MW72-UD 5731.06
MW36-UD 5767.25
MW39-UD 5751.69
North Toe Extraction System
MW93-UD 5731.29
MW90-UD 5731.23
MW-1 5744.91 Not Used
B-502 5748.7
GW-104 5751.65
PM-15-UD 5735.55
MW35-UD 5759.34
MW111-UD 5766.58
B-712-LD 5741.32 Not Used
B-712-UD 5747.72
B-712-25S-UD 5748.04
GW-101 5729.15
MW-2 5757.75 Not Used
MW34-UD 5787.4
MW52-UD 5748.02
MW106-UD 5750.88
BM-4X-40S 5785.94
MW42-UD 5786.84
B-706 5785.33
MW51-10S 5752.91
B-518 5759.15
MW-3 5787.34
MW32-UD 5787.26
B-708 5774.02
MW107-UD 5751.96
Slurry Wall
MW33-UD 5788.67
MW112-UD 5791.9
PM-6X-UD 5792.20
B-519 5807.99

5700 5710 5720 5730 5740 5750 5760 5770 5780 5790 5800 5810

BKGD-2UD 5801.4 Not Used

N

0 250 500 Feet

1 inch = 500 feet

Legend

- Unweathered Dawson Well Location
- Water Elevation Contour (10-foot interval) (Dashed where inferred)
- (5790.09) Water levels recorded week of October 01, 2021
- Dry — Water Level Below Base of Screen

FIGURE 4.4

SITEWIDE POTENTIOMETRIC SURFACE UNWEATHERED DAWSON
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

PARSONS

Denver, Colorado

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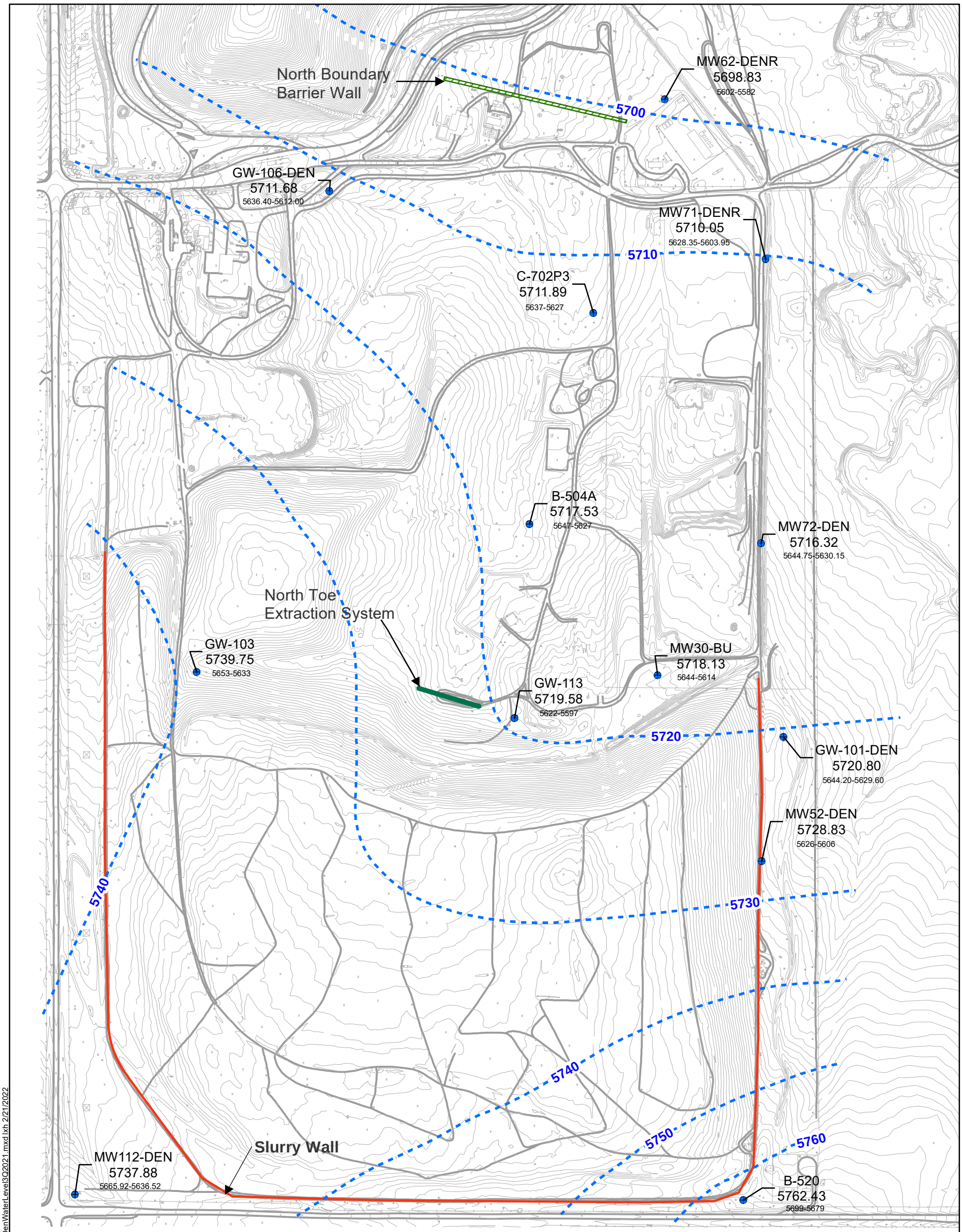


Legend

MW112-DEN Well location,
5737.88 Water Elevation, and
5665.92 - 5636.52 Elevation of Screen Interval (feet above mean sea level)
Water elevation contour
(dashed where inferred, queried where uncertain)

N

0 250 500
Feet

1 inch = 500 feet

Figure 4.5
Sitewide Potentiometric Levels
Upper Denver Formation
July 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS
Denver, Colorado

S:\ES\Maj\Proj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-5_SitewideDenWaterLevel3Q2021.mxd lxh 2/21/2022

North Boundary
Barrier Wall

MW62-DENR
5698.43
5602-5582

5710

5700

GW-106-DEN
5711.53
5636.40-5612.00

MW71-DENR
5709.81
5628.35-5603.95

C-702P3
5711.83
5637-5627

B-504A
5717.34
5647-5627

MW72-DEN
5716.04
5644.75-5630.15

North Toe
Extraction System

GW-103
5739.55
5653-5633

GW-113
5719.46
5622-5597

MW30-BU
5717.81
5644-5614

5720

GW-101-DEN
5720.49
5644.20-5629.60

MW52-DEN
5728.47
5626-5606

5740

5730

5740

5750

5760

MW112-DEN
5737.53
5665.92-5636.52

Slurry Wall

B-520
5762.19

5699-5679

Legend

MW112-DEN Well location,
5737.53 Water Elevation, and
5665.92 - 5636.52 Elevation of Screen Interval (feet above mean sea level)
Water elevation contour
(dashed where inferred, queried where uncertain)

N

0 250 500
Feet

1 inch = 500 feet

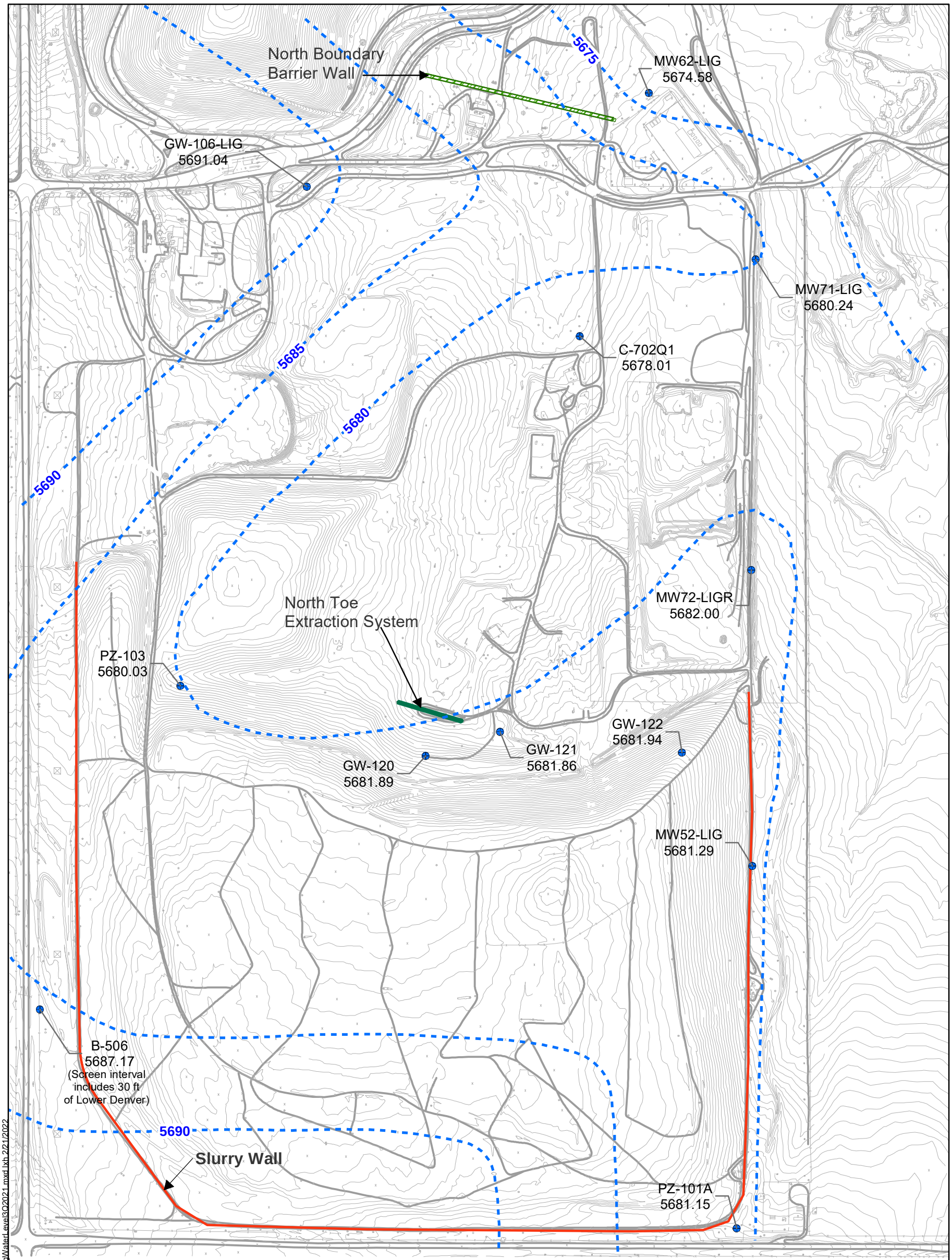
Figure 4.6
Sitewide Potentiometric Levels
Upper Denver Formation
October 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

S:\ES\MajProj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-6_SitewideDenWaterLevel4Q2021.mxd lxh 2/21/2022



Legend

MW52-LIG 5681.29 — Well location and water elevation

Water elevation contour (dashed where inferred)

N

0 250 500 Feet

1 inch = 500 feet

Figure 4.7
Sitewide Potentiometric Levels
Lignite Layer
July 2021

O&M Status Report- 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

North Boundary
Barrier Wall

MW62-LIG
5674.28

GW-106-LIG
5690.88

MW71-LIG
5680.09

C-702Q1
5677.92

5675

5685

5690

MW72-LIGR
5681.03

North Toe
Extraction System

PZ-103
5679.75

GW-122
5681.03

GW-121
5680.98

GW-120
5681.38

MW52-LIG
5680.93

B-506
5686.94
(Screen interval
includes 30 ft
of Lower Denver)

5690

Slurry Wall

5680

PZ-101A
5677.87

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Legend

MW52-LIG 5680.93 — Well location and water elevation

Water elevation contour (dashed where inferred)

N

0 250 500 Feet

1 inch = 500 feet

Figure 4.8
Sitewide Potentiometric Levels
Lignite Layer
October 2021

O&M Status Report- 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

MW114-WD
PTP-11
PTP-12
MW103-WD
MW113-UD
MW113-WD
PTP-13
MW113-EW-1
B-321
B-326-UD
MW77-EW-2
B-326-WD
B-314
B-313
MW102-WD
NBBW-IW-3
MW77-EW-1
MW98-WD
MW62-WDR
MW77-WD
North Boundary
Barrier Wall
MW23-UPPER-C
MW38-1028N-256E
MW170-EW-1
MW38-830N-230E
MW78-WD
MW74-WD
GW-106
MW71-WD
Asbestos
Monofill
MW91-WD
MW38-170S-140W
MW54-WD
MW105-WD
MW38-825S-445E
MW36-WDR
MW90-WD
North Toe
Extraction System
MNA-03
BM-15N6
MNA-01
BM-15E2
PM-3X
PM-14X
PM-13X
MW60-WD
MW70-WD
U-518R-WD
MW43-WD
Slurry Wall
BM-11X-100N
BM-11X-100S
MW108-WD
PM-6X

Legend

FORMATION

- ALLUVIUM
- ALLUVIUM/WD
- LIGNITE
- Unweathered Dawson
- UPPER DENVER
- Weathered Dawson
- NO GEOLOGIC LOG
- Groundwater Compliance Well

N

Feet
0 250 500

1 inch = 500 feet

FIGURE 4.9
GROUNDWATER SAMPLING LOCATIONS
2nd Half 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

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13
18
24
19
25
30
MW176-DEN
MW144-WD
MW142-WD
Residence 1
MW141-WD
Residence 2
MW135-WD
MW05-WD
MW122-WDR
MW123-WD
MW124-WD
MW179-UDEN
MW129-WD
MW125-WD
MW121-WDR
MW156-WD
MW153-EW-1
MW157-WD
MW156-EW-1
MW151-WD
MW155-EW-1
MW154-EW-1
MW132-WD
MW118-WD
MW160-WD
MW117-WD
PTP-11
MW113-EW-1
MW113-WD
MW113-UD
PTP-12
NBBW-IW-3
MW114-WD
PTP-13
MW103-WD
B-321
B-326-WD
B-326-UD
MW77-EW-2
MW102-WD
B-313
MW77-EW-1
MW98-WD
B-314
MW62-WDR
MW74-WD
MW77-WD
MW38-1028N-256E
MW23-UPPER-C
MW38-830N-230E
MW170-EW-1
MW78-WD
GW-106
MW71-WD
Mississippi Ave.
Coal Creek
Gun Club Road
Un-Named Murphy Creek Tributary
Murphy Creek
Un-Named Murphy Creek Tributary
Yale Ave.
Murphy Creek Tributary
MURPHY CREEK
UNNAMED CREEK
STORMWAT

Legend

FORMATION

- ALLUVIUM
- LIGHNITE
- Unweathered Dawson
- UNWEATHERED DENVER
- DENVER
- UPPER DENVER
- Weathered Dawson
- Groundwater Compliance Well

N

Feet

0 600 1,200

1 inch = 1,200 feet

FIGURE 4.10

GROUNDWATER
NORTH END SAMPLING LOCATIONS
2nd Half 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

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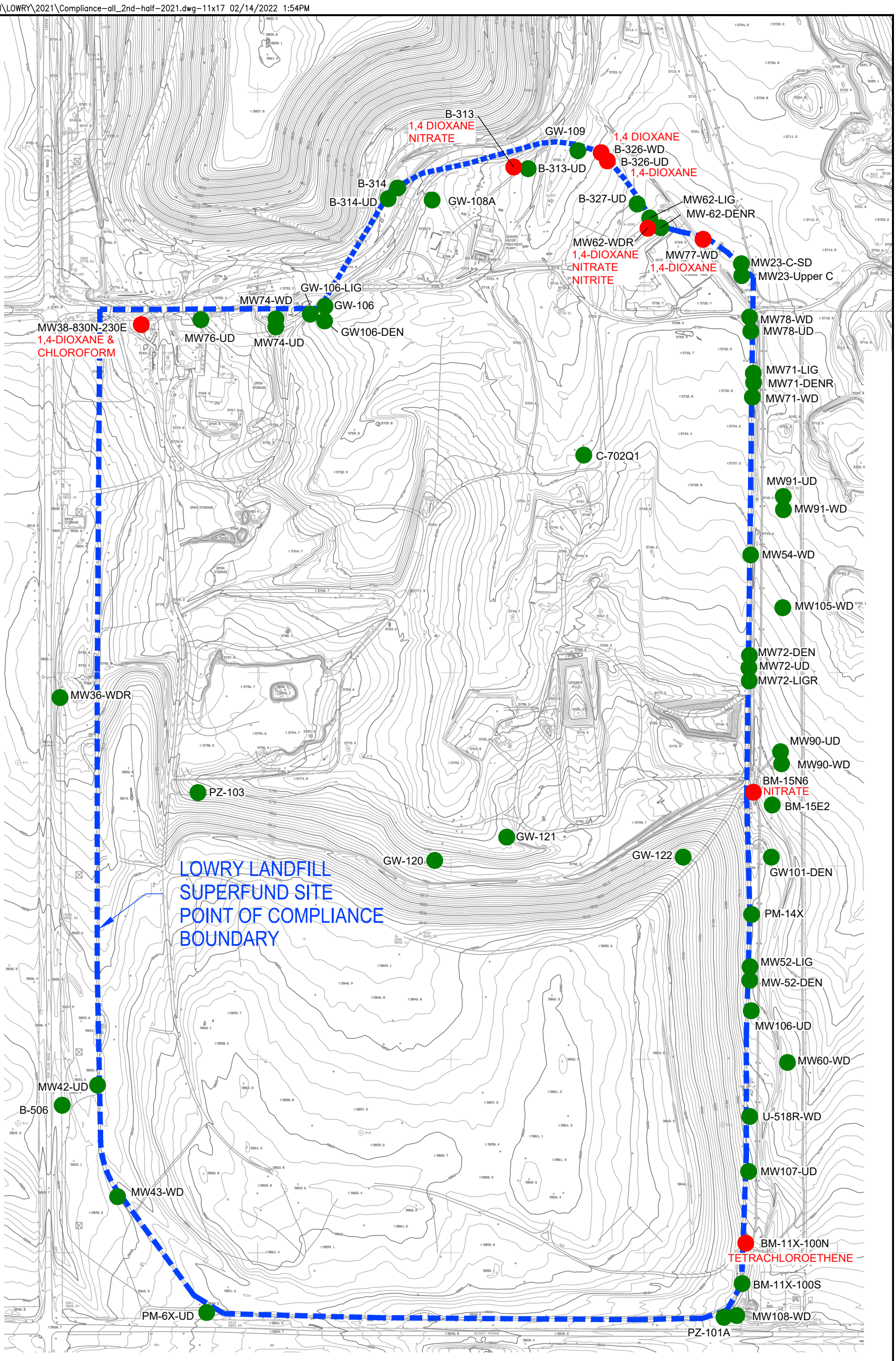

Legend

- Out of Compliance or Potentially out of Compliance
- In Compliance or Potentially in Compliance

Note: Results for certain parameters of indeterminant compliance are not shown

NITRATE Compounds With Detections That Exceed Performance Standard

0 250 500
FEET

Figure 4.11

Groundwater Compliance With Performance Standards

O&M Status Report 2nd Half 2021
Lowry Landfill Superfund Site

EMSI Engineering Management Support, Inc.

PM-1X
PM-1I
PM-1 Well Pair Hydrographs
PM-2 Well Pair Hydrographs
PM-2X
PM-2I
PM-3X
PM-3I
PM-3 Well Pair Hydrographs
PM-14 Well Pair Hydrographs
PM-15I
PM-15X
PM-15 Well Pair Hydrographs
PM-14I
PM-14X
PM-13 Well Pair Hydrographs
SLURRY WALL
PM-4 Well Pair Hydrographs
PM-4X
PM-4I
PM-5 Well Pair Hydrographs
PM-10 Well Pair Hydrographs
PM-13I
PM-13X
PM-12 Well Pair Hydrographs
PM-5X
PM-5I
PM-8 Well Pair Hydrographs
PM-9 Well Pair Hydrographs
PM-12I
PM-12X
PM-6 Well Pair Hydrographs
PM-11 Well Pair Hydrographs
PM-11I
PM-11X
PM-6I
PM-6X
PM-7I
PM-8I
PM-9I
PM-10I
PM-7 well Pair Hydrographs
PM-7X
PM-8X
PM-9X
PM-10X

Legend

PM-14X Hydraulic gradient monitoring well

Exterior well hydrograph

Interior well hydrograph

0 200 400

FEET

N

Figure 4.12

Perimeter Slurry Wall
Well Pair Hydrographs

O&M Status Report 2nd Half 2021
Lowry Landfill Superfund Site

EMSI Engineering Management Support, Inc.

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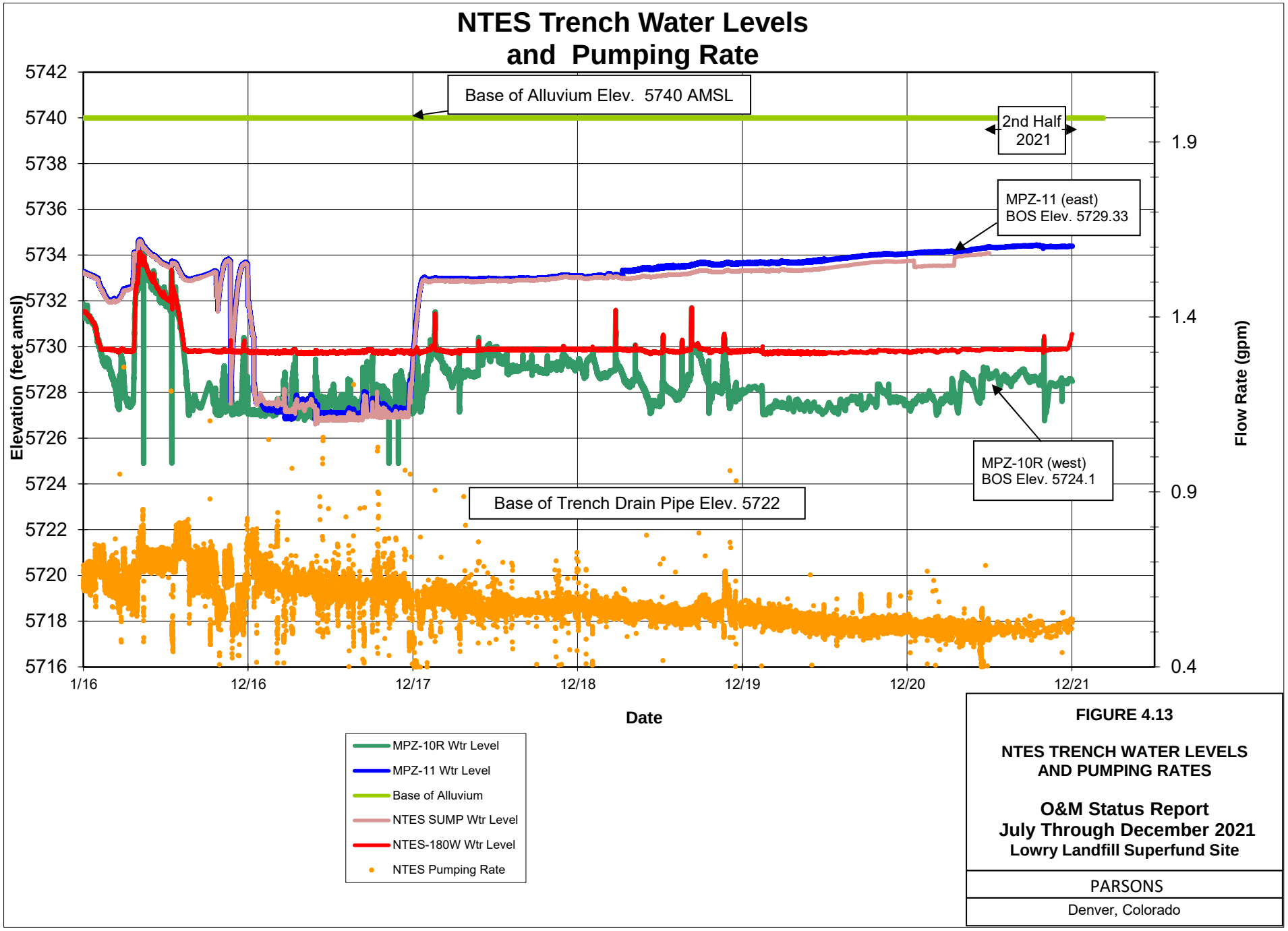

FIGURE 4.13

NTES TRENCH WATER LEVELS AND PUMPING RATES

O&M Status Report
July Through December 2021
Lowry Landfill Superfund Site

PARSONS
Denver, Colorado

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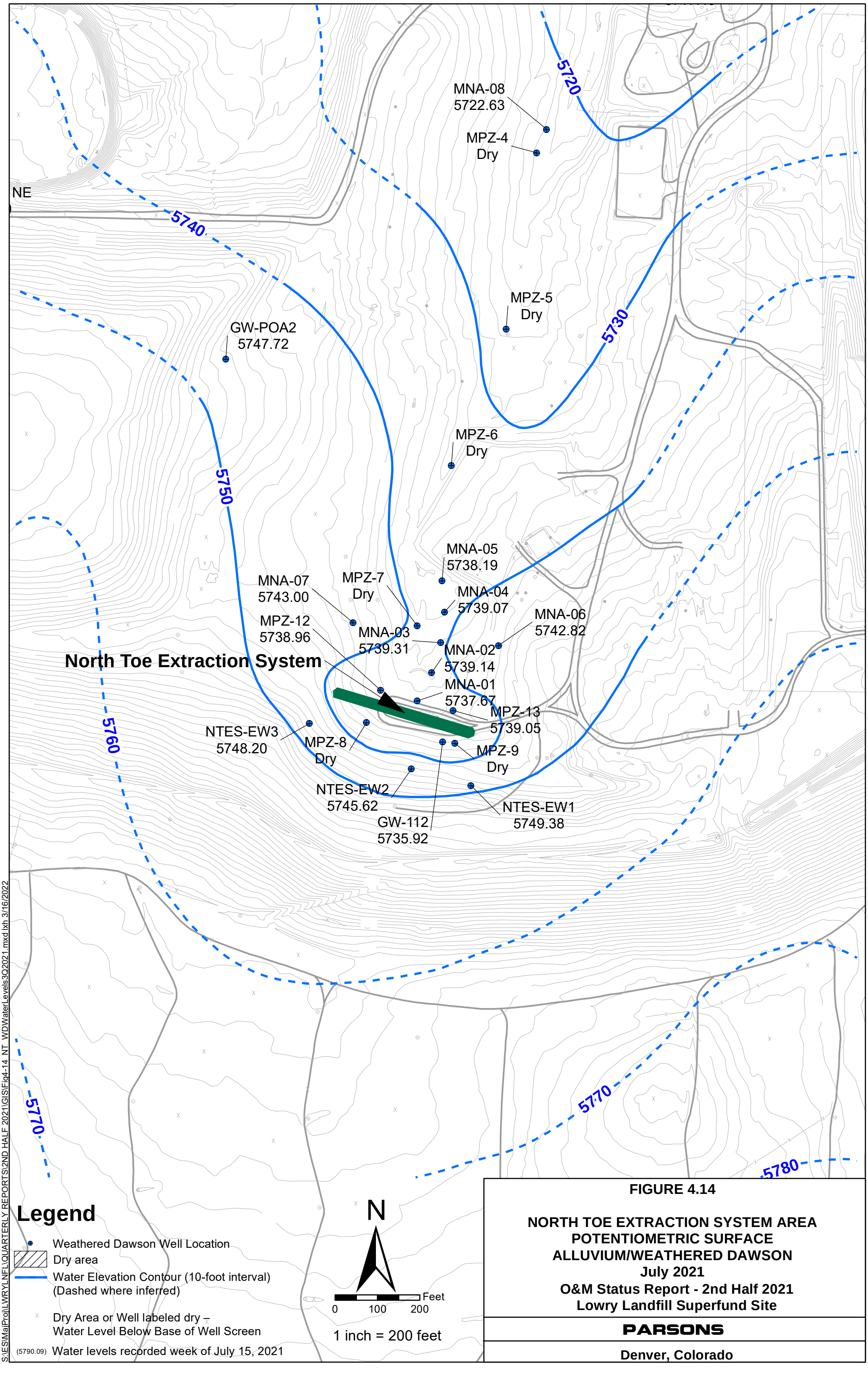

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FIGURE 4.14

NORTH TOE EXTRACTION SYSTEM AREA
POTENTIOMETRIC SURFACE
ALLUVIUM/WEATHERED DAWSON
July 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

PARSONS

Denver, Colorado

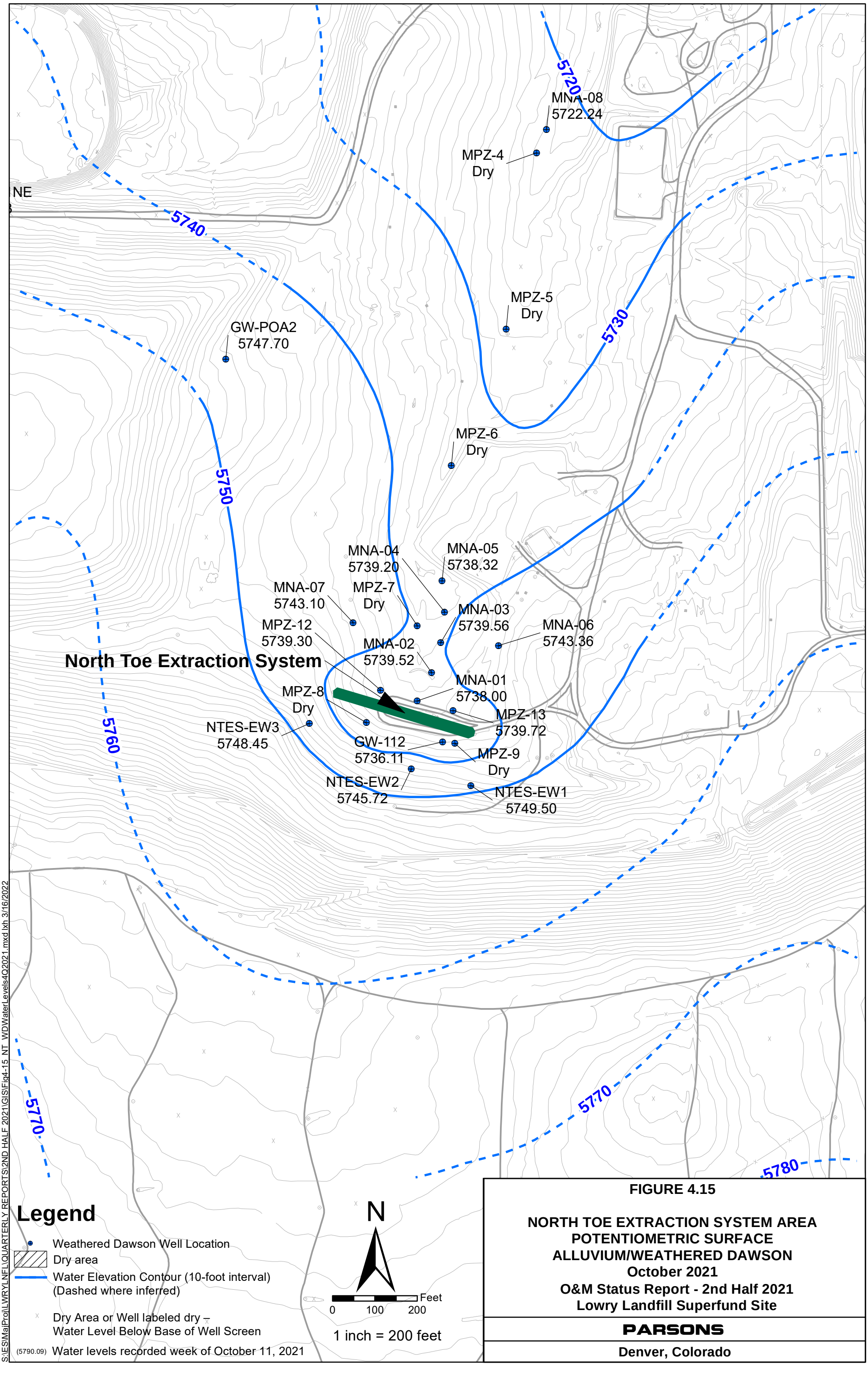

FIGURE 4.15

NORTH TOE EXTRACTION SYSTEM AREA
POTENTIOMETRIC SURFACE
ALLUVIUM/WEATHERED DAWSON
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

PARSONS

Denver, Colorado

Legend

- Potentiometric Surface (dashed where inferred)
- Injection Trench
- Groundwater Monitoring Well
- Compliance Wells highlighted with blue
- Groundwater Extraction Well
- Groundwater injection Well
- Groundwater Flow Direction
- Zone of Containment
- NBBW
- Area where the WD is dry

Injection Wells
Operation suspended 10/2/18

NBBW

Note: The water elevation value for the fully penetrating well when twinned by a partially penetrating piezometer was honored for contouring

Dry - Water Level Below Base of Screen (hatched contour line) Zone of Depression created by Groundwater Extraction

N

0 37.5 75 150 Feet

1 inch = 150 feet

FIGURE 4.16
NBBW AREA
WEATHERED DAWSON
POTENTIOMETRIC SURFACE

July 2021

O&M Status Report - 1st Half 2021
Lowry Landfill Superfund Site

PARSONS
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Legend

- Water Elevation Contour (2-foot interval) (dashed where inferred)
- Injection Trench
- Groundwater Monitoring Well
  Compliance Wells highlighted with blue
- Groundwater Extraction Well
- Groundwater injection Well
- Groundwater Flow Direction
- Zone of Containment caused by NBBW and Response Action Pumping
- NBBW
- Area where the WD is dry

Injection Wells
Operation terminated 10/2/18

NBBW

Note: The water elevation value for the fully penetrating well when twinned by a partially penetrating piezometer was honored for contouring

Dry - Water Level Below Base of Screen (hatched contour line) Zone of Depression created by Groundwater Extraction

N

0 37.5 75 150 Feet

1 inch = 150 feet

FIGURE 4.17
NBBW AREA
WEATHERED DAWSON
POTENTIOMETRIC SURFACE

OCTOBER 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

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Figure 4.18

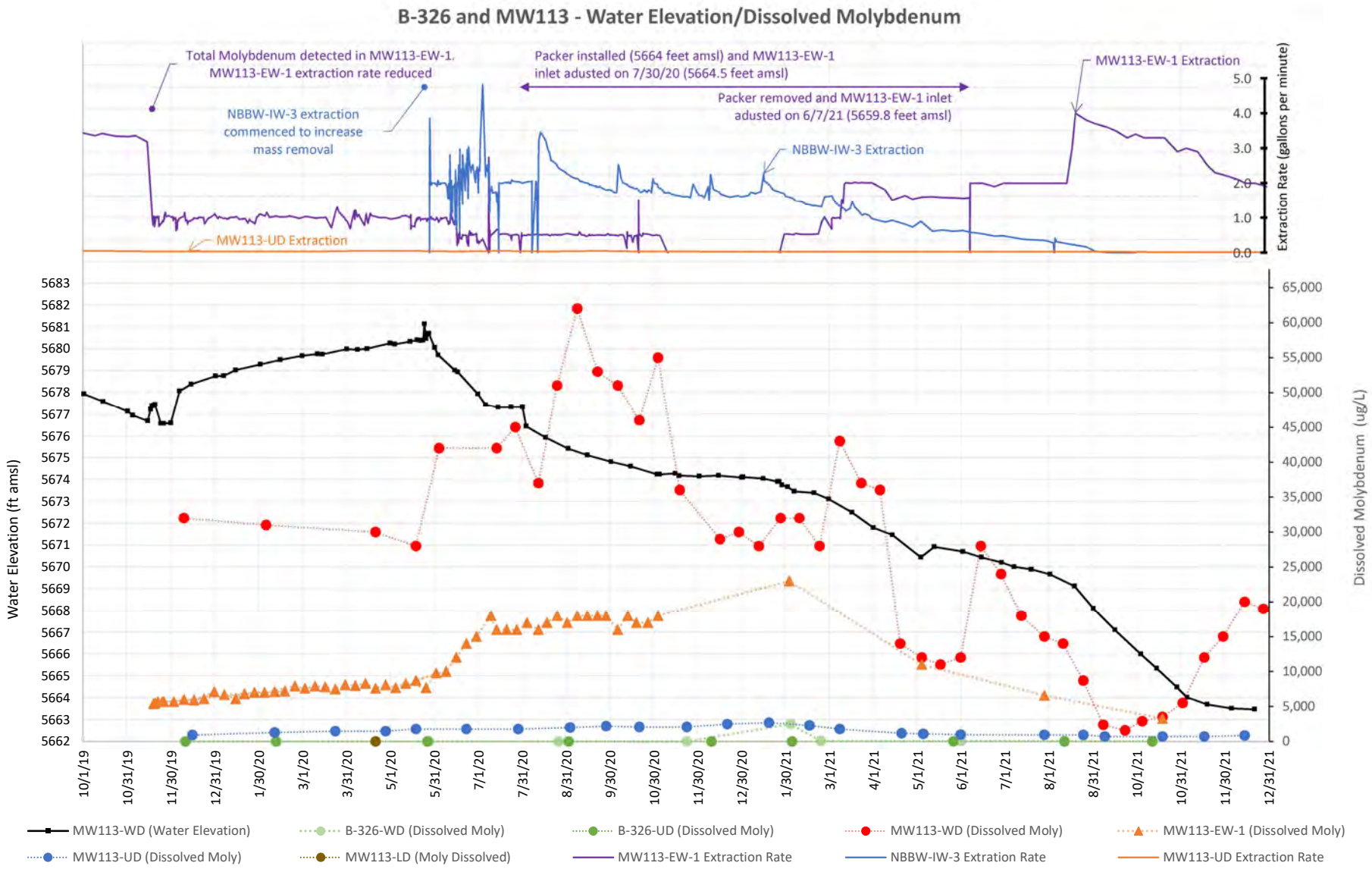
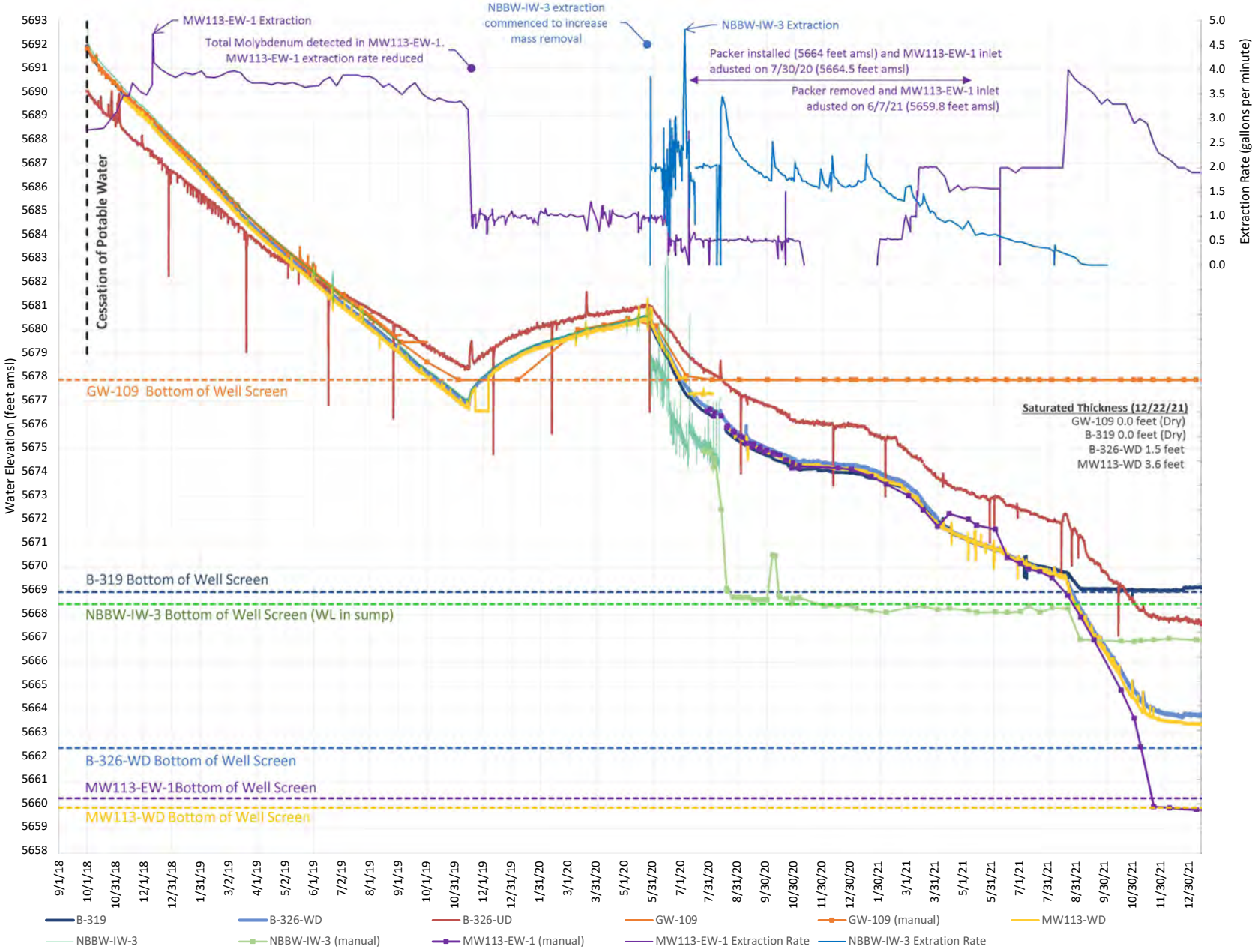

B-326 and MW113 - Water Elevation/Dissolved Molybdenum
Total Molybdenum detected in MW113-EW-1. MW113-EW-1 extraction rate reduced
NBBW-IW-3 extraction commenced to increase mass removal
Packer installed (5664 feet amsl) and MW113-EW-1 inlet adusted on 7/30/20 (5664.5 feet amsl)
Packer removed and MW113-EW-1 inlet adusted on 6/7/21 (5659.8 feet amsl)
MW113-EW-1 Extraction
NBBW-IW-3 Extraction
MW113-UD Extraction
Extraction Rate (gallons per minute)
Water Elevation (ft amsl)
Dissolved Molybdenum (ug/L)
MW113-WD (Water Elevation)
B-326-WD (Dissolved Moly)
B-326-UD (Dissolved Moly)
MW113-WD (Dissolved Moly)
MW113-EW-1 (Dissolved Moly)
MW113-UD (Dissolved Moly)
MW113-LD (Moly Dissolved)
MW113-EW-1 Extraction Rate
NBBW-IW-3 Extration Rate
MW113-UD Extraction Rate

Figure 4.19
MW113 Area - Water Elevations and MW113-EW-1 and NBBW-IW-3 Extraction Rate

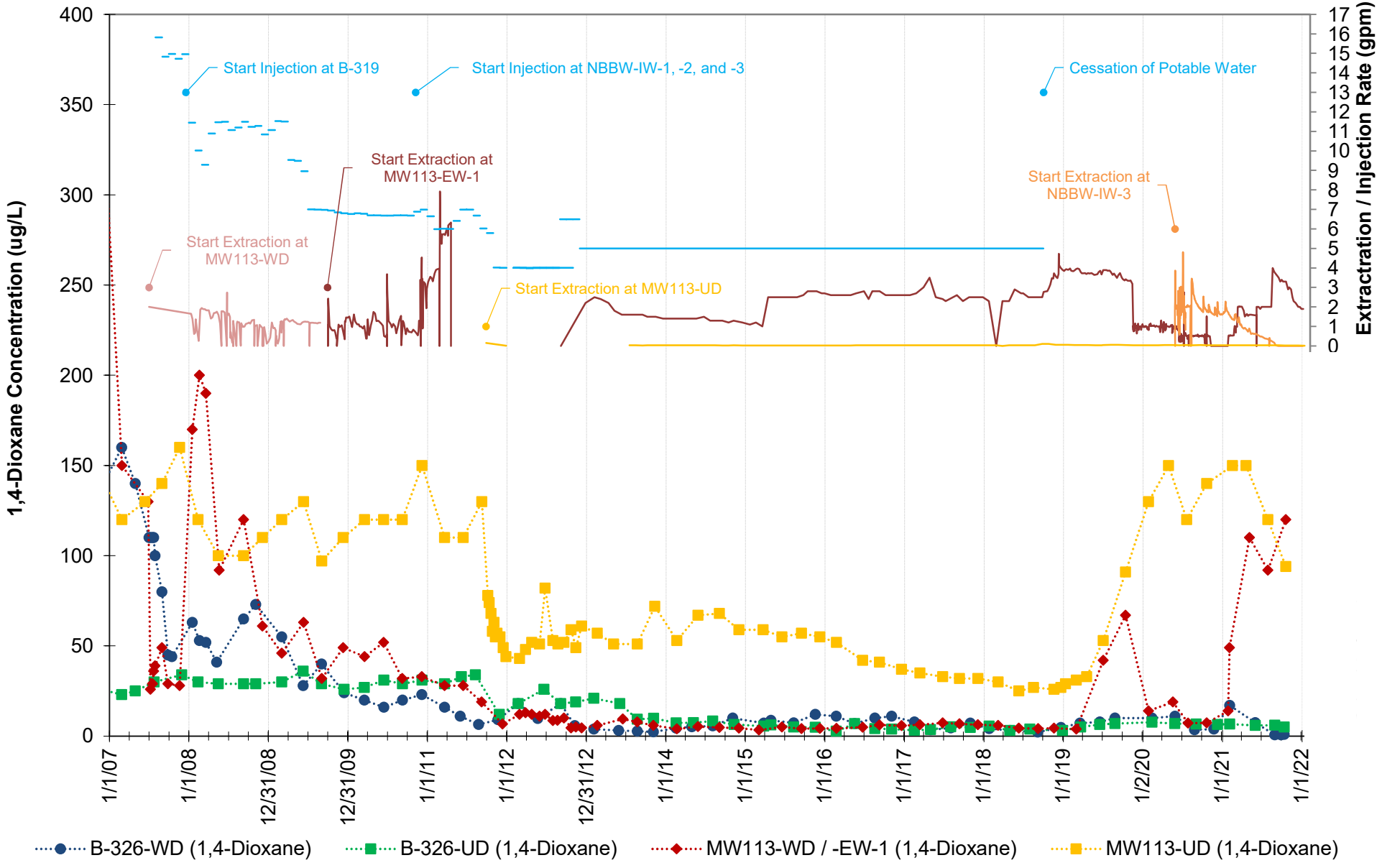


1 Transducer Water Levels 2 6 2022 for SSR

Figure 4.20

1,4-Dioxane Concentrations

B-326 / MW113 Area

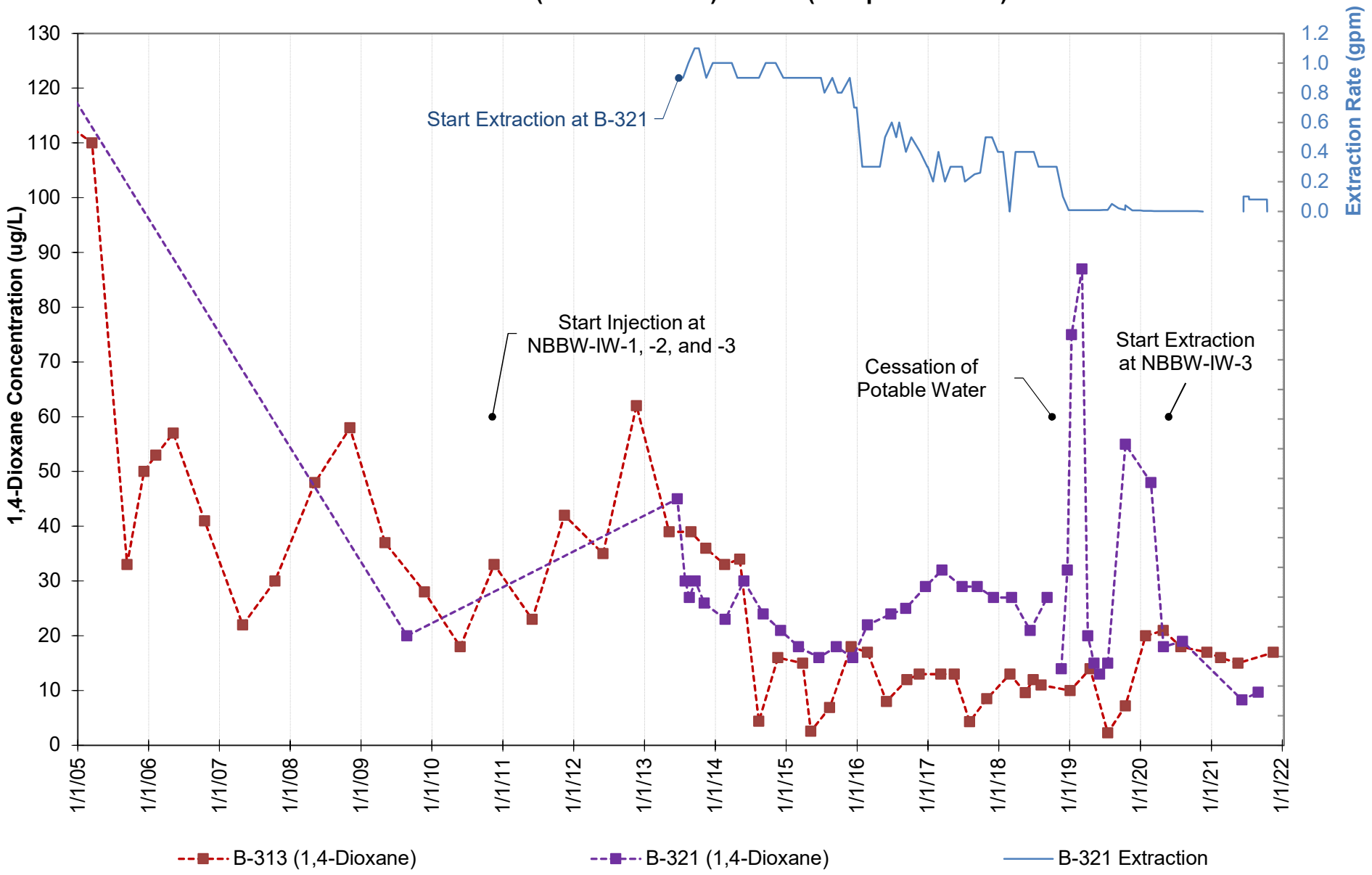


B-326 and MW113 WD & UD 14X 2H2021 SDF

Figure 4.21

1,4-Dioxane Concentrations

B-321 (Extraction Well) / B-313 (Compliance Well)



B-313 and B-321 Extraction 14X 2H2021 SDF

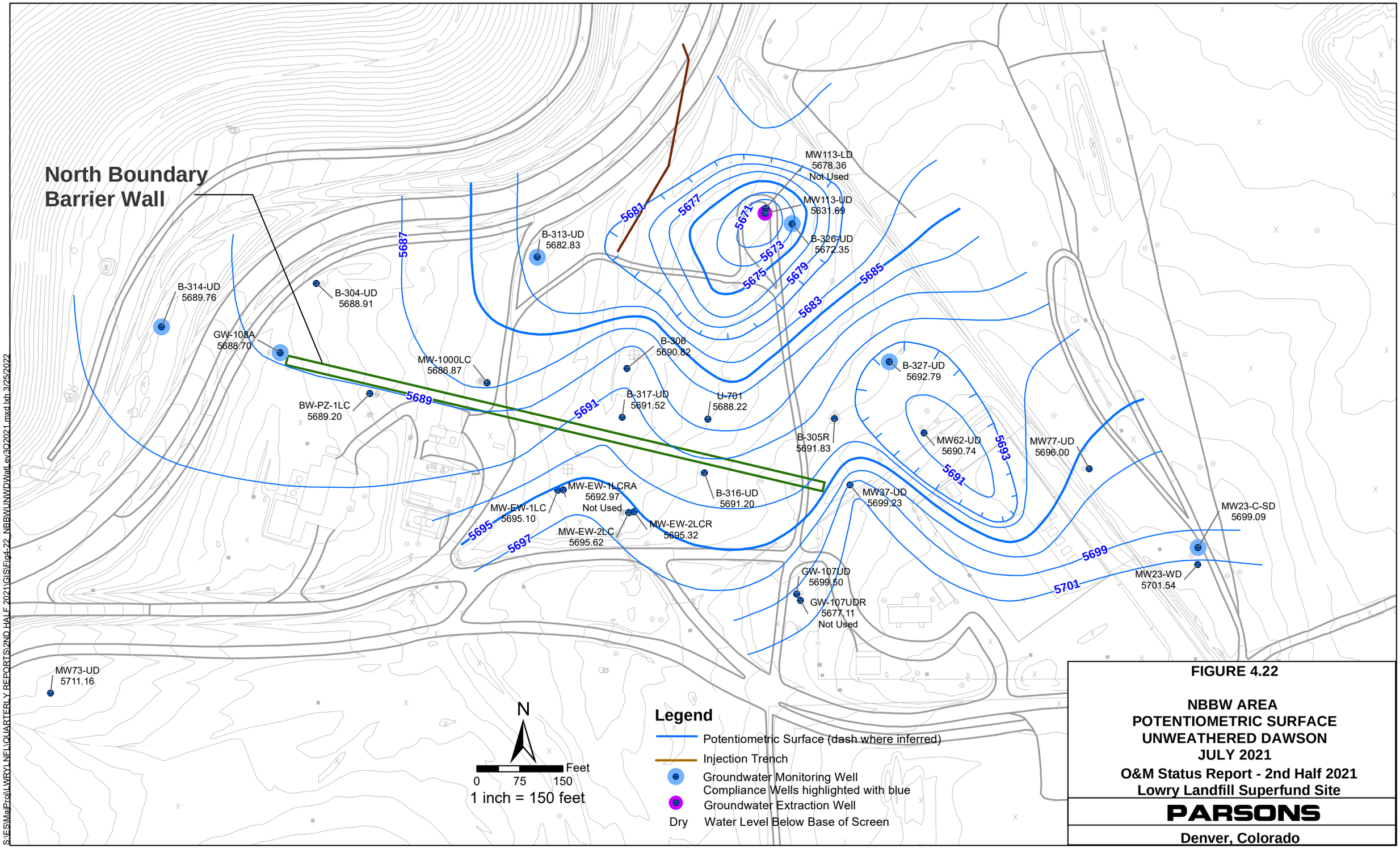


FIGURE 4.22

NBBW AREA
POTENTIOMETRIC SURFACE
UNWEATHERED DAWSON
JULY 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

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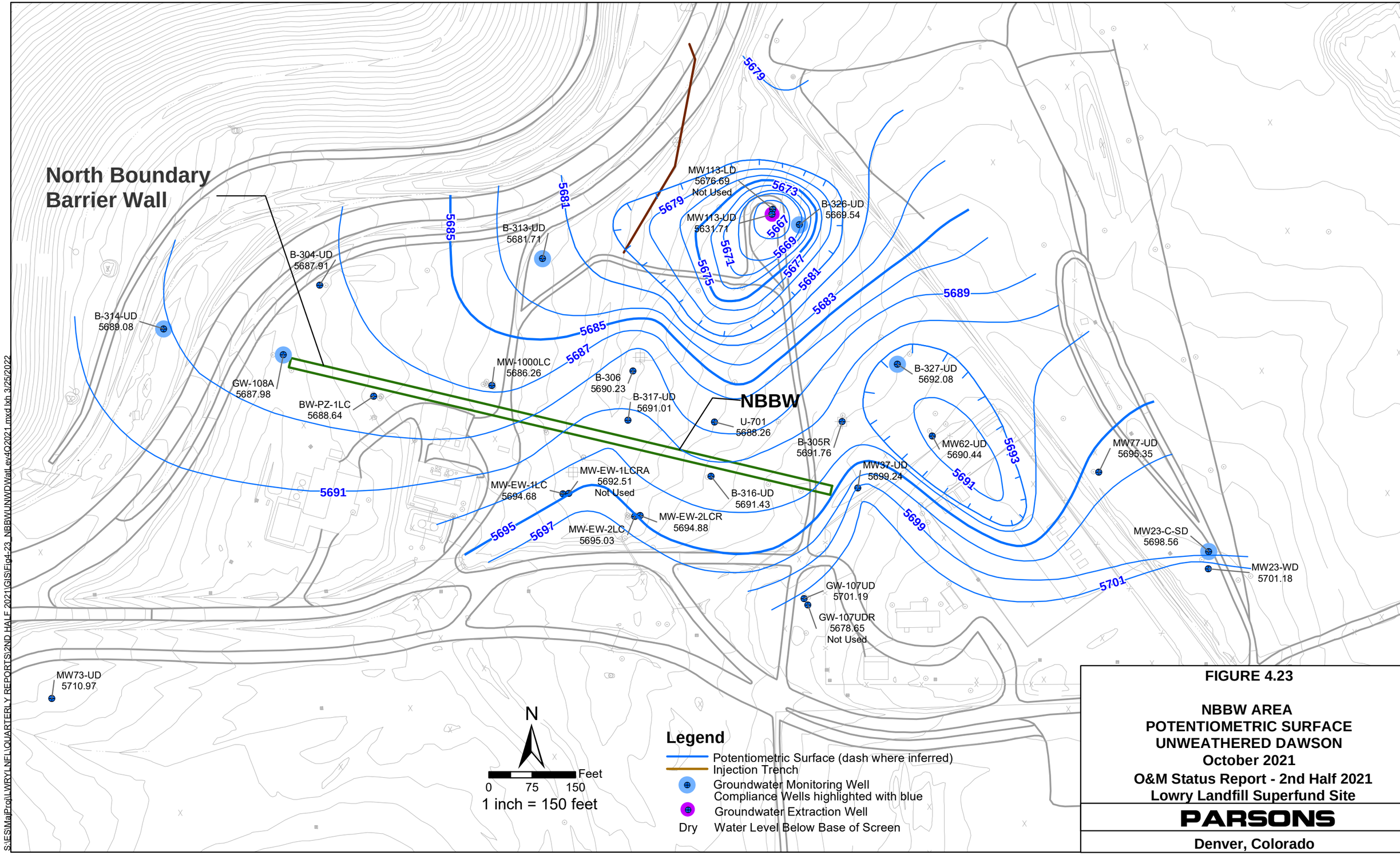

FIGURE 4.23

NBBW AREA
POTENTIOMETRIC SURFACE
UNWEATHERED DAWSON
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site

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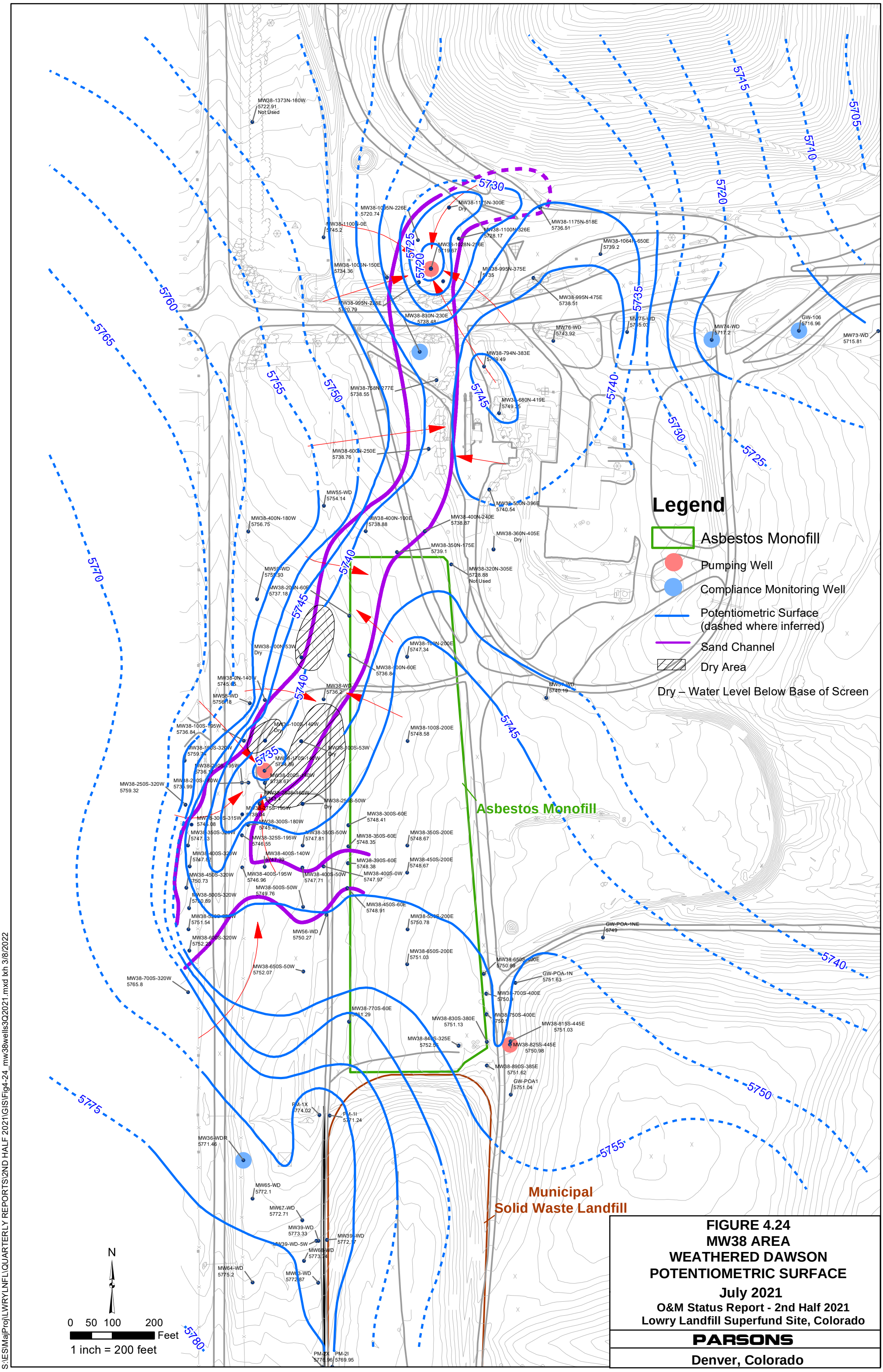
MW38-1373N-180W
5722.91
Not Used
MW38-1005N-226E
5720.74
MW38-1175N-300E
Dry
MW38-1175N-518E
5736.51
MW38-1100N-326E
5728.17
MW38-1028N-256E
5719.67
MW38-1064N-650E
5739.2
MW38-1005N-150E
5734.36
MW38-995N-375E
MW38-995N-475E
5738.51
MW38-995N-278E
5720.79
MW38-830N-230E
5738.48
MW76-WD
5743.92
MW75-WD
MW74-WD
5717.2
GW-106
5716.96
MW73-WD
5715.81
MW38-794N-383E
MW38-758N-277E
5738.55
MW38-680N-419E
MW38-600N-250E
5738.76
MW55-WD
5754.14
MW38-500N-396E
5740.54
MW38-400N-180W
5756.75
MW38-400N-100E
5738.88
MW38-400N-240E
5738.87
MW38-360N-405E
Dry
MW38-350N-175E
5739.1
MW56-WD
MW38-320N-305E
5728.88
Not Used
MW38-200N-60E
5737.18
MW38-100N-53W
Dry
MW38-100N-200E
5747.34
MW38-100N-60E
MW38-0N-140W
MW38-WD
5736.2
MW56-WD
5756.18
MW51-WD
5740.19
MW38-100S-195W
5736.84
MW38-100S-140W
Dry
MW38-100S-200E
5748.58
MW38-150S-320W
5759.74
MW38-100S-53W
Dry
MW38-170S-140W
5744.69
MW38-200S-195W
MW38-200S-140W
5738.67
MW38-250S-320W
5759.32
MW38-250S-160W
MW38-250S-50W
Dry
MW38-275S-195W
MW38-300S-315W
5745.08
MW38-300S-60E
5748.41
MW38-300S-180W
MW38-350S-320W
MW38-350S-50W
5747.81
MW38-325S-195W
5746.55
MW38-350S-60E
5748.35
MW38-350S-200E
5748.67
MW38-400S-320W
MW38-400S-140W
MW38-390S-60E
5748.38
MW38-450S-200E
5748.67
MW38-400S-195W
5746.96
MW38-400S-50W
5747.71
MW38-400S-0W
5747.97
MW38-450S-320W
5750.73
MW38-500S-50W
5749.76
MW38-500S-320W
5750.89
MW38-450S-60E
5748.91
MW38-550S-200E
5750.78
MW38-550S-320W
5751.54
MW56-WD
5750.27
MW38-600S-320W
5752.23
MW38-650S-200E
5751.03
MW38-650S-50W
5752.07
MW38-650S-400E
5750.89
GW-POA-1NE
5749
GW-POA-1N
5751.63
MW38-700S-320W
5765.8
MW38-700S-400E
5750.9
MW38-770S-60E
5751.29
MW38-830S-380E
5751.13
MW38-750S-400E
MW38-815S-445E
5751.03
MW38-825S-445E
5750.98
MW38-890S-385E
5751.62
GW-POA1
5751.04
PM-1X
5774.02
PM-1I
5771.24
MW36-WDR
5771.46
MW65-WD
5772.1
MW67-WD
5772.71
MW39-WD
5773.33
MW39-WD-5W
MW39-WD
MW68-WD
5773.74
MW64-WD
5775.2
MW63-WD
PM-2X
5776.96
PM-2I
5769.95
5705
5710
5715
5720
5725
5730
5735
5740
5745
5750
5755
5760
5765
5770
5775
5780
Asbestos Monofill
Municipal
Solid Waste Landfill
Legend
Asbestos Monofill
Pumping Well
Compliance Monitoring Well
Potentiometric Surface
(dashed where inferred)
Sand Channel
Dry Area
Dry – Water Level Below Base of Screen
N
0 50 100 200
Feet
1 inch = 200 feet
FIGURE 4.24
MW38 AREA
WEATHERED DAWSON
POTENTIOMETRIC SURFACE
July 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado
PARSONS
Denver, Colorado
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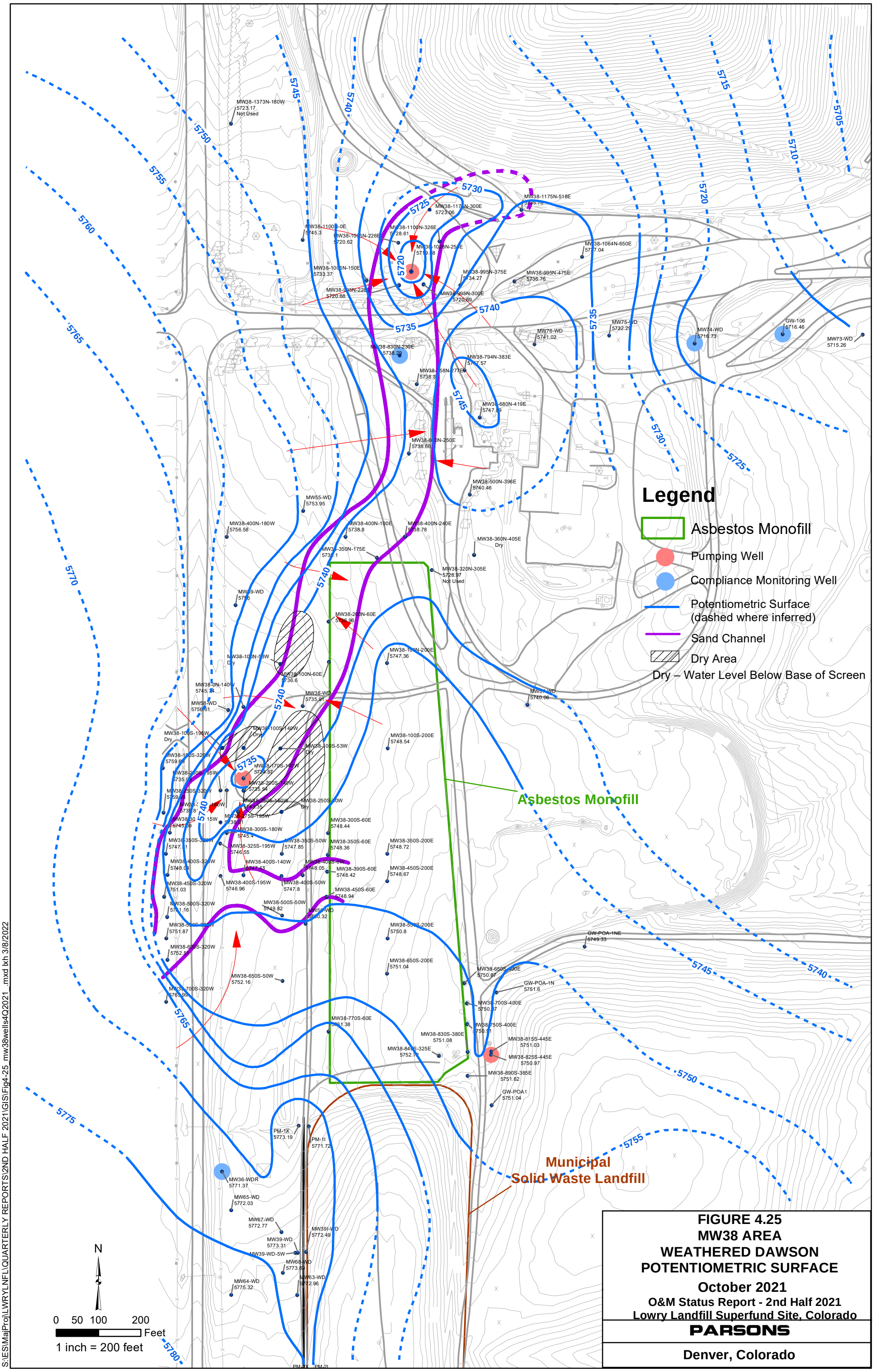
Legend
Asbestos Monofill
Pumping Well
Compliance Monitoring Well
Potentiometric Surface (dashed where inferred)
Sand Channel
Dry Area
Dry – Water Level Below Base of Screen
Asbestos Monofill
Municipal Solid Waste Landfill
MW38-1373N-180W 5723.17 Not Used
MW38-1175N-518E
MW38-1175N-300E 5723.06
MW38-1100N-326E 5728.61
MW38-1028N-250E
MW38-1064N-650E 5727.04
MW38-995N-375E 5734.27
MW38-995N-475E 5736.76
MW38-995N-300E 5720.69
MW38-1055N-150E 5733.37
MW38-1055N-226E 5720.62
MW38-996N-226E 5720.68
MW38-830N-230E 5738.29
MW38-794N-383E 5727.57
MW38-758N-277E
MW38-680N-419E
MW38-600N-250E 5738.66
MW38-500N-396E 5740.46
MW76-WD 5741.02
MW75-WD 5732.29
MW74-WD 5716.73
GW-106 5716.46
MW73-WD 5715.26
MW55-WD 5753.95
MW38-400N-180W 5756.58
MW38-400N-100E 5738.8
MW38-400N-240E 5738.78
MW38-360N-405E Dry
MW38-350N-175E 5730.1
MW38-320N-305E 5728.97 Not Used
MW38-200N-60E 5736.96
MW38-100N-200E 5747.36
MW38-100N-53W Dry
MW38-100N-60E 5736.6
MW38-0N-140W 5745.74
MW58-WD 5750.61
MW38-WD 5735.91
MW37-WD 5740.06
MW38-100S-195W Dry
MW38-100S-140W Dry
MW38-100S-53W Dry
MW38-100S-200E 5748.54
MW38-170S-140W 5724.57
MW38-200S-140W 5735.54
MW38-250S-150W 5747.35
MW38-250S-10W Dry
MW38-275S-195W 5738.01
MW38-300S-60E 5748.44
MW38-300S-180W 5745.4
MW38-350S-50W 5747.85
MW38-350S-60E 5748.36
MW38-350S-200E 5748.72
MW38-325S-195W 5746.55
MW38-400S-140W 5747.43
MW38-400S-0W 5748.05
MW38-390S-60E 5748.42
MW38-450S-200E 5748.67
MW38-400S-195W 5746.96
MW38-400S-50W 5747.8
MW38-450S-60E 5748.94
MW38-500S-50W 5749.82
MW50-WD 5750.32
MW38-500S-200E 5750.8
MW38-600S-320W 5752.51
MW38-650S-50W 5752.16
MW38-650S-200E 5751.04
MW38-650S-400E 5750.87
GW-POA-1NE 5749.33
GW-POA-1N 5751.6
MW38-700S-400E 5750.37
MW38-750S-400E 5750.31
MW38-770S-60E 5761.38
MW38-830S-380E 5751.08
MW38-815S-445E 5751.03
MW38-825S-445E 5750.97
MW38-890S-385E 5751.62
GW-POA1 5751.04
PM-1X 5773.19
PM-1I 5771.72
MW36-WDR 5771.37
MW65-WD 5772.03
MW67-WD 5772.77
MW39I-WD 5772.49
MW39-WD 5773.31
MW39-WD-5W
MW68-WD 5773.65
MW63-WD 5772.96
MW64-WD 5775.32
5705
5710
5715
5720
5725
5730
5735
5740
5745
5750
5755
5760
5765
5770
5775
5780
N
0 50 100 200
Feet
1 inch = 200 feet
FIGURE 4.25
MW38 AREA
WEATHERED DAWSON
POTENTIOMETRIC SURFACE
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado
PARSONS
Denver, Colorado
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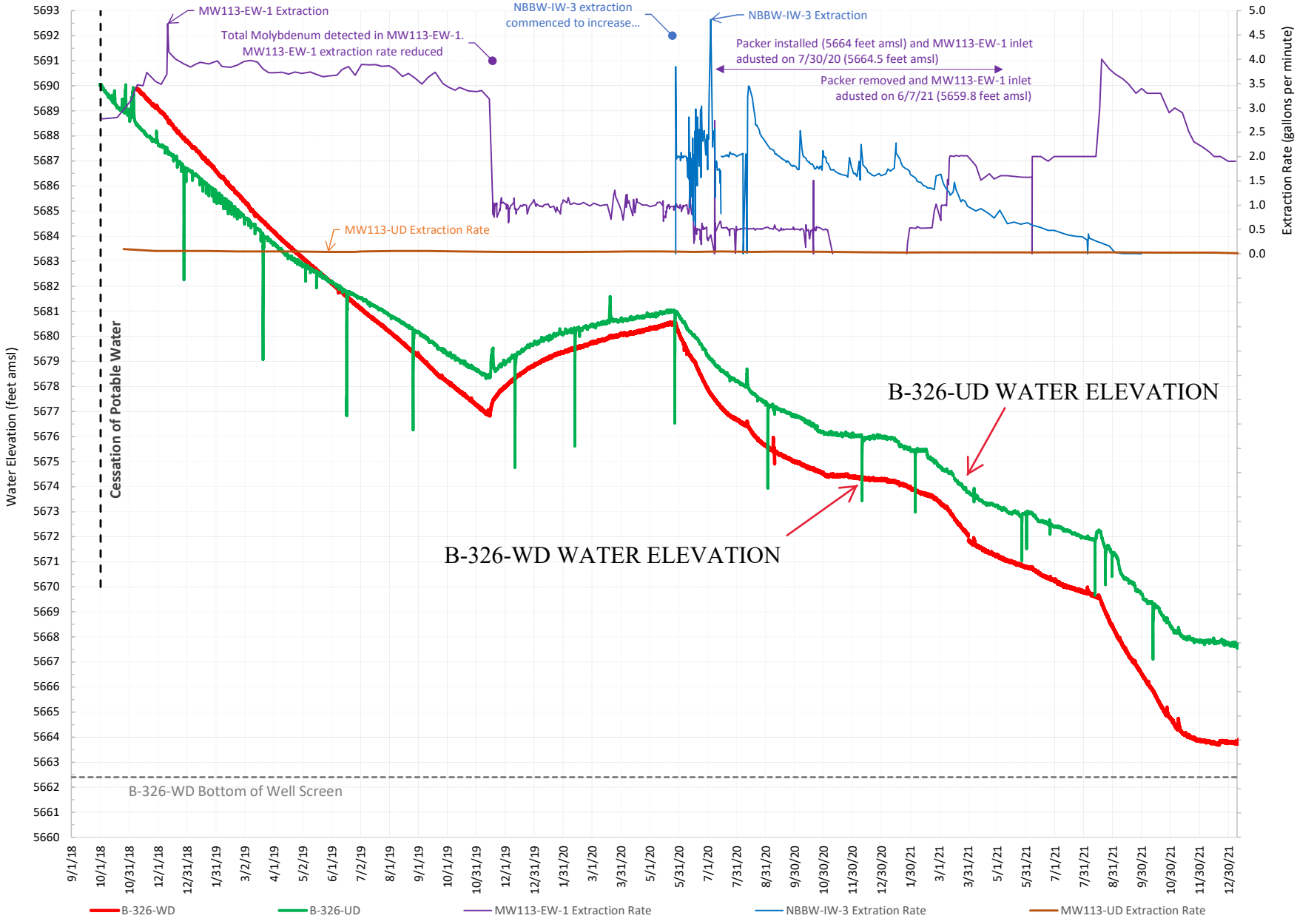
FIGURE 4.26

B-326-WD and B-326-UD Water Elevation and NBBW-IW-3, MW113-EW-1 and MW133-UD Extraction Rate



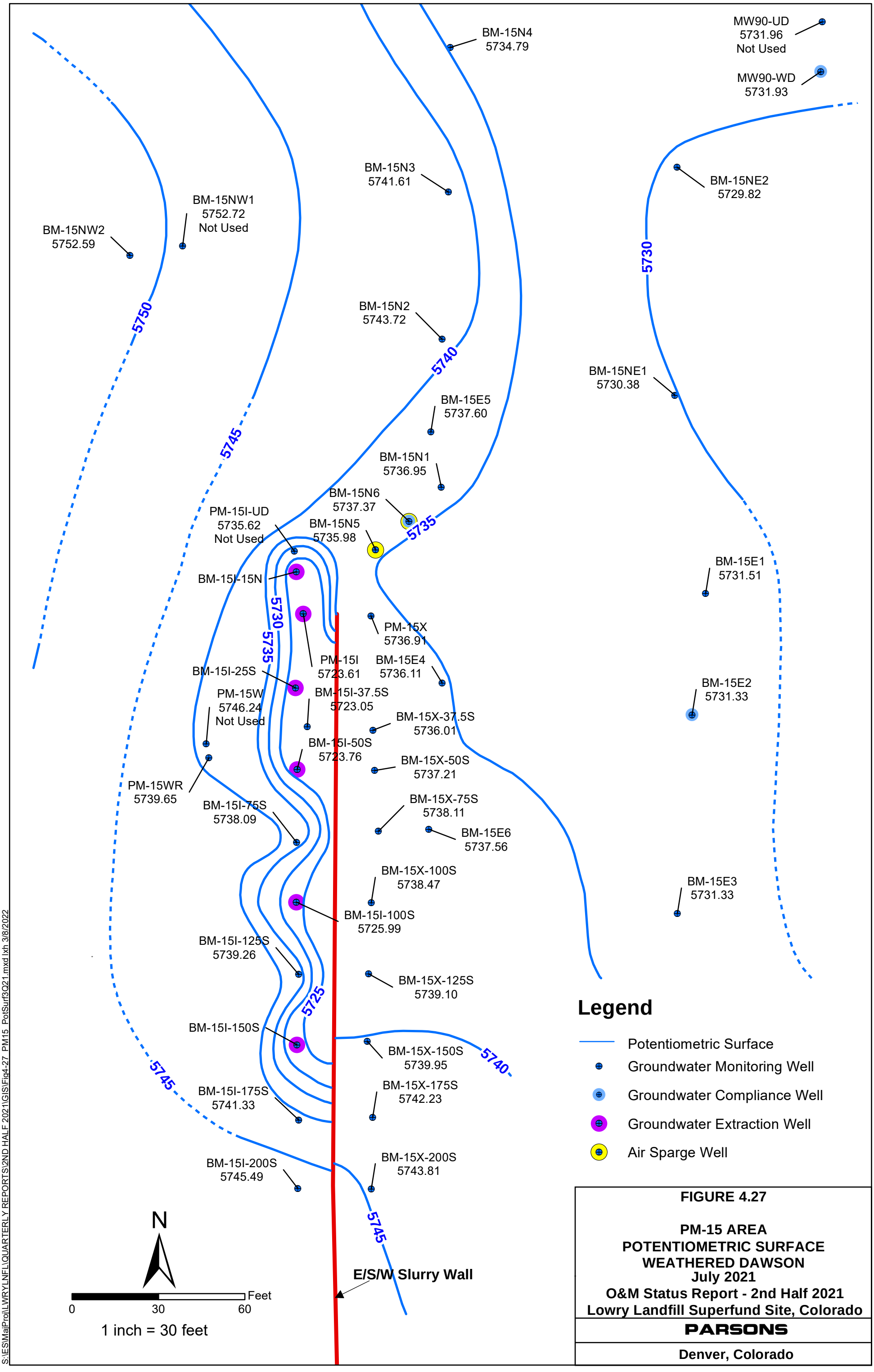


FIGURE 4.27

PM-15 AREA
POTENTIOMETRIC SURFACE
WEATHERED DAWSON
July 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

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MW90-UD
5731.23
Not Used

MW90-WD
5731.21

BM-15N4
5735.50

BM-15N3
5738.70

BM-15NE2
5729.59

BM-15NW1
5753.02
Not Used

BM-15NW2
5752.70

BM-15N2
5739.21

BM-15NE1
5730.27

BM-15E5
5736.93

BM-15N1
5736.66

BM-15N6
5737.42

PM-15I-UD
5735.55
Not Used

BM-15N5
5736.00

BM-15I-15N
5725.02

BM-15E1
5731.86

PM-15X
5737.04

PM-15I
5723.20

BM-15E4
5736.31

BM-15I-25S
5720.40

PM-15W
5746.19
Not Used

BM-15E2
5731.44

BM-15X-37.5S
5736.37

BM-15I-37.5S
5723.04

PM-15WR
5739.62

BM-15X-50S
5737.66

BM-15I-50S
5723.62

BM-15I-75S
5738.05

BM-15E6
5737.84

BM-15X-75S
5738.44

BM-15I-100S
5725.57

BM-15E3
5731.42

BM-15X-100S
5738.26

BM-15I-125S
5739.21

BM-15X-125S
5739.16

BM-15X-150S
5739.94

BM-15I-150S
5725.21

BM-15I-175S
5741.19

BM-15X-175S
5741.99

BM-15I-200S
5745.34

BM-15X-200S
5743.44

5730
5735
5740
5745
5750
5725

N

0 30 60 Feet

1 inch = 30 feet

E/S/W Slurry Wall

Legend

- Potentiometric Surface
- Groundwater Monitoring Well
- Groundwater Compliance Well
- Groundwater Extraction Well
- Air Sparge Well

FIGURE 4.28

PM-15 AREA
POTENTIOMETRIC SURFACE
WEATHERED DAWSON
October 2021
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

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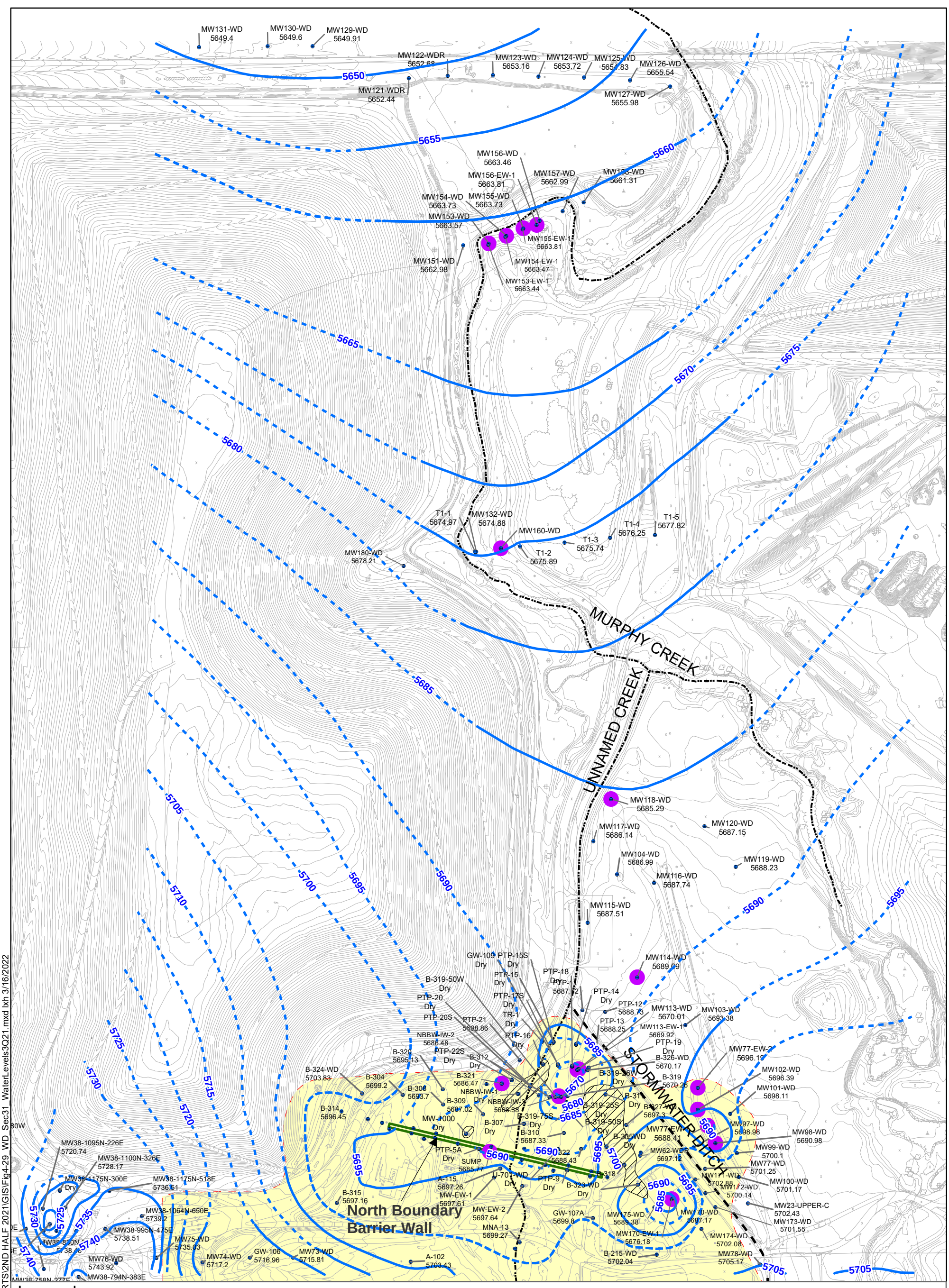
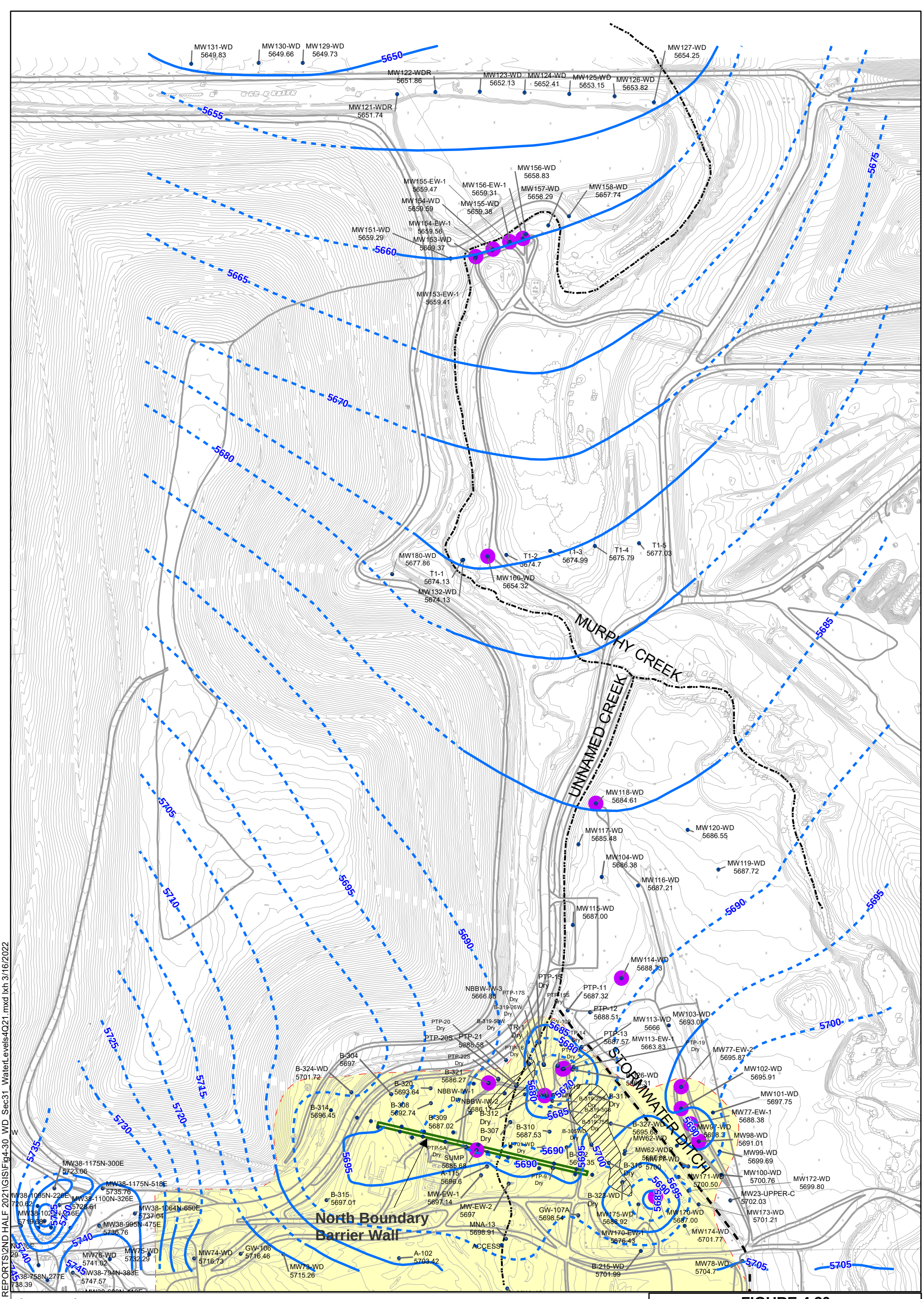

MW131-WD
5649.4
MW130-WD
5649.6
MW129-WD
5649.91
MW122-WDR
5652.68
MW123-WD
5653.16
MW124-WD
5653.72
MW125-WD
5654.83
MW126-WD
5655.54
MW121-WDR
5652.44
MW127-WD
5655.98
5650
5655
5660
MW156-WD
5663.46
MW156-EW-1
5663.81
MW157-WD
5662.99
MW158-WD
5661.31
MW154-WD
5663.73
MW155-WD
5663.73
MW153-WD
5663.57
MW155-EW-1
5663.81
MW151-WD
5662.98
MW154-EW-1
5663.47
MW153-EW-1
5663.44
5665
5670
5675
5680
T1-1
5674.97
MW132-WD
5674.88
MW160-WD
T1-2
5675.89
T1-3
5675.74
T1-4
5676.25
T1-5
5677.82
MW180-WD
5678.21
MURPHY CREEK
UNNAMED CREEK
5685
MW118-WD
5685.29
MW117-WD
5686.14
MW120-WD
5687.15
MW104-WD
5686.99
MW119-WD
5688.23
MW116-WD
5687.74
MW115-WD
5687.51
5690
5695
5700
5705
5710
5725
5730
5735
5740
GW-109
Dry
PTP-15S
Dry
PTP-15
Dry
PTP-17S
Dry
TR-1
Dry
PTP-16
Dry
PTP-18
Dry
PTP-14
Dry
PTP-12
5688.73
PTP-13
5688.25
PTP-19
Dry
MW114-WD
5689.09
MW113-WD
5670.01
MW103-WD
5693.38
MW113-EW-1
5669.92
MW77-EW-2
5696.10
B-319-50W
Dry
PTP-20
Dry
PTP-20S
PTP-21
5688.86
NBBW-IW-2
5686.48
PTP-22S
Dry
B-320
5695.13
B-312
Dry
B-324-WD
5703.83
B-304
5699.2
B-321
5686.47
NBBW-IW-1
Dry
NBBW-IW-3
5688.38
B-309
5687.02
B-308
5693.7
B-314
5696.45
MW-1000
Dry
B-307
Dry
B-319-75S
Dry
B-310
5687.33
B-319-25S
Dry
B-319-50S
Dry
B-305WD
Dry
B-322
5688.43
B-318
B-326-WD
5670.17
B-319
5670.26
B-327-WD
5697.3
MW102-WD
5696.39
MW101-WD
5698.11
MW97-WD
5698.98
MW98-WD
5690.98
MW99-WD
5700.1
MW77-WD
5701.25
MW100-WD
5701.17
MW23-UPPER-C
5702.43
MW173-WD
5701.55
MW174-WD
5702.08
MW78-WD
5705.17
MW62-WDR
5697.12
MW171-WD
5702.88
MW172-WD
5700.14
STORMWATER DITCH
PTP-5A
Dry
SUMP
5685.77
A-115
5697.26
MW-EW-1
5697.61
LI-701-WD
Dry
PTP-9
Dry
B-329-WD
Dry
B-315
5697.16
MW-EW-2
5697.64
MNA-13
5699.27
GW-107A
5699.8
MW175-WD
5689.38
MW170-WD
5687.17
MW170-EW-1
5676.18
B-215-WD
5702.04
A-102
5703.43
North Boundary
Barrier Wall
MW38-1095N-226E
5720.74
MW38-1100N-326E
5728.17
MW38-1175N-300E
Dry
MW38-1175N-518E
5736.51
MW38-1064N-650E
5739.2
MW38-995N-475E
5738.51
MW38-800N
5738.0
MW75-WD
5735.03
MW76-WD
5743.92
MW74-WD
5717.2
GW-106
5716.96
MW73-WD
5715.81
MW38-794N-383E
5720
5715
5705
5695
5690
5685
5680
5670
5700
5725
5730
5735
5740
Legend
Extraction Well
Groundwater Monitoring Well
Potentiometric Contours
(dashed where inferred)
Area where Weathered Dawson is dry
Dry
Water Level Below Base of Screen
Zone of Containment
N
Feet
0
400
1 inch = 400 feet
FIGURE 4.29
SECTION 31 WEATHERED DAWSON
POTENTIOMETRIC SURFACE
July 2021
O&M Status Report - 2nd Half 2021
North End
Lowry Landfill Superfund Site, Colorado
PARSONS
Denver, Colorado
S:\ES\Maj\Proj\LWRY\LNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-29_WD_Sec31_WaterLevels3Q21.mxd lxh 3/16/2022



Legend

- Extraction Well
- Groundwater Monitoring Well
- Potentiometric Contours (dashed where inferred)
- Dry — Water Level Below Base of Screen
- Area where Weathered Dawson is dry
- Zone of Containment caused by NBBW and Response Action Pumping

N

0 400 Feet

1 inch = 400 feet

FIGURE 4.30

SECTION 31 WEATHERED DAWSON POTENTIOMETRIC SURFACE
October 2021
O&M Status Report - 2nd Half 2021
North End
Lowry Landfill Superfund Site, Colorado

PARSONS
Denver, Colorado

S:\ES\Maj\Proj\LWRY\LNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-30_WD_Sec31_WaterLevels4Q21.mxd lxh 3/16/2022

13
18
24
19
25
30
31

MW178-UDEN 5536.74
MW178-DEN 5559.89
NEPZ-104 5564.95
MW176-UDEN 5557.89
MW176-DEN 5558.58
MW177-UDEN 5565.27
MW177-DEN 5569.35
NEPZ-098 5554.88
NEPZ-097 5553.88
NEPZ-103 5564.66
NEPZ-101 5560.75
NEPZ-099 5556.66
NEPZ-102 5563.38
NEPZ-105 5566.35
MW145-WD 5568.45
MW144-WD 5568.43
MW142-WD 5589.62
MW141-UDEN 5605.32
MW140-WD 5607.51
MW141-WD 5607.33
MW139-WD 5638.77
MW138-WD 5638.29
MW137-WD 5638.46
MW136-WD 5638.69
MW133-WD 5636.1
MW134-WD 5637.68
MW135-WD 5638.95
MW129-WD 5649.91
MW130-WD 5649.6
MW131-WD 5649.4
MW179-UDEN 5649.18
MW122-WDR 5652.68
MW124-WD 5653.72
MW126-WD 5655.54
MW127-WD 5655.98
MW121-WDR 5652.44
MW123-WD 5653.16
MW125-WD 5654.53
MW157-WD 5662.99
MW154-WD 5663.72
MW158-WD 5661.31
MW156-WD 5663.46
MW151-WD 5662.98
MW155-EW-1 5663.81
MW153-WD 5663.57
MW155-WD 5663.73
MW160-WD
MW132-WD 5674.88
T1-1 5674.97
T1-2 5675.89
T1-3 5675.74
T1-4 5676.25
T1-5 5677.82

SWMC-07
SWMC-06
SWMC-05
SWMC-04
SWMC-03
SWMC-02
SWMC-09
SWMC-08
SWMC-01
SW-5
SW-3

5555
5560
5565
5570
5575
5580
5585
5590
5595
5600
5605
5610
5615
5620
5625
5630
5635
5640
5645
5650
5655
5660
5665
5670
5675
5680
5685
5690

Mississippi Ave.
E. Jewell Ave.
Yale Ave.
Gun Club Road
Un-Named Murphy Creek Tributary
Un-Named Murphy Creek Tributary
Murphy Creek
Un-Named Murphy Creek Tributary
Murphy Creek

Legend

- Groundwater Extraction Well
- Groundwater Monitoring Well
- Domestic Well Location
- Surface Water Sample Location
- Piezometer Location
- Dry — Water Level Below Base of Screen

N

0 500 1,000 Feet

1 inch = 1,000 feet

FIGURE 4.31

SECTIONS 19 AND 30
WEATHERED DAWSON/
WEATHERED UPPER DENVER
POTENTIOMETRIC SURFACE
July 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS
Denver, Colorado

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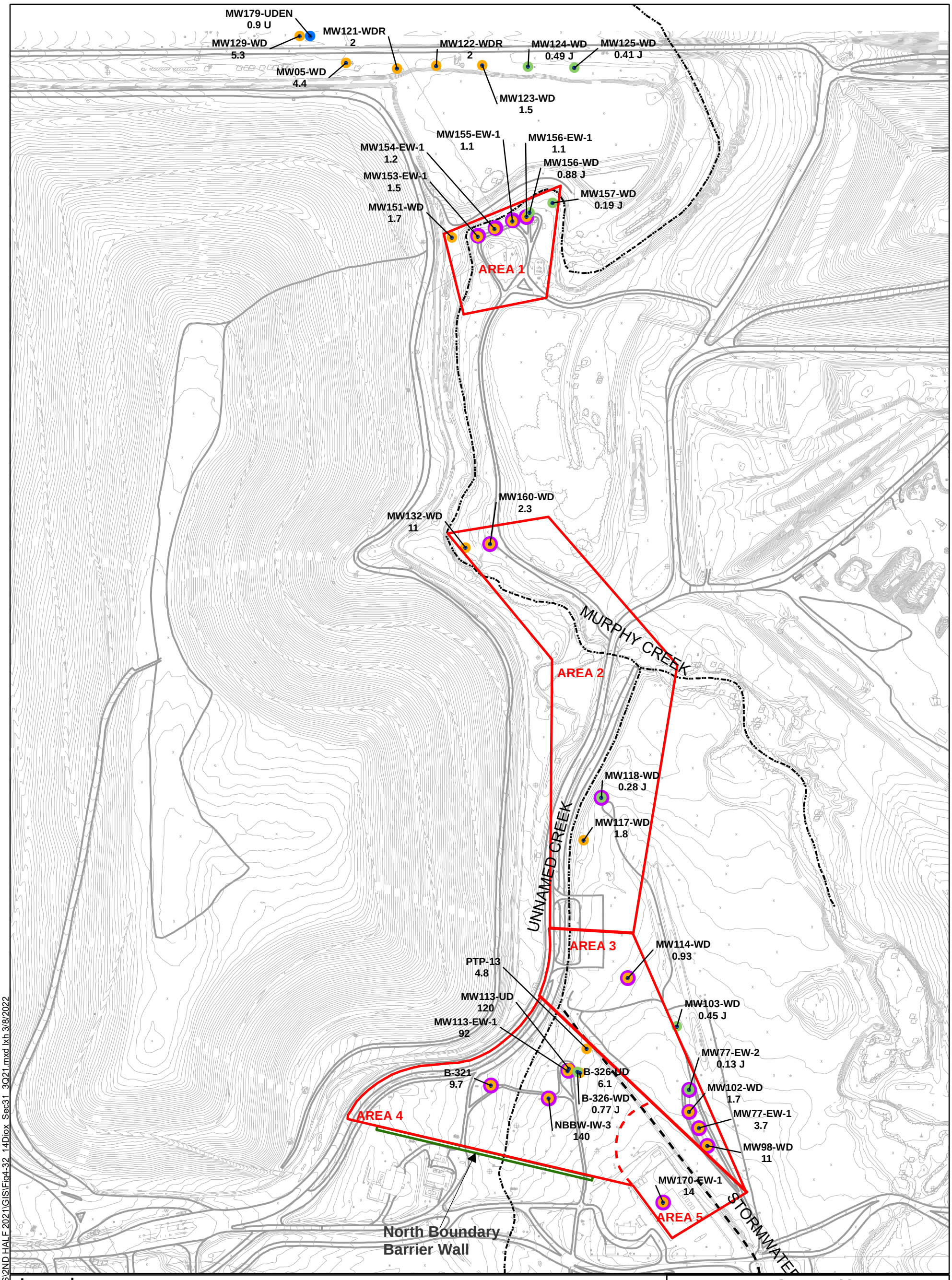

Legend

- NO 1,4-Dioxane (14X) DETECTED
- DETECTED 14X <= 0.9 ug/L PERFORMANCE STANDARD
- DETECTED 14X > 0.9 ug/L PERFORMANCE STANDARD
- EXTRACTION WELL

J = ESTIMATED VALUE
U = UNDETECTED

N

0 200 400 800 Feet

1 inch = 400 feet

FIGURE 4.32

SECTION 31
1,4-DIOXANE RESULTS
THIRD QUARTER 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

S:\ES\MalProj\LWRY\LNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-32_14Diox_Sec31_3Q21.mxd lxh 3/8/2022

MW155-EW-1
0.27 J

MW156-EW-1
0.48 J

MW156-WD
0.25 J

MW154-EW-1
0.63 J

MW157-WD
0.1 J

MW153-EW-1
2

MW151-WD
5.1

AREA 1

MW160-WD
3.3

MW132-WD
14

MURPHY CREEK

AREA 2

MW118-WD
0.26 J

MW117-WD
1.5

UNNAMED CREEK

AREA 3

MW114-WD
0.96

MW113-UD
94

PTP-12
9.1

MW103-WD
0.41 J

MW113-EW-1
120

PTP-13
6.9

B-326-WD
1

MW77-EW-2
0.12 J

MW102-WD
1.1

B-313
17

B-326-UD
5

MW77-EW-1
3

B-314
0.9 U

NBBW-IW-3

AREA 4

MW98-WD
11

MW62-WDR
3.2

MW77-WD
11

MW23-UPPER-C
0.9 U

MW38-1028N-256E
2.1

MW170-EW-1
12

AREA 5

STORMWATER

MW38-830N-230E
4.6

MW74-WD
0.9 U

GW-106
0.9 U

North Boundary
Barrier Wall

MW78-WD
0.9 U

Legend

- NO 1,4-Dioxane (14X) DETECTED
- DETECTED 14X <= 0.9 ug/L PERFORMANCE STANDARD
- DETECTED 14X > 0.9 ug/L PERFORMANCE STANDARD
- EXTRACTION WELL

J = ESTIMATED VALUE
U = UNDETECTED

N

0 200 400 800 Feet

1 inch = 400 feet

FIGURE 4.33

SECTION 31
1,4-DIOXANE RESULTS
FOURTH QUARTER 2021

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

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MW176-DEN
0.49 J

MW144-WD
0.9 U

Mississippi Ave.

Gun Club Road

24

19

MW142-WD
1.7

Un-Named Murphy Creek Tributary

MW141-WD
2.3

E. Jewell Ave.

Un-Named Murphy Creek Tributary

Un-Named Murphy Creek Tributary

Murphy Creek

25

30

MW135-WD
4.5

MW122-WDR
2

MW121-WDR
2

MW123-WD
1.5

MW05-WD
4.4

MW124-WD
0.49 J

MW179-UDEN
0.9 U

MW125-WD
0.41 J

MW129-WD
5.3

Yale Ave.

MW156-WD
0.25 J

MW157-WD
0.1 J

MW156-EW-1
0.48 J

MW151-WD
5.1

MW155-EW-1
0.27 J

MW153-EW-1
2

MW154-EW-1
0.63 J

31

MW160-WD
3.3

MW132-WD
14

Murphy Creek

S:\ES\Maj\Proj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-34_14Diox_Sec1930_34Q21.mxd lxh 3/8/2022

Legend

- DETECTED 14X > 0.9 ug/L PERFORMANCE STANDARD
- DETECTED 14X <= 0.9 ug/L PERFORMANCE STANDARD
- NO 1,4-Dioxane (14X) DETECTED
- EXTRACTION WELL
- Domestic Well Location

J = ESTIMATED VALUE
U = UNDETECTED

N

Feet
0 1,000

1 inch = 1,000 feet

FIGURE 4.34

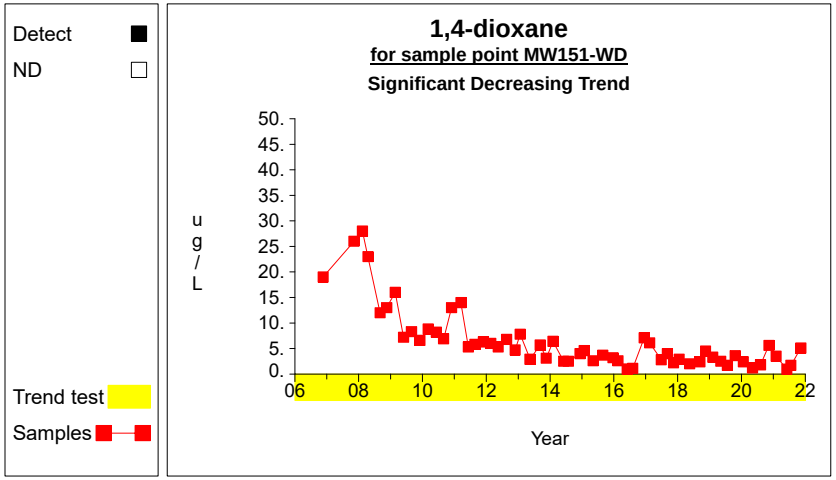
SECTIONS 19 AND 30
1,4-DIOXANE
MOST RECENT RESULTS

O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

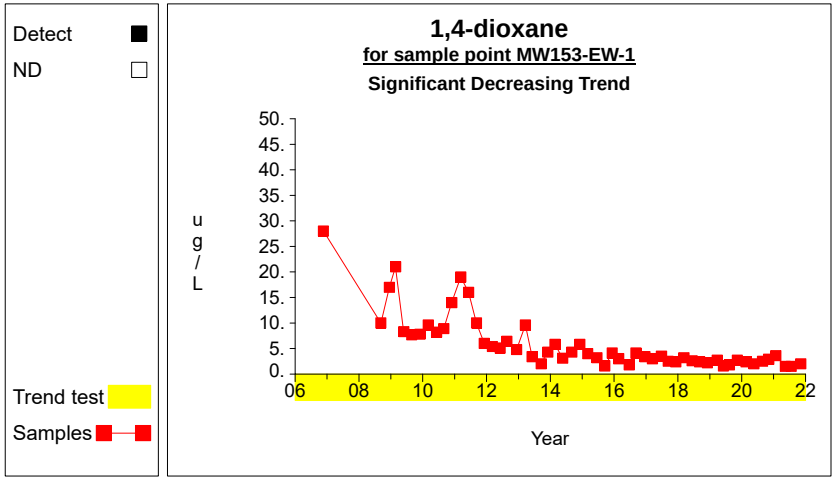
PARSONS

Denver, Colorado

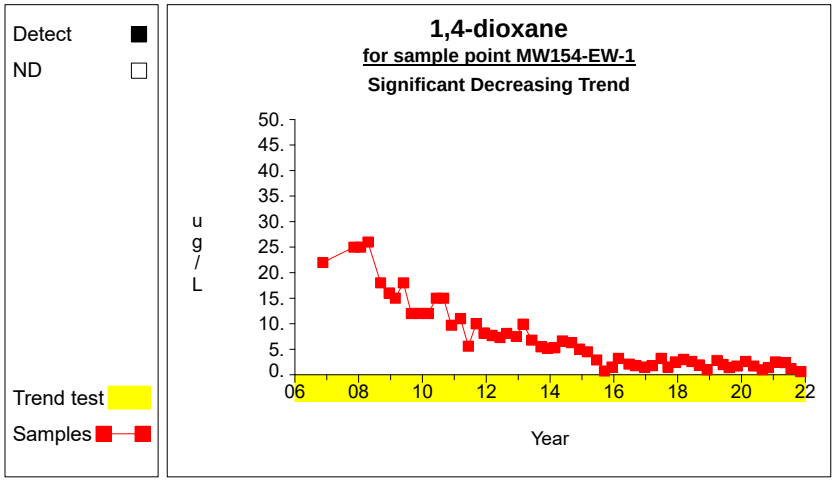
Figure 4.35
North End Trend Analysis Plots - Area 1
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



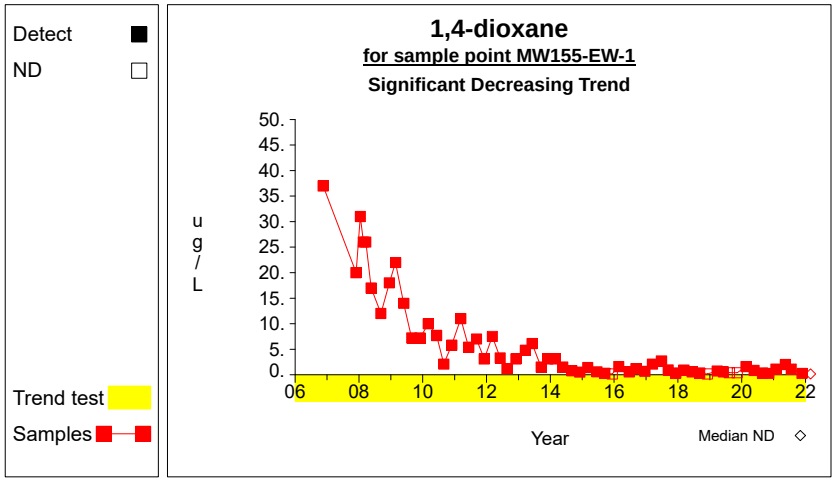
Graph 1



Graph 2

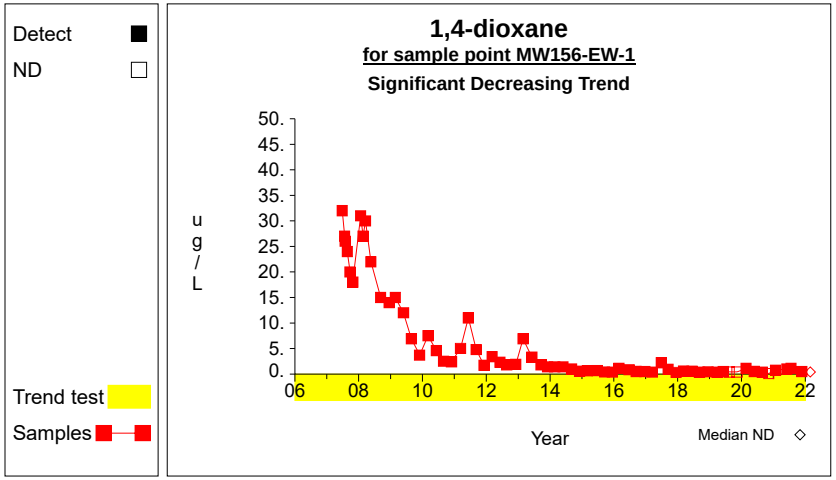


Graph 3



Graph 4

Figure 4.35
North End Trend Analysis Plots - Area 1
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund



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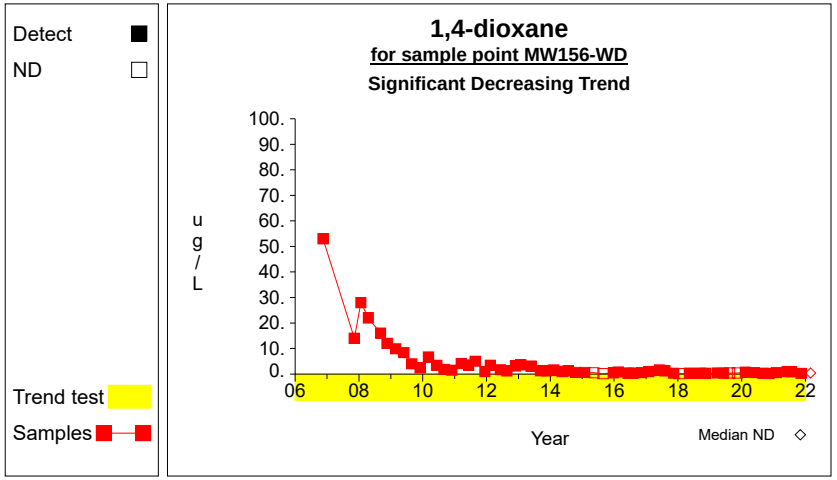
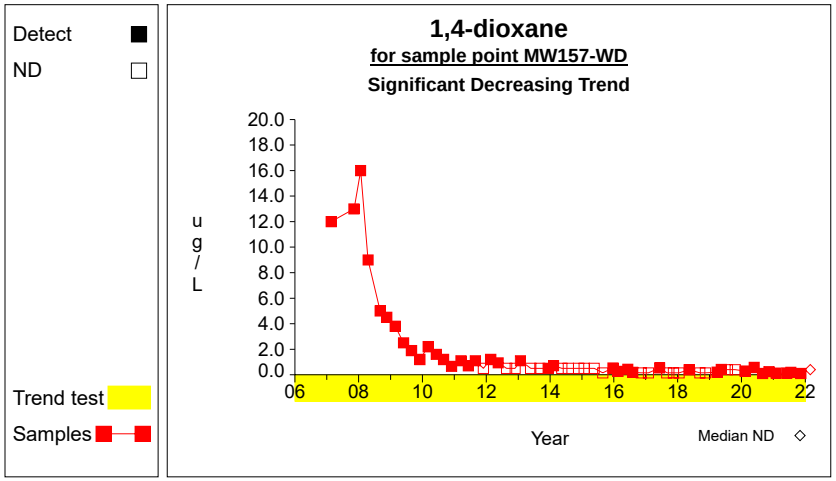


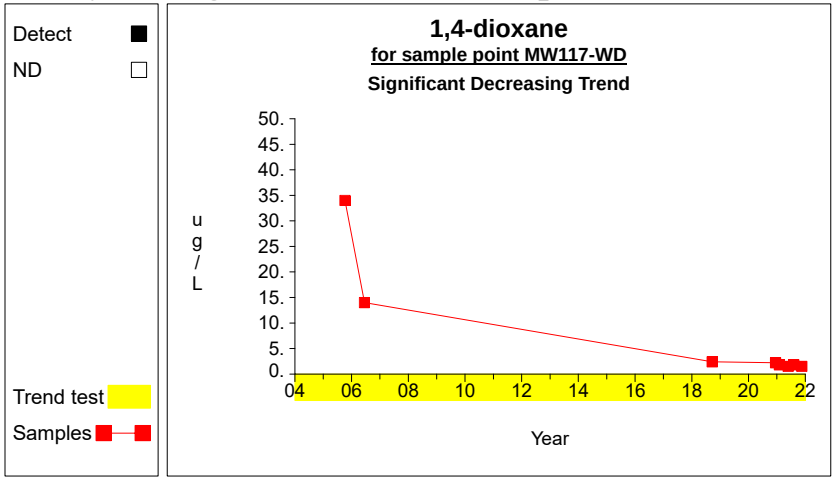
Graph 6



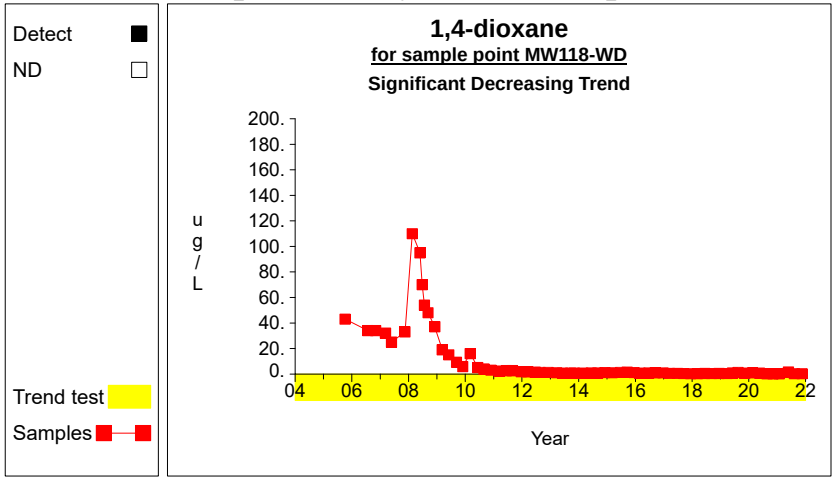
Graph 7

Analysis prepared using Sen's Test for trend and DUMPSTAT®

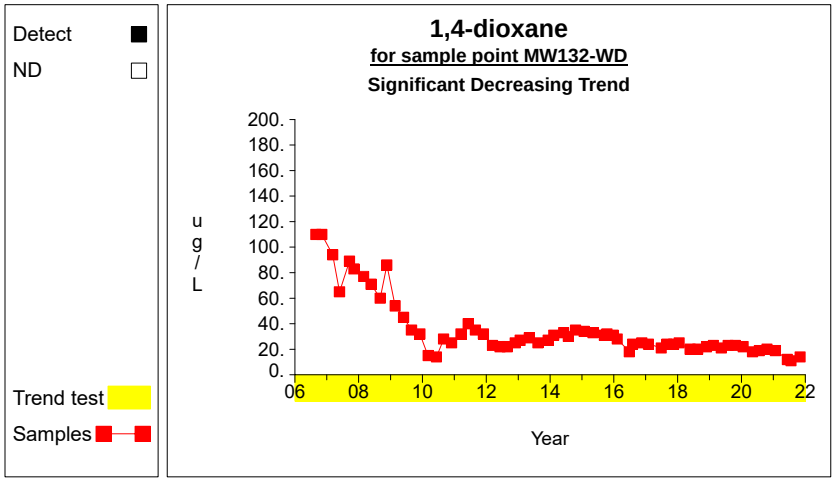
Figure 4.36
North End Trend Analysis Plots - Area 2
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



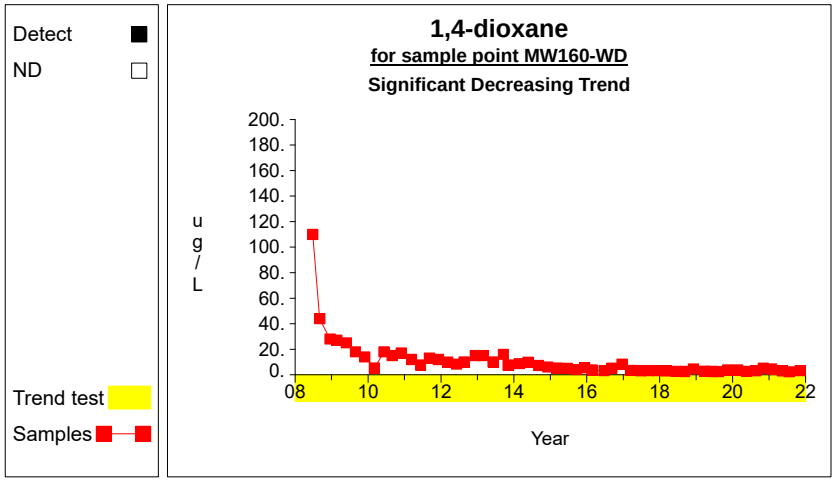
Graph 1



Graph 2



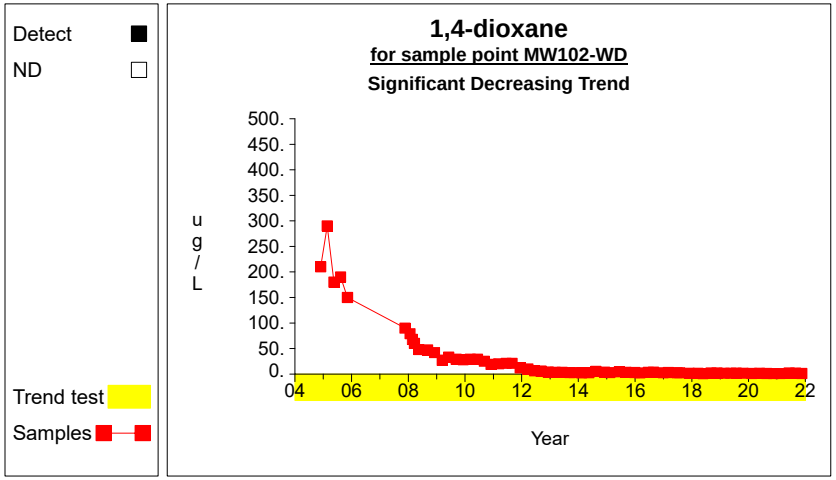
Graph 3



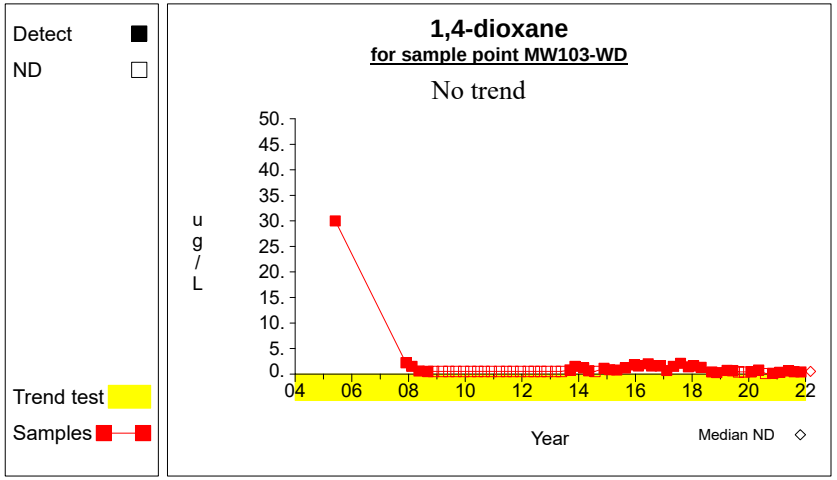
Graph 4

Prepared by: Parsons
Analysis prepared using Sen's Test for trend and DUMPSTAT®

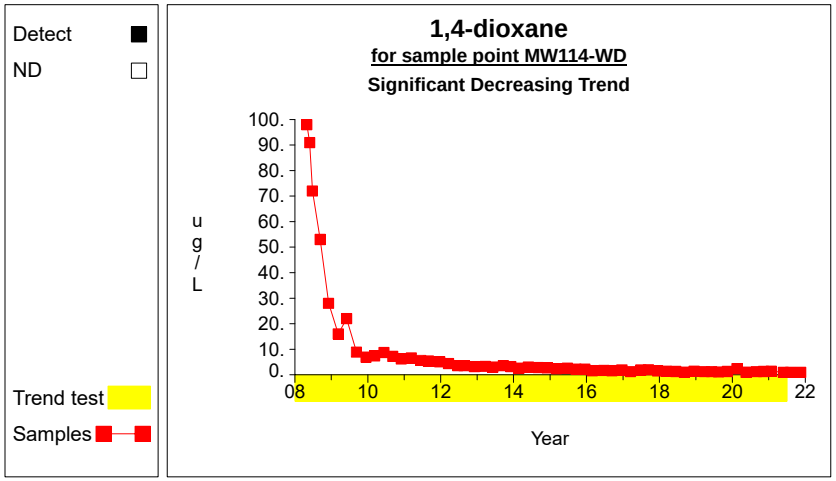
Figure 4.37
North End Trend Analysis Plots - Area 3
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



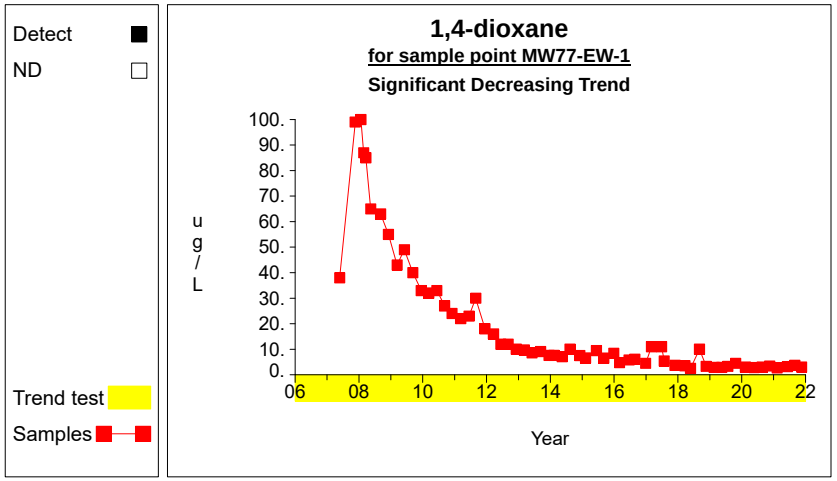
Graph 1



Graph 2

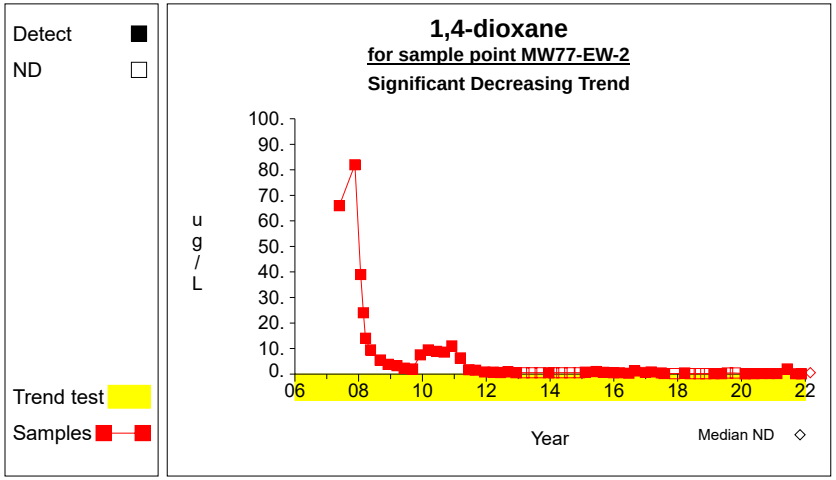


Graph 3

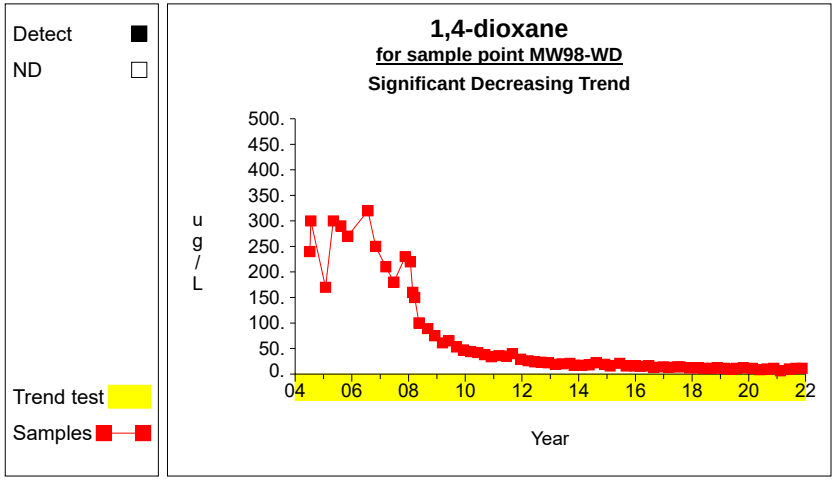


Graph 4

Figure 4.37
North End Trend Analysis Plots - Area 3
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



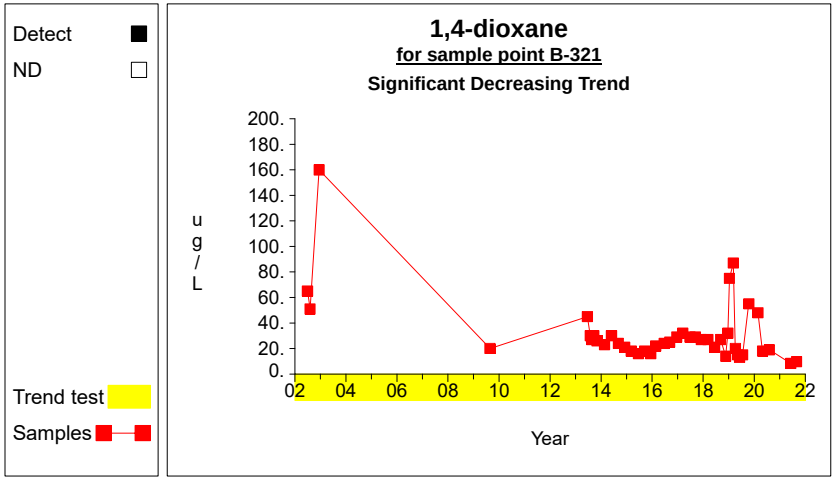
Graph 5



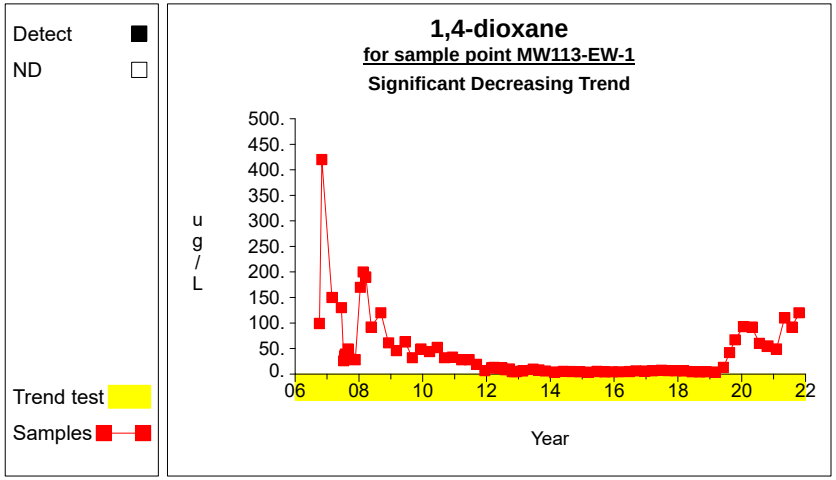
Graph 6

Analysis prepared using Sen's Test for trend and DUMPSTAT®

Figure 4.38
North End Trend Analysis Plots - Area 4
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



Graph 1



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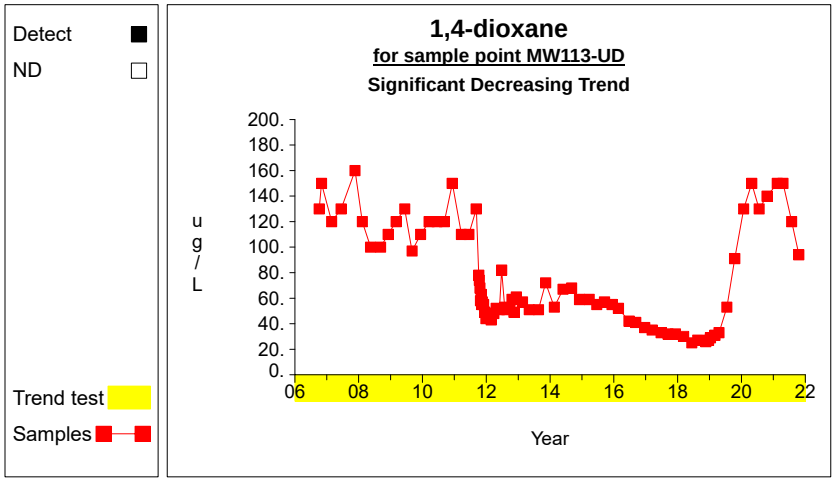
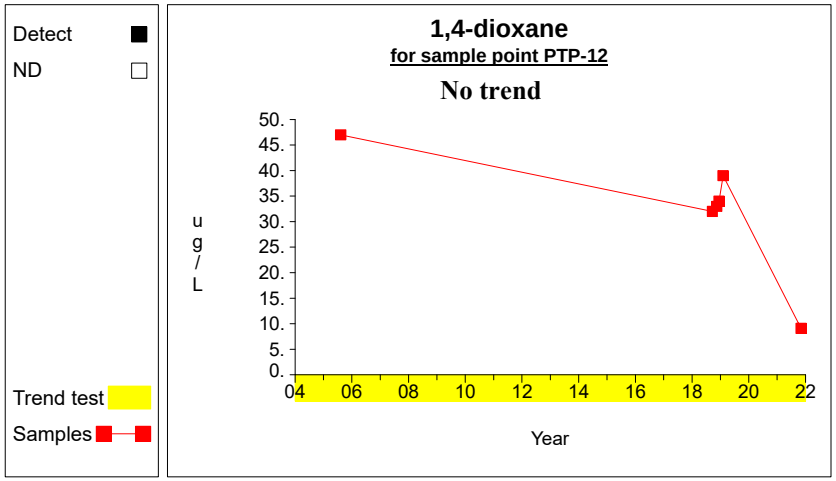
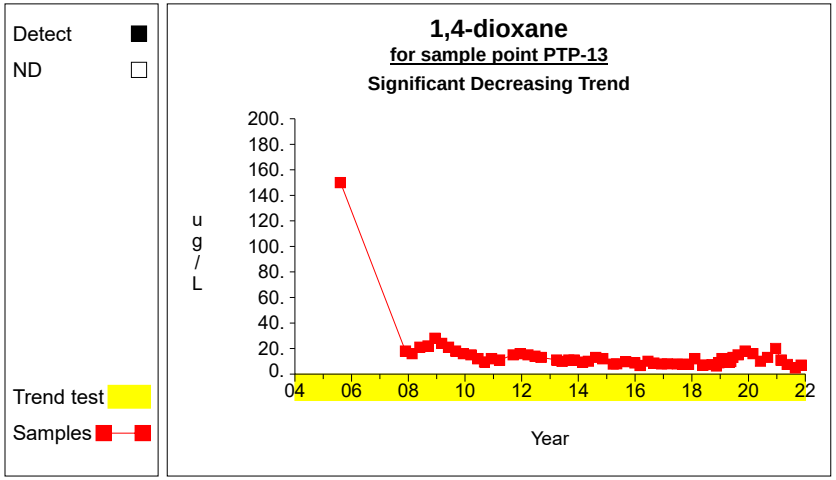


Graph 3



Graph 4

Figure 4.38
North End Trend Analysis Plots - Area 4
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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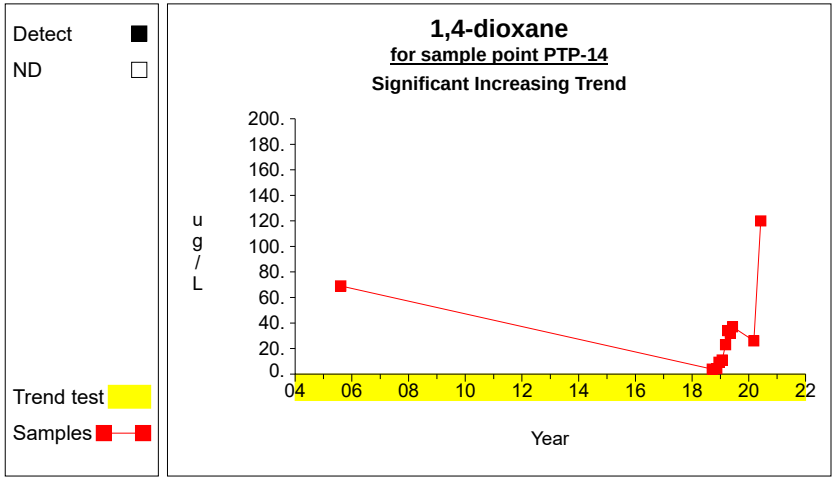
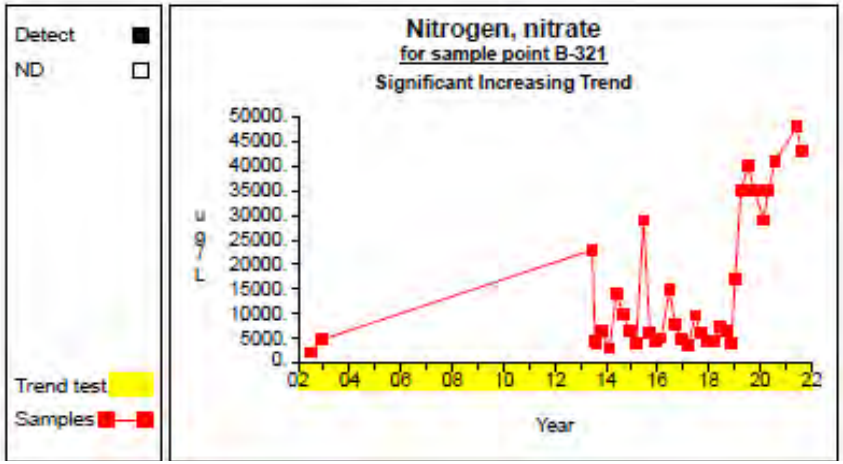


Graph 6



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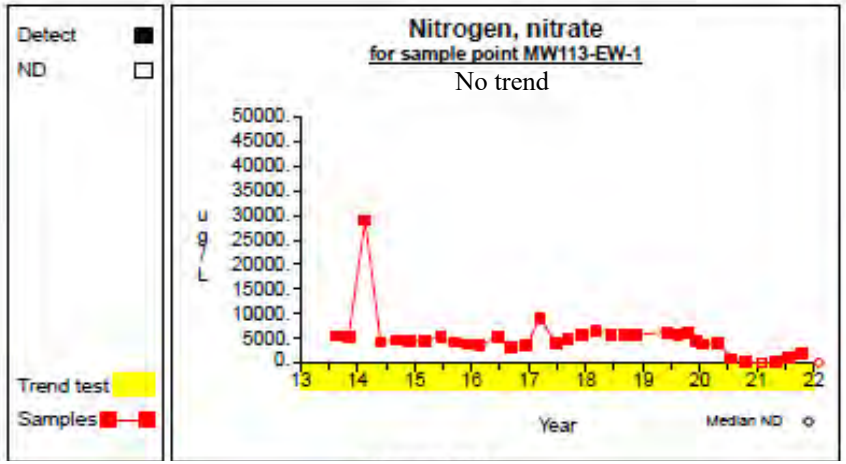
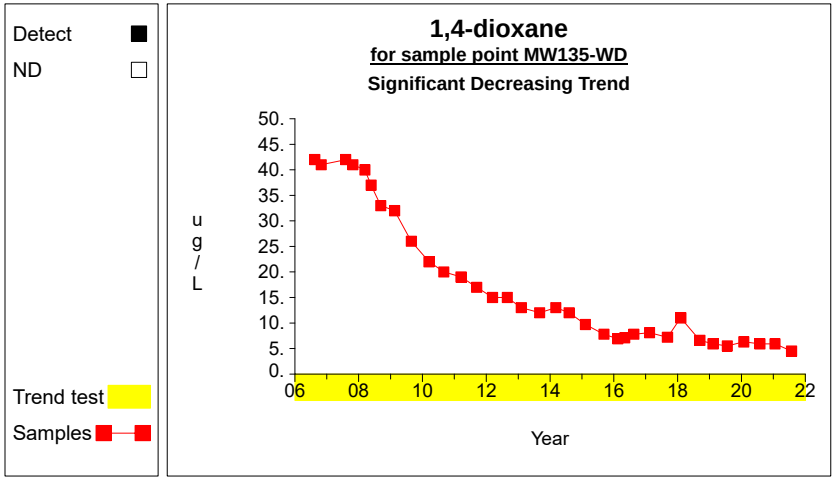


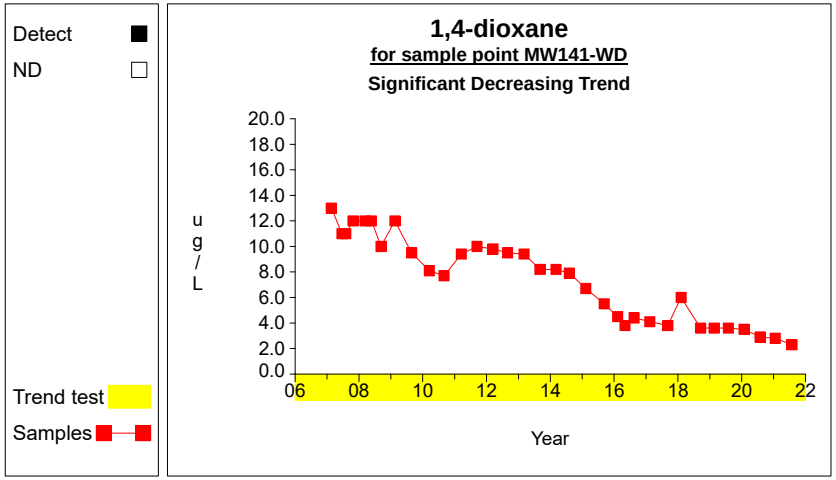
Graph 8

Analysis prepared using Sen's Test for trend and DUMPSTAT®

Figure 4.39
North End Trend Analysis Plots - Sections 30 and 19
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



Graph 1



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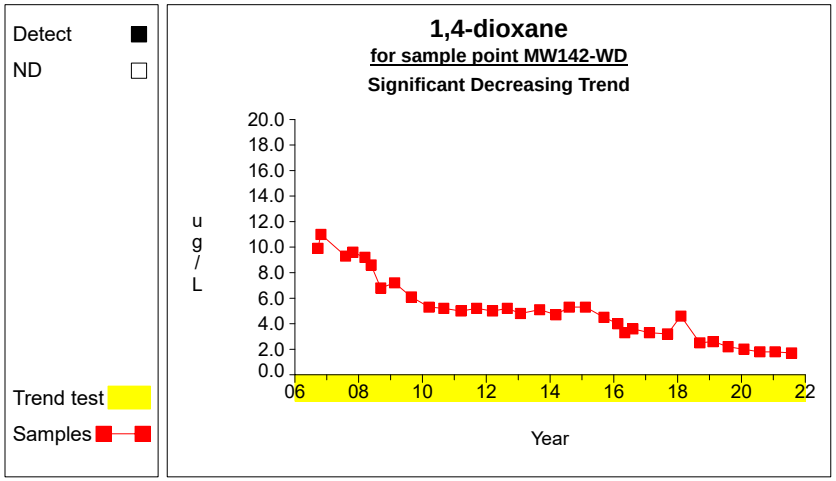
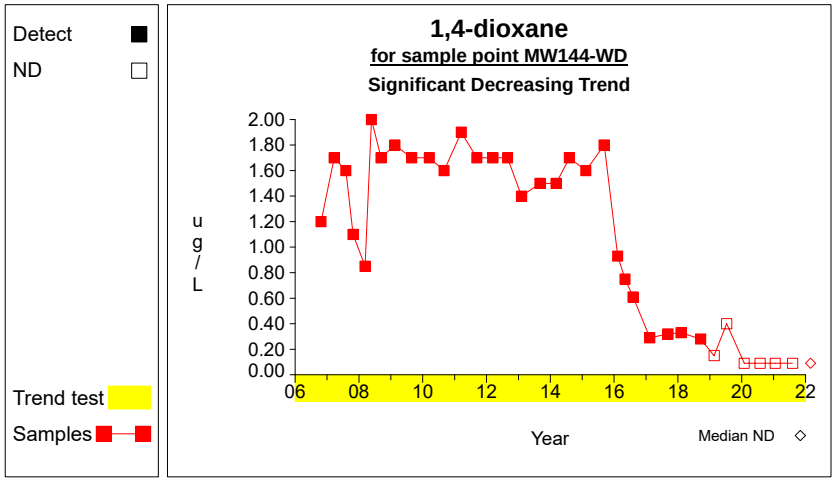
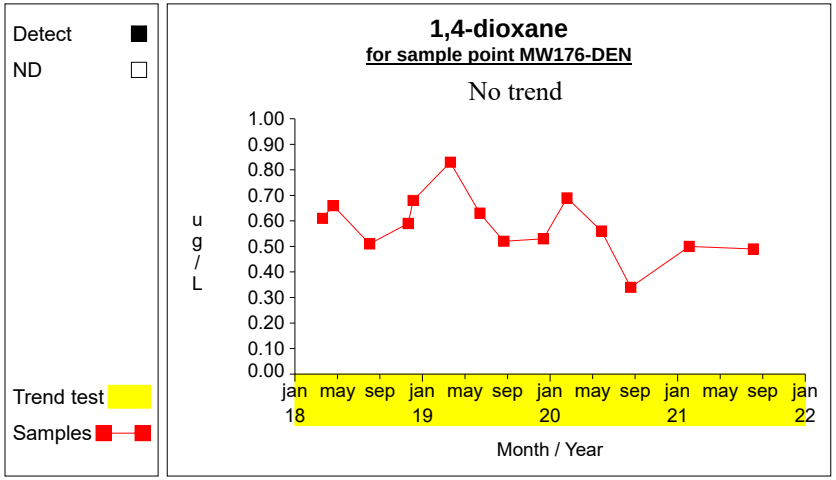


Graph 3

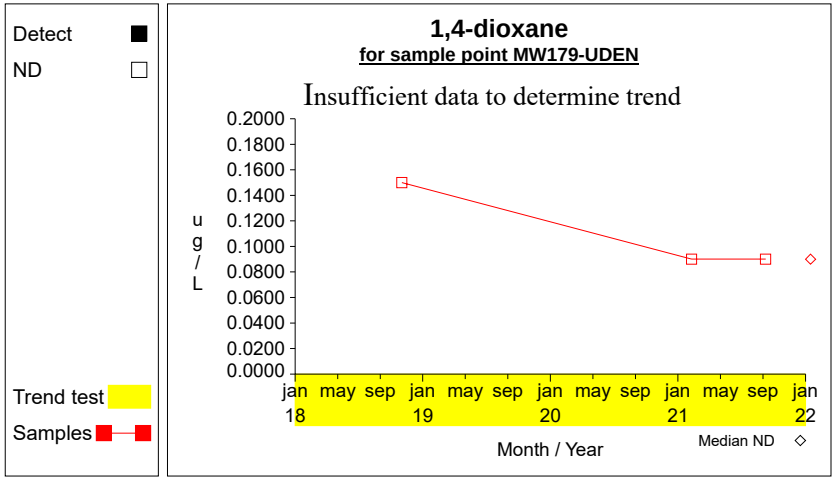


Graph 4

Figure 4.39
North End Trend Analysis Plots - Sections 30 and 19
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



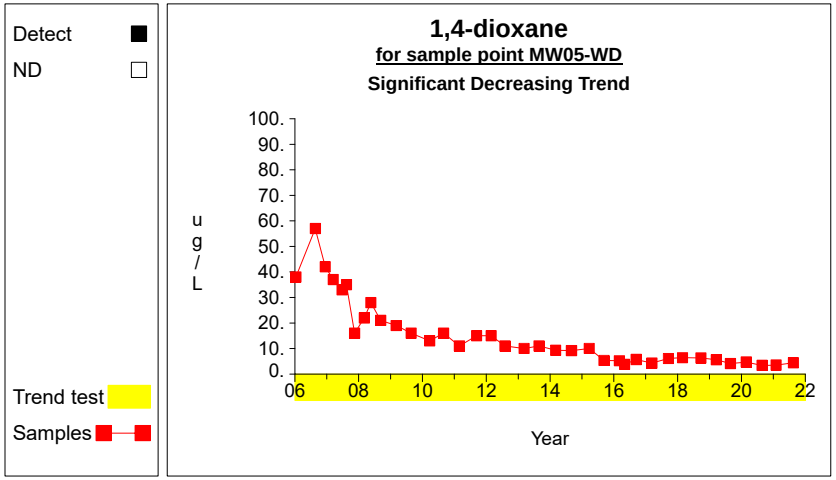
Graph 5



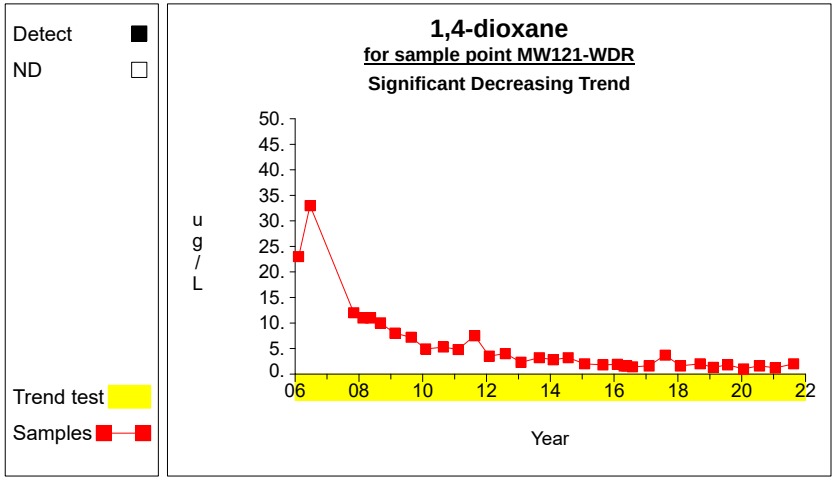
Graph 6

Analysis prepared using Sen's Test for trend and DUMPSTAT®

Figure 4.40
North End Trend Analysis Plots - Yale Area
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



Graph 1



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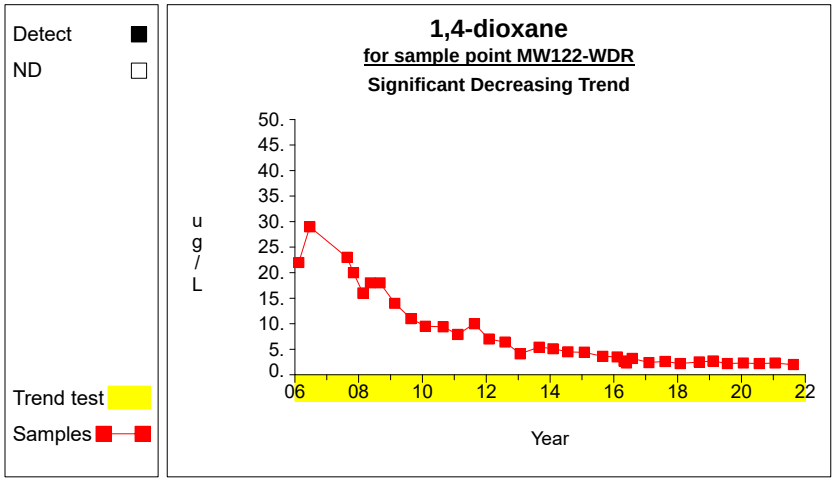

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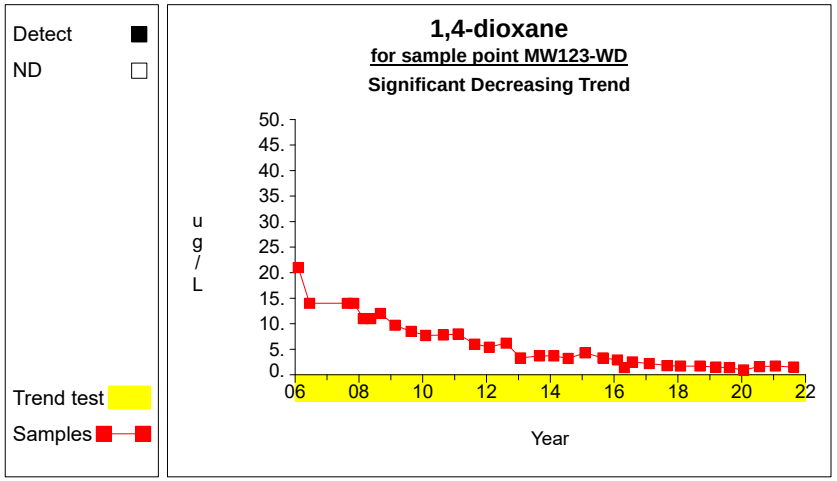
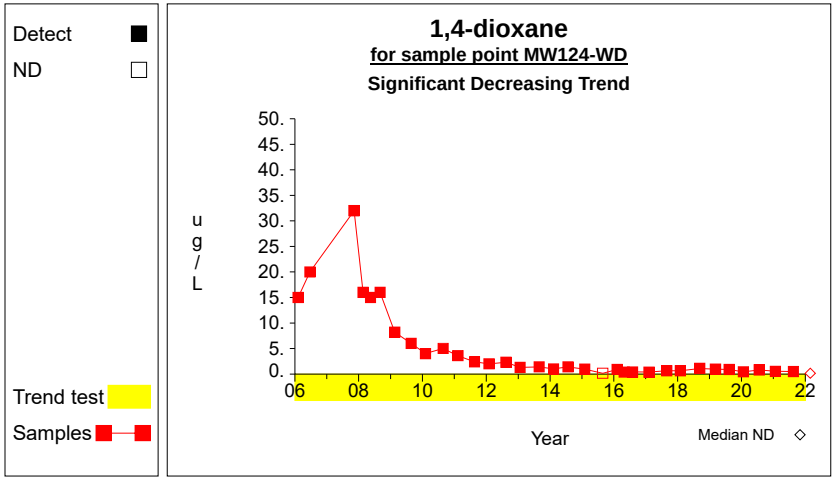


Graph 4

Figure 4.40
North End Trend Analysis Plots - Yale Area
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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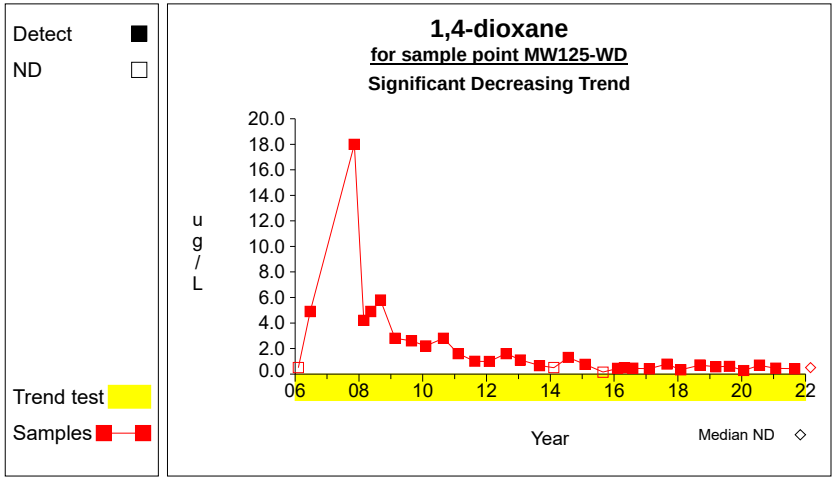

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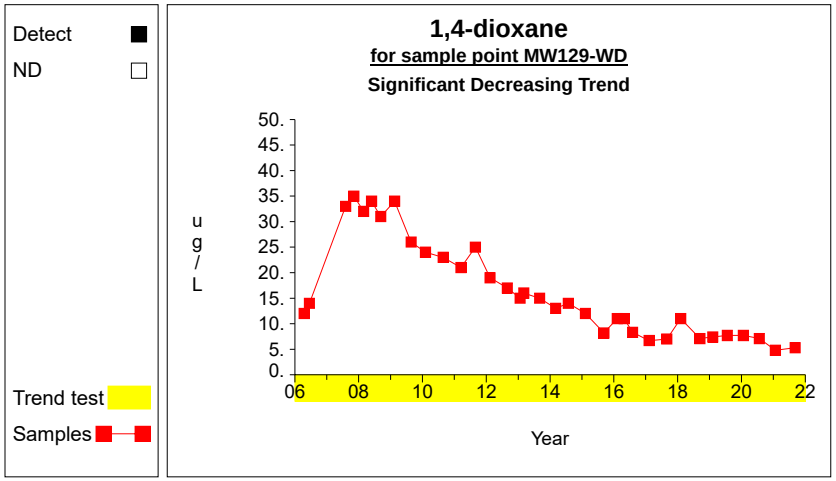


Graph 7

Analysis prepared using Sen's Test for trend and DUMPSTAT®

13
18
24
19
30
31
MW176-DEN
0.49 J
MW144-WD
0.9 U
MW142-WD
1.7
MW141-WD
2.3
MW135-WD
4.5
MW05-WD
4.4
MW122-WDR
2
MW179-UDEN
0.9 U
MW129-WD
5.3
MW121-WDR
2
MW155-EW-1
0.27 J
MW151-WD
5.1
B-326-WD
1
B-326-UD
5
MW153-EW-1
2
MW154-EW-1
0.63 J
MW132-WD
14
MW156-WD
0.25 J
MW157-WD
0.1 J
MW156-EW-1
0.48 J
MW160-WD
3.3
PTP-13
6.9
MW113-UD
94
MW62-WDR
3.2
MW113-EW-1
120
NBBW-IW-3
140
MW118-WD
0.26 J
MW117-WD
1.5
PTP-12
9.1
B-321
9.7
B-313
17
B-314
0.9 U
MW74-WD
0.9 U
GW-106
0.9 U
MW38-1028N-256E
2.1
MW38-830N-230E
4.6
MW38-170S-140W
14
MW170-EW-1
12
MW23-UPPER-C
0.9 U
MW38-825S-445E
2500
MW36-WDR
0.9 U
MW77-WD
11
MW78-WD
0.9 U
MW54-WD
0.9 U
MW123-WD
1.5
MW124-WD
0.49 J
MW125-WD
0.41 J
MW114-WD
0.96
MW103-WD
0.41 J
MW77-EW-1
3
MW77-EW-2
0.12 J
MW102-WD
1.1
MW98-WD
11
Mississippi Ave.
E. Jewell Ave.
Gun Club Road
Coal Creek
Un-Named Murphy Creek Tributary
Murphy Creek
UNNAMED CREEK
North Boundary Barrier Wall
North Toe
MURPHY CREEK
N
0 600 1,200 Feet
1 inch = 1,200 feet

B-326-WD
Compliance Monitoring Well
1,4-Dioxane Concentration (ug/L)
Start Injection at B-319 12/18/07
Start Extraction at MW113-EW-1 9/29/09
Start Injection at 3 IWs 11/8/10
Start Extraction at MW113-WD 7/2/07
1,4-D (ug/L)

MW103-WD
1,4-Dioxane Concentration (ug/L)

B-313 (Compliance Well)
1,4-DIOXANE
Concentration (ug/L)

MW77-WD (Compliance Well)
1,4-DIOXANE
Concentration (ug/L)

Legend

- Increasing Trend
- No Trend; 1,4-Dioxane <= 0.9 µg/L
- Decreasing Trend; 1,4 Dioxane > 0.9 µg/L
- No Trend; 1,4 Dioxane > 0.9 µg/L
- Decreasing Trend; 1,4-Dioxane <= 0.9 µg/L
- Never Above Performance Standard

Note: 1,4-Dioxane values from last sampling date for 2nd half 2021

1,4 Dioxane > 0.9 µg/L in 2nd half 2021 (dashed where inferred)

FIGURE 4.41

PROGRESS FROM RESPONSE ACTIONS

LAST SAMPLING DATE

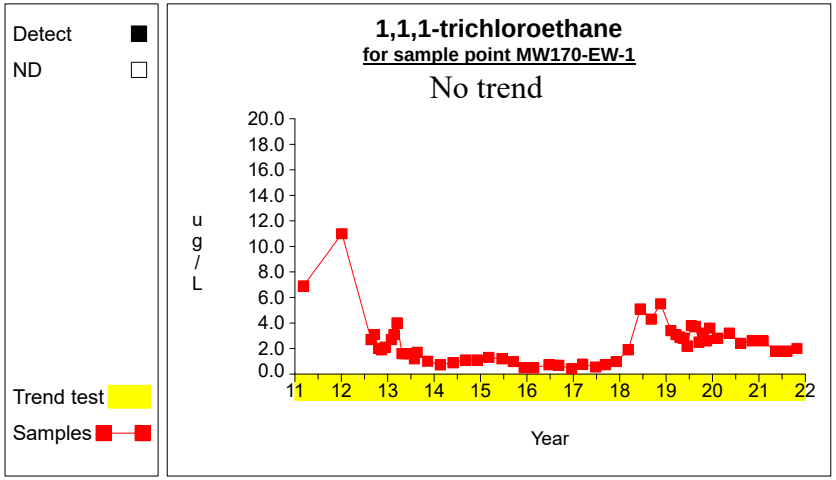
O&M Status Report - 2nd Half 2021
Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

S:\ES\Maj\Proj\LWRY\LNFL\QUARTERLY REPORTS\2ND HALF 2021\GIS\Fig4-41_14Diox_Sec1930_31_34Q21_MostRecent.mxd lxh 3/3/2022

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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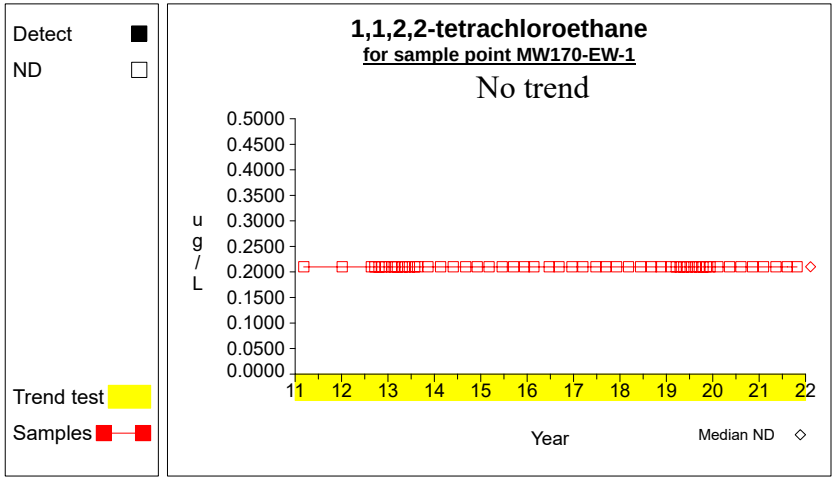

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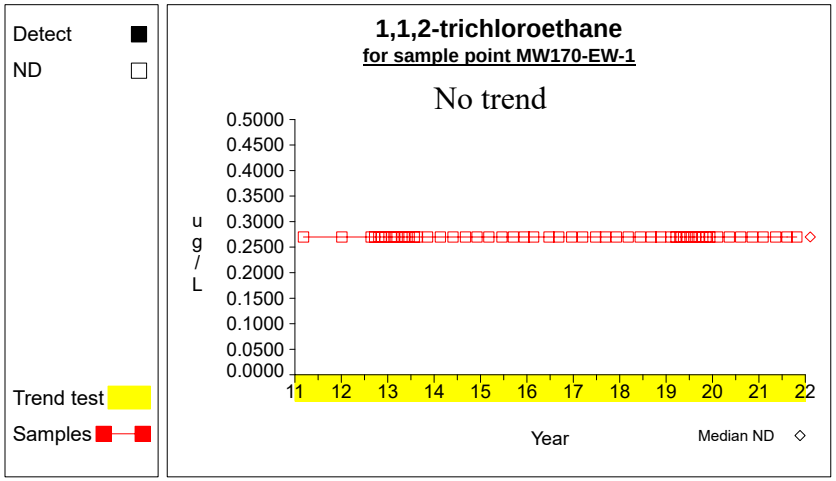

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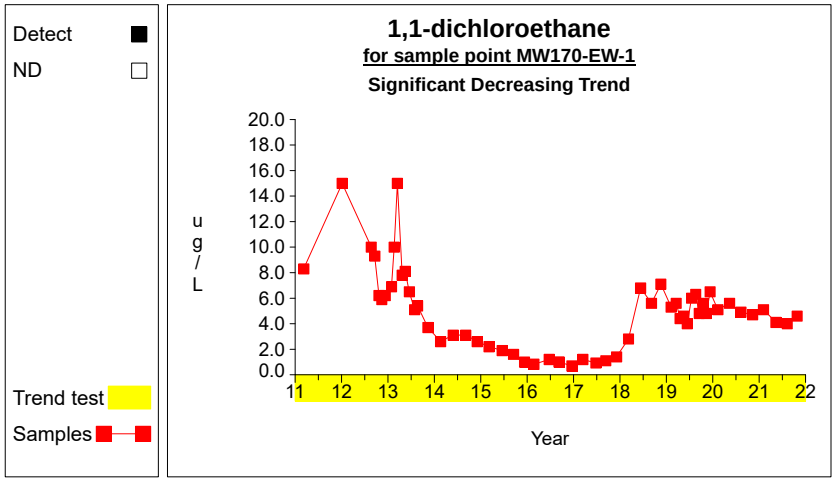
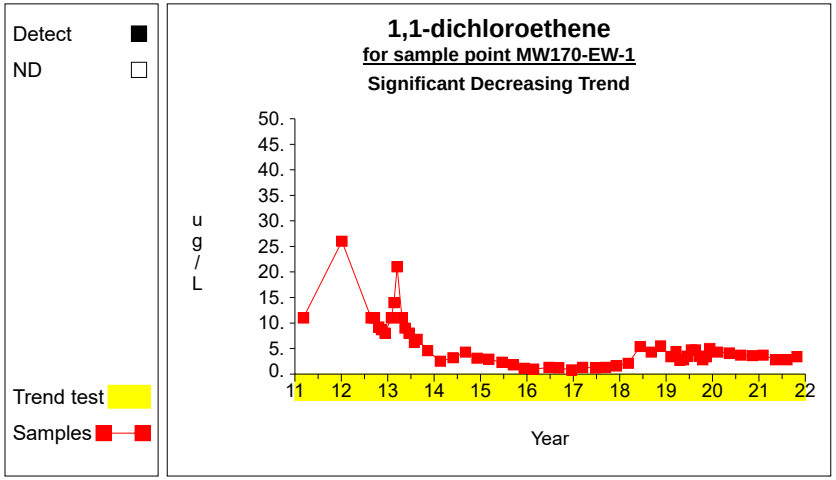


Graph 4

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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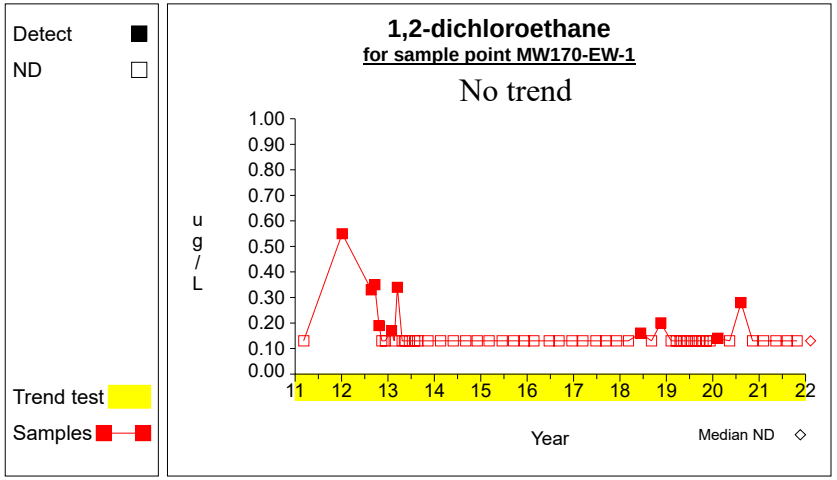

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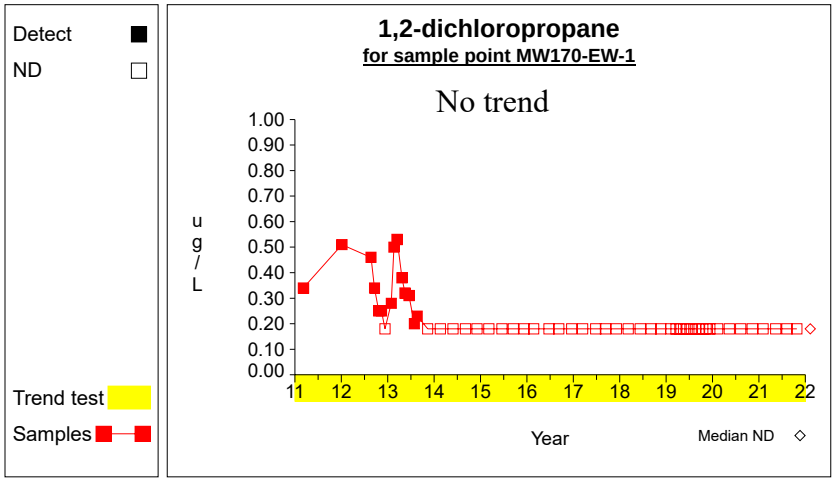

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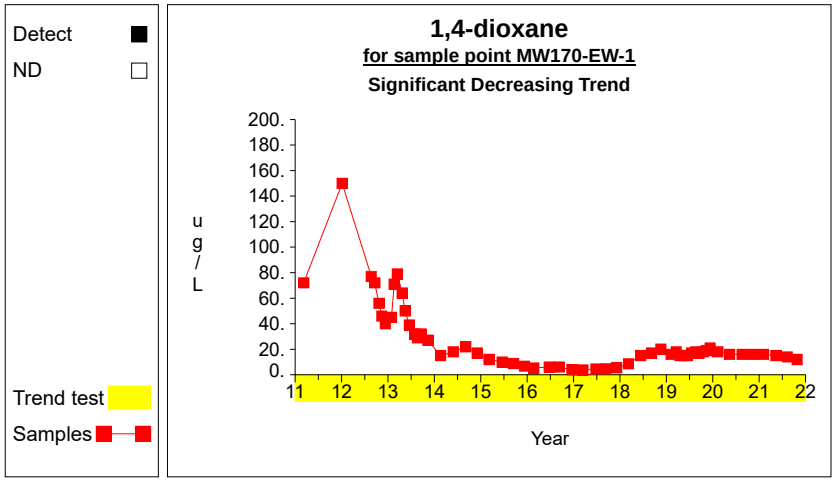
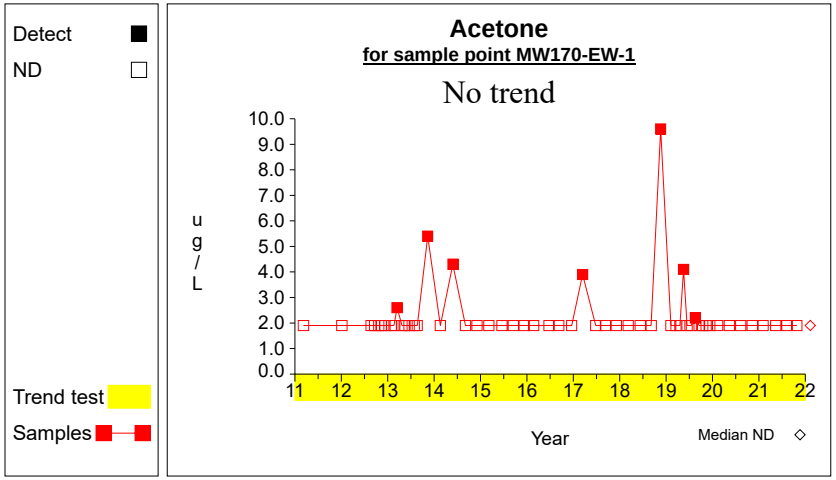


Graph 8

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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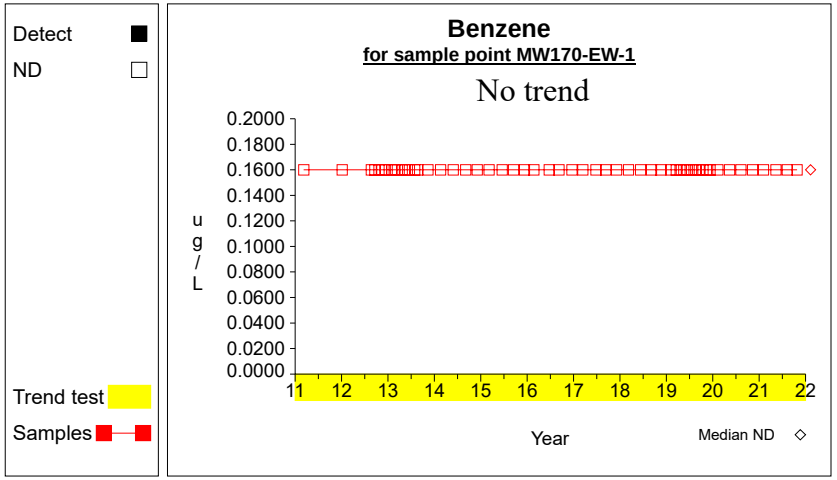

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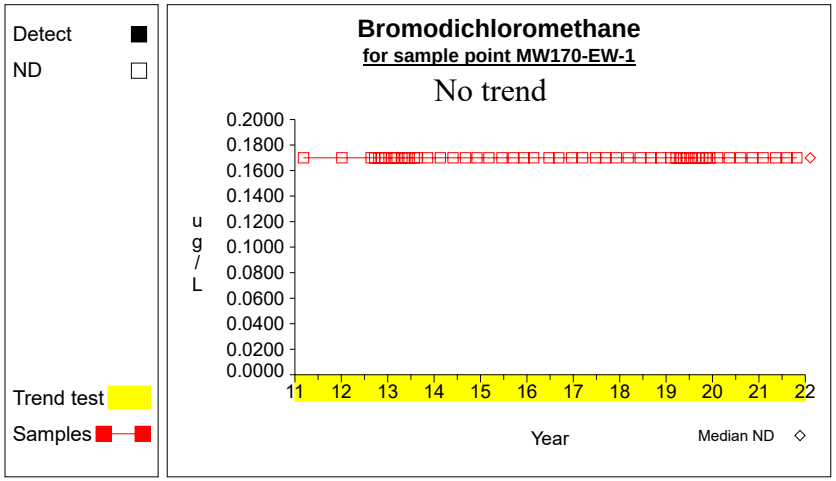

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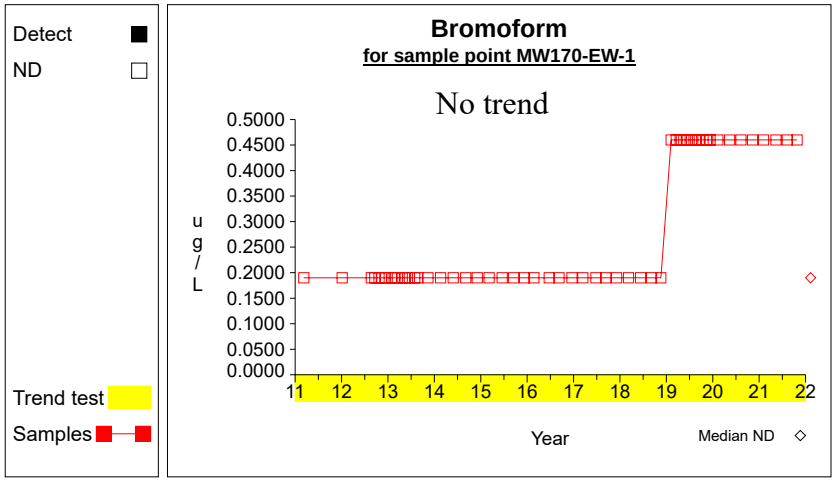
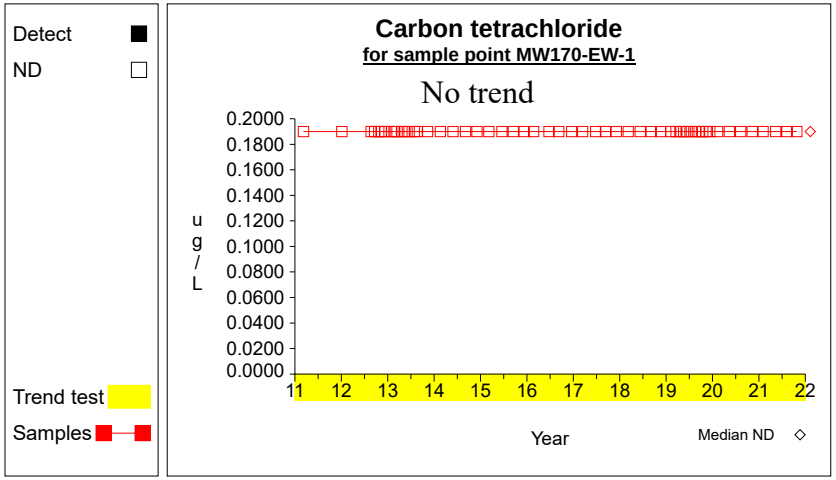


Graph 12

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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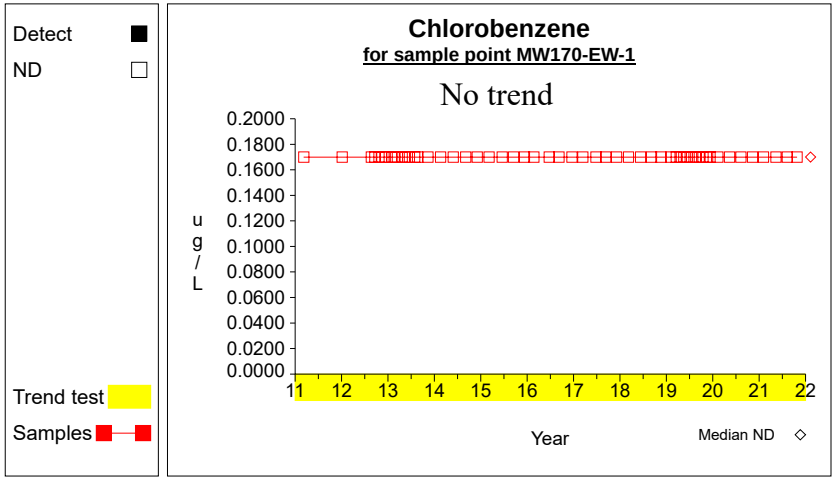

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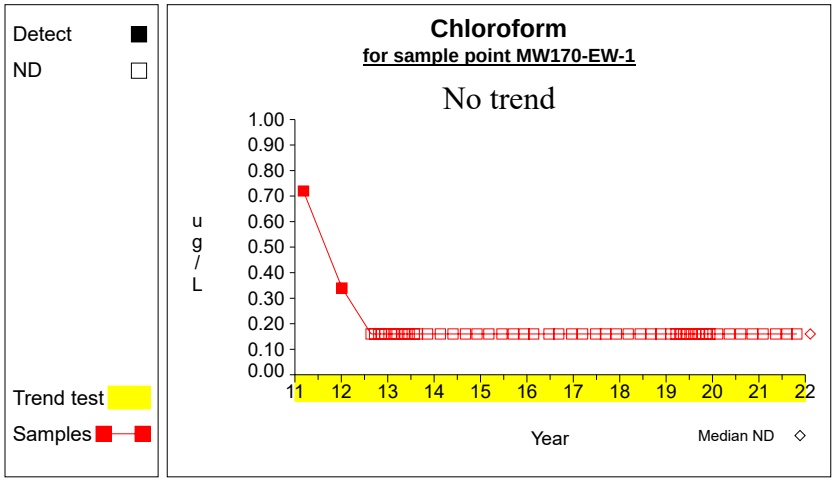

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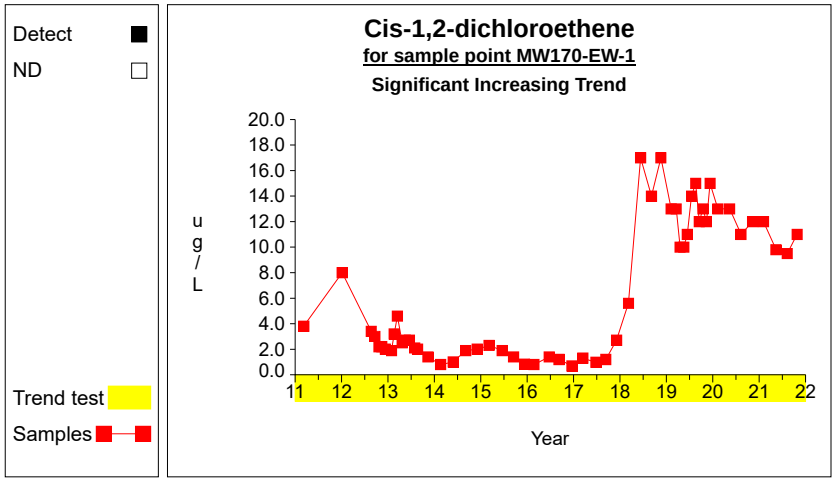
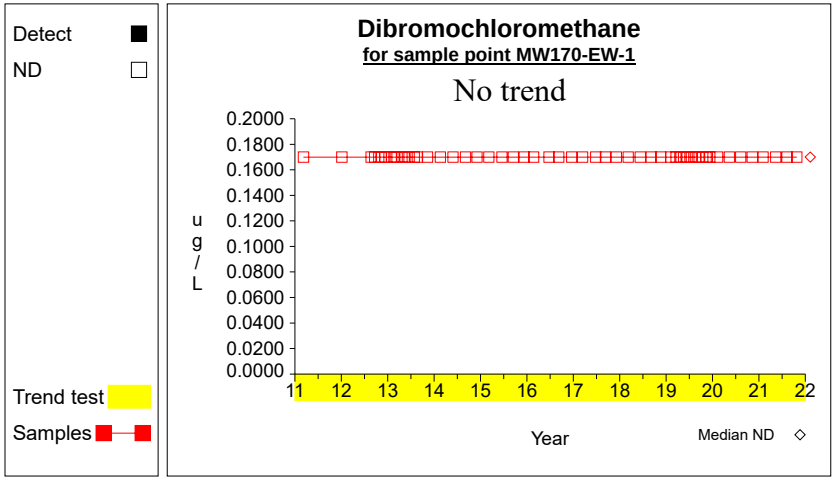


Graph 16

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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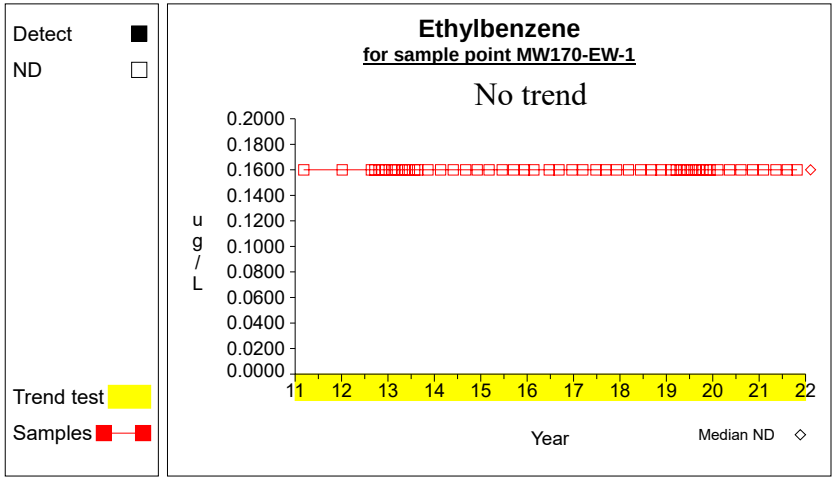

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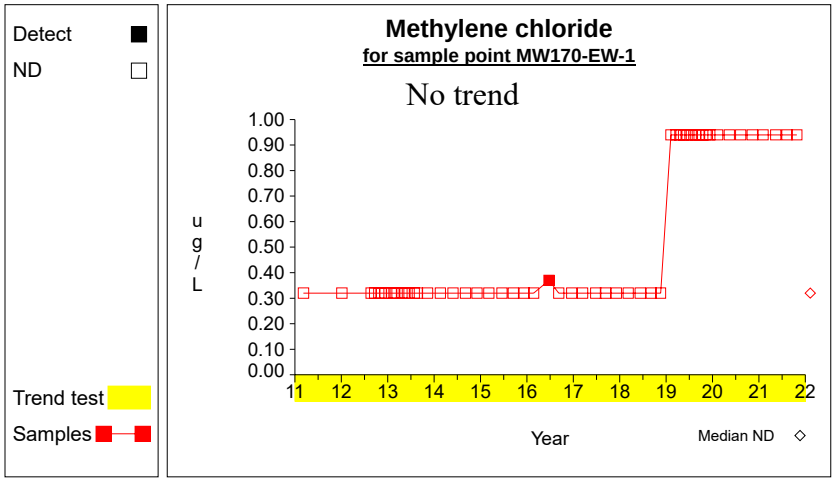

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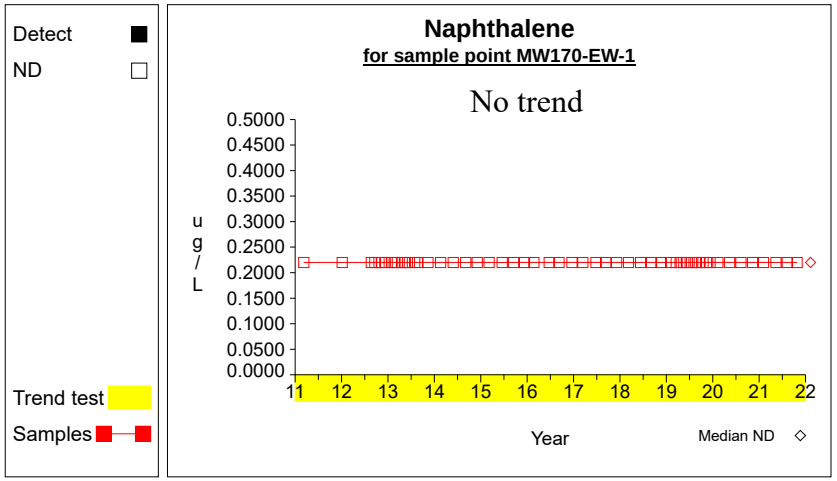
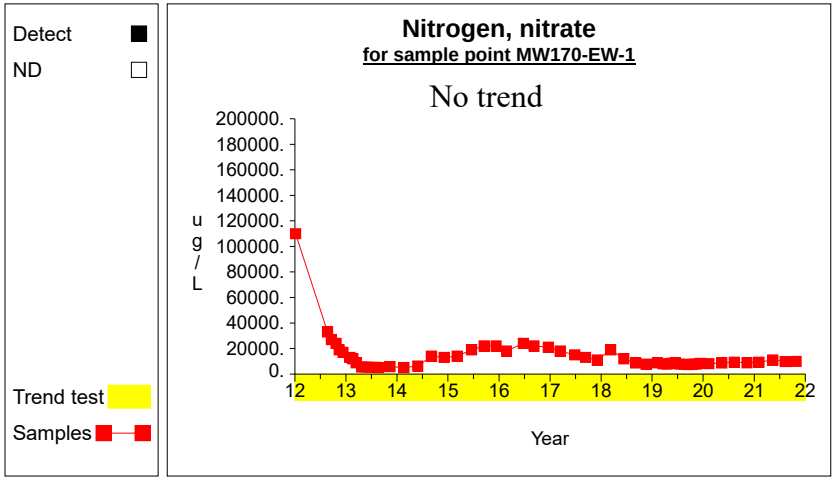


Graph 20

Figure 4.42
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site



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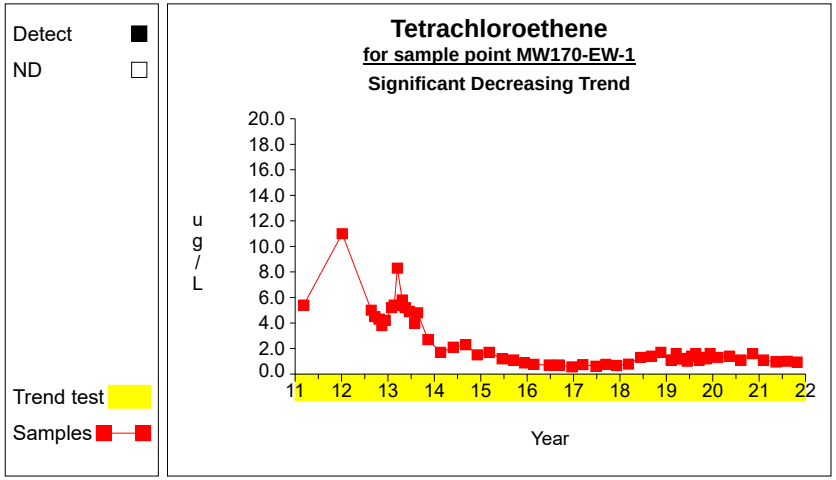
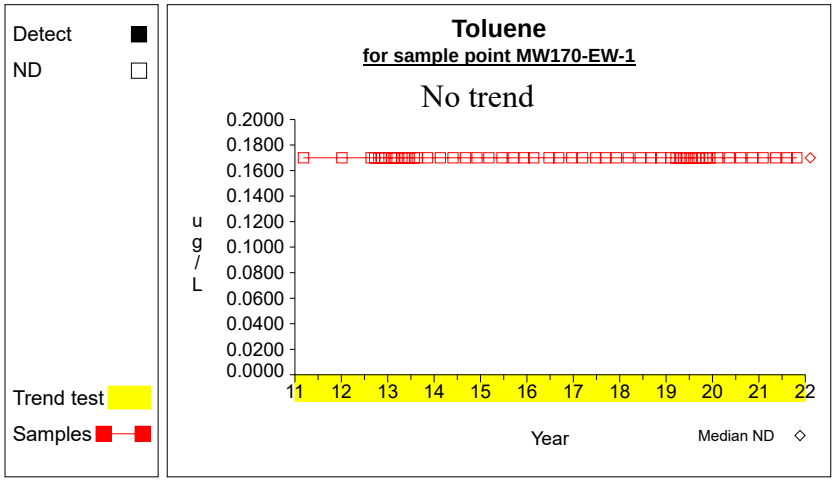


Graph 22



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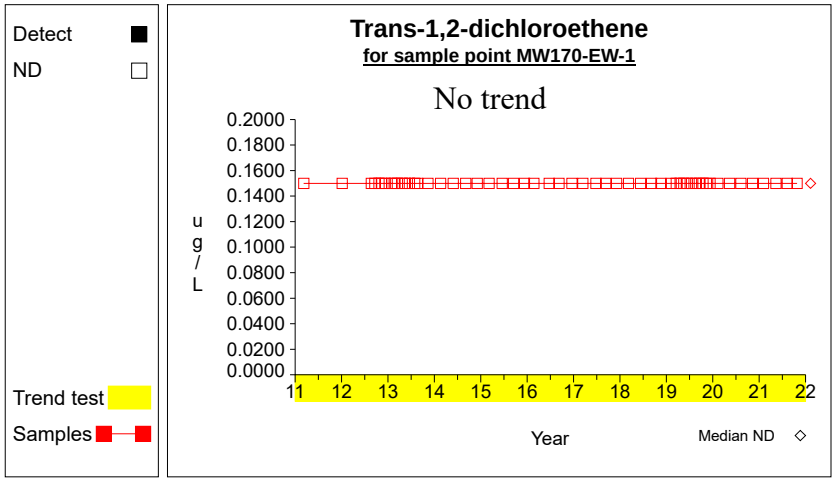
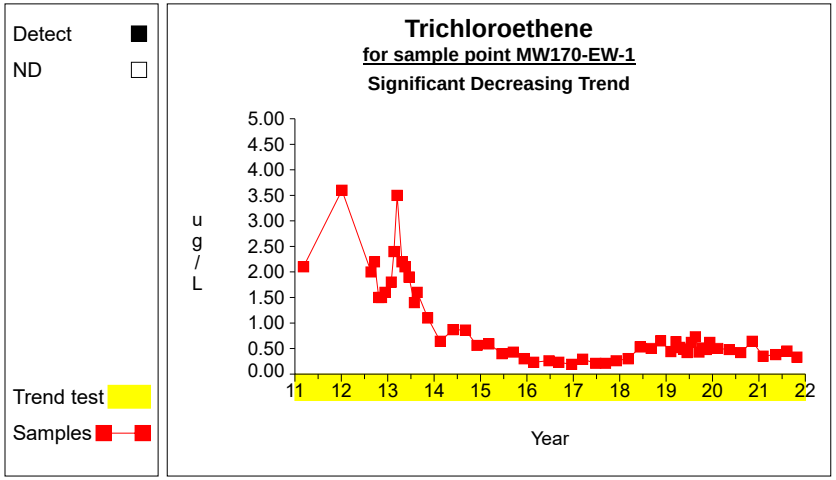
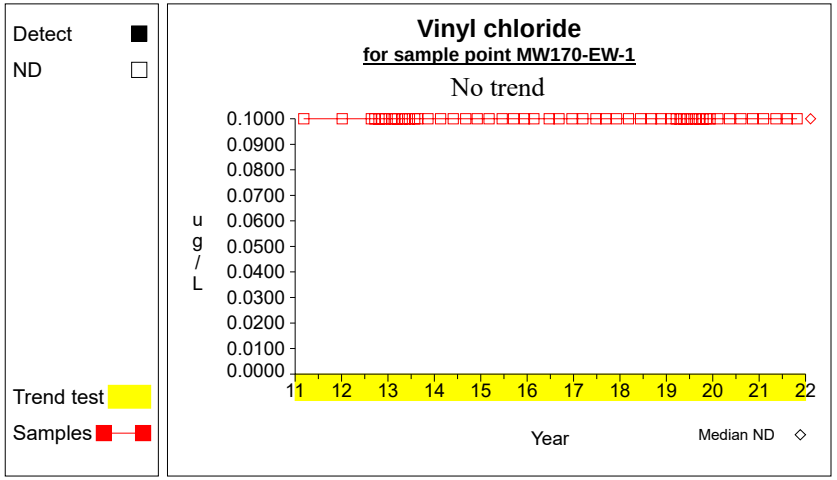


Graph 24

Figure 4.32
North End Trend Analysis Plots - Area 5
July through December 2021 Operations and Maintenance Status Report Lowry Landfill Superfund Site

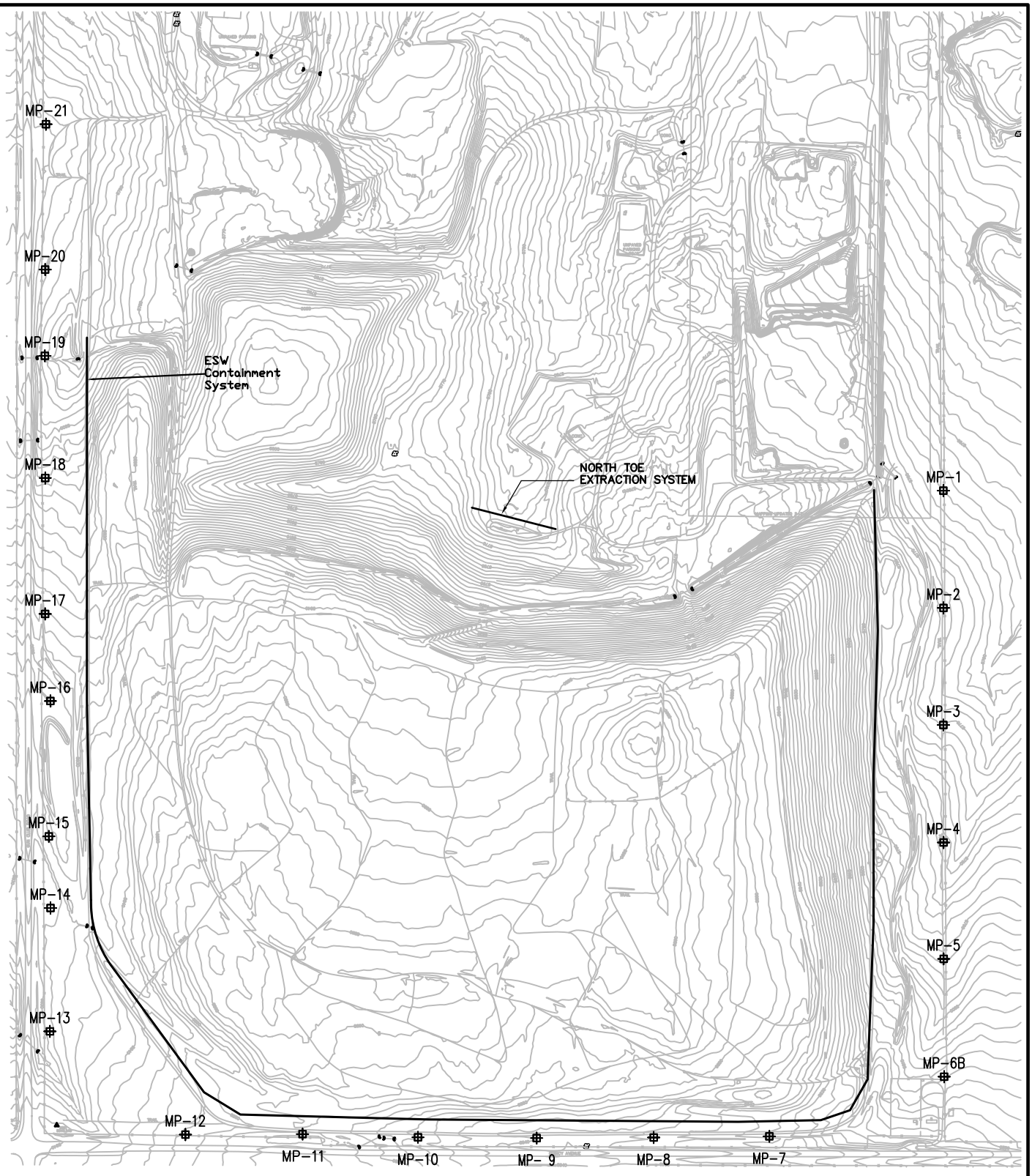


Graph 25



Graph 26

Analysis prepared using Sen's Test for trend and DUMPSTAT®



LEGEND

MP-1 — LFG Monitoring Probe

5730 — Topographic Contour

N

0 300 600'

1"=600'

FIGURE 5.1

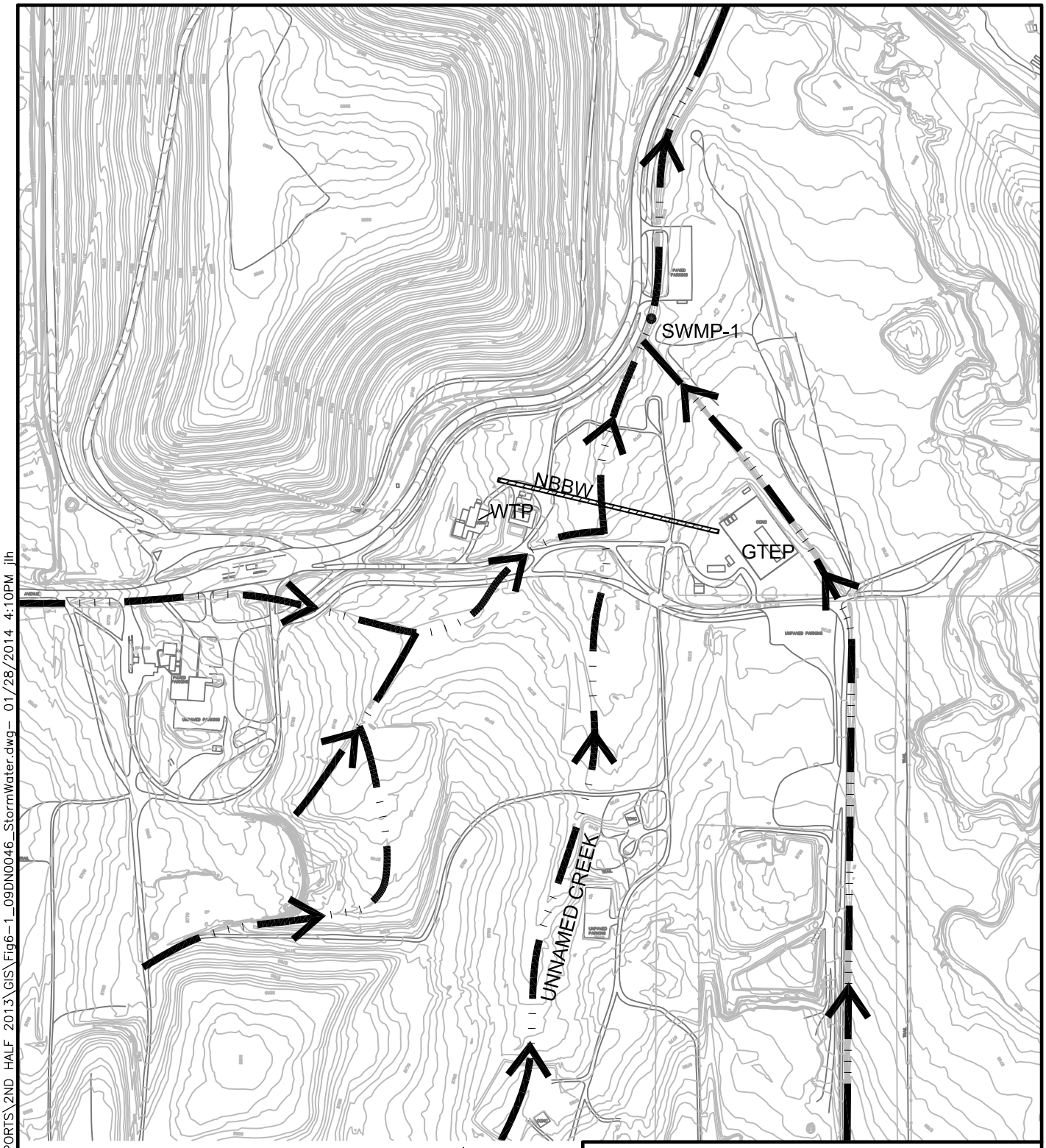
GAS MONITORING PROBE LOCATION MAP

Lowry Landfill Superfund Site, Colorado

PARSONS

Denver, Colorado

S:\ES\CAD\LOWRYLF\727479\60030\02DN0036.dwg 02\27\14 SEH



LEGEND

SWMP-1 — STORMWATER SAMPLE LOCATION

5730 — TOPOGRAPHIC CONTOUR

NORTH BOUNDARY BARRIER WALL

STORMWATER DRAINAGEWAY AND FLOW DIRECTION

N

0 300 600

FEET

FIGURE 6.1

STORMWATER SAMPLE LOCATION

Lowry Landfill Superfund Site, Colorado

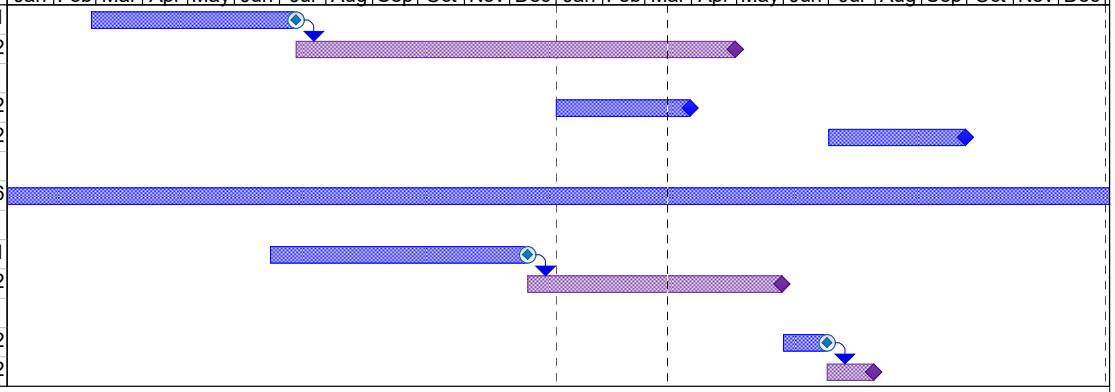
PARSONS

Denver, Colorado

S:\ES\MajProj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2013\GIS\Fig6-1_09DN0046_StormWater.dwg- 01/28/2014 4:10PM jlh

Figure 9.1
Master Schedule

ID	Task Name	Duration	Start	Finish
1	Update Site Management Plan	136 edays	2/26/21	7/12/21
2	Agency Review/Comment Resolution/Approval	292 edays	7/12/21	4/30/22
3				
4	2H 2021 O&M Status Report	89 edays	1/1/22	3/31/22
5	1H 2022 O&M Status Report	91 edays	7/1/22	9/30/22
6				
7	WTP Periodic Compliance Reports	2000 edays	1/1/21	6/24/26
8				
9	Update Contingency Plan	171 edays	6/25/21	12/13/21
10	Agency Review/Comment Resolution/Approval	169 edays	12/13/21	5/31/22
11				
12	Update Records Management Plan	29 edays	6/1/22	6/30/22
13	Agency Review/Comment Resolution/Approval	31 edays	6/30/22	7/31/22



Project: 2022 O&M Status Report
Date: 16 March 2022

Task | Milestone | Summary | Rolled Up Task

APPENDIX A

WATER TREATMENT PLANT

APPENDIX A-1

WTP WEEKLY SUMMARIES AND STANDARD OPERATIONS CHECKLISTS

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.79 ok	Counter: 175474 Cycles: 4
LFG Cond Automatic Trap CT-2	Sump Level: 8.76 ok	Counter: 272965 Cycles: 26
LFG Cond Automatic Trap CT-3	Sump Level: 7.55 ok	Counter: 293488 Cycles: 867
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.18 Counter: 191164 Cycles: 2 Sump: 8.90 ok
PM-15 Containment / Vessel	✓ Level: 51 %	
MW-51 Containment / Vessel	✓ Level: 65 %	
PM-11 Containment / Vessel	✓ Level: 70 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 6-23-21
North End Pipeline(s) Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 6-17-21
North Boundary System P-001:	CV 75.5% @ 7.5 gpm	42.08 Hz / 2.11 Amps. / vault psi @ 18/Wolenes
T-101 & T-102 Containment / Tank	✓	Levels: 21 % & 21 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	70.3 °F	Outside Temp.: ~ 69 °F
P-121 or P-122	✓	0.0 gpm / CV 58 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 6-17-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 6-17-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~590 Gallons Reserve = 0
Caustic Bay Heater	✓	58-celsius
Peroxide Tote Level	✓	~ 200 Gallons Reserve = 1105 gal
HCL Tote Levels	✓	~ 160 Gallons Reserve = ~300 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 67 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.82	
pH 315	Value: 10.87	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 550	Just Refilled
Clear-well Transfer Pumps(P-371 /(372))	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom or / Pull Suction to Side
Manual Sludge Lateral pumping	✓	Last done (As Needed): 5-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	7-1-21-today	1323
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1359
pH-740 Discharge Surge Tank		Discharge suspended: 1315 ↔ 1322
Out of Hold Double Check	----------	None in hold: ✓ ✓ ok
Valves Back to Normal Position	----------	All OK: ✓ ✓ ok

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 41 %
Decant Transfer Pump (P-352)	✓	CV 44 % @0.8 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: filling / stage 4

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 70 %	
Feed Pump (P-114)	✓ Operating Press: 55.6 psi	CV@ 84 % @ 2.0 gpm
Retention Tank (T-114)	✓ Operating Press: 54 psi	pH-113 @ 3.9
Bag Filter (BF-113)	✓ Operating Press: 52.5 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 54 psi	TP-1734 → TP-177A/9 cannisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 22 psi	CV@ 67 % @ 36.5 gpm
T-520 to GAC Total (FT-675)	245564185 gal	Time: 1129
North End On-Site Pumping	Operating Press: 2-3 psi	13.2 gpm @ 1123
North End Off-Site Pumping	Operating Press: 2-4 psi	8.7 gpm @ 1123
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-4-20	Next: 8-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 26.52 Volts 9.8 Amps
Lamp Hours	2629 Hrs	
Crystal Condition & Wiper Status	6-27-21	Oiler status: OK / Lubricated
UV-OX Bagfilters Status	Last change: 6-27-21 Cleaned: 6-27-21	11 psi In 11 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 74 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 16.1 °C	Out(TT-710): 27.2 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 1 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	18833796 gal	Time: 1129
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7 psi

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Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 9 psi
PDT-730	✓	Δ Pressure: 7 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751) or P752)	✓	CV@ 55.6 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.2 gpm @ 1126
POTW Line Pressure (PT-770)	✓	32.6 psi
Effluent Totalizer Reading (FT-770)	239635906 gal	Time: 1129
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 5-18-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 5-20-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~ 6-15-21 ok
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 5/19/20
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 5/19/20
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 6-24-21	Plant Effluent Suspended: 1255 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Ⓨ or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	1.998→2.001 / 47% → 49% LEL

O. WTP INFLUENT TOTALIZERS Time : 1130-1135

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19535935	(FT-505) LFG Cond. to T-530	214124
(FT-025) NBBW Influent	92832738	(FT-056) Off - Site N. End Influent	41796300
(FT-012) MW-38 Inf. to HMR-30	7956045	(FT-113) Ion Exchange Influent	319391
(FT-042 HMR30) MW-38 Source to HMR-30	35484 ~~35840~~	(FT-810) Plant Potable Water In	30046936
(FT-043) MW-38 to RWST	3061772	(FT-026) NBBW Bypass to RWST	4358374
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8094579
(FT-012T) MW-38 to T-540/541	8572115	(FT-035) NTES Inf. to BIO	6581370
(FT-040T) MW-38N to T-540/541	1976318	(FT-035T) NTES to T-530	457427
(FT-041T) MW-38S to T-540/541	2694046	(FT-017) BIO Inf. from T-530	645359
(FT-042T) MW-38 Source to T-540/541	3973705	(FT-018) T-540/541 Influent	8617680
(FT-055) On - Site N. End Influent	95943505	(FT-352) T-352 to HMR-30	1239498

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	70 °F (Analog Gauge)	Outside Temp.: ~ 71 °F
Compressor Building Vent	✓	open-operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 1-20-21 Serviced @ 58736 Hours	Coolant present in sight glass: Y / N Next service @ 60736 Hours Current Hours @ 60857
IRN30H Motor Speed	31 %	
IRN30H Pressure	111 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 5-20-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Y / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 6-24-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: 2
Alarms Enabled	✓	
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 6-23-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

Sludge Transfer Pump TOP valve seized to open, needs replaced

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	SB	–	– %	–	
P-3301A	✓	4.0	61.8 %	14.0	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	49 %	P035 36-37 / P038 6.0	Globules Observed at TP-130: Y / (N) Time: 1020
T-530 P-005	✓	0.21	33 %	5	
T-540/541 P-006	✓	0.30	49 %	3.5	
LFG COND Auto-Traps	✓	0.0	NA	4	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.62	59.0 %	6.5	
P-3322	✓	3.62	46.3 %	5.0	
P-3323	✓	2.58	67.8 %	6.5	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	4.32	70.5 %	20	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.26	150	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.47	156	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.24	148	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 19.6 PPM
VTP-3360	✓	PID Reading: 9.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 12/15/19
T-530 LFG Condensate / NTES Tank	✓ Level: 34 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 8-10-20 Next: 8-2021 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 66 % & 67%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 0.50" Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 6-14-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 73 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.01 gpm @ 1142
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 6-17-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 19.75 Gallons: ~ 75
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 40 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 6-17-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	6-24-21	Starting off Clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 59	Auto
BF-3340 a/b Differential Pressure	PSI: 1	10/11 @ 4.5 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 5	11/6 @ 3.9 gpm
Last Backwash Performed	Date: 6-17-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 71 Events
HMI's	✓	
BTS Process KWH Meter	1776024 KWH	Time: 1212
Building#2 KWH Meter	5190989 KWH	Time: 1212

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: 3
Alarms Enabled	✓	
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 01, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5670946	
FT-3324 Feed Spare	45618	
FT-3322 Feed to Reactor 2	10226436	
FT-3323 Feed to Reactor 3	349091	
FT-3301 T-510 to BIO	51132798	
FT-3341 BIO Effluent	65811262	
FT-3342 BIO Recycle	54839734	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 6-23-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.76 oz	Counter: 175944 Cycles: 470
LFG Cond Automatic Trap CT-2	Sump Level: 8.73 oz	Counter: 273036 Cycles: 71
LFG Cond Automatic Trap CT-3	Sump Level: 7.45 oz	Counter: 295259 Cycles: 1771
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.18 Counter: 191164 Cycles: 0 Sump: 9.01 oz
PM-15 Containment / Vessel	✓ Level: 60 %	
MW-51 Containment / Vessel	✓ Level: 30 %	
PM-11 Containment / Vessel	✓ Level: 25 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 6-23-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry = 16.07' Date: 6-17-21
North Boundary System P-001:	CV 75.8 % @ 7.6 gpm	42.38 Hz / 2.11 Amps. / vault psi @ 18/No leaks
T-101 & T-102 Containment / Tank	✓	Levels: 28 % & 26 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	73.9 °F	Outside Temp.: ~ 81 °F
(P-121) or P-122	✓	0.6 gpm / CV 61 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 6-17-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 6-17-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 420 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	58-warmest
Peroxide Tote Level	✓	~ 175 Gallons Reserve = ~105 gal
HCL Tote Levels	✓	~ 115 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 66-68 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

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E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.73	
pH 315	Value: 10.92	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps(P-371 /(372))	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom ok / TOP sized to open
Manual Sludge Lateral pumping	✓	Last done (As Needed): 3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	7-8-21 Today	1300
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1330
pH-740 Discharge Surge Tank		Discharge suspended: 1251 ↔ 1258
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 57 %
Decant Transfer Pump (P-352)	✓	CV 31 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 52 %	
Feed Pump (P-114)	Operating Press: 55.5 psi	CV@ 82 % @ 2.0 gpm
Retention Tank (T-114)	Operating Press: 54 psi	pH-113 @ 3.91
Bag Filter (BF-113)	Operating Press: 56 psi	
Ion Exchange (Cage (1) or 2) + Guard	Operating Press: 54 psi	TP-123A → TP-177A / 9 canisters + Guard
Post Ion Exchange	Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 24 psi	CV@ 68 % @ 35.7 gpm
T-520 to GAC Total (FT-675)	24591727 gal	Time: 0929
North End On-Site Pumping	Operating Press: 2-4 psi	13.3 gpm @ 0918
North End Off-Site Pumping	Operating Press: 2-6 psi	8.8 gpm @ 0918
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 8-2021
Quarterly Test Run	Date: NA/Annually	Next: NA/Annually
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2628 Volts 9.8 Amps
Lamp Hours	2794 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 6-27-21 Cleaned: 6-27-21	110 psi In 110 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 76 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 16.1 °C	Out(TT-710): 27.1 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	20 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	18911032 gal	Time: 0930
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 10 psi
PDT-730	✓	Δ Pressure: 8 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump ((P751) or P752)	✓	CV@ 55.5 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	35.7 gpm @ 0927
POTW Line Pressure (PT-770)	✓	32.5 psi
Effluent Totalizer Reading (FT-770)	239988114 gal	Time: 0930
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: ~~5/19/20~~
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: ~~5/19/20~~
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 6-24-21	Plant Effluent Suspended: 1255 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: (Y) or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	1.998→2.001 / 47% → 49% LEL

O. WTP INFLUENT TOTALIZERS Time : 0930- 0935

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19541777	(FT-505) LFG Cond. to T-530	214276
(FT-025) NBBW Influent	92906687	(FT-056) Off - Site N. End Influent	41880576
(FT-012) MW-38 Inf. to HMR-30	7979314	(FT-113) Ion Exchange Influent	338916
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30048320
(FT-043) MW-38 to RWST	3062136	(FT-026) NBBW Bypass to RWST	4359669
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8099458
(FT-012T) MW-38 to T-540/541	8572115	(FT-035) NTES Inf. to BIO	6586250
(FT-040T) MW-38N to T-540/541	1976318	(FT-035T) NTES to T-530	457555
(FT-041T) MW-38S to T-540/541	2694046	(FT-017) BIO Inf. from T-530	645871
(FT-042T) MW-38 Source to T-540/541	3973705	(FT-018) T-540/541 Influent	8620591
(FT-055) On - Site N. End Influent	96075748	(FT-352) T-352 to HMR-30	1241188

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	79 °F (Analog Gauge)	Outside Temp.: ~ 85 °F
Compressor Building Vent	✓	open - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 today Serviced @ 60952 Hours	Coolant present in sight glass: Y / N Next service @ 62952 Hours Current Hours @ 60952
IRN30H Motor Speed	– %	Getting serviced currently off
IRN30H Pressure	– psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 7-8-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	✓	Running during service Both cool to touch: Y / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 6-24-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: # 2
Alarms Enabled	✓	Calibration - [illegible] 7-7-21
GC Influent Filters	✓	[illegible]

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 6-23-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

#MR30 sludge transfer pump needs top valve replaced. Sent to [illegible].

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	SB	–	– %	–	
P-3301A	✓	4.0	52.7 %	11.5	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035 3637 / P038 6.0	Globules Observed at TP-130: Y / (N) Time: 0840
T-530 P-005	✓	0.20	32 %	5.0	
T-540/541 P-006	✓	0.29	53 %	3.5	
LFG COND Auto-Traps	✓	0.0	NA	4.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.66	65.9 %	8.0	
P-3322	✓	3.68	53.4 %	6.0	
P-3323	& ✓	2.66	79.1 %	8.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	4.30	76.1 %	26.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.26	154	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.47	162		Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.21	150		Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 3.1 PPM
VTP-3360	✓	PID Reading: 0.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 70 %	Last Cleaning (As needed, if 2" of solids accumulate): 12/15/19
T-530 LFG Condensate / NTES Tank	✓ Level: 30 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 8-10-20 Next: 8-2021 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 44 % & 45%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~.75 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 6-14-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.99 gpm @ 0955
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 6-17-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 19.75 Gallons: ~100
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 30 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 6-17-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	6-24-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 40	Reset
BF-3340 a/b Differential Pressure	PSI: 2	16/14 @ 2.6gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 8	14/6 @ 2.6gpm
Last Backwash Performed	Date: 6-17-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 71 Events
HMI's	✓	
BTS Process KWH Meter	1777959 KWH	Time: 1038
Building#2 KWH Meter	5193815 KWH	Time: 1038

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC-Calibration & Maint 7-7-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 08, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5694148	
FT-3324 Feed Spare	45618	
FT-3322 Feed to Reactor 2	10258656	
FT-3323 Feed to Reactor 3	371970	
FT-3301 T-510 to BIO	51157745	
FT-3341 BIO Effluent	65844602	
FT-3342 BIO Recycle	54880493	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 6-23-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.81 ok	Counter: 176464 Cycles: 520
LFG Cond Automatic Trap CT-2	Sump Level: 8.75 ok	Counter: 273046 Cycles: 10
LFG Cond Automatic Trap CT-3	Sump Level: 7.39 ok	Counter: 296353 Cycles: 1094
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.18 Counter: 19164 Cycles: 0 Sump: 8.92 ok
PM-15 Containment / Vessel	✓ Level: 59 %	
MW-51 Containment / Vessel	✓ Level: 70 %	
PM-11 Containment / Vessel	✓ Level: 65 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 6-23-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 6-17-21
North Boundary System P-001:	CV 76.2 % @ 7.6 gpm	42.71 Hz / 2.12 Amps. / vault psi @ 18/NO LEAKS
T-101 & T-102 Containment / Tank	✓	Levels: 22 % & 20 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	70.1 °F	Outside Temp.: ~ 73 °F
(P-121) or P-122	✓	2.6 gpm / CV 25 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 6-17-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 6-17-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 560 Gallons Reserve = 1 tote
Caustic Bay Heater	✓	SB- WARM OUT
Peroxide Tote Level	✓	~ 155 Gallons Reserve = ~105 gal
HCL Tote Levels	✓	~ 100 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 70 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.98	
pH 315	Value: 10.73	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 375	
Clear-well Transfer Pumps(P-371 / (372))	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom OK / Top Screw to Open
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-14-21 / 1+2 3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All of
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	7-15-21 ~Today	1341
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1415
pH-740 Discharge Surge Tank		Discharge suspended: 1331 ↔ 1340
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 50 %
Decant Transfer Pump (P-352)	✓	CV 36 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 45 %	
Feed Pump (P-114)	✓ Operating Press: 60.3psi	CV@ 83 % @ 2.0 gpm
Retention Tank (T-114)	✓ Operating Press: 59 psi	pH-113 @ 3.63
Bag Filter (BF-113)	✓ Operating Press: 62 psi	
Ion Exchange (Cage 1 or 2) + Guard	✓ Operating Press: 59 psi	TP-173A → TP-177A / 9 canisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 27 psi	CV@ 70 % @ 35.8 gpm
T-520 to GAC Total (FT-675)	246276267 gal	Time: 0951
North End On-Site Pumping	Operating Press: 2-3 psi	13.4 gpm @ 0945
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 0945
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 8-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2642 Volts 9.8 Amps
Lamp Hours	2961 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: Ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	10.5 psi In 11.0 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 73 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 17.0 °C	Out(TT-710): 28.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	18988684 gal	Time: 0951
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 12 psi
PDT-730	✓	Δ Pressure: 8 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.7 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.1 gpm @ 0949
POTW Line Pressure (PT-770)	✓	32.7 psi
Effluent Totalizer Reading (FT-770)	240346876 gal	Time: 0953
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: ~~5/19/20~~
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: ~~5/19/20~~
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 6-24-21	Plant Effluent Suspended: 1255 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: (Y) or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	1.998→2.001 / 47%→49% LEL

O. WTP INFLUENT TOTALIZERS Time : 1003 - 1039

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	195520679	(FT-505) LFG Cond. to T-530	214516
(FT-025) NBBW Influent	9298682	(FT-056) Off - Site N. End Influent	41966092
(FT-012) MW-38 Inf. to HMR-30	7998659	(FT-113) Ion Exchange Influent	358800
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30050220
(FT-043) MW-38 to RWST	3062560	(FT-026) NBBW Bypass to RWST	4361831
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8103265
(FT-012T) MW-38 to T-540/541	8578623	(FT-035) NTES Inf. to BIO	6591147
(FT-040T) MW-38N to T-540/541	1976318	(FT-035T) NTES to T-530	457756
(FT-041T) MW-38S to T-540/541	2694046	(FT-017) BIO Inf. from T-530	646405
(FT-042T) MW-38 Source to T-540/541	3980265	(FT-018) T-540/541 Influent	8623514
(FT-055) On - Site N. End Influent	96210405	(FT-352) T-352 to HMR-30	1245565

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	68 °F (Analog Gauge)	Outside Temp.: ~ 87 °F
Compressor Building Vent	✓	open - observed
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Y / N Next service @ 62952 Hours Current Hours @ 61047
IRN30H Motor Speed	31 %	
IRN30H Pressure	116 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 7-8-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Y / N
Air Dryer	✓ ECO on	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 6-24-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: # 2
Alarms Enabled	✓	GC - Calibration + Maint 7-14-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 6-23-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

UMR30 Sludge Transfer Pump heads for valve replaced.

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	SB	–	– %	–		
P-3301A	✓	2.51	32.8 %	7.5		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	49 %	P035 37-38	P038 6.5	Globules Observed at TP-130: Y / (N) Time: 0915
T-530 P-005	✓	0.30	35 %	5.5		
T-540/541 P-006	✓	0.30	56 %	4.5		
LFG COND Auto-Traps	✓	0.0	NA	4.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.64	57.5 %	6.5		
P-3322	✓	3.67	48.6 %	5.0		
P-3323	✓	2.65	71.5 %	6.5		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	2.34	42.8 %	6.5		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.25	152	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.49	158	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.20	146	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 1.6 PPM
VTP-3360	✓	PID Reading: 0.4 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 12/15/19
T-530 LFG Condensate / NTES Tank	✓ Level: 28 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 8-10-20 Next: 8-2021 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 70 % & 70 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.0 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 7-14-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 73 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.99 gpm @ 1109
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 6-17-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 19,125 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 275 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 6-17-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	6-24-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 56	Reset
BF-3340 a/b Differential Pressure	PSI: 1	11/10 @ 4.6 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	↓
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 4	10/6 @ 4.6 gpm
Last Backwash Performed	Date: 7-14-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 71 Events
HMI's	✓	
BTS Process KWH Meter	1779956 KWH	Time: 1242
Building#2 KWH Meter	5196749 KWH	Time: 1242

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - calibration + maint 7-14-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 15, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5718596	
FT-3324 Feed Spare	45628	
FT-3322 Feed to Reactor 2	10292601	
FT-3323 Feed to Reactor 3	396083	
FT-3301 T-510 to BIO	51185632	
FT-3341 BIO Effluent	65880856	
FT-3342 BIO Recycle	54922499	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 6-23-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.23 ∝	Counter: 177078 Cycles: 614
LFG Cond Automatic Trap CT-2	Sump Level: 8.54 ∝	Counter: ~~273773~~ 273609 Cycles: 623
LFG Cond Automatic Trap CT-3	Sump Level: 7.38 ∝	Counter: 298372 Cycles: 2019
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level 2.18 Counter: 191164 Cycles: 0 Sump: 8.82 ∝
PM-15 Containment / Vessel	✓ Level: 25 %	
MW-51 Containment / Vessel	✓ Level: 40 %	
PM-11 Containment / Vessel	✓ Level: 35 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 6-23-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry 16.07' Date: 7-22-21 - Today
North Boundary System P-001:	CV 75.9% @ 7.6 gpm	42.44 Hz / 2.12 Amps. / vault psi @ 18/No leaks
T-101 & T-102 Containment / Tank	✓	Levels: 32 % & 31 % Containment Attached 7-21-21
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	75.9 °F	Outside Temp.: ~ 77 °F
(P-121) or P-122	✓	0.6 gpm / CV 58 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 7-22-21 - Today
RWST Back-Up Generator	✓	Last Test Run(monthly): 7-22-21 - Today TOP off fuel 7-19-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels		~455 Gallons Reserve = 4 totes
Caustic Bay Heater	✓	50 - WARM OUT.
Peroxide Tote Level	✓	~ 195 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 300 Gallons Reserve = ~90 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 68-70 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.49	
pH 315	Value: 10.87	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 500	
Clear-well Transfer Pumps(P-371 (372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom ok / 10" suction open
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 - 7-20-21 1+2 - 3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allen
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	7-22-21-Today	1334
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1405
pH-740 Discharge Surge Tank		Discharge suspended: 1325 ↔ 1333
Out of Hold Double Check	----------	None in hold: ✓ ✓ ✓ m
Valves Back to Normal Position	----------	All OK: ✓ ✓ ✓ m

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 41 %
Decant Transfer Pump (P-352)	✓	CV 40 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Fill

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 66 %	
Feed Pump (P-114)	✓ Operating Press: 59.1 psi	CV@ 82 % @ 2.0 gpm
Retention Tank (T-114)	✓ Operating Press: 58 psi	pH-113 @ 3.81
Bag Filter (BF-113)	✓ Operating Press: 61 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 58 psi	TP-173A→TP-177A (Beam Bars + Guard)
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 30 psi	CV@ 73 % @ 37.0 gpm
T-520 to GAC Total (FT-675)	246637341 gal	Time: 1051
North End On-Site Pumping	Operating Press: 2-3 psi	13.3 gpm @ 1046
North End Off-Site Pumping	Operating Press: 2-6 psi	8.9 gpm @ 1046
Peroxide Feed Pump (P-680)	✓	SPD 2.8 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 8-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2639 Volts 9.8 Amps
Lamp Hours	3,130 Hrs	Change out Planned
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	10.5 psi In 11.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 74 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 16.6 °C	Out(TT-710): 27.6 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 1 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19067258 gal	Time: 1051
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 14 psi
PDT-730	✓	Δ Pressure: 10 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump ((P751) or P752)	✓	CV@ 55.6 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.9 gpm @ 1050
POTW Line Pressure (PT-770)	✓	32.7 psi
Effluent Totalizer Reading (FT-770)	240707472 gal	Time: 1052
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: ~~5/19/20~~
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: ~~5/19/20~~
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 6-24-21	Plant Effluent Suspended: 1255 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: (Y) or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	1.998→2.001 / 47%→49% LEL

O. WTP INFLUENT TOTALIZERS Time : 1053- 1057

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19558996	(FT-505) LFG Cond. to T-530	2148311
(FT-025) NBBW Influent	93057845	(FT-056) Off - Site N. End Influent	42051004
(FT-012) MW-38 Inf. to HMR-30	8018306	(FT-113) Ion Exchange Influent	3784844
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30051020
(FT-043) MW-38 to RWST	3064155	(FT-026) NBBW Bypass to RWST	43631366
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8112833
(FT-012T) MW-38 to T-540/541	8581121	(FT-035) NTES Inf. to BIO	6596266
(FT-040T) MW-38N to T-540/541	1976607	(FT-035T) NTES to T-530	457895
(FT-041T) MW-38S to T-540/541	2694379	(FT-017) BIO Inf. from T-530	646940
(FT-042T) MW-38 Source to T-540/541	3982106	(FT-018) T-540/541 Influent	86263311
(FT-055) On - Site N. End Influent	96344647	(FT-352) T-352 to HMR-30	1249517

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STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	76 °F (Analog Gauge)	Outside Temp.: ~ 82 °F
Compressor Building Vent	✓	open - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Y / N Next service @ 62952 Hours Current Hours @ 61142
IRN30H Motor Speed	31 %	
IRN30H Pressure	116 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 7-8-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Y / N
Air Dryer	✓	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 7-22-21 - today	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	CC-Calibration + maint - 7-21-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 6-23-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	SB	–	– %	–		
P-3301A	✓	1.91	31.5 %	6.5		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035 37-38	P038 6.5	Globules Observed at TP-130: Y / (N) Time: 1015
T-530 P-005	✓	0.20	33 %	5.5		
T-540/541 P-006	✓	0.30	49 %	3.5		
LFG COND Auto-Traps	✓	0.0	NA	5.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.55	64.9 %	8.0		
P-3322	✓	3.53	56.3 %	5.5		
P-3323	✓	2.52	50.3 %	7.5		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	4.26	65.6 %	20.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.25	156	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.43	164	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.12	148	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 0.9 PPM
VTP-3360	✓	PID Reading: 0.1 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 67 %	Last Cleaning (As needed, if 2" of solids accumulate): 12/15/19
T-530 LFG Condensate / NTES Tank	✓ Level: 27 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 64 % & 65%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.0 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 7-14-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.98 gpm @ 1113
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 7-22-21 - today

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 19 Gallons: ~ 55
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 270 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 7-22-21 - today
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	6-24-21	Acid/Base clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 47	reset
BF-3340 a/b Differential Pressure	PSI: 3	19/16 @ 3.7 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 4	19/15 @ 3.7 gpm
Last Backwash Performed	Date: 7-14-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓ Top off Fuel 7-19-21	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 71 Events
HMI's	✓	
BTS Process KWH Meter	MB1836 KWH	Time: 1205
Building#2 KWH Meter	5199525 KWH	Time: 1205

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc- Calibration + Maint - 7-21-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 22, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5742648	
FT-3324 Feed Spare	45628	
FT-3322 Feed to Reactor 2	10325998	
FT-3323 Feed to Reactor 3	419798	
FT-3301 T-510 to BIO	51212873	
FT-3341 BIO Effluent	65916832	
FT-3342 BIO Recycle	54963778	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 6-23-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.21 oz	Counter: 177679 Cycles: 60
LFG Cond Automatic Trap CT-2	Sump Level: 8.55 oz	Counter: 273873 Cycles: 104
LFG Cond Automatic Trap CT-3	Sump Level: 7.36 oz	Counter: 299479 Cycles: 1107
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 90 %	Tank Level: 2.18 Counter: 191165 Cycles: 1 Sump: 8.90 oz
PM-15 Containment / Vessel	✓ Level: 27 %	
MW-51 Containment / Vessel	✓ Level: 70 %	
PM-11 Containment / Vessel	✓ Level: 75 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 7-26-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 16.07' Date: 7-22-21
North Boundary System P-001:	CV 75.8% @ 7.6 gpm	42.27 Hz / 2.11 Amps. / vault psi @ 18/20 Inches
T-101 & T-102 Containment / Tank	✓	Levels: % & %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	76.9 °F	Outside Temp.: ~ 75 °F
(P-121) or P-122	✓	0.6 gpm / CV 65 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 7-22-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 7-22-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~530 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	SB - warm out
Peroxide Tote Level	✓	~ 175 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 275 Gallons Reserve = ~ 90 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 68-70 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.74	
pH 315	Value: 10.84	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / N
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 425	
Clear-well Transfer Pumps(P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom OK / Got top to close + open but very sticky - still needs replace
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 - 7-20-21 / #1 & 2 3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	7-29-21 - today	1253
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1319
pH-740 Discharge Surge Tank		Discharge suspended: 1320 ↔ 1340
Out of Hold Double Check	----------	None in hold: ✓✓'d m
Valves Back to Normal Position	----------	All OK: ✓✓'d m

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 46 %
Decant Transfer Pump (P-352)	✓	CV 42 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 61.6 psi	CV@ 88 % @ 2.1 gpm
Retention Tank (T-114)	✓ Operating Press: 60 psi	pH-113 @ 3.83
Bag Filter (BF-113)	✓ Operating Press: 63 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 60 psi	TP-173A → TP-177A / 9 canisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: ~~831~~ psi	CV@ 73 % @ 35.6 gpm
T-520 to GAC Total (FT-675)	246993048 gal	Time: 1031
North End On-Site Pumping	Operating Press: 2-3 psi	13.2 gpm @ 1026
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 1026
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	00 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 8-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2619 Volts 9.8 Amps
Lamp Hours	2 Hrs	Change out Lamp today - 7-29-21 Lamp Had 3,295 Hrs ⇒ Change out
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.0 psi In 11.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 74 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 17.7 °C	Out(TT-710): 29.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	20 PPM	
Peroxide Conc. Post PDU (TP-730)	00 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 1 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19145150 gal	Time: 1031
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 15 psi
PDT-730	✓	Δ Pressure: 10 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.4 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	35.8 gpm @ 1030
POTW Line Pressure (PT-770)	✓	32.5 psi
Effluent Totalizer Reading (FT-770)	241062714 gal	Time: 1032
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: ~~5/19/20~~
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: ~~5/19/20~~
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 7-29-21 - today	Plant Effluent Suspended: 1320 ↔ 1340
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1032 - 1036

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19565229	(FT-505) LFG Cond. to T-530	214995
(FT-025) NBBW Influent	93132813	(FT-056) Off - Site N. End Influent	42134676
(FT-012) MW-38 Inf. to HMR-30	8040535	(FT-113) Ion Exchange Influent	398283
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30051700
(FT-043) MW-38 to RWST	3064653	(FT-026) NBBW Bypass to RWST	4364940
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8112833
(FT-012T) MW-38 to T-540/541	8581121	(FT-035) NTES Inf. to BIO	4600783
(FT-040T) MW-38N to T-540/541	1976607	(FT-035T) NTES to T-530	458394
(FT-041T) MW-38S to T-540/541	26943 79	(FT-017) BIO Inf. from T-530	647809
(FT-042T) MW-38 Source to T-540/541	3982106	(FT-018) T-540/541 Influent	8629262
(FT-055) On - Site N. End Influent	96477687	(FT-352) T-352 to HMR-30	1253142

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	72 °F (Analog Gauge)	Outside Temp.: ~ 76 °F
Compressor Building Vent	✓	open - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ 61237
IRN30H Motor Speed	0 %	
IRN30H Pressure	114 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 7-8-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 7-22-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: # 2
Alarms Enabled	✓	cc-calibration + manual - 7-28-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 7-26-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	SB	–	– %	–	
P-3301A	✓	3.97	48.3 %	10.0	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	49 %	P035: 35-36 / P038: 6.5	Globules Observed at TP-130: Y / (N) Time: 1000
T-530 P-005	✓	0.20	36 %	5.5	
T-540/541 P-006	✓	0.30	57 %	4.0	
LFG COND Auto-Traps	✓	0.0	NA	5.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.65	80.3 %	8.0	
P-3322	✓	3.68	52.8 %	5.0	
P-3323	✓	2.66	54.4 %	7.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	3.45	69.5 %	19.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.24	162	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.34	166	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.28	160	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 1.1 PPM
VTP-3360	✓	PID Reading: 0.7 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 12/15/19
T-530 LFG Condensate / NTES Tank	✓ Level: 24 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 41 % & 43 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~1,0 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 7-14-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 74 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.28 gpm @ 1051
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 7-22-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 19 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 260 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 7-22-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	7-29-21 - today	New 4 + 10 pH Stds today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 75	Reset
BF-3340 a/b Differential Pressure	PSI: 8	10/18 @ 2.6 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 4	10/6 @ 2.6 gpm
Last Backwash Performed	Date: 7-14-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 71 Events
HMI's	✓	
BTS Process KWH Meter	1783632 KWH	Time: 1136
Building#2 KWH Meter	5202219 KWH	Time: 1136

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	Cc - Calibration + Maint - 7-28-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, July 29, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5766472	
FT-3324 Feed Spare	45636	
FT-3322 Feed to Reactor 2	10359072	
FT-3323 Feed to Reactor 3	443288	
FT-3301 T-510 to BIO	51239611	
FT-3341 BIO Effluent	65952009	
FT-3342 BIO Recycle	55004858	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 7-26-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.48 oz	Counter: 178521 Cycles: 842
LFG Cond Automatic Trap CT-2	Sump Level: 8.54 oz	Counter: 273866 Cycles: 93
LFG Cond Automatic Trap CT-3	Sump Level: 7.36 oz	Counter: 300575 Cycles: 1096
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.16 Counter: 191175 Cycles: 10 Sump: 8.92 oz
PM-15 Containment / Vessel	✓ Level: 30 %	
MW-51 Containment / Vessel	✓ Level: 30 %	
PM-11 Containment / Vessel	✓ Level: 25 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 7-26-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 7-22-21
North Boundary System P-001:	CV 75.6% @ 7.6 gpm	4252 Hz / 2.12 Amps. / vault psi @ 18/10 [illegible]
T-101 & T-102 Containment / Tank	✓	Levels: 45 % & 44 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	71.8 °F	Outside Temp.: ~ 81 °F
P-121 or P-122	✓	3.0 gpm / CV 61 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 7-22-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 7-22-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~380 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	OKSB-warm out
Peroxide Tote Level	✓	~150 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~260 Gallons Reserve = ~55 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / N
Emergency Shower Inspected	✓	Checked and Flushed - All OK: Y / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 68-70 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / N

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.81	
pH 315	Value: 10.86	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / N
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~550	
Clear-well Transfer Pumps(P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom ok / Top moves but sticky and still needs replaced
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 - 7-20-21 / 1+2 3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	8-5-21 - Today	1340
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1420
pH-740 Discharge Surge Tank		Discharge suspended: 1331 ↔ 1339
Out of Hold Double Check	----------	None in hold: ✓✓'d
Valves Back to Normal Position	----------	All OK: ✓✓'d

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 60 %
Decant Transfer Pump (P-352)	✓	CV 36 % @ 0.40 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 31 %	
Feed Pump (P-114)	✓ Operating Press: 60.9 psi	CV@ 89 % @ 2.1 gpm
Retention Tank (T-114)	✓ Operating Press: 60 psi	pH-113 @ 3.73
Bag Filter (BF-113)	✓ Operating Press: 63 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 60 psi	TP-173A→TP-177A / 9 canisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 34 psi	CV@ 76 % @ 37.1 gpm
T-520 to GAC Total (FT-675)	247326881 gal	Time: 1056
North End On-Site Pumping	Operating Press: 2-3 psi	13.3 gpm @ 1052
North End Off-Site Pumping	Operating Press: 2-8 psi	10.1 gpm @ 1052
Peroxide Feed Pump (P-680)	✓	SPD 2.8 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: N/A/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 8-2021
Quarterly Test Run	Date: N/A/Running	Next: N/A/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 20 cc/min.
UV-Ox Power	✓	25.7 kVA 2634 Volts 9.8 Amps
Lamp Hours	159 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.0 psi In 11.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 74 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 16.3 °C	Out(TT-710): 27.6 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ (%
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19218308 gal	Time: 1056
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 17 psi
PDT-730	✓	Δ Pressure: 11 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.9 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.7 gpm @ 1052
POTW Line Pressure (PT-770)	✓	32.7 psi
Effluent Totalizer Reading (FT-770)	241395984 gal	Time: 1057
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 7-29-21	Plant Effluent Suspended: 1320 ↔ 1340
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1058– 1103

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19573325	(FT-505) LFG Cond. to T-530	215267
(FT-025) NBBW Influent	93203168	(FT-056) Off - Site N. End Influent	422128 29
(FT-012) MW-38 Inf. to HMR-30	8058378	(FT-113) Ion Exchange Influent	417551
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30052504
(FT-043) MW-38 to RWST	30649 79	(FT-026) NBBW Bypass to RWST	4371356
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8123338
(FT-012T) MW-38 to T-540/541	8589238	(FT-035) NTES Inf. to BIO	6605443
(FT-040T) MW-38N to T-540/541	1976607	(FT-035T) NTES to T-530	458842
(FT-041T) MW-38S to T-540/541	2694379	(FT-017) BIO Inf. from T-530	648286
(FT-042T) MW-38 Source to T-540/541	3990225	(FT-018) T-540/541 Influent	8631730
(FT-055) On - Site N. End Influent	96602655	(FT-352) T-352 to HMR-30	1256129

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	°F (Analog Gauge)	Outside Temp.: ~ 82 °F
Compressor Building Vent	✓	open-operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 61327
IRN30H Motor Speed	31 %	
IRN30H Pressure	119 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 7-8-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly)	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 7-22-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc-calibration + maint 8-4-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 7-26-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	2.32	32.5%	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	50 %	P035 3436	P038 6.0	Globules Observed at TP-130: Y / (N) Time: 1030
T-530 P-005	✓	0.20	37 %	5.5		
T-540/541 P-006	SB	–	– %	–		
LFG COND Auto-Traps	✓	0.0	NA	5.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.58	42.9 %	5.0		
P-3322	✓	3.61	41.4 %	5.0		
P-3323	✓	2.64	56.3 %	5.0		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	4.77	79.6 %	22.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.27	154	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.39	156	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.29	154	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 2.6 PPM
VTP-3360	✓	PID Reading: 1.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 71 %	Last Cleaning (As needed, if 2" of solids accumulate): ~~12/15/19~~ 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 27 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 82 % & 83%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.25 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-4-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	—	4.0 gpm @ 1152
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 7-22-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 18,9 Gallons: ~80
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~230 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 7-22-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ✓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	7-29-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 51	Reset
BF-3340 a/b Differential Pressure	PSI: 2	21/19 @ 4.0gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 12	19/7 24.0gpm
Last Backwash Performed	Date: 7-14-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 73 Events
HMI's	✓	
BTS Process KWH Meter	1705434 KWH	Time: 1230
Building#2 KWH Meter	5204767 KWH	Time: 1230

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc- Calibration + maint 8.4.21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 05, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5775325	
FT-3324 Feed Spare	59886	
FT-3322 Feed to Reactor 2	10391273	
FT-3323 Feed to Reactor 3	466149	
FT-3301 T-510 to BIO	57263538	
FT-3341 BIO Effluent	65983578	
FT-3342 BIO Recycle	55046290	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 7-26-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

TABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.46 oz	Counter: 178665 Cycles: 144
LFG Cond Automatic Trap CT-2	Sump Level: 8.65 oz	Counter: 273891 Cycles: 25
LFG Cond Automatic Trap CT-3	Sump Level: 7.23 oz	Counter: 301220 Cycles: 645
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 71 %	Tank Level 2.16 Counter: 191176 Cycles: 1 Sump: 8.90 oz
PM-15 Containment / Vessel	✓ Level: 35 %	
MW-51 Containment / Vessel	✓ Level: 65 %	
PM-11 Containment / Vessel	✓ Level: 75 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 7-26-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 6.07' Date: 7/22/21
North Boundary System P-001:	CV 75.5% @ 7.4 gpm	42.16 Hz / 2.11 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 32 % & 31 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	73.4 °F	Outside Temp.: ~ 80 °F
P-121 or P-122	✓	0.6 gpm / CV 57 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 7/22/21
RWST Back-Up Generator	✓	Last Test Run(monthly): 7/22/21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 540 Gallons Reserve = 2 Totes
Caustic Bay Heater	✓	SB - Warm out
Peroxide Tote Level	✓	~ 125 Gallons Reserve = ~ 55 gal
HCL Tote Levels	✓	~ 220 Gallons Reserve = ~ 95 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 70
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

TABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6/3/21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6/3/21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.99	
pH 315	Value: 10.84	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	okay
Clarifier Water Quality	✓	okay Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 450	
Clear-well Transfer Pumps(P-371 (372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bothgoal-Top ff Valves to Out.
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 7/20/21 #1 3/20/20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All good.
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	8/12/21	1153
pH-315 HMR-30 (T-300B)	↓	
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1218
pH-740 Discharge Surge Tank	✓	Discharge suspended: 1146 ↔ 1157
Out of Hold Double Check	----------	None in hold: vv'd (M)
Valves Back to Normal Position	----------	All OK: vv'd (M)

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 70 %
Sludge Holding Tank (T-352)	✓	Level: 30 %
Decant Transfer Pump (P-352)	SB	CV — % @— gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

TABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 60 %	
Feed Pump (P-114)	Operating Press: 60.9 psi	CV@ 97 % @ 2.0 gpm
Retention Tank (T-114)	Operating Press: 60 psi	pH-113 @ 3.70
Bag Filter (BF-113)	Operating Press: 63 psi	
Ion Exchange (Cage 1 or 2) + Guard	Operating Press: 60 psi	
Post Ion Exchange	Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 33 psi	CV@ 75 % @ 34.7 gpm
T-520 to GAC Total (FT-675)	247673120 gal	Time: 0612
North End On-Site Pumping	Operating Press: 2-3 psi	13.0 gpm @ 0631
North End Off-Site Pumping	Operating Press: 2-8 psi	8.4 gpm @ 0631
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1 PPM	
Peroxide Conc. At (TP-740)	0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8/4/20	Next: 9/2021
Quarterly Test Run	Date: NA Running	Next: NA Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~~2618~~ 2617 cc/min.
UV-Ox Power	✓	25.7 kVA ~~2680~~ Volts 9.9 Amps
Lamp Hours	322 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: okay
UV-OX Bagfilters Status	Last change: 7/13/21 Cleaned: 7/13/21	11.5 ~~75~~ psi In 12 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 75 % @ 8 gpm
UV-OX Temperature	In(TT-670): 16.3 °C	Out(TT-710): 27.8 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 1 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19294558 gal	Time: 0615
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.5 psi

TABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 17 psi
PDT-730	✓	Δ Pressure: 11 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 54.9 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	34.7 gpm @ 0616
POTW Line Pressure (PT-770)	✓	32.4 psi
Effluent Totalizer Reading (FT-770)	241741236 gal	Time: 0616
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 7/8/21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: ~~5/19/20~~ 7/8/21 (N)
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: ~~5/19/20~~ 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: ~~5/19/20~~ 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 1 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 7/29/21	Plant Effluent Suspended: 1320 ↔ 1340
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0826 – 0831

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19581969	(FT-505) LFG Cond. to T-530	2153141
(FT-025) NBBW Influent	43276974	(FT-113) Ion Exchange Influent	4377998
(FT-012) MW-38 Inf. to HMR-30	8077540	(FT-056) Off - Site N. End Influent	42294872
(FT-042 HMR30) MW-38 Source to HMR-30	354484	(FT-810) Plant Potable Water In	30052972
(FT-043) MW-38 to RWST	3067108	(FT-026) NBBW Bypass to RWST	4372648
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8123338
(FT-012T) MW-38 to T-540/541	8590044	(FT-035) NTES Inf. to BIO	6610359
(FT-040T) MW-38N to T-540/541	1976891	(FT-035T) NTES to T-530	458472
(FT-041T) MW-38S to T-540/541	2694735	(FT-017) BIO Inf. from T-530	648793
(FT-042T) MW-38 Source to T-540/541	3990399	(FT-018) T-540/541 Influent	8633655
(FT-055) On - Site N. End Influent	96733259	(FT-352) T-352 to HMR-30	1259186

TABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	65 °F (Analog Gauge)	Outside Temp.: ~ 80 °F
Compressor Building Vent	✓	
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7/8/21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 61415
IRN30H Motor Speed	31 %	
IRN30H Pressure	118 psi ✓	
IRN30H Moisture purge valve chk(Weekly):	✓	Motor cooling fan good.
IRN30H Intake Filter	✓	Date Last Changed: ~~7/9/21~~ 8/12/21
Air Tanks Moisture Purge Valves	Manually Activate(weekly)	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ ECO ON	Moisture at Receiver Tank: Y (N)
Oil Moisture Prevention (Monthly)	Last Done: 7/22/21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	111 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: 2
Alarms Enabled	✓	
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 7/26/21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.82	31.9 %	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) (P-002W(10F))	✓	0.50	50 %	P035 34-36	P038 7	Globules Observed at TP-130: Y / (N) Time: 0650
T-530 P-005	✓	0.2	37 %	5.5		
T-540/541 P-006	✓	0.3	50 %	3.75		
LFG COND Auto-Traps	✓	0.0	NA	5		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	SB	–	– %	–		
P-3322	✓	2.20	43.9 %	6.0		
P-3323	✓	1.27	58.1%	7.0		
P-3324	✓	1.26	32.8%	7.0		
Reactor Effluent Pumps						
P-3341	✓	1.80	57.5%	30.0		
P-3341A	SB	–	–%	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6/22/21
B-3331	✓	4.22	160	9/2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	–	Belt and Filter Checked: Y / (N)
B-3333	✓	4.37	160	✓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.29	150	✓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 6.5 PPM
VTP-3360	✓	PID Reading: 4.8 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 68 %	Last Cleaning (As needed, if 2" of solids accumulate) ~~12/15/19~~ 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 22 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7/19/21 Next: 7/2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	✓ Lvls: 71 % & 72%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.25" Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8/4/21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 12/2017 (Needs cleaning)
T-3320 Blend Tank	✓ Level: 72%	Last Cleaning (Semi Annual): 5/7/20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5/7/20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 31 %	
Recycle Valve to Blend Tank	✓	4.02 gpm @ 0944
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 7/22/21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 18.5 Gallons: ~70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 220 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 7/22/21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	7/29/21	Sprayed off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 31	Reset
BF-3340 a/b Differential Pressure	PSI: 62	36/24
75-micron Bags Last Cleaning	Date: 11/14/19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 13	24/7
Last Backwash Performed	Date: 7/14/21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 73 Events
HMI's	✓	
BTS Process KWH Meter	1797333 KWH	Time: 0434
Building#2 KWH Meter	5207527 KWH	Time: 0434

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: 3
Alarms Enabled	✓	
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 12, 2021

Inspection Performed by: Chris Carlson

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5798182	
FT-3324 Feed Spare	60135	
FT-3322 Feed to Reactor 2	10423363	
FT-3323 Feed to Reactor 3	488927	
FT-3301 T-510 to BIO	51289735	
FT-3341 BIO Effluent	66017438	
FT-3342 BIO Recycle	55087220	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 7/26/21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.85 oz	Counter: 179950 Cycles: 1285
LFG Cond Automatic Trap CT-2	Sump Level: 8.66 oz	Counter: 273917 Cycles: 26
LFG Cond Automatic Trap CT-3	Sump Level: 7.65 oz	Counter: 302961 Cycles: 1241
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.16 Counter: 191182 Cycles: 6 Sump: 9.22 oz
PM-15 Containment / Vessel	✓ Level: 37 %	
MW-51 Containment / Vessel	✓ Level: 20 %	
PM-11 Containment / Vessel	✓ Level: 20 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 7-26-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Sump 16.07' Date: 8-19-21 - today
North Boundary System P-001:	CV 75.6 % @ 7.5 gpm	42.13 Hz / 2.12 Amps. / vault psi @ 18 / 20 leaves
T-101 & T-102 Containment / Tank	✓	Levels: 46 % & 45 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	74.4 °F	Outside Temp.: ~ 67 °F
(P-121) or P-122	✓	0.6 gpm / CV 45 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 8-19-21 - today
RWST Back-Up Generator	✓	Last Test Run(monthly): 8-19-21 - today

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 345 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	SB-warmout
Peroxide Tote Level	✓	~ 100 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 180 Gallons Reserve = ~95 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78 CV: 8 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.95	
pH 315	Value: 10.73	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / N
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 375	
Clear-well Transfer Pumps(P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3- 7-20-21/1+2 3-20-20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	8-19-21- Today	1322
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1355
pH-740 Discharge Surge Tank		Discharge suspended: 1315 ↔ 1321
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 42 %
Decant Transfer Pump (P-352)	✓	CV 44 % @ 0.4 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: %	
Feed Pump (P-114)	✓ Operating Press: 75.5 psi	CV@ 73 % @ 3.9 gpm
Retention Tank (T-114)	✓ Operating Press: 73 psi	pH-113 @ 3.75
Bag Filter (BF-113)	✓ Operating Press: 76 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 72 psi	currently TP-173A-2 → TP-175A/4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

* Increased flow on 8-18-21

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 38 psi	CV@ 78 % @ 36.6 gpm
T-520 to GAC Total (FT-675)	248037197 gal	Time: 1033
North End On-Site Pumping	Operating Press: 2-3 psi	13.0 gpm @ 1026
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 1026
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

IX System Anionic Resin satellite container in Good condition

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-4-20	Next: 9-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2607 Volts 9.9 Amps
Lamp Hours	494 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.5 psi In 12.0 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 75 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 16.6 °C	Out(TT-710): 28.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	20 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ (%
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19374532 gal	Time: 1032
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.25 psi

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MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 20 psi
PDT-730	✓	Δ Pressure: 11 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751) or P752)	✓	CV@ 55.6 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.3 gpm @ 1031
POTW Line Pressure (PT-770)	✓	32.6 psi
Effluent Totalizer Reading (FT-770)	242104082 gal	Time: 1035
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 8-17-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 1 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 7-29-21	Plant Effluent Suspended: 1320 ↔ 1340
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1035 - 1039

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19588274	(FT-505) LFG Cond. to T-530	215775
(FT-025) NBBW Influent	93352341	(FT-056) Off - Site N. End Influent	42378056
(FT-012) MW-38 Inf. to HMR-30	8098981	(FT-113) Ion Exchange Influent	462468
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30053434
(FT-043) MW-38 to RWST	3067460	(FT-026) NBBW Bypass to RWST	4373930
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8133454
(FT-012T) MW-38 to T-540/541	8590044	(FT-035) NTES Inf. to BIO	6615370
(FT-040T) MW-38N to T-540/541	1976891	(FT-035T) NTES to T-530	4579141
(FT-041T) MW-38S to T-540/541	2694735	(FT-017) BIO Inf. from T-530	649133
(FT-042T) MW-38 Source to T-540/541	3990399	(FT-018) T-540/541 Influent	8636841
(FT-055) On - Site N. End Influent	96865944	(FT-352) T-352 to HMR-30	1262752

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MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	76 °F (Analog Gauge)	Outside Temp.: ~ 70 °F
Compressor Building Vent	✓	closed - observed
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ 61508
IRN30H Motor Speed	31 %	
IRN30H Pressure	111 psi	
IRN30H Moisture purge valve chk(Weekly)	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 7-22-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	a - calibration + maint 8-18-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 7-26-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

* 8-17-21- Begin increasing flow thru EX System. Take TP-173A-1 offline and empty. Now only running thru 4 canisters on stage 1 and GAC vessels. TP-173A-2 -> TP-175A.

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.20	22.0 %	5.5		
P-3301A	SB	—	— %	—		
NTES Pump Swapped out 8-17-21 P-002(Sump) / (P-002W(10R))	✓	0.51	47 %	P035 34-35	P038 6.0	Globules Observed at TP-130: Y / (N) Time: 1000
T-530 P-005	SB	—	— %	—		
T-540/541 P-006	✓	0.31	57 %	4.0		
LFG COND Auto-Traps	✓	0.0	NA	5.0		Between Cycles: (Y) / N Received 325 gal transported
Reactor Feed Pumps						
P-3321	SB	—	— %	—		
P-3322	✓	3.14	49.2 %	5.0		
P-3323	✓	2.27	75.4 %	6.5		
P-3324	✓	2.14	51.6 %	11.0		
Reactor Effluent Pumps						
P-3341	✓	1.75	56.9 %	10.0		
P-3341A	SB	—	— %	—		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.26	152	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	—	—	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.34	154	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.29	152	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 13.6 PPM
VTP-3360	✓	PID Reading: 9.2 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 68 %	Last Cleaning (As needed, if 2" of solids accumulate): ~~12/15/19~~ 7-14-21
T-530 LFG Condensate / NTES Tank	✓ Level: 27 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 48 % & 49 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.5 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-4-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 74 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.94 gpm @ 1110
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 8-19-21 - Today

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 18.5 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 200 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 8-19-21 - Today
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 19, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	7-29-21	Acid/Base cleaning today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 63	Reset
BF-3340 a/b Differential Pressure	PSI: 2	15/17 ≈2.9 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 10	17/6 ≈2.9 gpm
Last Backwash Performed	Date: 7-14-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 73 Events
HMI's	✓	
BTS Process KWH Meter	1789160 KWH	Time: 1200
Building#2 KWH Meter	5210267 KWH	Time: 1200

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - Calibration + Maint 8-19-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5798182	
FT-3324 Feed Spare	83880	
FT-3322 Feed to Reactor 2	10456563	
FT-3323 Feed to Reactor 3	512486	
FT-3301 T-510 to BIO	51313933	
FT-3341 BIO Effluent	66049980	
FT-3342 BIO Recycle	55128837	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 7-26-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.84 oz	Counter: 180317 Cycles: 367
LFG Cond Automatic Trap CT-2	Sump Level: 8.61 oz	Counter: 273967 Cycles: 50
LFG Cond Automatic Trap CT-3	Sump Level: 7.73 oz	Counter: 302996 Cycles: 35
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.16 Counter: 191206 Cycles: 24 Sump: 9.14 oz
PM-15 Containment / Vessel	✓ Level: 40 %	
MW-51 Containment / Vessel	✓ Level: 50 %	
PM-11 Containment / Vessel	✓ Level: 55 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 8-27-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 16.07' Date: 8-19-21
North Boundary System P-001:	CV 75.6 % @ 7.4 gpm	42.16 Hz / 2.11 Amps. / vault psi @ 18/20 kPa
T-101 & T-102 Containment / Tank	✓	Levels: 31 % & 30 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	74.4 °F	Outside Temp.: ~ 77 °F
(P-121) or P-122	✓	0.6 gpm / CV 57 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 8-19-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 8-19-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 510 Gallons Reserve = 1 tote
Caustic Bay Heater	✓	56 - warm out
Peroxide Tote Level	✓	~ 75 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 225 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 80 CV: 8 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

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MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.77	
pH 315	Value: 10.87	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps(P-371 / (372))	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Auto
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #1&2-5-20-20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allow
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	8-26-21-Today	1330
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1400
pH-740 Discharge Surge Tank		Discharge suspended: 1400 ↔ 1420
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 47 %
Decant Transfer Pump (P-352)	✓	CV 46 % @0.4 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

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H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 68.8 psi	CV@ 79 % @ 3.8 gpm
Retention Tank (T-114)	✓ Operating Press: 62 psi	pH-113 @ 4.01
Bag Filter (BF-113)	✓ Operating Press: 65 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 62 psi	TP-173A-2 → TP-175A / 4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 24 psi	CV@ 68 % @ 35.7 gpm
T-520 to GAC Total (FT-675)	248403895 gal	Time: 1119
North End On-Site Pumping	Operating Press: 2-3 psi	12.6 gpm @ 1113
North End Off-Site Pumping	Operating Press: 2-6 psi	8.6 gpm @ 1113
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

IX System Anions Resin Satellite container in Good condition

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 9-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2618 Volts 9.8 Amps
Lamp Hours	663 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.5 psi In 12.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 75 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 16.6 °C	Out(TT-710): 28.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 1 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19453084 gal	Time: 1120
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.25 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 8 psi
PDT-730	✓	Δ Pressure: 10 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751) or P752)	✓	CV@ 57.3 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.2 gpm @ 1118
POTW Line Pressure (PT-770)	✓	32.5 psi
Effluent Totalizer Reading (FT-770)	242470438 gal	Time: 1120
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 8-17-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 8-26-21 - gdm	Plant Effluent Suspended: 1400 ◄► 1420
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1121- 1126

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19596094	(FT-505) LFG Cond. to T-530	215917
(FT-025) NBBW Influent	93426251	(FT-056) Off - Site N. End Influent	42459932
(FT-012) MW-38 Inf. to HMR-30	8117659	(FT-113) Ion Exchange Influent	500788
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30054646
(FT-043) MW-38 to RWST	3067813	(FT-026) NBBW Bypass to RWST	4375418
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8133454
(FT-012T) MW-38 to T-540/541	8590044	(FT-035) NTES Inf. to BIO	6620319
(FT-040T) MW-38N to T-540/541	1976891	(FT-035T) NTES to T-530	459283
(FT-041T) MW-38S to T-540/541	2694735	(FT-017) BIO Inf. from T-530	649133
(FT-042T) MW-38 Source to T-540/541	3790399	(FT-018) T-540/541 Influent	8639795
(FT-055) On - Site N. End Influent	96995104	(FT-352) T-352 to HMR-30	1266447

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	70 °F (Analog Gauge)	Outside Temp.: ~ 79 °F
Compressor Building Vent	✓	closed - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 61604
IRN30H Motor Speed	0 %	
IRN30H Pressure	119 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 8-26-21 - Today	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc- calibration + maint 8-25-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 8-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.21	27.2 %	6.0		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035 36-37	P038 6.0	Globules Observed at TP-130: Y / (N) Time: 1045
T-530 P-005	SB	–	– %	–		
T-540/541 P-006	✓	0.30	57 %	3.5		
LFG COND Auto-Traps	✓	0.0	NA	4.75		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.16	48.6 %	5.0		
P-3322	✓	3.04	43.2 %	5.0		
P-3323	✓	2.20	65.0 %	5.0		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.48	45.9 %	10.0		[illegible] GACF-3340 today
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.25	154	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.36	156	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.27	154	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 0.6 PPM
VTP-3360	✓	PID Reading: 0.3 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 72 %	Last Cleaning (As needed, if 2" of solids accumulate): ~~12/15/19~~ 7-14-21
T-530 LFG Condensate / NTES Tank	✓ Level: 31 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 25 % & 27%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ 1.25 " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-4-20
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 72 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	9.01 gpm @ 1143
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 8-19-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 18.25 Gallons: ~ 85
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 180 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 8-19-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	8-26-21-today	New 4+10 pH STD's today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 25	Reset
BF-3340 a/b Differential Pressure	PSI: 4	13/9 24.5 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 3	~~13~~ 6/9 24.5 gpm
Last Backwash Performed	Date: 8-26-21-today	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 73 Events
HMI's	✓	
BTS Process KWH Meter	1791012 KWH	Time: 1222
Building#2 KWH Meter	5213037 KWH	Time: 1222

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC-calibration + maint. 8-25-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, August 26, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5817484	
FT-3324 Feed Spare	87141	
FT-3322 Feed to Reactor 2	10487914	
FT-3323 Feed to Reactor 3	534731	
FT-3301 T-510 to BIO	51337544	
FT-3341 BIO Effluent	66081361	
FT-3342 BIO Recycle	55170131	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 8-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.09 ok	Counter: 180744 Cycles: 427
LFG Cond Automatic Trap CT-2	Sump Level: 8.60 ok	Counter: 273971 Cycles: 4
LFG Cond Automatic Trap CT-3	Sump Level: 7.45 ok	Counter: 303155 Cycles: 159
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.16 Counter: 191211 Cycles: 5 Sump: 9.15
PM-15 Containment / Vessel	✓ Level: 50 %	
MW-51 Containment / Vessel	✓ Level: 25 %	
PM-11 Containment / Vessel	✓ Level: 20 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 8-27-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry 16.07' Date: 8-19-21
North Boundary System P-001:	CV 75.3 % @ 7.3 gpm	41.96 Hz / 2.11 Amps. / vault psi @ 19/100 cells
T-101 & T-102 Containment / Tank	✓	Levels: 34 % & 33 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	71.5 °F	Outside Temp.: ~ 63 °F
(P-121) or P-122	✓	0.6 gpm / CV 55 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 8-19-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 8-19-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 315 Gallons Reserve = 4 totes
Caustic Bay Heater	✓	56- warmest
Peroxide Tote Level	✓	~ 330 Gallons Reserve = ~95 gal
HCL Tote Levels	✓	~ 195 Gallons Reserve = ~55 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-80 CV: 7 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.9	
pH 310	Value: 6.98	
pH 315	Value: 10.82	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 400	
Clear-well Transfer Pumps(P-371 /(372))	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both or
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-2021/#1+2-3-2020
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Alloc
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	9-2-21-Today	1256
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1326
pH-740 Discharge Surge Tank		Discharge suspended: 1245 ↔ 1255
Out of Hold Double Check	----------	None in hold: ✓ ✓'d m
Valves Back to Normal Position	----------	All OK: ✓ ✓'d m

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 60 %
Sludge Holding Tank (T-352)	✓	Level: 36 %
Decant Transfer Pump (P-352)	SB	CV – % @ – gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Running/Stage 4

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 56 %	
Feed Pump (P-114)	✓ Operating Press: 63.8 psi	CV@ 95 % @ 3.7 gpm
Retention Tank (T-114)	✓ Operating Press: 62 psi	pH-113 @ 3.81
Bag Filter (BF-113)	✓ Operating Press: 65 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 61 psi	TP-173A-2 → TP-175A/4 Canister + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 26 psi	CV@ 70 % @ 35.5 gpm
T-520 to GAC Total (FT-675)	248757247 gal	Time: 0927
North End On-Site Pumping	Operating Press: 23 ~~31~~ psi	13.1 gpm @ 0852
North End Off-Site Pumping	Operating Press: 26 ~~33~~ psi	8.3 gpm @ 0852
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

IX System Anionic Resin Satellite Container Area In Good Condition.

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 9-2021
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2600 Volts 9.9 Amps
Lamp Hours	827 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK - Refilled
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12 psi In 12.5 psi Out
UV-OX Feed Pump ((P-600) or P-601)	✓	CV@ 77 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 16.8 °C	Out(TT-710): 28.3 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 0 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	195295441 gal	Time: 0928
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 10 psi
PDT-730	✓	Δ Pressure: 10 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 63.8 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.7 gpm @ 0924
POTW Line Pressure (PT-770)	✓	38.2 psi
Effluent Totalizer Reading (FT-770)	242830444 gal	Time: 0928
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 8-17-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 8-26-21	Plant Effluent Suspended: 1400 ↔ 1420
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0929- 0934

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	196082 82	(FT-505) LFG Cond. to T-530	216105
(FT-025) NBBW Influent	93499761	(FT-056) Off - Site N. End Influent	425 39628
(FT-012) MW-38 Inf. to HMR-30	8132117	(FT-113) Ion Exchange Influent	538148
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30055308
(FT-043) MW-38 to RWST	3069612	(FT-026) NBBW Bypass to RWST	4377701
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8142638
(FT-012T) MW-38 to T-540/541	8599830	(FT-035) NTES Inf. to BIO	6625137
(FT-040T) MW-38N to T-540/541	1971172	(FT-035T) NTES to T-530	459475
(FT-041T) MW-38S to T-540/541	2695073	(FT-017) BIO Inf. from T-530	649246
(FT-042T) MW-38 Source to T-540/541	~~97120431~~ 3999573	(FT-018) T-540/541 Influent	8641473
(FT-055) On - Site N. End Influent	97120431	(FT-352) T-352 to HMR-30	1269367

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	65 °F (Analog Gauge)	Outside Temp.: ~ 67 °F
Compressor Building Vent	✓	Closed - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 61681
IRN30H Motor Speed	31 %	
IRN30H Pressure	117 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly)	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ Econ on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 8-26-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc- calibration + maint 9-1-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 8-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.81	27.9 %	6.0		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.49	49 %	P035 36-37	P038 7.5	Globules Observed at TP-130: Y / (N) Time: 0830
T-530 P-005	✓	0.20	37 %	6.0		
T-540/541 P-006	✓	0.30	51 %	4.5		
LFG COND Auto-Traps	✓	0.0	NA	4.75		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.52	63.2%	7.0		
P-3322	✓	3.47	48.6 %	5.0		
P-3323	✓	2.51	74.6 %	5.0		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.51	55.3 %	11.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.26	152	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.38	152	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.26	152	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 1.1 PPM
VTP-3360	✓	PID Reading: 0.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 71 %	Last Cleaning (As needed, if 2" of solids accumulate): ~~12/15/19~~ 7-14-21
T-530 LFG Condensate / NTES Tank	✓ Level: 35 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 83 % & 84 %	
T-540/541 Mixers	✓	
Chiller Coolant level not visible thru sight glass. will fill at some point and check for leaks		Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-31
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.96 gpm @ 0957
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 8-19-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 18 Gallons: ~ 85
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~170 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 8-19-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	8-26-21	Spray off Clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 32	Reset
BF-3340 a/b Differential Pressure	PSI: 0	10/10 @ 2.0gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 4	10/6 @ 2.0gpm
Last Backwash Performed	Date: 8-26-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 75 Events
HMI's	✓	
BTS Process KWH Meter	1792711 KWH	Time: 1110
Building#2 KWH Meter	5215623 KWH	Time: 1110

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc- calibration + making. 9-1-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 02, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5839656	
FT-3324 Feed Spare	87141	
FT-3322 Feed to Reactor 2	10518713	
FT-3323 Feed to Reactor 3	556571	
FT-3301 T-510 to BIO	51360459	
FT-3341 BIO Effluent	66111004	
FT-3342 BIO Recycle	55211382	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 8-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.65 oz	Counter: 181404 Cycles: 660
LFG Cond Automatic Trap CT-2	Sump Level: 8.60 oz	Counter: 274021 Cycles: 50
LFG Cond Automatic Trap CT-3	Sump Level: 7.55 oz	Counter: 303879 Cycles: 724
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 70 %	Tank Level: 2.16 Counter: 191229 Cycles: 18 Sump: 9.19 oz
PM-15 Containment / Vessel	✓ Level: ~~60%~~ 50%	
MW-51 Containment / Vessel	✓ Level: 50 %	
PM-11 Containment / Vessel	✓ Level: 45 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 8-27-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 8-19-21
North Boundary System P-001:	CV 75.2% @ 7.3 gpm	41.94 Hz / 2.11 Amps. / vault psi @ 18/20 inches
T-101 & T-102 Containment / Tank	✓	Levels: 29 % & 27 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	71.3 °F	Outside Temp.: ~ 69 °F
(P-121) or P-122	✓	0.6 gpm / CV 59 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 8-19-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 8-19-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 465 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	SB-warmest
Peroxide Tote Level	✓	~ 300 Gallons Reserve = ~95 gal
HCL Tote Levels	✓	~ 165 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-80 CV: 7 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.93	
pH 315	Value: 10.87	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / N
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~525	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bother
Manual Sludge Lateral pumping	✓	Last done (As Needed): 3-7-20-21 / 4+2 - 3-20-20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	9-9-21 - today	1311
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1338
pH-740 Discharge Surge Tank		Discharge suspended: 1303 ↔ 1310
Out of Hold Double Check	----------	None in hold: ✓ ✓'d
Valves Back to Normal Position	----------	All OK: ✓ ✓'d

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 42 %
Decant Transfer Pump (P-352)	✓	CV 55 % @ 0.4 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 45 %	
Feed Pump (P-114)	✓ Operating Press: 63.5 psi	CV@ 99 % @ 3.7 gpm
Retention Tank (T-114)	✓ Operating Press: 60 psi	pH-113 @ 3.56
Bag Filter (BF-113)	✓ Operating Press: 63 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 58 psi	TP-173A-2 + TP-175A / 4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 31 psi	CV@ 83 % @ 36.7 gpm
T-520 to GAC Total (FT-675)	249112428 gal	Time: 1040
North End On-Site Pumping	Operating Press: 2-3 psi	13.1 gpm @ 1022
North End Off-Site Pumping	Operating Press: 2-6 psi	8.6 gpm @ 1022
Peroxide Feed Pump (P-680)	✓	SPD 2.8 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: both EX Areas + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 8-4-20	Next: 9-16-21
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2620 Volts 9.9 Amps
Lamp Hours	994 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12.5 psi In 13.0 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 79 % @ gpm
UV-OX Temperature	In(TT-670): 16.6 °C	Out(TT-710): 28.3 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 5 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	1960750 gal	Time: 1040
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: ~7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 13 psi
PDT-730	✓	Δ Pressure: 11 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752)	✓	CV@ 62.5 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	37.5 gpm @ 1038
POTW Line Pressure (PT-770)	✓	37.5 psi
Effluent Totalizer Reading (FT-770)	243193310 gal	Time: 1040
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 8-17-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 8-26-21	Plant Effluent Suspended: 1400 ↔ 1420
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1041-1045

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19614229	(FT-505) LFG Cond. to T-530	216318
(FT-025) NBBW Influent	93569401	(FT-056) Off - Site N. End Influent	42620820
(FT-012) MW-38 Inf. to HMR-30	8153403	(FT-113) Ion Exchange Influent	574421
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30055996
(FT-043) MW-38 to RWST	3070358	(FT-026) NBBW Bypass to RWST	4380453
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8142654
(FT-012T) MW-38 to T-540/541	8599830	(FT-035) NTES Inf. to BIO	6630033
(FT-040T) MW-38N to T-540/541	1977172	(FT-035T) NTES to T-530	459682
(FT-041T) MW-38S to T-540/541	2695073	(FT-017) BIO Inf. from T-530	649783
(FT-042T) MW-38 Source to T-540/541	3999573	(FT-018) T-540/541 Influent	8644393
(FT-055) On - Site N. End Influent	97252105	(FT-352) T-352 to HMR-30	1272134

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	73 °F (Analog Gauge)	Outside Temp.: ~ 72 °F
Compressor Building Vent	✓	Closed - [illegible]
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Y / N Next service @ 62952 Hours Current Hours @ 61781
IRN30H Motor Speed	57 %	CC [illegible]
IRN30H Pressure	110 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Y / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 8-26-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	Disabled currently	CC working on calibration & maint today
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 8-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.78	32.0 %	6.0	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035: 34.35 / P038: 8.0	Globules Observed at TP-130: Y / (N) Time: 1000
T-530 P-005	✓	0.20	37 %	6.0	
T-540/541 P-006	✓	0.30	57 %	4.0	
LFG COND Auto-Traps	✓	0.0	NA	5.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.44	75.4 %	10.5	
P-3322	✓	3.41	55.2 %	5.5	
P-3323	✓	2.51	66.7 %	5.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	2.19	57.0%	22.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.24	156	9-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.37	158	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.25	156	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 2.1 PPM
VTP-3360	✓	PID Reading: 1.0 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 68 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 32 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 61 % & 62 %	
T-540/541 Mixers	✓	
Chiller	Coolant leaked into discharge tank thru coil	Chiller Coolant Lvl: ~ NA " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 12/2017
T-3320 Blend Tank	✓ Level: 72 %	Last Cleaning (Semi Annual): 5-7-20
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 5-7-20
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 32 %	
Recycle Valve to Blend Tank	✓	4.25 gpm @ 1600
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 8-19-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 17.75 Gallons: ~ 100
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 165 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 8-19-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	8-26-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 37	reset
BF-3340 a/b Differential Pressure	PSI: 4	20/16 @ 2.8 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 9	15/6 @ 2.6 gpm
Last Backwash Performed	Date: 8-26-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / ~~Off Warm Out~~
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 80 Events
HMI's	✓	
BTS Process KWH Meter	1794577 KWH	Time: 1159
Building#2 KWH Meter	5218365 KWH	Time: 1159

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	DISABled currently	CC working on Calibration + Maint today
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 09, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5862424	
FT-3324 Feed Spare	87141	
FT-3322 Feed to Reactor 2	10550340	
FT-3323 Feed to Reactor 3	579011	
FT-3301 T-510 to BIO	51382607	
FT-3341 BIO Effluent	66141708	
FT-3342 BIO Recycle	55253310	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 8-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.34 ok	Counter: 181754 Cycles: 350
LFG Cond Automatic Trap CT-2	Sump Level: 8.67 ok	Counter: 274034 Cycles: 13
LFG Cond Automatic Trap CT-3	Sump Level: 7.36 ok	Counter: 50304006 Cycles: 127
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 68 %	Tank Level: 2.16 2.14 Counter: 191229 191235 Cycles: 10 6 Sump: 5.19 ok 9.000 ok
PM-15 Containment / Vessel	✓ Level: 25 %	
MW-51 Containment / Vessel	✓ Level: 30 %	
PM-11 Containment / Vessel	✓ Level: 20 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 8-27-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry = 16.07' Date: 8-19-21
North Boundary System P-001:	CV 71.4 % @ 7.3 gpm	39.13 Hz / 20.5 Amps. / vault psi @ 18/20 levels
T-101 & T-102 Containment / Tank	✓	Levels: 48 % & 47 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	71.3 °F	Outside Temp.: ~ 71 °F
(P-121) or P-122	✓	2.5 gpm / CV 43 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 8-19-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 8-19-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 310 Gallons Reserve = 3 totes
Caustic Bay Heater	SB - winterized	
Peroxide Tote Level	✓	~ 278 Gallons Reserve = ~95 gal
HCL Tote Levels	✓	~ 125 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-80 CV: 6 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.21	
pH 315	Value: 10.84	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 440	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bottom
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-2021 / #2-3-20-20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All on
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	9-16-21-today	1306
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1335
pH-740 Discharge Surge Tank		Discharge suspended: 1257 ↔ 1305
Out of Hold Double Check		None in hold: ✓✓ 'd m
Valves Back to Normal Position		All OK: ✓✓ 'd m

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 60 %
Sludge Holding Tank (T-352)	✓	Level: 47 %
Decant Transfer Pump (P-352)	SB	CV – % @ – gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 35 %	
Feed Pump (P-114)	✓ Operating Press: 61.2 psi	CV@ 100 % @ 3.5 gpm
Retention Tank (T-114)	✓ Operating Press: 69.5 psi	pH-113 @ 3.91
Bag Filter (BF-113)	✓ Operating Press: 62.5 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 53 psi	TP-173A-2 → TP-1754 / 4 Cartridges + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	Level: 34 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 61.7 24 psi	CV@ ~~100~~ 75 % @ ~~3.5~~ 28.0 gpm
T-520 to GAC Total (FT-675)	249464144 gal	Time: 1013
North End On-Site Pumping	Operating Press: 2-3 psi	13.3 gpm @ 1009
North End Off-Site Pumping	Operating Press: 2-6 psi	8.3 gpm @ 1009
Peroxide Feed Pump (P-680)	✓	SPD 2.1 % / RATE 0.6
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Both Ex Resin + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓ SB	* Currently Getting Serviced *
Annual Test Run (Calgon)	Date: 9-16-21 - today	Next: 9-2022
Quarterly Test Run	Date: NA	Next: NA
Peroxide Feed Pump (P-650)	SB	Flow Rate: ~ - cc/min.
UV-Ox Power	–	– kVA – Volts – Amps
Lamp Hours	1158 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	— psi In – psi Out
UV-OX Feed Pump (P-600 or P-601)	SB	CV@ – % @ – gpm
UV-OX Temperature	In(TT-670): – °C	Out(TT-710): – °C
PDU GAC (PDT-710)	Backwashed, Retayed/Rumbled, etc.	Δ Pressure: – psi
Peroxide Concentration Pre UV	– PPM	
Peroxide Concentration Post UV(TP-720)	– PPM	
Peroxide Conc. Post PDU (TP-730)	– PPM	
Secondary Acid Feed Pump (P-630)	SB	CV @ – %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19685590 gal	Time: 1013
Post UV-Ox / Pre PDU	–	Pressure: – psi
Post PDU	–	Pressure: – psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 12 psi
PDT-730	✓	Δ Pressure: 8 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751) or P752)	✓	CV@ 57.7 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	286 gpm @ 1011
POTW Line Pressure (PT-770)	✓	33.6 psi
Effluent Totalizer Reading (FT-770)	243554382 gal	Time: 1013
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 8-17-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 8-26-21	Plant Effluent Suspended: 1400 ↔ 1420
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1014-1017

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19621097	(FT-505) LFG Cond. to T-530	216459
(FT-025) NBBW Influent	93639012	(FT-056) Off - Site N. End Influent	42702416
(FT-012) MW-38 Inf. to HMR-30	8172939	(FT-113) Ion Exchange Influent	609376
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30057890
(FT-043) MW-38 to RWST	3071283	(FT-026) NBBW Bypass to RWST	4384148
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8153383
(FT-012T) MW-38 to T-540/541	8599830	(FT-035) NTES Inf. to BIO	6634837
(FT-040T) MW-38N to T-540/541	1977172	(FT-035T) NTES to T-530	459966
(FT-041T) MW-38S to T-540/541	2695073	(FT-017) BIO Inf. from T-530	650312
(FT-042T) MW-38 Source to T-540/541	3999573	(FT-018) T-540/541 Influent	8647240
(FT-055) On - Site N. End Influent	97382212	(FT-352) T-352 to HMR-30	1276916

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	72 °F (Analog Gauge)	Outside Temp.: ~ 75 °F
Compressor Building Vent	✓	open - observed
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ 61888
IRN30H Motor Speed	31 %	
IRN30H Pressure	110 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 8-26-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc- calibration + maint 9-15-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 8-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

* UVOX Getting serviced today during checks.

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	2.86	37.1 %	8.0	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.52	48 %	P035 35-36 / P038 80	Globules Observed at TP-130: Y / (N) Time: 0940
T-530 P-005	✓	0.20	39 %	6	
T-540/541 P-006	✓	0.31	59 %	4.5	
LFG COND Auto-Traps	✓	0.0	NA	5	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.40	54.9 %	5.5	
P-3322	✓	3.27	48.7 %	5.0	
P-3323	✓	2.40	72.1 %	6.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	3.53	73.5 %	27.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.23	152	SOON	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.35	154	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.25	152	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 1.8 PPM
VTP-3360	✓	PID Reading: 0.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 70 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 30 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 39 % & 40 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-31
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): ~~12/2017~~ 9-10-21
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	Cleaned - 9-10-21
Recycle Valve to Blend Tank	✓	3.99 gpm @ 10:39
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 8-19-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 17.5 Gallons: ~ 60
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 155 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 8-19-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	8-26-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 32	Reset
BF-3340 a/b Differential Pressure	PSI: 0	9/9 = 2.2 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 3	9/6 = 2.2 gpm
Last Backwash Performed	Date: 8-26-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 84 Events
HMI's	✓	
BTS Process KWH Meter	1796456 KWH	Time: 1109
Building#2 KWH Meter	5221118 KWH	Time: 1109

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC-calibration + maint 9-15-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 16, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5885085	
FT-3324 Feed Spare	87149	
FT-3322 Feed to Reactor 2	10581808	
FT-3323 Feed to Reactor 3	601358	
FT-3301 T-510 to BIO	51406487	
FT-3341 BIO Effluent	66172585	
FT-3342 BIO Recycle	55294085	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 8-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.35 ok	Counter: 182519 Cycles: 764
LFG Cond Automatic Trap CT-2	Sump Level: 8.50 ok	Counter: 2274127 Cycles: 93
LFG Cond Automatic Trap CT-3	Sump Level: 7.40 ok	Counter: 304811 Cycles: 805
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 68 %	Tank Level: 2.13 Counter: 191242 Cycles: 7 Sump: 8.99 ok
PM-15 Containment / Vessel	✓ Level: 50 %	
MW-51 Containment / Vessel	✓ Level: 60 %	
PM-11 Containment / Vessel	✓ Level: 55 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 8-27-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 9-23-21 - Today
North Boundary System P-001:	CV 74.7 % @ 7.1 gpm	39.88 Hz / 2.05 Amps. / vault psi @ 18/NBBW/carbs
T-101 & T-102 Containment / Tank	✓	Levels: 34 % & 32 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	65.6 °F	Outside Temp.: ~ 64 °F
(P-121) or P-122	✓	0.6 gpm / CV 54 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 9-23-21 - Today
RWST Back-Up Generator	✓	Last Test Run(monthly): 9-23-21 - Today

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 450 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	Running during tote change out on 9-20-21 ok
Peroxide Tote Level	✓	~ 290 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 110 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-80 CV: 6 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

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E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.64	
pH 315	Value: 10.89	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 550	JUST REFILLED
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-2021 / #2 3-20-20
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

* NOTE: Power off during calibrations *

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	9-23-21 - Today	1358
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1455
pH-740 Discharge Surge Tank		Discharge suspended: OFF 1350 ↔ OFF 1357
Out of Hold Double Check	----------	None in hold: ✓ ✓ M
Valves Back to Normal Position	----------	All OK: ✓ ✓ M

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 50 %
Sludge Holding Tank (T-352)	✓	Level: 41 %
Decant Transfer Pump (P-352)	✓	CV 59 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 47 %	
Feed Pump (P-114)	✓ Operating Press: 58.8 psi	CV@ 100 % @ 3.4 gpm
Retention Tank (T-114)	✓ Operating Press: 57 psi	pH-113 @ 3.71
Bag Filter (BF-113)	✓ Operating Press: 60 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 53 psi	TP-123A-2 → TP-175A / 4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 34 psi	CV@ 86 % @ 35.2 gpm
T-520 to GAC Total (FT-675)	249812508 gal	Time: 0952
North End On-Site Pumping	Operating Press: 2-3 psi	13.2 gpm @ 0942
North End Off-Site Pumping	Operating Press: 2-6 psi	8.2 gpm @ 0942
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Both Inclosm + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2613 Volts 9.9 Amps
Lamp Hours	1321 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: Ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11 psi In 11.5 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 75 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 15.9 °C	Out(TT-710): 27.5 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	1000 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19757948 gal	Time: 0952
Post UV-Ox / Pre PDU	✓	Pressure: 19 psi
Post PDU	✓	Pressure: 7.5 psi

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Inspection Date: Thursday, September 23, 2021

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L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 18 psi
PDT-730	✓	Δ Pressure: 10 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 60 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	35.9 gpm @ 0949
POTW Line Pressure (PT-770)	✓	34.2 psi
Effluent Totalizer Reading (FT-770)	243911840 gal	Time: 0953
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 9-27-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 1 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 8-26-21	Plant Effluent Suspended: 1400 ↔ 1420
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0953-0957

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19632901	(FT-505) LFG Cond. to T-530	216597
(FT-025) NBBW Influent	93708032	(FT-056) Off - Site N. End Influent	42785212
(FT-012) MW-38 Inf. to HMR-30	8187270	(FT-113) Ion Exchange Influent	642648
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30058696
(FT-043) MW-38 to RWST	3072979	(FT-026) NBBW Bypass to RWST	4387641
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8153383
(FT-012T) MW-38 to T-540/541	8608152	(FT-035) NTES Inf. to BIO	6639852
(FT-040T) MW-38N to T-540/541	1977498	(FT-035T) NTES to T-530	460108
(FT-041T) MW-38S to T-540/541	2695519	(FT-017) BIO Inf. from T-530	650804
(FT-042T) MW-38 Source to T-540/541	4007125	(FT-018) T-540/541 Influent	86501555
(FT-055) On - Site N. End Influent	~~95~~ 95/14287	(FT-352) T-352 to HMR-30	1280099

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	64 °F (Analog Gauge)	Outside Temp.: ~ 68 °F
Compressor Building Vent	✓	Closed - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 61977
IRN30H Motor Speed	98 %	
IRN30H Pressure	109 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 8-12-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ ECO on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21 - today	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	100 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	CC - Calibration + maint 9-22-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 8-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.86	33.6 %	6.0	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.53	52 %	P035 35-36 / P038 8	Globules Observed at TP-130: Y / (N) Time: 0900
T-530 P-005	✓	0.22	41 %	5.5	
T-540/541 P-006	✓	0.28	57 %	4.5	
LFG COND Auto-Traps	✓	0.0	NA	5	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.44	57.6 %	5.0	
P-3322	✓	3.40	46.0 %	5.0	
P-3323	✓	2.42	67.3 %	5.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	3.16	77.4 %	28	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6-22-21
B-3331	✓	4.25	148	5000	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.34	150		Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.26	146		Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 2.4 PPM
VTP-3360	✓	PID Reading: 1.8 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 64 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 27 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 78 % & 79 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.69 gpm @ 1012
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 9-23-21-today

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 12.25 Gallons: ~ 60
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~85 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 9-23-21-today
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 23, 2021

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F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	8-26-21	Acid/BASE clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 26	Reset
BF-3340 a/b Differential Pressure	PSI: 3	30/27 @ 3.7 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	27/7 @ 3.7 gpm
GACF-3340 Differential Pressure	PSI: 20	27/7 @ 3.7 gpm
Last Backwash Performed	Date: 8-26-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 84 Events
HMI's	✓	
BTS Process KWH Meter	1798495 KWH	Time: 1127
Building#2 KWH Meter	5224446 KWH	Time: 1127

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc-calibration & maint 9-22-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5907824	
FT-3324 Feed Spare	87149	
FT-3322 Feed to Reactor 2	10613374	
FT-3323 Feed to Reactor 3	623781	
FT-3301 T-510 to BIO	51428408	
FT-3341 BIO Effluent	66202789	
FT-3342 BIO Recycle	55335425	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 8-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

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A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.58 oz	Counter: 183304 Cycles: 780
LFG Cond Automatic Trap CT-2	Sump Level: 8.62 oz	Counter: 274179 Cycles: 52
LFG Cond Automatic Trap CT-3	Sump Level: 7.25 oz	Counter: 305256 Cycles: 445
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191242 Cycles: 0 Sump: 8.88 oz
PM-15 Containment / Vessel	✓ Level: 50 %	
MW-51 Containment / Vessel	✓ Level: 20 %	
PM-11 Containment / Vessel	✓ Level: 20 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 9-24-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry 016.07' Date: 9-23-21
North Boundary System P-001:	CV 74.8 % @ 7.1 gpm	41.57 Hz / 2.09 Amps. / vault psi @ 18/20 levels
T-101 & T-102 Containment / Tank	✓	Levels: 31 % & 35 % Gauges correctly reflecting
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	59.3 °F	Outside Temp.: ~ 44 °F
(P-121) or P-122	✓	0.60 gpm / CV 48 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 9-23-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 9-23-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 900 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	Operational
Peroxide Tote Level	✓	~ 265 Gallons Reserve = ~55gal
HCL Tote Levels	✓	~ 85 Gallons Reserve = 1 tote + ~3 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 80-82 CV: 8 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

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E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.92	
pH 315	Value: 10.84	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #4 + 2-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

* New 4 + 10 pH STDs today *

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	9-30-21 - Today	1313
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1348
pH-740 Discharge Surge Tank		Discharge suspended: 1350 ↔ 1410
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓ * Grease motor bearings today *	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 41 %
Decant Transfer Pump (P-352)	✓	CV 61 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty / need to wash out

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 52 %	
Feed Pump (P-114)	✓ Operating Press: 54 psi	CV@ 100 % @ 3.4 gpm
Retention Tank (T-114)	✓ Operating Press: 52 psi	pH-113 @ 3.56
Bag Filter (BF-113)	✓ Operating Press: 56 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 51.5 psi	TP-173A-2 → TP-175A/4 [illegible] + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 35.1 psi	CV@ 64 % @ 35.1 gpm
T-520 to GAC Total (FT-675)	250160586 gal	Time: 1014
North End On-Site Pumping	Operating Press: 2-3 psi	13.3 gpm @ 1006
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 1006
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition:
Satellite Haz. Waste Area (BLDG #2)	✓	Condition:

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.0 cc/min.
UV-Ox Power		kVA Volts Amps
Lamp Hours	1486 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.0 psi In 11.5 psi Out
UV-OX Feed Pump ((P-600) or P-601)	✓	CV@ 72 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 15.8 °C	Out(TT-710): 27.7 °C
PDU GAC (PDT-710)	BACKWASHED 9-27-21 ✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	198345772 gal	Time: 1014
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓ BACKWASHED 9-27-21	Δ Pressure: 9 psi
PDT-730	✓ BACKWASHED 9-29-21	Δ Pressure: 5 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 57.1 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	35.4 gpm @ 1012
POTW Line Pressure (PT-770)	✓	33.6 psi
Effluent Totalizer Reading (FT-770)	244265118 gal	Time: 1014
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 9-27-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 9-30-21 - today	Plant Effluent Suspended: 1350 ↔ 1410
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: (Y) or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	very Active - 49.3 → 49% / 2.003 → 2.001

O. WTP INFLUENT TOTALIZERS Time : 1015-1019

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19638746	(FT-505) LFG Cond. to T-530	216843
(FT-025) NBBW Influent	93778029	(FT-056) Off - Site N. End Influent	42865868
(FT-012) MW-38 Inf. to HMR-30	8207863	(FT-113) Ion Exchange Influent	674985
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30059980
(FT-043) MW-38 to RWST	3073667	(FT-026) NBBW Bypass to RWST	4390222
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8157671
(FT-012T) MW-38 to T-540/541	8608152	(FT-035) NTES Inf. to BIO	6644770
(FT-040T) MW-38N to T-540/541	977498	(FT-035T) NTES to T-530	460342
(FT-041T) MW-38S to T-540/541	26955519	(FT-017) BIO Inf. from T-530	651336
(FT-042T) MW-38 Source to T-540/541	4007125	(FT-018) T-540/541 Influent	8653040
(FT-055) On - Site N. End Influent	97647758	(FT-352) T-352 to HMR-30	1283431

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	40 °F (Analog Gauge)	Outside Temp.: ~ 45 °F
Compressor Building Vent	✓	closed - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours ~Accuracy Current Hours @ 62066
IRN30H Motor Speed	31 %	
IRN30H Pressure	111 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: ~~9-12-21~~ 9-30-21-today
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc-calibration + maint 9-28-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 9-30-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.81	32.1 %	6.5	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.61	53 %	P035 34.35 / P038 7.5	Globules Observed at TP-130: Y / (N) Time: 0940
T-530 P-005	✓	0.20	40 %	6.5	
T-540/541 P-006	✓	0.30	65 %	5.5	
LFG COND Auto-Traps	✓	0.0	NA	5.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.44	63.3 %	5.5	
P-3322	✓	3.29	60.1 %	5.5	
P-3323	✓	2.47	74.5 %	5.5	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	1.71	36.2 %	9.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 6.22.21
B-3331	✓	4.28	136	10-1-21	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.38	136	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.29	132	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 3.6 PPM
VTP-3360	✓	PID Reading: 1.9 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 55 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 27 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 57 % & 57 %	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.97 gpm @ 1047
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 9-23-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 17 Gallons: ~ 80
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 125 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 9-23-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	9-30-21 - Today	New 4+10 pH stds today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 33	reset
BF-3340 a/b Differential Pressure	PSI: 1	8/7 @ 1.5 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 0	7/7 @ 1.5 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 86 Events
HMI's	✓	
BTS Process KWH Meter	1800502 KWH	Time: 1140
Building#2 KWH Meter	5227489 KWH	Time: 1140

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - Calibration + Maint 9-29-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, September 30, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5930468	
FT-3324 Feed Spare	87149	
FT-3322 Feed to Reactor 2	10644830	
FT-3323 Feed to Reactor 3	646100	
FT-3301 T-510 to BIO	57452180	
FT-3341 BIO Effluent	66232818	
FT-3342 BIO Recycle	55377411	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 9-30-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

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MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.48 oc	Counter: 184155 Cycles: 851
LFG Cond Automatic Trap CT-2	Sump Level: 8.65 oc	Counter: 274231 Cycles: 52
LFG Cond Automatic Trap CT-3	Sump Level: 7.23 oc	Counter: 306221 Cycles: 965
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191242 Cycles: 0 Sump: 8.54 oc
PM-15 Containment / Vessel	✓ Level: 52 %	
MW-51 Containment / Vessel	✓ Level: 40 %	
PM-11 Containment / Vessel	✓ Level: 40 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 9-24-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 9-23-21
North Boundary System P-001:	CV 74.9 % @ 7.1 gpm	41.71 Hz / 2.10 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 40 % & 39 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	63.7 °F	Outside Temp.: ~ 58 °F
(P-121) or P-122	✓	2.0 gpm / CV 57 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 9-23-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 9-23-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 715 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 250 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 54 Gallons Reserve = 1 tote + 30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-82 CV: 7 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.07	
pH 315	Value: 10.91	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~375	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #12-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly:
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	10-7-21 - today	1233
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1335
pH-740 Discharge Surge Tank		Discharge suspended: 1226 ↔ 1232
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~55 %
Sludge Holding Tank (T-352)	✓	Level: 44 %
Decant Transfer Pump (P-352)	✓	CV 56 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: 4 / currently pumping from T-351

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 47 %	
Feed Pump (P-114)	✓ Operating Press: 51.7 psi	CV@ 100 % @ 3.3 gpm
Retention Tank (T-114)	✓ Operating Press: 50 psi	pH-113 @ 3.56
Bag Filter (BF-113)	✓ Operating Press: 54 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 49 psi	TP-173A-2 → TP-175A / 4 cartridges + GAC
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 25 psi	CV@ 69 % @ 35.9 gpm
T-520 to GAC Total (FT-675)	250510112 gal	Time: 1001
North End On-Site Pumping	Operating Press: 2-3 psi	13.2 gpm @ 0952
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 0952
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Exhaust + Main both Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2587 Volts 9.9 Amps
Lamp Hours	1653 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12.0 psi In 12.5 psi Out
UV-OX Feed Pump ((P-600) or P-601)	✓	CV@ 77 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 15.8 °C	Out(TT-710): 27.4 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	20 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19912158 gal	Time: 1001
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.75 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 14 psi
PDT-730	✓	Δ Pressure: 5 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 56.9 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.5 gpm @ 0959
POTW Line Pressure (PT-770)	✓	33.0 psi
Effluent Totalizer Reading (FT-770)	244620682 gal	Time: 1002
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 9-27-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 9-30-21	Plant Effluent Suspended: 1350 ↔ 1410
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Ⓨ or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	minor - 49.3→49.0% / 2.003→2.001

O. WTP INFLUENT TOTALIZERS Time : 1002-1006

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19644964	(FT-505) LFG Cond. to T-530	217084
(FT-025) NBBW Influent	93848365	(FT-056) Off - Site N. End Influent	42948728
(FT-012) MW-38 Inf. to HMR-30	8227969	(FT-113) Ion Exchange Influent	707971
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30060484
(FT-043) MW-38 to RWST	3073983	(FT-026) NBBW Bypass to RWST	4391497
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8162856
(FT-012T) MW-38 to T-540/541	8608152	(FT-035) NTES Inf. to BIO	6649651
(FT-040T) MW-38N to T-540/541	1977498	(FT-035T) NTES to T-530	460540
(FT-041T) MW-38S to T-540/541	26955519	(FT-017) BIO Inf. from T-530	651889
(FT-042T) MW-38 Source to T-540/541	4007125	(FT-018) T-540/541 Influent	8655969
(FT-055) On - Site N. End Influent	97780912	(FT-352) T-352 to HMR-30	1285906

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	59 °F (Analog Gauge)	Outside Temp.: ~ 58 °F
Compressor Building Vent	✓	closed - operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ 62160
IRN30H Motor Speed	31 %	
IRN30H Pressure	114 psi	
IRN30H Moisture purge valve chk(Weekly)	✓	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓ ECO on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: # 2
Alarms Enabled	✓	cc-calibration + monthly 10-6-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 9-30-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	3.38	48.7 %	11.0	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.53	48 %	P035: 36.37 / P038: 5.0	Globules Observed at TP-130: Y / (N) Time: 0935
T-530 P-005	✓	0.20	36 %	6.0	
T-540/541 P-006	✓	0.30	57 %	4.0	
LFG COND Auto-Traps	✓	0.0	NA	5.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.64	74.1 %	8.5	
P-3322	✓	3.67	54.7 %	6.0	
P-3323	✓	2.64	61.5 %	7.5	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	2.02	36.4 %	8.5	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.26	140	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.39	144	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.30	140	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 14.6 PPM
VTP-3360	✓	PID Reading: 9.1 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 24 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 33 % & 34%	
T-540/541 Mixers	✓	
Chiller	✓	Chiller Coolant Lvl: ~ – " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 8-30-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 72 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.03 gpm @ 1026
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 9-23-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 16.9 Gallons: ~ 75
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 110 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 9-23-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	9-30-21	spray off clean tubes
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 24	reset to 3 gpm
BF-3340 a/b Differential Pressure	PSI: 3	15/12 ≈ 4.1 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 5	12/7 ≈ 4.1 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 86 Events
HMI's	✓	
BTS Process KWH Meter	1802536 KWH	Time: 1127
Building#2 KWH Meter	5230630 KWH	Time: 1127

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	GC-calibration + maint 10-6-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 07, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5952232	
FT-3324 Feed Spare	87149	
FT-3322 Feed to Reactor 2	10675076	
FT-3323 Feed to Reactor 3	667552	
FT-3301 T-510 to BIO	51469844	
FT-3341 BIO Effluent	66260823	
FT-3342 BIO Recycle	55418748	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 9-30-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.00 ft	Counter: 186409 Cycles: 2254
LFG Cond Automatic Trap CT-2	Sump Level: 8.65 ft	Counter: 274231 Cycles: 0
LFG Cond Automatic Trap CT-3	Sump Level: 7.39 ft	Counter: 307080 Cycles: 859
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191244 Cycles: 2 Sump: 9.10 ft
PM-15 Containment / Vessel	✓ Level: 60 %	
MW-51 Containment / Vessel	✓ Level: 25 %	
PM-11 Containment / Vessel	✓ Level: 25 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 9-24-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 16.07' Date: 9-25-21
North Boundary System P-001:	CV 74.6% @ 7.0 gpm	11.41 Hz / 2.09 Amps. / vault psi @ 19/wet leaks
T-101 & T-102 Containment / Tank	✓	Levels: 37 % & 38 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	56.9 °F	Outside Temp.: ~ 42 °F
P-121 or P-122	✓	0.6 gpm / CV 49 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 9-23-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 9-23-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~~560~~ 560 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 225 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 300 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-84 CV: 8 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 6-3-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.31	
pH 315	Value: 10.96	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~500	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21/#2-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	10-14-21-Today	1356
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1435
pH-740 Discharge Surge Tank		Discharge suspended: 1348 ↔ 1355
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 45 %
Decant Transfer Pump (P-352)	✓	CV 60 % @ 0.7 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty ready to fill

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 52 %	Not using TANK / currently Direct Feed Formula
Feed Pump (P-114)	✓ Operating Press: 54.9 psi	CV@ 100 % @ 3.3 gpm
Retention Tank (T-114)	✓ Operating Press: 50-52 psi	pH-113 @ 3.73
Bag Filter (BF-113)	✓ Operating Press: 54-56 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 50-52 psi	TP-173A-2 → TP-175A / 4 cartridges + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 27 psi	CV@ 70 % @ 34.8 gpm
T-520 to GAC Total (FT-675)	250849872 gal	Time: 1018
North End On-Site Pumping	Operating Press: 2-3 psi	13.1 gpm @ 1011
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 1011
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.00 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Items mark Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 25-43 Volts 10.1 Amps
Lamp Hours	1819 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12.0 psi In 12.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 77 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 15.4 °C	Out(TT-710): 27.2 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.00 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	19989052 gal	Time: 1019
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.75 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 16 psi
PDT-730	✓	Δ Pressure: 5 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 56.0 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	358 gpm @ 1014
POTW Line Pressure (PT-770)	✓	32.6 psi
Effluent Totalizer Reading (FT-770)	244966782 gal	Time: 1019
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 9-27-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 9-30-21	Plant Effluent Suspended: 1350 ↔ 1410
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Ⓨ or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	Minor - 49.3→49% / 2.003→2.001

O. WTP INFLUENT TOTALIZERS Time : 1019-1024

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19657904	(FT-505) LFG Cond. to T-530	217750
(FT-025) NBBW Influent	93917181	(FT-056) Off - Site N. End Influent	43026020
(FT-012) MW-38 Inf. to HMR-30	8241469	(FT-113) Ion Exchange Influent	739408
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30061556
(FT-043) MW-38 to RWST	3074816	(FT-026) NBBW Bypass to RWST	43947255
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8171793
(FT-012T) MW-38 to T-540/541	8619022	(FT-035) NTES Inf. to BIO	6654584
(FT-040T) MW-38N to T-540/541	1977936	(FT-035T) NTES to T-530	460794
(FT-041T) MW-38S to T-540/541	2695864	(FT-017) BIO Inf. from T-530	652405
(FT-042T) MW-38 Source to T-540/541	4017250	(FT-018) T-540/541 Influent	86588 51
(FT-055) On - Site N. End Influent	97913042	(FT-352) T-352 to HMR-30	1288222

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS *currently running on backups* main down currently*

Item	Status	Comments
Compressor Intake Temp.	60 °F (Analog Gauge)	Outside Temp.: ~ 45 °F
Compressor Building Vent	✓	open / operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ NA / currently off
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-31
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓ Running	Both cool to touch: Y / (N) Running
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	CC-calibrations & maint on 10-13-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 9-30-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

*Main compressor blew fuses last night and developed an air leak, leaving off until repaired, currently running on back up compressors.

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.83	31.8 %	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035 34-35	P038 6.5	Globules Observed at TP-130: Y / (N) Time: 0955
T-530 P-005	✓	0.21	41 %	6.5		
T-540/541 P-006	✓	0.29	57 %	5.5		
LFG COND Auto-Traps	✓	0.0	NA	5.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.48	45.8 %	4.5		
P-3322	✓	3.24	42.1 %	4.5		
P-3323	✓	2.42	66.1 %	4.5		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.09	50.1 %	14.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.29	130	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.50	132	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.33	130	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 19.6 PPM
VTP-3360	✓	PID Reading: 12.8 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 62 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 30 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 90 % & 91 %	
T-540/541 Mixers	✓ ✗	T-541 Runs a little wobble and trips Breaker. Needs replaced.
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 10-13-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 72 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 32 %	
Recycle Valve to Blend Tank	✓	4.01 gpm @ 1052
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 9-23-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 16.75 Gallons: ~ 45
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 104 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 9-23-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	9-30-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 23	reset
BF-3340 a/b Differential Pressure	PSI: 1	5/6 21.6 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 1	6/7 21.6 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Tested ran on OK. Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 88 Events
HMI's	✓	
BTS Process KWH Meter	1804702 KWH	Time: 1256
Building#2 KWH Meter	5234457 KWH	Time: 1256

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc-calibration + maint 10-13-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 14, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5974163	
FT-3324 Feed Spare	87155	
FT-3322 Feed to Reactor 2	10705518	
FT-3323 Feed to Reactor 3	689163	
FT-3301 T-510 to BIO	51489391	
FT-3341 BIO Effluent	66288744	
FT-3342 BIO Recycle	55460594	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 9-30-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.42 ok	Counter: 186490 Cycles: 81
LFG Cond Automatic Trap CT-2	Sump Level: 8.62 ok	Counter: 274305 Cycles: 74
LFG Cond Automatic Trap CT-3	Sump Level: 7.29 ok	Counter: 307538 Cycles: 458
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191244 Cycles: 0 Sump: 8.89 ok
PM-15 Containment / Vessel	✓ Level: 65 %	
MW-51 Containment / Vessel	✓ Level: 50 %	
PM-11 Containment / Vessel	✓ Level: 40 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 9-24-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 10-21-21 - Today
North Boundary System P-001:	CV 74.4 % @ 6.9 gpm	41.27 Hz / 7.09 Amps. / vault psi @ 18 / no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 30 % & 30 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	57.0 °F	Outside Temp.: ~ 49 °F
(P-121) or P-122	✓	0.60 gpm / CV 55 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 10-21-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 10-21-21 TEST clock hour ok

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 425 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 200 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 275 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 78-82 CV: 7 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.80	
pH 310	Value: 6.92	
pH 315	Value: 10.93	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 425	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #42-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allen
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	10-21-21-Today	1321
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1352
pH-740 Discharge Surge Tank		Discharge suspended: 1314 ↔ 1320
Out of Hold Double Check	----------	None in hold: ✓✓'d
Valves Back to Normal Position	----------	All OK: ✓✓'d

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 53 %
Decant Transfer Pump (P-352)	✓	CV 73 % @ 0.8 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty / currently getting washout

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 48 %	Not using tank/currently direct Feed from well
Feed Pump (P-114)	✓ Operating Press: 50.3 psi	CV@ 100 % @ 3.3 gpm
Retention Tank (T-114)	✓ Operating Press: 49-52 psi	pH-113 @ 3.56
Bag Filter (BF-113)	✓ Operating Press: 50-54 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 49-51 psi	TP-173A-2 → TP-175A/4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 30 psi	CV@ 73 % @ 35.3 gpm
T-520 to GAC Total (FT-675)	251197040 gal	Time: 1030
North End On-Site Pumping	Operating Press: 2-3 psi	13.0 gpm @ 1024
North End Off-Site Pumping	Operating Press: 2-6 psi	8.8 gpm @ 1024
Peroxide Feed Pump (P-680)	✓	SPD 2.7 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: N/A/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resins + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: N/A/Running	Next: N/A/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2522 Volts 10.1 Amps
Lamp Hours	1985 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12.5 psi In 12.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 77 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 15.3 °C	Out(TT-710): 27.1 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	200166008 gal	Time: 1030
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 8 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 19 psi
PDT-730	✓	Δ Pressure: 5 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 56.0 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	36.1 gpm @ 1028
POTW Line Pressure (PT-770)	✓	32.6 psi
Effluent Totalizer Reading (FT-770)	245320030 gal	Time: 1031
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 10-19-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 9-30-21	Plant Effluent Suspended: 1350 ↔ 1410
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Ⓨ or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	Minor - 49.3→49% / 2.003→2.001

O. WTP INFLUENT TOTALIZERS Time : 1031-1041

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19663952	(FT-505) LFG Cond. to T-530	217816
(FT-025) NBBW Influent	93985653	(FT-056) Off - Site N. End Influent	43108536
(FT-012) MW-38 Inf. to HMR-30	~~35484~~ 8262319	(FT-113) Ion Exchange Influent	772887
(FT-042 HMR30) MW-38 Source to HMR-30	~~3075411~~ 35484	(FT-810) Plant Potable Water In	30062980
(FT-043) MW-38 to RWST	~~72236~~ 3075411	(FT-026) NBBW Bypass to RWST	4396418
(FT-042 RWST) MW-38 Source to RWST	~~8619022~~ 72236	(FT-014) Misc. Water to RWST	8171793
(FT-012T) MW-38 to T-540/541	~~1977936~~ 8619022	(FT-035) NTES Inf. to BIO	6659539
(FT-040T) MW-38N to T-540/541	~~2695864~~ 1977936	(FT-035T) NTES to T-530	461003
(FT-041T) MW-38S to T-540/541	~~4017250~~ 2695864	(FT-017) BIO Inf. from T-530	652921
(FT-042T) MW-38 Source to T-540/541	4017250	(FT-018) T-540/541 Influent	8661759
(FT-055) On - Site N. End Influent	98044996	(FT-352) T-352 to HMR-30	1291676

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS * Main VFD bad shut off/Running on backups

Item	Status	Comments
Compressor Intake Temp.	55 °F (Analog Gauge)	Outside Temp.: ~ 51 °F
Compressor Building Vent	✓	open/open-mesh
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ N4/OFF
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	~	
IRN30H Intake Filter	—	Date Last Changed: 9-30-31
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / Ⓝ
Air Dryer	✓	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	CC-calibration & maint 10-20-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 9-30-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

* Main compressor has a bad VFD. Replacement on order. Repair planned

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.85	30.1 %	6.5	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	47 %	P035 34-35 / P038 7.5	Globules Observed at TP-130: Y / (N) Time: 0935
T-530 P-005	✓	0.19	41 %	6.5	
T-540/541 P-006	✓	0.30	63 %	7.0	
LFG COND Auto-Traps	✓	0.0	NA	5	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.54	75.4 %	10.0	
P-3322	✓	3.51	58.8 %	7.0	
P-3323	✓	2.57	74.3 %	5.0	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	2.74	53.6 %	19.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.28	130	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.35	130	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.32	126	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 21.7 PPM
VTP-3360	✓	PID Reading: 17.2 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 71 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-520 LFG Condensate / NTES Tank	✓ Level: 26 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 68 % & 69 %	
T-540/541 Mixers	✓	* T-541 needs new one. Replacement ordered
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out) Check OK when cold
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 10-13-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	Level: 30 %	
Recycle Valve to Blend Tank	✓	4.00 gpm @ 1055
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 10-21-21 - today

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 16.50 Gallons: ~ 60
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 85 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 10-21-21 - today
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	9-30-21	Acid/BASE clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 14	reset
BF-3340 a/b Differential Pressure	PSI: 5	21/16 @ 3.8gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date:	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 9	16/7 @ 3.8gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	Been OK on Warm setting
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 88 Events
HMI's	✓	
BTS Process KWH Meter	1806591 KWH	Time: 1138
Building#2 KWH Meter	523982 KWH	Time: 1138

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC-Calibration remains 10-20-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 21, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	5996358	
FT-3324 Feed Spare	87155	
FT-3322 Feed to Reactor 2	10736358	
FT-3323 Feed to Reactor 3	711051	
FT-3301 T-510 to BIO	51509465	
FT-3341 BIO Effluent	66317434	
FT-3342 BIO Recycle	55502281	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 9-30-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 13.02 ok	Counter: 188284 Cycles: 1794
LFG Cond Automatic Trap CT-2	Sump Level: 8.68 ok	Counter: 274344 Cycles: 39
LFG Cond Automatic Trap CT-3	Sump Level: 7.60 ok	Counter: 309101 Cycles: 1563
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191244 Cycles: 0 Sump: 9.17 ok
PM-15 Containment / Vessel	✓ Level: 75 %	
MW-51 Containment / Vessel	✓ Level: 25 %	
PM-11 Containment / Vessel	✓ Level: 25 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 9-24-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 2/13/20
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 10-21-21
North Boundary System P-001:	CV 74.6 % @ 6.9 gpm	4141 Hz / 2.10 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 30 % & 31 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	56.6 °F	Outside Temp.: ~ 49 °F
(P-121) or P-122	✓	1.2 gpm / CV 56 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 10-21-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 10-21-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 315 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~175 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 250 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 80-82 CV: 7 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.80	
pH 315	Value: 10.94	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 360	
Clear-well Transfer Pumps(P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #1&2-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	10-29-21-Friday	1320
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1352
pH-740 Discharge Surge Tank		Discharge suspended: 1352 ↔ 1413
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 40 %
Decant Transfer Pump (P-352)	✓	CV 70 % @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty/needs washout

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 52 %	
Feed Pump (P-114)	✓ Operating Press: 48.9 psi	CV@ 100 % @ 3.1 gpm
Retention Tank (T-114)	✓ Operating Press: 48-49 psi	pH-113 @ 3.99
Bag Filter (BF-113)	✓ Operating Press: 51-52 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 48-49 psi	TP-175A-2 → TP-175A / 4 Canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or (P-522))	Operating Press: 20 psi	CV@ 64 % @ 39.6 gpm
T-520 to GAC Total (FT-675)	25153624 gal	Time: 1302
North End On-Site Pumping	Operating Press: 2-3 psi	13.0 gpm @ 1256
North End Off-Site Pumping	Operating Press: 2-6 psi	8.2 gpm @ 1256
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Ix Resin + Main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 20 cc/min.
UV-Ox Power	✓	25.7 kVA 2580 Volts 10.0 Amps
Lamp Hours	27 Hrs	Lamp Failed on 10-21-21. Changed out w/new
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	13.5 psi In 13.5 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 80 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 14.5 °C	Out(TT-710): 26.3 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 5 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20139999 gal	Time: 1302
Post UV-Ox / Pre PDU	✓	Pressure: 15 psi
Post PDU	✓	Pressure: 8 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720 Backwashed 10-22-21	✓	Δ Pressure: 9 psi
PDT-730	✓	Δ Pressure: 6 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 55.3 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	35.2 gpm @ 1300
POTW Line Pressure (PT-770)	✓	32.5 psi
Effluent Totalizer Reading (FT-770)	24563656 gal	Time: 1304
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 10-19-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 10-29-21	Plant Effluent Suspended: 1352 ↔ 1413
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.000 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1304- 1308

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19671556	(FT-505) LFG Cond. to T-530	218333
(FT-025) NBBW Influent	94050832	(FT-056) Off - Site N. End Influent	43186284
(FT-012) MW-38 Inf. to HMR-30	8281522	(FT-113) Ion Exchange Influent	8035543
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30063844
(FT-043) MW-38 to RWST	3076642	(FT-026) NBBW Bypass to RWST	4402592
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8173749
(FT-012T) MW-38 to T-540/541	8619025	(FT-035) NTES Inf. to BIO	6664270
(FT-040T) MW-38N to T-540/541	1977937	(FT-035T) NTES to T-530	461537
(FT-041T) MW-38S to T-540/541	2695864	(FT-017) BIO Inf. from T-530	653562
(FT-042T) MW-38 Source to T-540/541	4017250	(FT-018) T-540/541 Influent	8664543
(FT-055) On - Site N. End Influent	98177898	(FT-352) T-352 to HMR-30	12955557

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS *STill Running on Backups*

Item	Status	Comments
Compressor Intake Temp.	59 °F (Analog Gauge)	Outside Temp.: ~ 50 °F
Compressor Building Vent	✓	Open/operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Y / N Next service @ 62952 Hours Current Hours @ NA/OFF
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	—	Date Last Changed: 9-30-31
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / N
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / N
Air Dryer	✓ Ecoair	Moisture at Receiver Tank: Y / N
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	105 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc-calibration + maint 10-28-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 10-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	3.67	52.7 %	12.0	
P-3301A	SB	—	— %	—	
NTES Pump Currently filling line w/potable water ~~P-002(Sump)~~ / ~~P-002W(10R)~~	✓	0.53	52 %	P035 29 / P038 6	Globules Observed at TP-130: Y / (N) Time: 1245
T-530 P-005	SB	0.0	— %	—	
T-540/541 P-006	✓	0.30	68 %	6.5	
LFG COND Auto-Traps	✓	0.0	NA	5.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.65	63.5 %	7.0	
P-3322	✓	3.65	53.7 %	6.0	
P-3323	✓	2.64	85.6 %	6.0	
P-3324	SB	—	— %	—	
Reactor Effluent Pumps					
P-3341	✓	3.09	60.1 %	19.0	
P-3341A	SB	—	— %	—	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.31	128	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	—	—	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.38	128	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.32	124	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 10.6 PPM
VTP-3360	✓	PID Reading: 3.8 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 33 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 48 % & 49 %	
T-540/541 Mixers	✓	* T-541 Mixer needs replace. Replacement ordered.
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 10-13-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 73 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.52 gpm @ 1321
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 10-21-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 16.25 Gallons: ~ 75
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 60 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 10-21-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	10-29-21 - Friday	New 4+10 pH STDS today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 21	reset
BF-3340 a/b Differential Pressure	PSI: 4	17/21 @ 410gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 10	17/7 @ 410gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 93 Events
HMI's	✓	
BTS Process KWH Meter	1808979 KWH	Time: 1344
Building#2 KWH Meter	5243065 KWH	Time: 1344

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	GC - calibration sample on 10-27-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, October 28, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6019208	
FT-3324 Feed Spare	87164	
FT-3322 Feed to Reactor 2	10768102	
FT-3323 Feed to Reactor 3	733587	
FT-3301 T-510 to BIO	51530687	
FT-3341 BIO Effluent	66346817	
FT-3342 BIO Recycle	55545739	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 10-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.59 oz	Counter: 188599 Cycles: 315
LFG Cond Automatic Trap CT-2	Sump Level: 8.68 oz	Counter: 274413 Cycles: 69
LFG Cond Automatic Trap CT-3	Sump Level: 7.28 oz	Counter: 309172 Cycles: 71
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.45 Counter: 191244 Cycles: 0 Sump: 8.97oz
PM-15 Containment / Vessel	✓ Level: 73 %	
MW-51 Containment / Vessel	✓ Level: 50 %	
PM-11 Containment / Vessel	✓ Level: 40 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 10-29-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: ~~5/13/20~~ 10-29-21
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 16.0' Date: 10-21-21
North Boundary System P-001:	CV 74.4 % @ 6.9 gpm	41.27 Hz / 2.08 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 29 % & 28 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	56.4 °F	Outside Temp.: ~ 46 °F
(P-121) or P-122	✓	1.2 gpm / CV 60 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 10-21-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 10-21-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 380 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 153 Gallons Reserve = ~55gal
HCL Tote Levels	✓	~ 220 Gallons Reserve = ~70gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 80-82 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.73	
pH 315	Value: 10.87	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps (P-371) / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Bothok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3- 7-20-21 / #1&2-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allon
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	11-4-21 - Today	1158
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1237
pH-740 Discharge Surge Tank		Discharge suspended: 1150 ↔ 1151
Out of Hold Double Check	----------	None in hold: ✓ ✓ ✓
Valves Back to Normal Position	----------	All OK: ✓ ✓ ✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 44 %
Decant Transfer Pump (P-352)	✓	CV 63 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 53 %	
Feed Pump (P-114)	✓ Operating Press: 48.8 psi	CV@ 98 % @ 3.0 gpm
Retention Tank (T-114)	✓ Operating Press: 45-47 psi	pH-113 @ 3.62
Bag Filter (BF-113)	✓ Operating Press: 48-50 psi	
Ion Exchange (Cage 1 or 2) + Guard	✓ Operating Press: 45-47 psi	TP-173A-2 → TP-175A / 4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 23 psi	CV@ 67 % @ 34.3 gpm
T-520 to GAC Total (FT-675)	251875304 gal	Time: 0942
North End On-Site Pumping	Operating Press: 2-3 psi	13.0 gpm @ 0915
North End Off-Site Pumping	Operating Press: 2-6 psi	8.2 gpm @ 0915
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resin + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2601 Volts 10.0 Amps
Lamp Hours	191 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok refilled
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	13.0 psi In 13.5 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 78 % @ 8.0 gpm
UV-OX Temperature	In(TT-670): 14.3 °C	Out(TT-710): 26.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 5 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 0 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20216484 gal	Time: 0943
Post UV-Ox / Pre PDU	✓	Pressure: 15 psi
Post PDU	✓	Pressure: 8 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 12 psi
PDT-730	✓	Δ Pressure: 6 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 55.1 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	34.7 gpm @ 0919
POTW Line Pressure (PT-770)	✓	32.4 psi
Effluent Totalizer Reading (FT-770)	246006886 gal	Time: 0943
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 10-19-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 7-19-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~New in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 10-24-21	Plant Effluent Suspended: 1352 ↔ 1413
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.000 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0943 - 0948

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19683225	(FT-505) LFG Cond. to T-530	218425
(FT-025) NBBW Influent	94117434	(FT-056) Off - Site N. End Influent	43265688
(FT-012) MW-38 Inf. to HMR-30	8301434	(FT-113) Ion Exchange Influent	832959
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30064908
(FT-043) MW-38 to RWST	3077015	(FT-026) NBBW Bypass to RWST	4403997
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8180743
(FT-012T) MW-38 to T-540/541	8619025	(FT-035) NTES Inf. to BIO	6667330
(FT-040T) MW-38N to T-540/541	1977937	(FT-035T) NTES to T-530	464016
(FT-041T) MW-38S to T-540/541	2695864	(FT-017) BIO Inf. from T-530	655598
(FT-042T) MW-38 Source to T-540/541	4017250	(FT-018) T-540/541 Influent	8667419
(FT-055) On - Site N. End Influent	98306028	(FT-352) T-352 to HMR-30	1298234

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS * Still running on backups *

Item	Status	Comments
Compressor Intake Temp.	62 °F (Analog Gauge)	Outside Temp.: ~ 51 °F
Compressor Building Vent	✓	open / screened
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ —
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 930-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / Ⓝ
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	105 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: * 1
Alarms Enabled	✓	Cc calibration + running 11-3-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 10-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.92	30.5 %	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.50	48 %	P035 35-36	P038 7.0	Globules Observed at TP-130: Y / (N) Time: 0850
T-530 P-005	✓	0.20	41 %	6.5		
T-540/541 P-006	✓	0.29	74 %	6.5		
LFG COND Auto-Traps	✓	0.0	NA	5		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.52	46.9 %	5.0		
P-3322	✓	3.51	48.8 %	5.0		
P-3323	✓	2.49	67.8 %	5.0		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.97	68.2 %	23.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-4-21
B-3331	✓	4.37	132	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	✓	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.39	130	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.35	128	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 167 PPM
VTP-3360	✓	PID Reading: 10.1 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 43 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 25 % & 25 %	
T-540/541 Mixers	✓	T541 mixer shutdown.
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 10-13-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 73 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 31 %	
Recycle Valve to Blend Tank	✓	4.01 gpm @ 1003
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 10-21-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 16 Gallons: ~85
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 55 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 10-21-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	10-29-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2	↓	↓
pH-3333 Reactor 3	↓	↓

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 36	Leset
BF-3340 a/b Differential Pressure	PSI: 6	18/24 @ 4.0gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date: ↓	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 11	18/7 @ 4.0gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 93 Events
HMI's	✓	
BTS Process KWH Meter	1811482 KWH	Time: 1107
Building#2 KWH Meter	5248364 KWH	Time: 1107

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - Calibration + matrix 11-8-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 04, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6041847	
FT-3324 Feed Spare	93574	
FT-3322 Feed to Reactor 2	10799535	
FT-3323 Feed to Reactor 3	749772	
FT-3301 T-510 to BIO	51553896	
FT-3341 BIO Effluent	66377951	
FT-3342 BIO Recycle	55596121	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 10-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.52 ok	Counter: 189413 Cycles: 814
LFG Cond Automatic Trap CT-2	Sump Level: 8.46 ok	Counter: 274542 Cycles: 129
LFG Cond Automatic Trap CT-3	Sump Level: 7.21 ok	Counter: 310014 Cycles: 842
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 19246 Cycles: 2 Sump: 8.32 ok
PM-15 Containment / Vessel	✓ Level: 76 %	
MW-51 Containment / Vessel	✓ Level: 30 %	
PM-11 Containment / Vessel	✓ Level: 30 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 10-29-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: ~216.07' Date: 10-21-21
North Boundary System P-001:	CV 74.2 % @ 6.8 gpm	41.13 Hz / 2.08 Amps. / vault psi @ 18/No leaks
T-101 & T-102 Containment / Tank	✓	Levels: 46 % & 45 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	55.9 °F	Outside Temp.: ~ 45 °F
(P-121) or P-122	✓	1.0 gpm / CV 45 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 10-21-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 10-21-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 345 Gallons Reserve = 1 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 126 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 205 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 80-82 CV: 6 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.01	
pH 315	Value: 10.96	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 400	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-2021 / #12-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	11-11-21 - today	1202
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1240
pH-740 Discharge Surge Tank		Discharge suspended: 1152 ↔ 1201
Out of Hold Double Check	----------	None in hold:
Valves Back to Normal Position	----------	All OK:

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running		Gauge Reading: %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 42 %
Decant Transfer Pump (P-352)	✓	CV 61 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Ready to fill

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STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 49 %	
Feed Pump (P-114)	✓ Operating Press: 42.8 psi	CV@ 84 % @ 2.9 gpm
Retention Tank (T-114)	✓ Operating Press: 40-42 psi	pH-113 @ 3.73
Bag Filter (BF-113)	✓ Operating Press: 43-45 psi	
Ion Exchange (Cage 1 or 2) + Guard	✓ Operating Press: 40-42 psi	TP-173A-2 → TP-175A/4 cannisters + Guard
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: ~~80~~ 26 psi	CV@ 80 % @ 33.8 gpm
T-520 to GAC Total (FT-675)	252195564 gal	Time: 0936
North End On-Site Pumping	Operating Press: 2-3 psi	12.8 gpm @ 0931
North End Off-Site Pumping	Operating Press: 2-6 psi	8.4 gpm @ 0931
Peroxide Feed Pump (P-680)	✓	SPD 2.5 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: I X Resin + Main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.0 cc/min.
UV-Ox Power	✓	25.7 kVA 2577 Volts 10.0 Amps
Lamp Hours	339 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	12.0 psi In 12.5 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 77 % @ 7.9 gpm
UV-OX Temperature	In(TT-670): 14.5 °C	Out(TT-710): 26.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 0 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20284232 gal	Time: 0936
Post UV-Ox / Pre PDU	✓	Pressure: 15 psi
Post PDU	✓	Pressure: 8 psi

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STANDARD OPERATIONS CHECKLIST
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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 15 psi
PDT-730	✓	Δ Pressure: 6 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or (P752))	✓	CV@ 54.5 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	34.0 gpm @ 0934
POTW Line Pressure (PT-770)	✓	32.4 psi
Effluent Totalizer Reading (FT-770)	246329884 gal	Time: 0936
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 11-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: ↓
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 10-29-21	Plant Effluent Suspended: 1352 ↔ 1413
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.000 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0937 - 0941

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19696869	(FT-505) LFG Cond. to T-530	218619
(FT-025) NBBW Influent	94176860	(FT-056) Off - Site N. End Influent	43340164
(FT-012) MW-38 Inf. to HMR-30	8313838	(FT-113) Ion Exchange Influent	860340
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30065290
(FT-043) MW-38 to RWST	3080261	(FT-026) NBBW Bypass to RWST	4414089
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8187853
(FT-012T) MW-38 to T-540/541	8628632	(FT-035) NTES Inf. to BIO	6672066
(FT-040T) MW-38N to T-540/541	1978197	(FT-035T) NTES to T-530	464291
(FT-041T) MW-38S to T-540/541	2696237	(FT-017) BIO Inf. from T-530	656512
(FT-042T) MW-38 Source to T-540/541	4026207	(FT-018) T-540/541 Influent	8669467
(FT-055) On - Site N. End Influent	98434419	(FT-352) T-352 to HMR-30	1300656

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS * Still Running on BACK UPS *

Item	Status	Comments
Compressor Intake Temp.	56 °F (Analog Gauge)	Outside Temp.: ~ 47 °F
Compressor Building Vent	✓	
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ — off
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / (N)
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank		102 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc - calibration + maint 11-10-21 * NEW TRAP *
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 10-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.79	32.0 %	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	49 %	P035 34-35	P038 6.5	Globules Observed at TP-130: Y / (N) Time: 0905
T-530 P-005	✓	0.20	41 %	7.0		
T-540/541 P-006	✓	0.30	57 %	7.0		
LFG COND Auto-Traps	✓	0.0	NA	5.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	~~2.28~~ ✓	~~57.8~~ 2.28	57.8 %	7.0		
P-3322	✓	3.19	51.2 %	5.5		
P-3323	SB	–	– %	–		
P-3324	~~2.34~~ ✓	~~36.4~~ 2.34	36.4 %	5.0		
Reactor Effluent Pumps						
P-3341	✓	2.15	48.9 %	16		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.35	126	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.36	126	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.34	122	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 21.7 PPM
VTP-3360	✓	PID Reading: 12.6 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 37 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 71 % & 80 %	
T-540/541 Mixers	✓	T-541 SP: 71 Down
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 10-13-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.32 gpm @ 0952
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 10-21-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 15.95 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 45 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 10-21-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	10-29-21	Spray off Clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 109	Reset
BF-3340 a/b Differential Pressure	PSI: 3	20/17 @ 3.6 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 10	17/7 @ 3.6 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1813933 KWH	Time: 1031
Building#2 KWH Meter	5252953 KWH	Time: 1031

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	cc-calibration + matrix 11-10-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 11, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6063404	
FT-3324 Feed Spare	104106	
FT-3322 Feed to Reactor 2	10824487	
FT-3323 Feed to Reactor 3	760556	
FT-3301 T-510 to BIO	51572914	
FT-3341 BIO Effluent	66404687	
FT-3342 BIO Recycle	55628075	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 10-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

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WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.49 ac	Counter: 189973 Cycles: 560
LFG Cond Automatic Trap CT-2	Sump Level: 8.71 ac	Counter: 274542 Cycles: 0
LFG Cond Automatic Trap CT-3	Sump Level: 7.22 ac	Counter: 311383 Cycles: 1369
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: 2.13 Counter: 191255 Cycles: 9 Sump: 8.65 ac
PM-15 Containment / Vessel	✓ Level: 80 %	
MW-51 Containment / Vessel	✓ Level: 60 %	
PM-11 Containment / Vessel	✓ Level: 60 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 10-29-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 11-18-21 - today
North Boundary System P-001:	CV 74.0% @ 6.8 gpm	41.07 Hz / 2.08 Amps. / vault psi @ 18/NO leaks
T-101 & T-102 Containment / Tank	✓	Levels: 33 % & 32 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	58.5 °F	Outside Temp.: ~ 40 °F
(P-121) or P-122	✓	0.60 gpm / CV 54 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 11-18-21 - today
RWST Back-Up Generator	✓	Last Test Run(monthly): 11-18-21 - today

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 555 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 300 Gallons Reserve = 180 gal
HCL Tote Levels	✓	~ 165 Gallons Reserve = 170 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 82-84 CV: 6 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

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E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.10	
pH 315	Value: 10.96	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~500	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Balloon
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21/#12-5-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: Allon
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	11-18-21-Today	1334
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1406
pH-740 Discharge Surge Tank		Discharge suspended: 1324 ↔ 1323
Out of Hold Double Check	----------	None in hold: ✓✓ 'm
Valves Back to Normal Position	----------	All OK: ✓✓ 'm

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 48 %
Decant Transfer Pump (P-352)	✓	CV 59% @ 0.6 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty/Ready to Fill

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 54 %	
Feed Pump (P-114)	✓ Operating Press: 37.1 psi	CV@ 71 % @ 2.5 gpm
Retention Tank (T-114)	✓ Operating Press: 35 psi	pH-113 @ 3.89
Bag Filter (BF-113)	✓ Operating Press: 42 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 35 psi	TP-173A→TP-175A/4 canisters + Guard.
Post Ion Exchange	✓ Operating Press: 4 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 27 psi	CV@ 79 % @ 33.1 gpm
T-520 to GAC Total (FT-675)	252534182 gal	Time: 1041
North End On-Site Pumping	Operating Press: 2-3 psi	12.9 gpm @ 1036
North End Off-Site Pumping	Operating Press: 2-6 psi	8.2 gpm @ 1036
Peroxide Feed Pump (P-680)	✓	SPD 2.5 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Ex Resin + mats Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2568 Volts 10.1 Amps
Lamp Hours	504 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.5 psi In 11.0 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 71 % @ 7.5 gpm
UV-OX Temperature	In(TT-670): 14.4 °C	Out(TT-710): 27.1 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 2 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20360868 gal	Time: 1041
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 8 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 16 psi
PDT-730	✓	Δ Pressure: 6 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.9 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	32.9 gpm @ 1039
POTW Line Pressure (PT-770)	✓	32.1 psi
Effluent Totalizer Reading (FT-770)	2466709.72 gal	Time: 1041
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 11-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 10-29-21	Plant Effluent Suspended: 1352 ↔ 1413
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.000 volts(monthly)	Adjustment Needed: Y or N
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1042-1046

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19706548	(FT-505) LFG Cond. to T-530	218806
(FT-025) NBBW Influent	94242410	(FT-056) Off - Site N. End Influent	43425024
(FT-012) MW-38 Inf. to HMR-30	8333599	(FT-113) Ion Exchange Influent	886426
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30066388
(FT-043) MW-38 to RWST	3081218	(FT-026) NBBW Bypass to RWST	4417406
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8187833
(FT-012T) MW-38 to T-540/541	8628632	(FT-035) NTES Inf. to BIO	6676940
(FT-040T) MW-38N to T-540/541	1978197	(FT-035T) NTES to T-530	464586
(FT-041T) MW-38S to T-540/541	2696237	(FT-017) BIO Inf. from T-530	656998
(FT-042T) MW-38 Source to T-540/541	4026207	(FT-018) T-540/541 Influent	8672337
(FT-055) On - Site N. End Influent	98563298	(FT-352) T-352 to HMR-30	1303083

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS * Still running on BACKUP *

Item	Status	Comments
Compressor Intake Temp.	56 °F (Analog Gauge)	Outside Temp.: ~ 45 °F
Compressor Building Vent	✓	open - observed
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ — off
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	Running / * New motor on #1 BACKUP *	Both cool to touch: Y / Ⓝ
Air Dryer	✓ ECO on	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	cc calibration + maint - 11-17-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 10-25-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

* 11-12-21 - New Motor put on BACK UP compressor #1 (Southern most compressor)

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.83	35.3 %	6.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	49 %	P035 35-36	P038 8	Globules Observed at TP-130: Y / (N) Time: 1020
T-530 P-005	✓	0.24	40 %	7.5		
T-540/541 P-006	✓	0.30	71 %	8.0		
LFG COND Auto-Traps	✓	0.0	NA	6.0		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.53	56.4 %	7.5		
P-3322	✓	3.50	50.2 %	5.0		
P-3323	✓	2.61	78.7 %	6.5		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.38	57.6 %	16.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.32	126	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.42	128	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.33	124	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 19.8 PPM
VTP-3360	✓	PID Reading: 15.7 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 69 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 35 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 57 % & 57 %	
T-540/541 Mixers	✓	T-541-Still needs replace
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 11-12-21
T-3310 Sedimentation Tank	Visual Level: ✓	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	Level: %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	Level: 30 %	
Recycle Valve to Blend Tank	✓	3.97 gpm @ 1116
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 11-18-21 - today

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 15.75 Gallons: ~ >0
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 300 Gallons * New today *
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-18-21 - today
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	10-29-21	Acid/Caustic clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 34	Reset
BF-3340 a/b Differential Pressure	PSI: 5	19/14 @ 3.6 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: >	14/7 @ 3.6 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1816271 KWH	Time: 1154
Building#2 KWH Meter	5258252 KWH	Time: 1154

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	GC-Calibration + Maint 11-17-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, November 18, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6085028	
FT-3324 Feed Spare	107199	
FT-3322 Feed to Reactor 2	10859536	
FT-3323 Feed to Reactor 3	778819	
FT-3301 T-510 to BIO	51592049	
FT-3341 BIO Effluent	6643183S	
FT-3342 BIO Recycle	55669829	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 10-25-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.55 ok	Counter: 190,345 Cycles: 372
LFG Cond Automatic Trap CT-2	Sump Level: 8.64 ok	Counter: 274,548 Cycles: 6
LFG Cond Automatic Trap CT-3	Sump Level: 7.23 ok	Counter: 312,237 Cycles: 854
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 72 %	Tank Level: Counter: 191,255 Cycles: 0 Sump: 8.68 ok
PM-15 Containment / Vessel	✓ Level: 25 %	
MW-51 Containment / Vessel	✓ Level: 80 %	Guy Pumped later in day 11/24/21
PM-11 Containment / Vessel	✓ Level: 85 %	Guy pumped later in day 11/24/21
MW-38 Systems	✓	Good, no leaks flow Rate @ 2.0 GPM
North Toe System	✓	MPE-10R @ 17,305,795 Sump Still off
North End Systems (Weekly)	✓	System good
Full N. End Systems Check (Monthly)	✓	Last Done: 11-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 11-18-21
North Boundary System P-001:	CV 73.9 % @ 6.7 gpm	40.91 Hz / 2.07 Amps. / vault psi @ 18 / no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 24 % & 23 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	54.0 °F	Outside Temp.: ~34.0 °F
(P-121) or P-122	✓	0.60 gpm / CV 60 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 11-18-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 11-18-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 450 Gallons Reserve = 3 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 275 Gallons Reserve = ~180 gal
HCL Tote Levels	✓	~ 155 Gallons Reserve = ~70 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 81-82 CV: 5 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.87	
pH 315	Value: 10.86	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 450	
Clear-well Transfer Pumps (P-371) / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #1 #2 - 3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

* new 4+10 pH stds today *

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	11-24-21 - Today	1150
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1225
pH-740 Discharge Surge Tank		Discharge suspended: 1225 ↔ 1315
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 42 %
Decant Transfer Pump (P-352)	✓	CV 65 % @ 05 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty / Ready to fill

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	BACK RUNNING USING TANK level
Feed Pump (P-114)	✓ Operating Press: 34.7 psi	CV@ 79 % @ 2.3 gpm
Retention Tank (T-114)	✓ Operating Press: 32 psi	pH-113 @ 3.65
Bag Filter (BF-113)	✓ Operating Press: 37 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 33 psi	TP-173A-2 → TP-175A / 4 canisters + GAURD
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 39 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 30 psi	CV@ 82 % @ 34.4 gpm
T-520 to GAC Total (FT-675)	252818471 gal	Time: 0913
North End On-Site Pumping	Operating Press: 2-3 psi	12.8 gpm @ 0908
North End Off-Site Pumping	Operating Press: 2-6 psi	8.8 gpm @ 0908
Peroxide Feed Pump (P-680)	✓	SPD 2.6 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resin + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2567 Volts 10.(Amps
Lamp Hours	647 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	13 psi In 13 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 78 % @ 7.5 gpm
UV-OX Temperature	In(TT-670): 14.4 °C	Out(TT-710): 26.8 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 5 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 3 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20422900 gal	Time: 0913
Post UV-Ox / Pre PDU	✓	Pressure: 15 psi
Post PDU	✓	Pressure: 8 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 18 psi
PDT-730	✓	Δ Pressure: 7 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump ((P751) or P752)	✓	CV@ 56.7 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	34.6 gpm @ 0911
POTW Line Pressure (PT-770)	✓	32.4 psi
Effluent Totalizer Reading (FT-770)	246956826 gal	Time: 0913
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 11-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 11-24-21-today	Plant Effluent Suspended: 1225 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0914-0918

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19711820	(FT-505) LFG Cond. to T-530	218946
(FT-025) NBBW Influent	94298898	(FT-056) Off - Site N. End Influent	43497220
(FT-012) MW-38 Inf. to HMR-30	8350681	(FT-113) Ion Exchange Influent	906571
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30066756
(FT-043) MW-38 to RWST	3081586	(FT-026) NBBW Bypass to RWST	4418687
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8187833
(FT-012T) MW-38 to T-540/541	8628632	(FT-035) NTES Inf. to BIO	6681156
(FT-040T) MW-38N to T-540/541	1978197	(FT-035T) NTES to T-530	464723
(FT-041T) MW-38S to T-540/541	2696237	(FT-017) BIO Inf. from T-530	657439
(FT-042T) MW-38 Source to T-540/541	4026207	(FT-018) T-540/541 Influent	8674823
(FT-055) On - Site N. End Influent	98672887	(FT-352) T-352 to HMR-30	1305410

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS * Still Running on Backups *

Item	Status	Comments
Compressor Intake Temp.	50 °F (Analog Gauge)	Outside Temp.: ~ 36 °F
Compressor Building Vent	✓	closed - opens wind
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ — off
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / (N)
Air Dryer	✓ Econ on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	108 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: # 2
Alarms Enabled	✓	CC - calibration & maint 11-24-21 - today
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 11-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.86	34.1 %	6.5	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.52	48 %	P035 34-35 / P038 6	Globules Observed at TP-130: Y / (N) Time: 0845
T-530 P-005	✓	0.18	41 %	7.0	
T-540/541 P-006	✓	0.32	73 %	7.0	
LFG COND Auto-Traps	✓	0.0	NA	5	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.66	43.8 %	5.5	
P-3322	✓	3.65	45.4 %	5.0	
P-3323	✓	2.66	62.9 %	4.5	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	4.51	66.8 %	22.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 10-1-21
B-3331	✓	4.35	125	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.41	125	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.34	122	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 22.6 PPM
VTP-3360	✓	PID Reading: 19.2 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 64 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 34 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 40 % & 41 %	
T-540/541 Mixers	✓	T-541 shrouds replace
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: (On OK) / Off Warm out
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 11-12-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 31 %	
Recycle Valve to Blend Tank	✓	4.01 gpm @ 0936
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 11-18-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 15.5 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 280 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-18-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	11-24-21 - today	New 4 & 10 pH STDs today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 33	reset
BF-3340 a/b Differential Pressure	PSI: 4	18/14 @ 3.5 gpm
75-micron Bags Last Cleaning	Date: 11-14-19	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 7	14/7 @ 3.5 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: (On OK) / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1818421 KWH	Time: 1028
Building#2 KWH Meter	5262785 KWH	Time: 1028

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - calibration + maint 11-24-21 - today
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Wednesday, November 24, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6103939	
FT-3324 Feed Spare	120021	
FT-3322 Feed to Reactor 2	10885806	
FT-3323 Feed to Reactor 3	784743	
FT-3301 T-510 to BIO	51609950	
FT-3341 BIO Effluent	66456582	
FT-3342 BIO Recycle	55704881	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 11-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.48 ok	Counter: 190,869 Cycles: 524
LFG Cond Automatic Trap CT-2	Sump Level: 8.70 ok	Counter: 274,548 Cycles: 0
LFG Cond Automatic Trap CT-3	Sump Level: 7.22 ok	Counter: 314,021 Cycles: 1784
CT-4 Containment/Vessel (LFG Cond)	Level: 72 %	Tank Level: 2.13 Counter: 191,255 Cycles: 0 Sump: 8.40 ok
PM-15 Containment / Vessel	Level: 28 %	
MW-51 Containment / Vessel	Level: 78 %	
PM-11 Containment / Vessel	Level: 75 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 11-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07' Date: 11-18-21
North Boundary System P-001:	CV 73.8% @ 6.7 gpm	40.88 Hz / 2.07 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 29 % & 29 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	55.6 °F	Outside Temp.: ~ 47 °F
(P-121) or P-122	✓	0.0 gpm / CV 56 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 11-18-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 11-18-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 515 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 255 Gallons Reserve = ~180 gallons
HCL Tote Levels	✓	~ 115 Gallons Reserve = ~ 70 gallons
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 81-84 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 7.04	
pH 315	Value: 10.90	
Flocculation Chamber Paddle Wheel	✓	good
Precipitate Floc Quality	✓	good
Clarifier Water Quality	✓	good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 375	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both OK
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 - 7-20-21 #2 3-20-21 #1 3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All OK ✓
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	12-2-21 - Today	1420
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1500
pH-740 Discharge Surge Tank		Discharge suspended: 1410 ↔ 1420
Out of Hold Double Check	----------	None in hold: ✓✓ m
Valves Back to Normal Position	----------	All OK: ✓✓ m

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 65 %
Sludge Holding Tank (T-352)	✓	Level: 40 %
Decant Transfer Pump (P-352)	✓	CV 63 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Empty - Ready to Fill

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 31.7 psi	CV@ 78 % @ 2.2 gpm
Retention Tank (T-114)	✓ Operating Press: 31 psi	pH-113 @ 3.73
Bag Filter (BF-113)	✓ Operating Press: 34 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 30 psi	TP173-A-2 → TP175A 4 canisters
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 31 psi	CV@ 83 % @ 33.1 gpm
T-520 to GAC Total (FT-675)	253197624 gal	Time: 1009
North End On-Site Pumping	Operating Press: 2-3 psi	12.7 gpm @ 9:50 AM
North End Off-Site Pumping	Operating Press: 2-6 psi	8.5 gpm @ 0950
Peroxide Feed Pump (P-680)	✓	SPD 2.5 % / RATE 0.7 GPM
Peroxide Conc. At (TP-710)	0.0 PPM	Pump was off - OK Now
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: N/A - Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Ix Resin + Main good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System		
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: N/A - running	Next: N/A - Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.2 cc/min.
UV-Ox Power	✓	25.7-9 kVA 2592 Volts 10.0 Amps
Lamp Hours	839 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK ✓
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	10 psi In 10.5 psi Out
UV-OX Feed Pump (P-600 or P-601)		CV@ 68 % @ 7.4 gpm
UV-OX Temperature	In(TT-670): 14.0 °C	Out(TT-710): 26.6 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 2 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20505838 gal	Time: 1010
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 19 psi
PDT-730	✓	Δ Pressure: 7 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.5 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	33.2 gpm @ 1000
POTW Line Pressure (PT-770)	✓	32.1 psi
Effluent Totalizer Reading (FT-770)	~~TG 50400~~ gal	Time: ~~1005~~ 1011
POTW MH17S-078 Discharge Check (Monthly)	247338008 ✓	Last Done: 11-8-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done:
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done:
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 11-24-21	Plant Effluent Suspended: 1225 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or N
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1011 - 1018

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19724515	(FT-505) LFG Cond. to T-530	219108
(FT-025) NBBW Influent	94374447	(FT-056) Off - Site N. End Influent	43595024
(FT-012) MW-38 Inf. to HMR-30	8366305	(FT-113) Ion Exchange Influent	932375
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30067502
(FT-043) MW-38 to RWST	3083542	(FT-026) NBBW Bypass to RWST	4420534
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8188871
(FT-012T) MW-38 to T-540/541	8637998	(FT-035) NTES Inf. to BIO	6686800
(FT-040T) MW-38N to T-540/541	1978498	(FT-035T) NTES to T-530	464931
(FT-041T) MW-38S to T-540/541	2696658	(FT-017) BIO Inf. from T-530	658049
(FT-042T) MW-38 Source to T-540/541	4034839	(FT-018) T-540/541 Influent	8678044
(FT-055) On - Site N. End Influent	98819767	(FT-352) T-352 to HMR-30	1308209

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

P. AIR COMPRESSORS * Still Running on backups

Item	Status	Comments
Compressor Intake Temp.	58 °F (Analog Gauge)	Outside Temp.: ~ 62 °F
Compressor Building Vent	✓	~~Closed~~ OPEN - function good
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ -OFF
IRN30H Motor Speed	— %	
IRN30H Pressure	— psi	
IRN30H Moisture purge valve chk(Weekly):	—	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	Running	Both cool to touch: Y / (N)
Air Dryer	✓ ECO ON	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi ~~110~~ TG

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #2
Alarms Enabled	✓	CC - calibration + maintnme 12-1-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 11-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	3.11	48.3 %	11	
P-3301A	SB	—	— %	—	
NTES Pump P-002(Sump) (P-002W(10R))	✓	0.49	49 %	P035 34-35 / P038 6.5	Globules Observed at TP-130: Y / (N) Time: 8:50 AM
T-530 P-005	✓	0.19	41 %	7	
T-540/541 P-006	✓	0.30	57 %	7 PSI	
LFG COND Auto-Traps	✓	0	NA	5 PSI	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.58	51.9 %	7	
P-3322	✓	3.59	57.4 %	6.5	
P-3323	✓	2.55	77.7 %	5.5	
P-3324	SB ✓	~~0.01~~ 16	~~44~~ 16 %	—	
Reactor Effluent Pumps					
P-3341	✓	2.67	56.9 %	17	
P-3341A	SB	—	— %	—	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments
B-3331	✓	4.29	138	12-2021	Last serviced on: 10-1-21 Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	~~0.0~~	—	↓	Belt and Filter Checked: (X) / (N)
B-3333	✓	4.40	140	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.34	138	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 30.6 PPM
VTP-3360	✓	PID Reading: 6.5 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 67 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 28 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-14-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 82 % & 83%	
T-540/541 Mixers	both off/ bad	popping breakers T-541 Needs to be replaced and T-540
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 11-12-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 28 %	
Recycle Valve to Blend Tank	✓	4.20 gpm @ 1137
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 11-18-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 15.25 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 270 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-18-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-18-21
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-18-21

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	11-24-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 41	Reset to 0
BF-3340 a/b Differential Pressure	PSI: 1	11/12 @ 3.5 GPM
75-micron Bags Last Cleaning	Date: ~~11-14-21~~ ~~11-14-21~~ 11-14-21	
75-micron Bags Last Inspection	Date: ↓ ~~11-14-21~~ TG	
75-micron Bags Last Changed	Date: ~~11-14-21~~	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 2	~~TB 11-14-21~~ 6/8 @ 1.9 GPM
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 45 Events
HMI's	✓	
BTS Process KWH Meter	01821302 KWH	Time: 1215
Building#2 KWH Meter	05268706 KWH	Time: 1215

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #3
Alarms Enabled	✓	CC - calibration + maintenance 12-1-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 02, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6129081	
FT-3324 Feed Spare	120021	
FT-3322 Feed to Reactor 2	10920744	
FT-3323 Feed to Reactor 3	809522	
FT-3301 T-510 to BIO	51632417	
FT-3341 BIO Effluent	66488285	
FT-3342 BIO Recycle	55752636	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 11-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1 12.50'	Sump Level: ~~12.51'~~ TB	Counter: TB ~~191,365~~ 191197 Cycles: TB ~~169~~ 328
LFG Cond Automatic Trap CT-2 8.72'	Sump Level: ~~8.54'~~ TB	Counter: TB ~~274,554~~ 274552 Cycles: TB 2 4
LFG Cond Automatic Trap CT-3 7.22'	Sump Level: ~~7.23'~~ TB	Counter: TB ~~315,845~~ 315169 Cycles: 676 1148
CT-4 Containment/Vessel (LFG Cond)	74 Level: ~~74~~ % TB	Tank Level: 2.12 Counter: 191,256 Cycles: TB 1 Sump: ~~8.52'~~ TB 8.31'
PM-15 Containment / Vessel	30 Level: ~~33~~ % TB	
MW-51 Containment / Vessel	35 Level: ~~55~~ % TB	
PM-11 Containment / Vessel	30 Level: ~~50~~ % TB	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 11-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: dry @ 16.07 Date: 11-18-21
North Boundary System P-001:	CV 73.9 % @ 6.7 gpm	40.88 Hz / 2.08 Amps. / vault psi @ 18/no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 19 % & 18 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	56.1 °F	Outside Temp.: ~ 37 °F
(P-121) or P-122	✓	0.6 gpm / CV 64 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 11-18-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 11-18-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 490 Gallons Reserve = 2 ~~tote~~
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 230 Gallons Reserve = 180
HCL Tote Levels	✓	~ 130 Gallons Reserve = 30
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 84-90 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	**OFFLINE**	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.86	
pH 315	Value: 10.88	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both OK ✓
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 7-20-21 #2 3-20-21 #1 3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All good
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	12-10-21-Friday	0840
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		0925
pH-740 Discharge Surge Tank	12-9-21	Discharge suspended: 1458 ↔ 1512
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 37 %
Decant Transfer Pump (P-352)	✓	CV 65 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 30.30 psi	CV@ 76 % @ 2.1 gpm
Retention Tank (T-114)	✓ Operating Press: 29 psi	pH-113 @ 3.5
Bag Filter (BF-113)	✓ Operating Press: 3.2 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 29 psi	FP-173A-2 → TP-175A/4 + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 23 psi	CV@ 75 % @ 33.0 gpm
T-520 to GAC Total (FT-675)	25352486 gal	Time: 0823
North End On-Site Pumping	Operating Press: 2-3 psi	12.5 gpm @ 0824
North End Off-Site Pumping	Operating Press: 2-5 psi	8.5 gpm @ 0824
Peroxide Feed Pump (P-680)	✓	SPD 2.5 % / RATE 0.7 gpm
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: N/A Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resin Main good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: N/A - Running	Next: N/A - Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.2 cc/min.
UV-Ox Power	✓	25.8 kVA 257.2 Volts 10.0 Amps
Lamp Hours	1005 Hrs	✓
Crystal Condition & Wiper Status	✓	Oiler status: ✓
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	13 psi In 13 psi Out
UV-OX Feed Pump (P-600 or P-601)	✓	CV@ 76 % @ 7.5 gpm
UV-OX Temperature	In(TT-670): 14.2 °C	Out(TT-710): 26.7 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 4 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 0 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20578296 gal	Time: 0830
Post UV-Ox / Pre PDU	✓	Pressure: 15 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

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L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 10 psi
PDT-730	✓	Δ Pressure: 7 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 55.7 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	33.3 gpm @ 0840
POTW Line Pressure (PT-770)	✓	32.4 psi
Effluent Totalizer Reading (FT-770)	247666218 gal	Time: 0841
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: ~~11-8-21~~ ~~11-8-21~~ end ~~12-13-21~~
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ~~11-8-21~~
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ~~11-8-21~~
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 11-8-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 11-24-21	Plant Effluent Suspended: 1225 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0842- 0852

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19730371	(FT-505) LFG Cond. to T-530	219225
(FT-025) NBBW Influent	94439809	(FT-056) Off - Site N. End Influent	43680476
(FT-012) MW-38 Inf. to HMR-30	8385728	(FT-113) Ion Exchange Influent	953400
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30069096
(FT-043) MW-38 to RWST	3083875	(FT-026) NBBW Bypass to RWST	4421674
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8188871
(FT-012T) MW-38 to T-540/541	8637998	(FT-035) NTES Inf. to BIO	6691334
(FT-040T) MW-38N to T-540/541	1978498	(FT-035T) NTES to T-530	465555
(FT-041T) MW-38S to T-540/541	2696658	(FT-017) BIO Inf. from T-530	659002
(FT-042T) MW-38 Source to T-540/541	4034839	(FT-018) T-540/541 Influent	8680963
(FT-055) On - Site N. End Influent	98945620	(FT-352) T-352 to HMR-30	1311240

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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P. AIR COMPRESSORS *See comments

Item	Status	Comments
Compressor Intake Temp.	66 °F (Analog Gauge)	Outside Temp.: ~ 55 °F
Compressor Building Vent	✓	Open - Operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 62197
IRN30H Motor Speed	36 %	
IRN30H Pressure	114 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ ECO ON	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	psi 110

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #1
Alarms Enabled	✓	CC calibration and maintance *12-9-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 11-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

*R Main Air compressor VFD Replaced 12-6-21. Running OK now.

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BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

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A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	2.22	74.7 %	9	
P-3301A	SB	—	— %	—	
NTES Pump P-002(Sump) / P-002W(10R) (12-8-21 swapped)	✓	0.52	49 %	P035 33.34 / P038 6.5	Globules Observed at TP-130: Y / (N) Time: 1150
T-530 P-005	✓	0.20	41 %	6.5	
T-540/541 P-006	✓	0.30	67 %	7	
LFG COND Auto-Traps	✓	0.0	NA	4	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.45	82.1 %	12	
P-3322	✓	3.49	60.5 %	6.5	
P-3323	✓	2.60	72.1 %	6.5	
P-3324	SB	—	— %	—	
Reactor Effluent Pumps					
P-3341	✓	2.73	50.6 %	16	
P-3341A	SB	—	— %	—	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on:
B-3331	✓	4.37	4.35 145	12-2021	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	—	—	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.39	4.36 132	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.34	128	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 2.7 PPM
VTP-3360	✓	PID Reading: 1.3 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	Level: 70 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	Level: 25 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 60 % & 61 %	
T-540/541 Mixers	Both Need Fix	Repair Planned
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: On OK / (Off Warm out)
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 11-12-21
T-3310 Sedimentation Tank	Visual Level: OK	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 73 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	Level: 30 %	
Recycle Valve to Blend Tank	✓	4.01 gpm @ 0920
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 11-18-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 14.75 Gallons: ~ 60
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 260 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-15-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-15-21
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 11-15-21

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	11-24-21	Spray off Clean
pH-3331 Reactor 1	11-24-21	↓
pH-3332 Reactor 2	11-24-21	
pH-3333 Reactor 3	11-24-21	

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 32	Reset
BF-3340 a/b Differential Pressure	PSI: 3	20 PSI / 17 PSI @ 3.8 GPM
75-micron Bags Last Cleaning	Date: 11-14-21	16.5/7
75-micron Bags Last Inspection	Date: 11-14-21	
75-micron Bags Last Changed	Date: 11-14-21	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 9.5	16.5/7 @ 3.8 GPM
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1823860 KWH	Time: 1400
Building#2 KWH Meter	5274470 KWH	Time: 1400

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: GC #2
Alarms Enabled	✓	CC calibration 12-8-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 09, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6151293	
FT-3324 Feed Spare	120021	
FT-3322 Feed to Reactor 2	10951606	
FT-3323 Feed to Reactor 3	831417	
FT-3301 T-510 to BIO	51652302	
FT-3341 BIO Effluent	66516313	
FT-3342 BIO Recycle	55793718	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 11-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.51	Counter: 191,365 Cycles: 168
LFG Cond Automatic Trap CT-2	Sump Level: 8.54	Counter: 274,554 Cycles: 2
LFG Cond Automatic Trap CT-3	Sump Level: 7.23	Counter: 315,845 Cycles: 676
CT-4 Containment/Vessel (LFG Cond)	Level: 74 %	Tank Level: 2.12 Counter: 191,256 Cycles: 0 Sump: 8.52'
PM-15 Containment / Vessel	Level: 33 %	
MW-51 Containment / Vessel	Level: 55 %	
PM-11 Containment / Vessel	Level: 50 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 11-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: Dry @ 16.07 Date: 12-16-21
North Boundary System P-001:	CV 73.8% @ 6.6 gpm	40.71 Hz / 2.08 Amps. / vault psi @ 18 No leaks
T-101 & T-102 Containment / Tank	✓	Levels: 35 % & 34 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	52.1 °F	Outside Temp.: ~ 27 °F
(P-121) or P-122	✓	1.2 gpm / CV 54 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 12-16-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 12-16-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 375 Gallons Reserve = 2 totes
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 215 Gallons Reserve = ~180
HCL Tote Levels	✓	~ 113 Gallons Reserve = ~30
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / (N)
Emergency Shower Inspected	✓	Checked and Flushed - All OK: (Y) / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 84-90 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / (N)

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.87	
pH 315	Value: 10.80	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	good
Clarifier Water Quality	✓	good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 390	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok ✓
Manual Sludge Lateral pumping	✓	Last done (As Needed): #1 3-20-21 #2 3-20-21 #3 7-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All good
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	12-16-21 today	1443
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1546
pH-740 Discharge Surge Tank		Discharge suspended: 1424 ↔ 1438
Out of Hold Double Check	----------	None in hold: ✓✓ Double checked TG
Valves Back to Normal Position	----------	All OK: ✓✓ TG

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 30 %
Decant Transfer Pump (P-352)	✓	CV 70 % @ 0.0 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	Operating Press: 29.4 psi	CV@ 73 % @ 2.0 gpm
Retention Tank (T-114)	Operating Press: 29 psi	pH-113 @ 3.9
Bag Filter (BF-113)	Operating Press: 32 psi	
Ion Exchange (Cage (1) or 2) + Guard	Operating Press: 28 psi	TP-173A-2 → TP-175A/4 canisters + Guard
Post Ion Exchange	Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 24 psi	CV@ 76 % @ 31.9 gpm
T-520 to GAC Total (FT-675)	253851837 gal	Time: 0843
North End On-Site Pumping	Operating Press: 2-3 psi	12.4 gpm @ 0845
North End Off-Site Pumping	Operating Press: 2-6 psi	9.1 gpm @ 0845
Peroxide Feed Pump (P-680)	✓	SPD 2.4 % / RATE 0.6 gpm
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: N/A Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resin main good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: N/A - Running	Next: N/A - Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 256.3 Volts 10.1 Amps
Lamp Hours	1173 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: OK ✓
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	14 psi In 14 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 82 % @ 7.4 gpm
UV-OX Temperature	In(TT-670): 14.1 °C	Out(TT-710): 26.8 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 6 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20650984 gal	Time: 0854
Post UV-Ox / Pre PDU	✓	Pressure: 17 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 12 psi
PDT-730	✓	Δ Pressure: 7 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump (P751 or P752)	✓	CV@ 54.9 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	32.1 gpm @ 0857
POTW Line Pressure (PT-770)	✓	32.2 psi
Effluent Totalizer Reading (FT-770)	247994456 gal	Time: 0858
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: ~~12-13-21~~ 11-8-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 11-24-21	Plant Effluent Suspended: 1225 ↔ 1315
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.331 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 0900 - 0910

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19736730	(FT-505) LFG Cond. to T-530	219304
(FT-025) NBBW Influent	94504820	(FT-056) Off - Site N. End Influent	43766952
(FT-012) MW-38 Inf. to HMR-30	8404037	(FT-113) Ion Exchange Influent	973455
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30069988
(FT-043) MW-38 to RWST	3084314	(FT-026) NBBW Bypass to RWST	4423294
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8199356
(FT-012T) MW-38 to T-540/541	8637998	(FT-035) NTES Inf. to BIO	6696424
(FT-040T) MW-38N to T-540/541	1978498	(FT-035T) NTES to T-530	465753
(FT-041T) MW-38S to T-540/541	2696658	(FT-017) BIO Inf. from T-530	659179
(FT-042T) MW-38 Source to T-540/541	4034839	(FT-018) T-540/541 Influent	8683485
(FT-055) On - Site N. End Influent	9907697	(FT-352) T-352 to HMR-30	1314027

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	65 °F (Analog Gauge)	Outside Temp.: ~ 34 °F
Compressor Building Vent	✓	OPEN - Operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 62286
IRN30H Motor Speed	31 %	
IRN30H Pressure	123 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ ECO ON	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 9-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	psi 108

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #1
Alarms Enabled	✓	cc - Calibration + Maint 12-15-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 11-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	1.3	28 %	7	
P-3301A	SB	—	— %	—	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.53	49 %	P035 34-38 / P038 7	Globules Observed at TP-130: Y / (N) Time: 1100
T-530 P-005	SB✓	~~0.00~~	~~40~~ %	~~7~~	
T-540/541 P-006	✓	0.30	73 %	6.5	
LFG COND Auto-Traps	✓	0.0	NA	4	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.21	47.7 %	7	
P-3322	✓	2.66	43.1 %	5	
P-3323	✓	2.12	70.2 %	6.5	
P-3324	SB	—	— %	—	
Reactor Effluent Pumps					
P-3341	✓	2.24	50.7 %	14	
P-3341A	SB	—	— %	—	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments
					Last serviced on: 10-1-21
B-3331	✓	4.33	129	12-2021-soon	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	—	—	↓	Belt and Filter Checked: (X) / (N)
B-3333	✓	4.43	129	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.37	125	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 4.8 PPM
VTP-3360	✓	PID Reading: 2.4 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	Level: 66 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	Level: 26 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 43 % & 43%	
T-540/541 Mixers	✓	New mixers on 12-15-21 *
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: (On OK) / Off Warm out
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 11-12-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	3.92 gpm @ 1139
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 12-16-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 14.5 Gallons: ~ 70
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 245 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 12-16-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	11-24-21	ACID/BASE Clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2	↓	↓
pH-3333 Reactor 3	↓	↓

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 19	Reset
BF-3340 a/b Differential Pressure	PSI: .5	7 PSI / 6.5 @ 1 gpm
75-micron Bags Last Cleaning	Date: 11-14-21	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: .5	7 / 6.5 @ .9 GPM
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: (On OK) / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	✓ 01826363 KWH	Time: 1252
Building#2 KWH Meter	05280578 KWH	Time: 1253

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #2
Alarms Enabled	✓	cc-calibration + maint 12-15-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 16, 2021

Inspection Performed by: Mike Gelwick / Tom Gilbert

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6166816	
FT-3324 Feed Spare	122744	
FT-3322 Feed to Reactor 2	10980830	
FT-3323 Feed to Reactor 3	852145	
FT-3301 T-510 to BIO	51670663	
FT-3341 BIO Effluent	66541420	
FT-3342 BIO Recycle	55834335	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 11-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

L. OTHER COMMENTS:

12-15-21- New mixers w/Checked Propellers installed in T540 + T541

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.55	Counter: 191718 Cycles: 353
LFG Cond Automatic Trap CT-2	Sump Level: 8.54 ok	Counter: 274591 Cycles: 37
LFG Cond Automatic Trap CT-3	Sump Level: 7.27 ok	Counter: 316777 Cycles: 932
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 76 %	Tank Level: 2.06 Counter: 191257 Cycles: 1 Sump: 8.55 ok
PM-15 Containment / Vessel	✓ Level: 35 %	
MW-51 Containment / Vessel	✓ Level: 25 %	
PM-11 Containment / Vessel	✓ Level: 30 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 12-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: Dry 216.07' Date: 12-16-21
North Boundary System P-001:	CV 74.0 % @ 6.5 gpm	40.96 Hz / 2.08 Amps. / vault psi @ 18 / no leaks
T-101 & T-102 Containment / Tank	✓	Levels: 39 % & 35 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	54.1 °F	Outside Temp.: ~ 42 °F
P-121 or P-122	✓	2.6 gpm / CV 63 % sourcewell batch currently
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 12-16-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 12-16-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 555 Gallons Reserve = 1 tote
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 185 Gallons Reserve = ~ 180
HCL Tote Levels	✓	~ 100 Gallons Reserve = ~ 30
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / N
Emergency Shower Inspected	✓	Checked and Flushed - All OK: Y / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 86-90 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / N

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.81	
pH 315	Value: 10.96	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 510	
Clear-well Transfer Pumps (P-371 / 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both ok
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3 - 7-2021 / #2 - 3-22-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All ok
Automatic Blow-down Operations	✓	

F. pH PROBES

* New 4 + 10 pH STDs today *

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	12-23-21 - today	1310
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1353
pH-740 Discharge Surge Tank		Discharge suspended: 1401 ↔ 1425
Out of Hold Double Check	----------	None in hold: ✓✓ " "
Valves Back to Normal Position	----------	All OK: ✓✓ " "

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments * Grease Thickener motor bearings today *
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level: ~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 48 %
Decant Transfer Pump (P-352)	✓	CV 59 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 29.1 psi	CV@ 71 % @ 2.0 gpm
Retention Tank (T-114)	✓ Operating Press: 29 psi	pH-113 @ 3.65
Bag Filter (BF-113)	✓ Operating Press: 31 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 28 psi	TP-173A-2 → TP-175A/4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521 or P-522)	Operating Press: 26 psi	CV@ 79 % @ 32.8 gpm
T-520 to GAC Total (FT-675)	254180282 gal	Time: 1005
North End On-Site Pumping	Operating Press: 2-3 psi	12.2 gpm @ 0939
North End Off-Site Pumping	Operating Press: 2-8 psi	9.0 gpm @ 0939
Peroxide Feed Pump (P-680)	✓	SPD 2.5 % / RATE 0.7
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: Inventory Mark Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 2552 Volts 10.1 Amps
Lamp Hours	1342 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 9-13-21 Cleaned: 9-13-21	9.5 psi In 10.0 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 66 % @ 7.5 gpm
UV-OX Temperature	In(TT-670): 13.3 °C	Out(TT-710): 25.8 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 1 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 2 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20724672 gal	Time: 1005
Post UV-Ox / Pre PDU	✓	Pressure: 13 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 13 psi
PDT-730	✓	Δ Pressure: 8 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump ((P751) or P752)	✓	CV@ 54.8 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	32.8 gpm @ 0942
POTW Line Pressure (PT-770)	✓	32.3 psi
Effluent Totalizer Reading (FT-770)	248323692 gal	Time: 1006
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 11-8-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly) ✓	Last Completed: 12-23-21	Plant Effluent Suspended: 1401 ↔ 1425
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1006 → 1011

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19746631	(FT-505) LFG Cond. to T-530	219394
(FT-025) NBBW Influent	94569420	(FT-056) Off - Site N. End Influent	43854456
(FT-012) MW-38 Inf. to HMR-30	8419560	(FT-113) Ion Exchange Influent	994118
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30071596
(FT-043) MW-38 to RWST	30845543	(FT-026) NBBW Bypass to RWST	4424951
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8207590
(FT-012T) MW-38 to T-540/541	8646109	(FT-035) NTES Inf. to BIO	6701517
(FT-040T) MW-38N to T-540/541	1978498	(FT-035T) NTES to T-530	465933
(FT-041T) MW-38S to T-540/541	2696658	(FT-017) BIO Inf. from T-530	659180
(FT-042T) MW-38 Source to T-540/541	4042952	(FT-018) T-540/541 Influent	8686270
(FT-055) On - Site N. End Influent	99197171	(FT-352) T-352 to HMR-30	1317208

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	75 °F (Analog Gauge)	Outside Temp.: ~ 45 °F
Compressor Building Vent	✓	Open - Operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: (Y) / N Next service @ 62952 Hours Current Hours @ 62376
IRN30H Motor Speed	73 %	
IRN30H Pressure	115 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / (N)
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: (Y) / N
Air Dryer	✓ Eco on	Moisture at Receiver Tank: Y / (N)
Oil Moisture Prevention (Monthly)	Last Done: 12-23-21 - Today	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #1
Alarms Enabled	✓	CC-Calibration + maint 12-22-21
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 12-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: (Y) / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)	Comments
T-510 Pumps					
P-3301	✓	2.50	39.2 %	8.0	
P-3301A	SB	–	– %	–	
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.53	48 %	P035 34-35 / P038 8.0	Globules Observed at TP-130: Y / (N) Time: 0915
T-530 P-005	SB	–	– %	–	
T-540/541 P-006	✓	0.20	64 %	7.5	
LFG COND Auto-Traps	✓	0.0	NA	9.0	Between Cycles: (Y) / N
Reactor Feed Pumps					
P-3321	✓	2.50	43.1 %	5.5	
P-3322	✓	3.37	41.1 %	5.0	
P-3323	✓	2.52	60.1 %	5.5	
P-3324	SB	–	– %	–	
Reactor Effluent Pumps					
P-3341	✓	2.02	48.3 %	10.0	
P-3341A	SB	–	– %	–	

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 12-20-21
B-3331	✓	4.18	126	3-2022	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: (Y) / [illegible]
B-3333	✓	4.62	142	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.21	124	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 25.4 PPM
VTP-3360	✓	PID Reading: 17.3 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 70 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 30 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: ?-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 81 % & 82%	
T-540/541 Mixers	✓ Both New 12-15-21	
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: (On OK) / Off Warm out
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 12-22-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 71 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 31 %	
Recycle Valve to Blend Tank	✓	3.99 gpm @ 1024
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 12-16-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 14.5 Gallons: ~ 75
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 225 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 12-16-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): ↓

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	12-23-21 - today	New 4+10 pH stds today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 19	reset
BF-3340 a/b Differential Pressure	PSI: 2	15/13 @ 3.1 gpm
75-micron Bags Last Cleaning	Date: 11-14-21	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 6.5	13/6.5 @ 3.1 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments on this month
"BIO" Backup Generator	✓	Block Heater: On OK / (Off Warm Out)
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1828902 KWH	Time: 1137
Building#2 KWH Meter	5286776 KWH	Time: 1137

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #2
Alarms Enabled	✓	CC-Calibration + Maint 12-22-21
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Thursday, December 23, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6187673	
FT-3324 Feed Spare	122754	
FT-3322 Feed to Reactor 2	11009804	
FT-3323 Feed to Reactor 3	872689	
FT-3301 T-510 to BIO	51688324	
FT-3341 BIO Effluent	66566441	
FT-3342 BIO Recycle	55875303	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 12-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

L. OTHER COMMENTS:

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MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

A. PERIMETER COLLECTION SYSTEMS

Item	Status	Comments
LFG Cond Automatic Trap CT-1	Sump Level: 12.62	Counter: 192109 Cycles: 391
LFG Cond Automatic Trap CT-2	Sump Level: 8.63	Counter: 274603 Cycles: 12
LFG Cond Automatic Trap CT-3	Sump Level: 7.30 ok	Counter: 317723 Cycles: 946
CT-4 Containment/Vessel (LFG Cond)	✓ Level: 78 %	Tank Level: 2.02 Counter: 191259 Cycles: 2 Sump: 7.73
PM-15 Containment / Vessel	✓ Level: 40 %	
MW-51 Containment / Vessel	✓ Level: 60 %	
PM-11 Containment / Vessel	✓ Level: 65 %	
MW-38 Systems	✓	
North Toe System	✓	
North End Systems (Weekly)	✓	
Full N. End Systems Check (Monthly)	✓	Last Done: 12-22-21
North End Pipeline(s)Flushing (As Needed)	✓	Perform if suspended solids present Last Done: 11/15/15
NTES line flush to T-530 (As needed)	✓	Perform if suspended solids present Last Done: 10/29/21
NTES Piping Containment	✓	Monthly Sump Level: Dry @16.07' Date: 12-16-21
North Boundary System P-001:	CV 73.8 % @ 6.5 gpm	40.71 Hz / 2.08 Amps. / vault psi @ 18/No leaks
T-101 & T-102 Containment / Tank	✓	Levels: 27 % & 26 %
Raw Water Storage Tanks Piping	✓	
RWST Building Temp. (TT-101)	54.9 °F	Outside Temp.: ~ 39 °F
P-121 or P-122	✓	0.60 gpm / CV 58 %
RWST 2ndry Cont. High Level Switch	✓	(LSH-101) Last Test(monthly): 12-16-21
RWST Back-Up Generator	✓	Last Test Run(monthly): 12-16-21

B. CHEMICAL STORAGE BAYS

Item	Status	Comments
Caustic Tote Levels	✓	~ 475 Gallons Reserve = 1 tote
Caustic Bay Heater	✓	
Peroxide Tote Level	✓	~ 300 Gallons Reserve = ~55 gal
HCL Tote Levels	✓	~ 75 Gallons Reserve = ~30 gal
Chemical Totes and Piping Inspected	✓	Leaks observed: Y / N
Emergency Shower Inspected	✓	Checked and Flushed - All OK: Y / N

C. PRIMARY AND SECONDARY ACID FEED SYSTEM

Item	Status	Comments
Primary Acid Feed Pump (P-631)	✓	
Ion Exchange Acid Feed Pump (P-632)	✓	PI-0632 PSI: 86-90 CV: 4 %
Primary Acid Retention Tank (T-510)	✓	
All Acid Feed Lines	✓	Leaks observed: Y / N

D. NBBW INJECTION TRENCH

Item	Status	Comments
Injection Carbon (GAC-810)	OFFLINE	Date online: 7/20/18
Injection Rate (FT-800)	0.0 gpm	NBBW-IW-1= 0.0 NBBW-IW-2= 0.0 NBBW-IW-3= 0.0 gpm ea.
Totalizer Reading (FT-800)	105,135,774 gal	INJ. STOPPED 10/02/18 @ 1545

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

E. CHEMICAL PRECIPITATION SYSTEM (US FILTER HMR-30)

Item	Status	Comment
T-300A Mixer	NA	
T-300B (Caustic Mixer)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Water Level	✓	
T-300B (Caustic Mix Chamber)	✓	Last Cleaning (Qtrly): 10-20-21
T-300A/B Overflow	✓	
pH Set-point for (pH 315)	Value: 10.8	
pH 310	Value: 6.65	
pH 315	Value: 10.92	
Flocculation Chamber Paddle Wheel	✓	
Precipitate Floc Quality	✓	Good
Clarifier Water Quality	✓	Good Oil or sheen observed: Y / (N)
Clarifier Effluent Piping / Water Level	✓	
Clear-well Chamber and Water Level	✓	
HMR PLC Panel	✓	
Caustic Pump (P-270)	SB	
Caustic Pump (P-280)	✓	
Polymer Pump (P-310)	✓	
Polymer Tank Mixer	✓	
Polymer Tank Level	Gallons: ~ 475	
Clear-well Transfer Pumps(P-371)/ 372)	✓	
Sludge Transfer Pump (P-330)	✓	Exercise Valves Weekly: Both OK
Manual Sludge Lateral pumping	✓	Last done (As Needed): #3-7-20-21 / #1+2-3-20-21
Manual Sludge Lateral Ball Valves	✓	Exercise Weekly: All OK
Automatic Blow-down Operations	✓	

F. pH PROBES

pH Probe Location	Calibration Date	Comments: (Time done)
pH-310 HMR-30 (T-300A)	12-27-21 – Today	1400
pH-315 HMR-30 (T-300B)		
pH-365 Primary Acid Ret. Tank		
pH-113 Pre-Ion Exchange		
pH-670 Pre-UV-OX		1445
pH-740 Discharge Surge Tank		Discharge suspended: 1351 ↔ 1359
Out of Hold Double Check	----------	None in hold: ✓✓
Valves Back to Normal Position	----------	All OK: ✓✓

G. SLUDGE THICKENER, SLUDGE HOLDING TANKS, FILTER PRESS

Item	Status	Comments
Verify Sludge Thickener Running	✓	Gauge Reading: 0 %
Sludge Thick. Transfer Pump (P-350)	✓	
Sludge Holding Tank (T-351)	✓	Level:~ 45 %
Sludge Holding Tank (T-352)	✓	Level: 40 %
Decant Transfer Pump (P-352)	✓	CV 64 % @ 0.5 gpm
Filter Press Pumps (P-381 / P-382)	✓	
Filter Press	✓	Stage: Full

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

H. ION EXCHANGE

Item	Status	Comments
Feed Tank (T-113)	✓ Level: 30 %	
Feed Pump (P-114)	✓ Operating Press: 28.5 psi	CV@ 70 % @ 2.0 gpm
Retention Tank (T-114)	✓ Operating Press: 28 psi	pH-113 @ 3.82
Bag Filter (BF-113)	✓ Operating Press: 30 psi	
Ion Exchange (Cage (1) or 2) + Guard	✓ Operating Press: 27 psi	TP-173A-2 → TP-175A/4 canisters + Guard
Post Ion Exchange	✓ Operating Press: 3.5 psi	

I. FEED SURGE TANK

Item	Status	Comments
Feed Surge Tank (T-520)	✓ Level: 38 %	Last Cleaning (As Needed, if 4" of solids accumulate): 12/15/19
Feed Surge Pump (P-521) or P-522)	Operating Press: 26 psi	CV@ 78 % @ 31.8 gpm
T-520 to GAC Total (FT-675)	2543677241 gal	Time: 1109
North End On-Site Pumping	Operating Press: 2-3 psi	11.9 gpm @ 1104
North End Off-Site Pumping	Operating Press: 2-6 psi	8.4 gpm @ 1104
Peroxide Feed Pump (P-680)	✓	SPD 2.4 % / RATE 0.6
Peroxide Conc. At (TP-710)	1.0 PPM	
Peroxide Conc. At (TP-740)	0.0 PPM	

J. HAZARDOUS WASTE STORAGE

Item	Status	Comments
180 Day storage area check	✓	Check sheet completed: NA/Empty
Satellite Haz. Waste Areas (BLDG #1)	✓	Condition: IX Resin + main Good
Satellite Haz. Waste Area (BLDG #2)	✓	Condition: Good

K. UV-OXIDATION SYSTEM

Item	Status	Comments
UV-Oxidation System	✓	
Annual Test Run (Calgon)	Date: 9-16-21	Next: 9-2022
Quarterly Test Run	Date: NA/Running	Next: NA/Running
Peroxide Feed Pump (P-650)	✓	Flow Rate: ~ 7.2 cc/min.
UV-Ox Power	✓	25.7 kVA 253 Volts 10.1 Amps
Lamp Hours	1439 Hrs	
Crystal Condition & Wiper Status	✓	Oiler status: ok
UV-OX Bagfilters Status	Last change: 7-13-21 Cleaned: 7-13-21	11.0 psi In 11.0 psi Out
UV-OX Feed Pump (P-600 or (P-601))	✓	CV@ 70 % @ 7.5 gpm
UV-OX Temperature	In(TT-670): 13.4 °C	Out(TT-710): 26.0 °C
PDU GAC (PDT-710)	✓	Δ Pressure: 3 psi
Peroxide Concentration Pre UV	100 PPM	
Peroxide Concentration Post UV(TP-720)	25 PPM	
Peroxide Conc. Post PDU (TP-730)	0.0 PPM	
Secondary Acid Feed Pump (P-630)	✓	CV @ 0 %
Secondary Acid Retention Tank (T-645)	✓	
Pre – UV Oxidizer Total (FT-670)	20766802 gal	Time: 1109
Post UV-Ox / Pre PDU	✓	Pressure: 14 psi
Post PDU	✓	Pressure: 7.5 psi

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

L. PDU AND LIQUID –PHASE GRANULAR ACTIVATED CARBON

Item	Status	Comments
PDT-720	✓	Δ Pressure: 13 psi
PDT-730	✓	Δ Pressure: 8 psi

M. EFFLUENT DISCHARGE

Item	Status	Comments
Effluent Surge Pump ((P751) or P752)	✓	CV@ 54.2 %
Effluent Surge Tank (T-740)	✓	Level: 40 %
Effluent Discharge Rate (FT-770)	✓	31.7 gpm @ 1107
POTW Line Pressure (PT-770)	✓	32.0 psi
Effluent Totalizer Reading (FT-770)	248511912 gal	Time: 1110
POTW MH17S-078 Discharge Check (Monthly)	✓	Last Done: 12-13-21
4X8-Inch POTW Leak Detection Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Air Reliefs Checks (Monthly)	✓	Last Done: ↓
4X8-Inch POTW Isolation Valves Exercise (Qtrly)	✓	Last Done: 11-8-21
2-Inch POTW Backup Pressure Testing (Annual)	✓	Last Done: 7/8/21
2-In POTW Backup Air Reliefs Checks (Annual)	✓	Last Done: 7/8/21
2-Inch POTW Isolation Valve Exercise (Annual)	✓	Last Done: 7/8/21
Rotate Chiller Compressors	NA on Standby	~~Now in Lead: 1 or 2~~

N. LEL EFFLUENT TANK T-740

Item	Status	Comments
LEL-740 Sensor	✓	Reading: 0 %
LEL Sensor Calibration / Automatic High LEL Shutdown Test (monthly)	Last Completed: 12-23-21	Plant Effluent Suspended: 1401 ↔ 1425
LEL Sensor Bridge Adjustment to 2.0 volts	Reading: 2.001 volts(monthly)	Adjustment Needed: Y or (N)
Verify Bridge Current between.300v-.360v	Reading: 0.330 volts(monthly)	

O. WTP INFLUENT TOTALIZERS Time : 1110→1114

Source	Reading(Gallons)	Source	Reading(Gallons)
(FT-015) RWST Influent	19751732	(FT-505) LFG Cond. to T-530	219428
(FT-025) NBBW Influent	94606624	(FT-056) Off - Site N. End Influent	43904060
(FT-012) MW-38 Inf. to HMR-30	8430041	(FT-113) Ion Exchange Influent	1005498
(FT-042 HMR30) MW-38 Source to HMR-30	35484	(FT-810) Plant Potable Water In	30071622
(FT-043) MW-38 to RWST	3084732	(FT-026) NBBW Bypass to RWST	4425737
(FT-042 RWST) MW-38 Source to RWST	72236	(FT-014) Misc. Water to RWST	8207590
(FT-012T) MW-38 to T-540/541	8646830	(FT-035) NTES Inf. to BIO	6704476
(FT-040T) MW-38N to T-540/541	1978778	(FT-035T) NTES to T-530	466018
(FT-041T) MW-38S to T-540/541	2697029	(FT-017) BIO Inf. from T-530	659180
(FT-042T) MW-38 Source to T-540/541	4043007	(FT-018) T-540/541 Influent	8687421
(FT-055) On - Site N. End Influent	99267215	(FT-352) T-352 to HMR-30	1318966

ABLE 3.19.1
STANDARD OPERATIONS CHECKLIST
MAIN WTP

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

P. AIR COMPRESSORS

Item	Status	Comments
Compressor Intake Temp.	64 °F (Analog Gauge)	Outside Temp.: ~ 42 °F
Compressor Building Vent	✓	closed/operational
Primary Air Compressor (IRN30H)	2,000 Hour service date: 7-8-21 Serviced @ 60952 Hours	Coolant present in sight glass: Ⓨ / N Next service @ 62952 Hours Current Hours @ 62427
IRN30H Motor Speed	31 %	
IRN30H Pressure	119 psi	
IRN30H Moisture purge valve chk(Weekly):	✓	
IRN30H Intake Filter	✓	Date Last Changed: 9-30-21
Air Tanks Moisture Purge Valves	Manually Activate(weekly) ✓	Excessive Moisture: Y / Ⓝ
Backup Air Compressors (T-30 East and West)	✓	Both cool to touch: Ⓨ / N
Air Dryer	✓ ECO OFF	Moisture at Receiver Tank: Y / Ⓝ
Oil Moisture Prevention (Monthly)	Last Done: 12-23-21	Run at max speed by bleeding air from filter canister above/after air dryer for 2 hrs
Air Receiver Tank	✓	110 psi

Q. SUMPS

Item	Status	Comments
Bag Filter Sump	✓	
Wet Well Sump	✓	

R. GAS CHROMATOGRAPH

Item	Status	Comments
GC Operational	✓	GC # checking UV-Ox Effluent: #1
Alarms Enabled	✓	
GC Influent Filters	✓	

S. SAFETY

Item	Status	Comments
Building #1 Fire Extinguishers	✓	Date inspected: 12-22-21
Building #1 Eye Wash/Shower	✓	Checked and Flushed- All OK: Ⓨ / N

Other Comments:

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

A. PUMPS

Item	Status	Flow Rate (gpm)	Pump Speed (CV%)	Discharge Pressure (psi)		Comments
T-510 Pumps						
P-3301	✓	1.24	24.9 %	5.5		
P-3301A	SB	–	– %	–		
NTES Pump P-002(Sump) / (P-002W(10R))	✓	0.51	48 %	P035 33-34	P038 6.0	Globules Observed at TP-130: Y / (N) Time: 1030
T-530 P-005	SB	–	– %	–		
T-540/541 P-006	✓	0.30	59 %	7.0		
LFG COND Auto-Traps	✓	0.0	NA	5		Between Cycles: (Y) / N
Reactor Feed Pumps						
P-3321	✓	2.23	46.0 %	5.5		
P-3322	✓	3.09	42.1 %	5.0		
P-3323	✓	2.20	65.3 %	5.0		
P-3324	SB	–	– %	–		
Reactor Effluent Pumps						
P-3341	✓	3.21	59.7 %	15.0		
P-3341A	SB	–	– %	–		

B. BLOWERS

Item	Status	Pressure (psi)	Temp (°F)	Next Scheduled Service (Qtrly)	Comments Last serviced on: 12-2021
B-3331	✓	4.19	118	3-2022	Greased, Belt and Filter Checked: (Y) / N
B-3332	SB	–	–	↓	Belt and Filter Checked: Y / (N)
B-3333	✓	4.48	122	↓	Greased, Belt and Filter Checked: (Y) / N
B-3334	✓	4.21	118	↓	Greased, Belt and Filter Checked: (Y) / N

C. REACTOR VENTILATION

Item	Status	Comments
Vapor Carbon Contactor	✓	On-line: 2/10/18
Reactor Vent Blower	✓	
Reactor Vent Booster	✓	
VTP-3350	✓	PID Reading: 31.6 PPM
VTP-3360	✓	PID Reading: 28.2 PPM

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

D. TANKS / REACTORS / SUMPS / CONTAINMENTS / PIPING / Chiller

Item	Status	Comments
T-510 Post HMR-30 Mixing Tank	✓ Level: 68 %	Last Cleaning (As needed, if 2" of solids accumulate): 7/14/21
T-530 LFG Condensate / NTES Tank	✓ Level: 32 %	
T-530 Mixer	✓	
LFG Condensate Conveyance Line	✓	Last Pressure Test: 7-19-21 Next: 7-2022 (Annual at a minimum or if flow drops off)
T-540/541 MW38 Tanks	Lvls: 78 % & 79 %	
T-540/541 Mixers	✓	both new 12-15-21
Chiller	✓	Chiller Coolant Lvl: ~ — " Below full mark
Chiller Cooling Fins (as needed)	✓	Last Cleaning: 4/20/18 (unit on Standby)
Secondary Containments	✓	Heat Trace: (On OK) / Off Warm out
Feed Piping to Sedimentation Tank	✓	Last Back Flushing (Quarterly): 12-22-21
T-3310 Sedimentation Tank	Visual Level: ok	Last Cleaning (As Needed, use TSS info to determine): 9/2021
T-3320 Blend Tank	✓ Level: 70 %	Last Cleaning (Semi Annual): 9-10-21
T-3331 Reactor No. 1	✓	Digital Displays: (GOOD) / Needs Attn
T-3332 Reactor No. 2	✓	Digital Displays: (GOOD) / Needs Attn
T-3333 Reactor No. 3	✓	Digital Displays: (GOOD) / Needs Attn
T-3334 Settling Tank	✓	Last Cleaning (Semi Annual): 9-10-21
P-3334 Biosolids Pump	✓	
T-3340 Overflow Tank	✓ Level: 30 %	
Recycle Valve to Blend Tank	✓	4.00 gpm @ 1131
Building Containment Sump	✓	Last Alarm Test Date (Monthly): 12-16-21

E. CHEMICAL FEED SYSTEM

Item	Status	Comments
Phosphorous Supply	✓	Bags: 14.25 Gallons: ~55
Phosphorous Pump (P-2221)	✓	
Caustic Supply	✓	~ 220 Gallons
Caustic Pump (P-2211)	SB	Currently in acid addition mode
Acid Supply	✓	~ 40 Gallons
Acid Pump (P-2211)	✓	
Caustic Pump (P-2231)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly): 12-16-21
Caustic Pump (P-2232)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):
Caustic Pump (P-2233)	✓ Leaks: Y / (N)	Last tubing tip cleaning (monthly):

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

F. pH Probes

pH Probe Location	Calibration Date (Monthly)	Comments
pH-3320 Blend Tank	12-23-21	Spray off clean today
pH-3331 Reactor 1	↓	↓
pH-3332 Reactor 2		
pH-3333 Reactor 3		

G. FILTER SYSTEM

Item	Status	Comments
BF-3340 a/b Status	✓	
Automatic Backwash	Cycle Count: 5	reset
BF-3340 a/b Differential Pressure	PSI: 1	13/12 22.2 gpm
75-micron Bags Last Cleaning	Date: 11-14-21	
75-micron Bags Last Inspection	Date: ↓	
75-micron Bags Last Changed	Date:	
GACF-3340 Status	✓	
GACF-3340 Differential Pressure	PSI: 5.5	12/6.5 22.2 gpm
Last Backwash Performed	Date: 9-27-21	

H. ELECTRICAL AND INSTRUMENTATION

Item	Status	Comments
"BIO" Backup Generator	✓	Block Heater: (On OK) / Off Warm Out
Electrical Surge Suppressor	✓	
Motor Control Center	✓	
PLC	✓	UPS @ 97 min / 95 Events
HMI's	✓	
BTS Process KWH Meter	1830310 KWH	Time: 1230
Building#2 KWH Meter	5290182 KWH	Time: 1230

I. GAS CHROMATOGRAPHY

Item	Status	Comments
GC Operational	✓	GC # checking BIO: #2
Alarms Enabled	✓	
GC Influent Filters	✓	

TABLE 3.19.2
STANDARD OPERATIONS CHECKLIST
BIOLOGICAL TREATMENT SYSTEM

WEEKLY OPERATIONS AND MAINTENANCE INSPECTION CHECKLIST

Inspection Date: Monday, December 27, 2021

Inspection Performed by: Mike Gelwick

J. TOTALIZERS

Item	Readings (gallons)	Comments
FT-3321 Feed to Reactor 1	6199747	
FT-3324 Feed Spare	122754	
FT-3322 Feed to Reactor 2	11026581	
FT-3323 Feed to Reactor 3	884580	
FT-3301 T-510 to BIO	5169595	
FT-3341 BIO Effluent	66581597	
FT-3342 BIO Recycle	55899161	

K. SAFETY

Item	Status	Comments
Building #2 Fire Extinguishers	✓	Inspection date: 12-22-21
Building #2 Eye Wash/Shower	✓	Checked and Flushed- All OK: Y / N

L. OTHER COMMENTS:

LOWRY WTP OPERATIONS LOG

Date: **Thursday, July 01, 2021**

Time:	
0615	Plan operations good. Mike working on weekly systems checks and calibrations.
0720	Start filterpress on T-351 (in stage 1)
1020	- Clean PH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down water
	- Check TP-130 for oily globules: None observed. water SS clear w/ yellow green tint
	- Refill polymer tank w/ 2 cups of NALCO polymer and 200 gal of potable water.
1315	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's.
1322	- Resume Normal Discharge. Continue with other pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1400	- Weekly plants systems checks and calibrations complete. Filter press full.
1410	- TP-150 molybdenum HACH value @ 10 ug/L.
1419	- work on setting up and calibrating Autosamplers. Triple rinse composite containers with DI water, will add preservatives on
	Tuesday prior to start up.
1530	- Plants operations Good

Influent Sources and Flow Rates: @ 0650
NBBW – 7.5 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.4 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.45" of rain Thursday P.M.

LOWRY WTP OPERATIONS LOG

Date: Friday, July 02, 2021

Time:	
0500	Plant operations good. Refill phosphorus tank with 40 gallons potable water + 1/16 TSP.
0600	TP-150 molybdenum Hach value reading 0 ug/L. Clean the HMR-30 weir and pH probe.
↓	No oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed.
↓	Water is clear, light yellow/green.
0715	Blowdown operations working well. Plant operations good
7/3/21 0645	Check plant remotely - All okay.
1905	Check plant remotely - All okay.

Influent Sources and Flow Rates: @0500
NBBW – 7.5 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.4 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

OPERATOR Chris Carlson

0.37" rain on 7/5/21 PM.

LOWRY WTP OPERATIONS LOG

Date: Sunday July 04, 2021

0600	ON site for weekend / holiday systems checks. Plant operations good. Refill phosphate
↓	tank with 30 gallons potable water + 3 lbs TSP.
0625	Decant T-35 / bottom valve. Wet well activated. Water is clear, no color. Clean
↓	the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130
↓	for oil globules - none observed. Water is clear, light green / yellow.
0645	TP-150 molybdenum Hach value reading 0 ug/L.
0750	Blowdown operations good.
0815	Plant operations good.
1830	Check plant remotely - All okay.
7/5/21 0650	Check plant remotely - All okay.
1600	Check plant remotely - All okay.

Influent Sources and Flow Rates: 0605
NBBW – 7.5 gpm
N. END ON-SITE – 13.2 gpm
N. END OFF-SITE – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm
COND/NTES T-530 – 0.2 gpm CAP-1/M
MW38 – 2.4 gpm
T-540/541 – 0.3 gpm
OTHER ~~NA~~ MW11BArea - 20 gpm.

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, July 06, 2021** pg 1 of 2

Time:	
0545	Plant operations good.
0615	Mike working on weekly efficiency sampling. Observe P-352 strainer is clogging clean strainer, transfer settled sludge from T-352 to T-351. Replace impeller on P-352.
0730	- Add preservatives to composite containers. Sodium Thiosulfate to SVOC's composite container and nitric acid to metals/RADS container.
0800	- START AutoSamplers for monthly/Qtrly WTP sampling. TOTAL Effluent @ 239882192 gal @ 6.85 su @ 16.8°C @ 33.3 gpm.
0915	- working on weekly BTS sampling.
1000	- Put BTS samples on ice. Prepare for rest of Qtrly sampling.
1030	- TP-150 molybdenum HACH value @ 10 ug/L
1100	- IX performance HACH testing and LAB split sampling after 333,454 gal treated: TP-183 @ 500 ug/L; TP-174A @ 1,900 ug/L TP-173A @ 6,800 ug/L; TP-170 @ 8,200 ug/L. Decanted T-351 to top valve. water is clear no color.
1150	- START flush of MP-001 and check for residual chlorine: None detected. ok to use HCl preserved vials
1200	- collect 1st set of time paced grab samples @ MP-001 for, VOC's, 1,4-Dioxane (low level) and Nonyphenols. water is clear no color, place samples in fridge. 1205 Restart - P-352. @ 28% CV
1230	- begin monthly/Qtrly Early warning sampling.
1340	- PACK to Reg 55 samples on ice for shipment to LAB.
1500	- Clean pH-315 probe w/ Acid solution. check the HMR30 for oil or sheen: None observed. Spray down weir. Check TP-130 for oil globules: None observed water is clear w/ yellow-green tint
1550	- START flush of MP-001 sample port and check for residual chlorine; None detected.
1600	- Collect 2nd set of time paced grab samples from MP-001 sample port for: VOC's, Low level 1,4-Dioxane and Nonyphenols. water is clear no color. Place samples in fridge with others
1615	- Reboot GC2 PC. Had a sentex Error message: File not opened or invalid Handle.
1630	- Plants operations Good. AutoSamplers on track/ok.
1945	Start MP-001 port flush and check for residual chlorine - none detected.
2000	Collect 3rd set of time paced grab samples for VOC's, low level 1,4-Dioxane and (continued)

Influent Sources and Flow Rates: @ 0630
NBBW – 7.5 gpm
North End On Site- 13.4 gpm
North End Off-Site – 6.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.4 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Tuesday, July 06, 2021 pg 2 of 2

Time:	
@ Cont.	Nonylphenols. Water is very clear, NO color. Place samples in fridge with others.
2345	Start MP-001 post flush and check for residual chlorine - none detected.
7/7/21 0000	Collect 4th set of time paced grab samples for VOC's, low level 1,4-Dioxane and Nonylphenols. Water is very clear, no color. Place samples in fridge with others.

Influent Sources and Flow Rates: @ 2010
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.4 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

OPERATOR Chris Carlson

985 gal potable not used in plant today.

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, July 07, 2021**

Time:	
0345	- Plants operations Good.
0350	- START Flush of MP-001 sample port and check for residual chlorine: None Detected.
0400	- Collect 5th set of time paced grab samples from MP-001 sample port for: VOC's, Low Level 1,4-Dioxane and NONYLphenols. water ES clear NO color place samples on fridge with others.
0440	- working on weekly GTS field Readings
0600	- Chris Working on weekly GC's calibrations and maint. and data backup.
0640	- Decant T-352 to TOP valve. Wet well did NOT activate. Water ES clear NO color.
	- Clean pH-315 probe w/Acid solution. Check TPC HMR 30 for oil or sheen: None observed. Spray down wash.
	- Check TP-130 for Oil globules: None observed. water ES clear w/ yellow-green hue.
0750 ~~0800~~	- ~~STOP~~ START Flush of MP-001 sample port and check for residual chlorine: None detected.
0800	- Collect 6th set of time paced grab samples from MP-001 sample port for: VOC's, Low Level 1,4-Dioxane and NONYLphenols with QC volume for each. water ES clear NO color. STOP Autosamplers. Total Effluent = 23993358 gal. A total of 51,396 gal treated during sample period. Process Sample composites By gently stirring each composite and checking the pH. pH of SVOC's composite = 6.97 su / Metals-RADs composite = 1.42 su. Fill sample containers and PACK all samples on ICE for SHIPMENT to labs.
1003	- TP-150 molybdenum HACH value = 0 ug/L
1200	Begin running potable water into the 2" PVC POTW backup discharge line to displace the air in the system - E.T. Tech has tie-in connected for the DADS septic lift system and will use some of this ~~potable~~ potable water to flush any dirt in their section of line out before they attempt a pressure test of the newly installed septic line.
1255	Stop potable after 985 gallons - E.T. pressure testing going well. Will plan to retest Laury backup section of the 2" POTW line tomorrow.
1315	Back up WTP data to Flash & CD. OneDrive daily cloud backup working well. 1340 Plant operations good.

Influent Sources and Flow Rates: @0455
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

700gal potable water for pressure test on Backup POTW 2" line

LOWRY WTP OPERATIONS LOG

Date: **Thursday, July 08, 2021**

Time	
0550 ↓	Plant operations good. Prepare for 2-inch POTW backup discharge line testing, post DADS septic line tie-in - note E.T. Tech pressure tested new piping from DADS offices to tie-in with 150psi for 1 hour yesterday - All okay.
0730	Blowdown operations good.
0830	- working on weekly Plants Systems checks and calibrations.
0840	- Decant T-351 to TOP valve. Wet well activated. water is clear No odors
	- Clean pH-315 probe w/Acid solution. Check the Hach 10 for oil or sheen; None observed. Spray down with.
	- Check TP-130 for oil globules: None observed. water is clear w/yellow-green tint
1040	- Refill BTS phosphorus TANK w/6 # of TSP and 60gal of potable water.
	- Suspend Plant Discharge for Chris to do 4x8" [redacted] POTW Isolation valve Exercising. Also checking for leaks and leak detection
	Also doing a Pressure test on the BACKUP 2" POTW Line and checking and Exercising those Isolation valves too.
1054	- Resume normal Discharge. Finish up on 2" POTW checks and valves. Close the valve on the 2" @ the end and check
	POTW MH175-078. All ok.
1126	Start potable water Flowing through Backup 2" POTW discharge line - Perform ANNUAL valve exercising and air relief checks with Mike - All okay.
1215	Close pressure test isolation valve NEXT to MH175-078
1225	Return to plant - line is at potable supply pressure of ~95psi Flow rate of potable 0.0gpm.
1231	HOUSE hydrostatic pump to set line pressure to 150 psi and start test.
1251	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STDs
1258	- Resume normal Discharge. Continue with other WTP pH probes calibrations to 4+10 pH STDs @ MH113, 670, 310, 315 & 365
1330	- Weekly Plants Systems checks and calibrations complete.
1331	- POTW BACKUP 2" pipeline pressure test complete. Dropped to 148psi. All ok. Slowly Release [redacted] pressure
	and water BACK to the WTP wetwell. PUT New NaOH TOTE on line to BTS
1435	- TP-150 Molybdenum HACH value @ 10 ug/L.
1445	- Plants operations Good.

Influent Sources and Flow Rates: @ 0835
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

* 1257 - TDM calling in NBBW sump level for TRANSducer QTRly calibration check. DTW @ 26.91' = 5685.64'. HMI Reading 5685.51' No calibration needed at this time.

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, July 09, 2021**

Time:	
0645	- Plants operating Good
0745	- Piper Electric on site (Haden) to Replace VFD FAN on MW170-EW-1. Also to work on Backup P-114 motor to be the same as current one.
0753	- Change N:End on site Flow Alarm value to 0 gpm while He works on FAN. Needs to turn off pump power.
0840	- MW170-EW-1 Back on. Return Flow Alarm value to 11 gpm.
0950	- Piper Electric off site. VFD FAN Replaced and Backup motor Ready.
1015	- Decant T-351 to TOP value. wetwell activated. water is clear no color
	- Clean pH-315 probe w/Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. water is clear w/yellow-green tint
1245	- TP-150 molybdenum HACH value ⇒ 0 ug/L
1515	- BTS into Maint Hold to Flush Reactor Feed lines.
1540	- BTS Back to Normal operations.
1600	- Plants operations Good.

Influent Sources and Flow Rates: @ 0650
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.8 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: Saturday, July 10, 2021

Time: 0815	Plant operations good. Start perimeter check of site
0915	Perimeter fence and gates secured and all sheds and compressors in normal operations.
0930	Decant T-351 Top valve until wet well activated -Stopped decant when water got cloudy
1000	Cleaned T-315 probe with Acid Solution. Check HMR30 for oil sheens: None observed ↳ tank is slightly cloudy → Sprayed down weir
1030	Checked TP-130 for oil globules and sheens: None observed water is clear with yellowish tint
1100	TP-150 molybdenum HACH value @ 10 ug/L
1200	Plant operations normal. Depart
1800	-Logon Remotely Allow.
Sunday	July 11, 2021
0616	- Receive Alarm for UV-OK Shutdown. Log on looks like BagFilters plugging.
0640	- onsite. Pressure on BagFilter outlet is High. Change out BAgs during Shutdown while UVOK on Recycle.
0710	- Install New 5 micron BAgs on UVOK BagFilter Systems
0755	- Plants operations Good

Influent Sources and Flow Rates: @0820
NBBW – 7.6 gpm
North End On Site-13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

OPERATOR Tom Gilbert / mike Gadwick

LOWRY WTP OPERATIONS LOG

Date: **Monday, July 12, 2021**

Time:	
0540	Plant operations good.
0820	- Decant T-351 to TOP valve. cut well activated. water is clear no color
	- Clean pH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen; none observed. Spray down warm
	- Check TP-130 for oily globules; none observed. water is clear w/ yellow-green tint.
0840	- TP-150 molybdenum HACH value @ 10 ug/l
1354	Tom send in MW38N Extraction well level for quarterly transducer calibration check. DTW @ 52.13'
↓	= GWE 5719.67'. HMI reading 5719.56', no calibration needed at this time.
1545	Observe a small amount of air is getting past the HMR-30 sparge valve, close manual ball valve
↓	until blowdown tomorrow, then will change out the auto valve.
1556	Plant operations good.

Influent Sources and Flow Rates: @0650
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, July 13, 2021**

Time:	
0530	Plant operations good.
0615	Mike working on weekly efficiency sampling / prep for weekly BTS performance sampling
0750	Blowdown operations good (sparge manual valve reopened then closed after sparge cycle).
0755	IX Performance Hach values with splits going to lab after 352,836 gallons treated.
↓	TP-183 @ 700 ug/L; TP-174A @ 1,200 ug/L; TP-173A @ 6,600 ug/L; TP-170 @ 7,700 ug/L.
0850	TP-150 molybdenum Hach value reading 0 ug/L.
0800	- Refill BTS Phosphorus TANK w/ 7 # of TSP and 70 gal of potable water
0825	- Decant T-351 to top valve. wet well activated. water IS clear No color
	- Clean pH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water IS clear w/ yellow-green tint.
1430	Replace the air valve on the HMR-30 sparge system - working well.
1500	Change 5-micron bags on UV-OX Feed.
1600	Plant operations good.

Influent Sources and Flow Rates: @0650
NBBW – 7.7 gpm
North End On Site- 13.4 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, July 14, 2021**

Time	
0600	Plant operations good. Start weekly GC maintenance & Calibrations. Prepare for T-510 cleaning.
0710	New sparge valve working well. Begin T-510 cleaning while HMR-30 is in blowdown.
0730	T-510 cleaning completed - clean UV-OX & BTS Feed y-strainers. Blowdown operations okay - observe sludge lateral #3 is partly clogged - will work on clearing it later after blowdown and the UV-OX has cooled back down.
0800	Tom sending MANUAL DTW of MW38 south well for transducer check. DTW @ 72.17' = GWE 5734.59'. HMI reading 5734.63', NO calibration needed at this time.
0900	Work on clearing sludge lateral #3 - Decant T-351, wet well on - water is clear, NO color.
0915	Lateral #3 clear - refill HMR-30
0925	~~TP-180~~ TP-150 molybdenum Hach values reading 0 ug/L.
0930	Decant T-351 again - wet well did not activate. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is very clear, light yellow/green.
1015	Weekly data backup done. OneDrive daily auto backup working well.
1200	Shutdown MW38 N & S extraction in preparation for MW38 source well batch extraction.
1225	Increase RWST influent from 0.6 gpm to 2.6 gpm and switch MW38 from direct HMR-30 influent to T-540/541. Run down to source well and start batch extraction to T-540/541.
1310	Place BTS in maintenance hold for Sediment tank feed line flush and GAC F-3340 backflushing.
1400	BTS out of maintenance hold.
1415	Plant operations good.

Influent Sources and Flow Rates: @ 0650
NBBW – 7.6 gpm
North End On Site- 13.4 gpm
North End Off-Site – 8.9 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, July 15, 2021**

Time:	
0540 ↓	Plant operations good. T-540/541 @ 60%, will continue MW38 batch extraction until 80% to 85% Full.
0740	Blowdown operations okay - observe sludge later #3 is partly plugged again after blowdown.
0800	Decant T-351 top valve, wet well activated. Water is clear, no color.
0810	Work on pumping sludge lateral #3 clean out port.
0820	Later #3 Clear again - Mike working on weekly systems checks and calibrations today.
0915	- Clean pH-315 probe w/Acid solution. Check the Hach 30 for oil or sheen: None observed. Spray down with.
	- Check TP-130 for oil globules: None observed, water is clear w/yellow-green tint
1331	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's.
1340	- Resume normal Discharge, continue with other WTP pH probes calibrations to 4+10 pH STD's ⇒ pH-113, 670, 310, 315 + 365.
1420	- Plant's weekly systems checks and calibrations complete.
1426	- Receive Cac warning alarm. GAC 3 1,2 DCA ⇒ 108.22 ppb Probably due to fresh MW38 Source well water hitting the system. Still OK. Conservative setting.
1447	- TP-150 molybdenum HACH value ⇒ 0 ug/L.
1615	- STOP MW38 Source well pumping to T-540/541. TANKS = 81%
1708	- START MW38 N+S wells pumping to T-540/541 TO Displace any residual Source well water in pipeline. At least 600 gal.
1715	- Plant's Operations Good.
2131	- Switch MW38 N+S pumping wells to RWST. 621 gal flushed thru effective to T-540/541.

Influent Sources and Flow Rates: @ 0650
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 2.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 30 gpm(Source well and 38 pumping wells mix)
MW38 ~~N+S~~ – 5.1 gpm Source well
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, July 16, 2021**

Time:	
0635	- Plants operations Good
0643	- Switch manual valves on 38 pipeline to HMR30 and switch MW38 N+S wells pumping to the HMR30. Return RWST Flow to 0.60 gpm.
0720	- Receive GC3/Bio warning VOC Alarm 1,2-DCA @ 109 ppb. Conservative setting. Still ok.
0740	- Refill BT3 phosphorus tank w/ 4# of TSP and 40 gal of potable water.
0810	- Decant T-351 to TOP valve. Wetwell activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is clear w/ yellow-green tint.
0830	- TP-150 Molybdenum HACH value @ 10 ug/L.
1415	- Plants operations Good

Influent Sources and Flow Rates: @ 0645
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 9.1 gpm
RWST – 0.60 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick**

0.1" rain

LOWRY WTP OPERATIONS LOG

Date: Sunday, July 18, 2021

Time:	
0830	Plants operations good.
0905 MS	Decant T-351 to top valve. Wet well activated. Water is clear, no color.
	Clean pH-315 probe w/ acid solution. Check HMR-30 for oil sheen: none observed. Spray down weir.
	Check TP-130 for oil globules: none observed. Water is clear with light yellow-greenish tint.
1035	TP-150 Molybdenum HACH value @ 20µg/L.
1045	Plants operations good.

Influent Sources and Flow Rates: @ 0900
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 1.9 gpm

OPERATOR Manuela Seewald

LOWRY WTP OPERATIONS LOG

Date: **Monday, July 19, 2021**

Time:	
0600	Plant operations good. IX system flow dropped to 1.9 gpm over the weekend.
0630	Change out 1-Micron bag in temporary filter before T-113, bag that was online did have a lot of fine silt trapped in it.
↓	Set up for annual LFG condensate conveyance line flushing / Pressure testing.
0750	Blowdown operations good. Refill phosphoric tank with 50 gallons potable water + 5 lbs TSP.
0800	Mike adding potable water to auto traps 1, 2 & 3 to displace air in the conveyance line.
0917	~200 gallons of potable sent through the conveyance line - valves ~~stop~~ closed and pressure test started, holding at 41 psi (condensate operating pressure ~20 psi - not).
↓	Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HACH-30 weir and pH probe - No oil or sheen observed in the Hach-30. Refill polymer tank with 200 gallons potable + 2 cups polymer. Flush lateral #3.
↓	Check TP-130 for oil globules - NONE observed. Water is clear, light green/yellow.
0940	TP-150 molybdenum Hach value reading 20 ug/L.
1020	LFG condensate conveyance line pressure at 40 psi - PASSING. Resume normal auto trap pumping.
	Mike topping up backup generators fuel today.
1500	- Plants operations good

Influent Sources and Flow Rates: @0650
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, July 20, 2021**

Time:	
0615	Plant operations good. Setup for weekly efficiency & performance sampling.
0640	Mike starting weekly efficiency sampling.
0730	IX performance with lab splits. Note: Running both Low & High range Hach test on TP-183 & TP-174A, logging low range on spreadsheet because it matches up closer to historical weekly lab results. TP-183 Low Range @ 120ug/L & High Range @ 400ug/L (Historical lab result ~200ug/L); TP-174A Low Range @ 170ug/L & High Range @ 600ug/L (Historical lab result ~300ug/L); TP-173A @ 6,900ug/L and TP-170 @ 7,600ug/L, IX performance readings / samples take after a total of 372,436 gallons treated.
0835	TP-150 molybdenum Hach value reading 0ug/L. Mike working on weekly BTS performance.
0845	- Decant T-351 to TDP valve wetwell activated. water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check TP-430 for oil or sheen: none observed. Spray down weir.
	- Check TP-430 for oil globules: none observed. water is clear w/ light yellow green tint.
1515	- Plants operations good.

Influent Sources and Flow Rates: @0830
- NBBW – 7.6 gpm
- North End On Site- 13.4 gpm
- North End Off-Site – 8.6 gpm
- RWST – 0.6 gpm
- NTES – 0.52 gpm(10R only)
- MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
- MW38 N & S– 2.2 gpm
- COND/NTES T-530- 0.2 gpm(6am-1pm daily)
- MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, July 21, 2021**

Time:	
0540	Plant operations good. Start on weekly GC maintenance and calibrations.
0700	Jim B of Brown Hill on site for OneDay database creation, fix P-632 PID control input value update, backup PID programs to OneDrive.
0835	TP-150 Molybdenum Hach value reading 0 ug/L.
1015	Reboot HMI2 after BioTrend data fix.
1017	HMI2 online.
1040	Swap out battery on HMR-30 PLC CPU card - All OK.
1205	-Decant T-351 to TOP valve. wet well activated. water IS clear NO color.
	-clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down wash.
	-Check TP-430 for oil globules: None observed. water IS clear w/ yellow-green tint.
1420	Refresh FTVIEW1 (possibly note logging data since 1314). working NOW. Jim done for now - will update him tomorrow on how well OneDay data logging / backup is working.
	Work on backing up data to CD & Flash drive.
1520	Plant operations good.

Influent Sources and Flow Rates: @0653
NBBW – 7.0 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, July 22, 2021**

Time:	
0500	Plant operations good. Oneday database didn't log on HMI2 but did on HMIFTVIEW1 at 11:59pm.
0538	Stop HMI2 RSVIEW and backup all data to flash drive, then reboot CPU.
0546	HMIL online - note Oneday did log at startup.
0610	Backup all data on HMIFTVIEW1
0642	Reboot HMIFTVIEW1 - online @ 0647.
0730	Blowdown operations good. Work with Mike to add remaining ~100 gallons hydrogen peroxide to main bay supply, one full HCL tote & ~1.25 tote of Caustic also to main bay supply. Also do some prep work for HCL supply line upgrade/refresh.
0840	Kelly working on OneDay compaction / backup remotely (adding VBA script)
0940	- Mike working on weekly Plants Systems checks and calibrations
1015	- Decant T-351 to TOP Valve. wet well activated. Water is clear No color
	- Clean pH-315 probe w/Acid solution. Check TK HMR30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules; None observed, water is clear w/yellow-green tint.
1100	- Begin main compressor oil moisture prevention MAX speed Run.
1300	- STOP main compressor MAX Run.
1325	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's
1333	- Resume normal Discharge. Continue with other pH probes calibrations to 4+10 pH STD's @ pH-113, 620, 310, 315 + 365.
1415	- Plants Systems and calibrations checks complete.
1420	- TP-150 molybdenum HACH Valve @ 10 ug/L
1500	- Plants operations Good

Influent Sources and Flow Rates: @ 1015
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.8 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, July 23, 2021**

Time:	
0650	- Plants operations Good.
0710	- TP-150 molybdenum HACH value ≥ 0 ug/L. Blowdown operations Good.
0810	- Decant T-351 to TOP valve. wet well activated. water IS clear No color
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray Down weir.
	- Check TP-130 for oil globules: None observed. water IS clear w/ Light yellow green Hart
0835	- Kelly from Browns Hill working on DATA issue Remotely, Refill BTS phosphorus tank w/ 6# of TSP and 60 gal of potable water
0855	- Kelly found one more possible mistake but will need to wait until morning tomorrow to see IF Fixed, Place BTS Into Hold to Flush Reactor
	Feed Lines
0928	- Resume Normal BTS operations
0940	- Plants operations Good.

Influent Sources and Flow Rates: @ 0655
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Saturday, July 24, 2021**

Time: 0500	- Plants operations Good.
0525	- Decant T-351 to TOP valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR50 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. water is clear w/ light yellow-green tint.
	- Both GC's operational within Limits.
	- All blowers ok. BAg filters backwash operations Good. No Refill on phosphorus tank needed. ~90 gal full.
0600	- TP-150 molybdenum HACH valve @ 10 ug/L. Go to check other site systems.
0825	- Plants operations Good 2100- Log in Remotely. All ok.
Sunday,	July 25, 2021
0900	- log in Remotely. All ok
2100	- Receive Alarm for NTES unstable flow. Log in and set NTES to manual and START T-530/R005 @ 0.50 gpm. Divert NTES
	to T-530. 10 OKS like trench may have pumped down to a Recharge Rate which was not enough to stay above flow Alarm set point.

Influent Sources and Flow Rates: @ 0500
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / ~~Chris Carlson~~**

LOWRY WTP OPERATIONS LOG

Date: **Monday, July 26, 2021**

Time:	
0610	Plant operations good. P-002UV did not stall out again overnight, will plan to pull and clean pump this week.
0815	- Decant T-351 to TOP valve. Wetwell activated. Water is Clear No odor.
	- Clean pH-315 probe w/ Acid solution. Check the HMI 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 For oil globules: None observed. Water is Clear w/ light yellow-green tint.
0825	- TP-150 molybdenum HACH value = 0 ug/L
1055	- Return NTES to normal flow mode = 0.51 gpm. Been running OK. Return T-530 to Auto Run = 0.20 gpm 6 AM-1pm.
1440	- Plant is operating Good.

Influent Sources and Flow Rates: @ 0830
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.9 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only) to T-530
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.51 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, July 27, 2021**

Time:	
0540	Plant operations good.
0630	Mike working on weekly efficiency sampling - Tom to continue training on Bio weekly performance today. 4 Samples
0730	IX performance HACH testing and LAB split sampling AFTER 392191gal treated: TP-183 = 110 ug/L ; TP-174A = 115 ug/L TP-173A = 5100 ug/L ; TP-170 = 7300 ug/L. Using Low RANGE KIT for TP-183 + 174A. Using High RANGE KIT for TP-173A + 170.
0817	TP-150 Molybdenum HACH value = 0 ug/L
1215	-Refill STS phosphorus tank w/ 6 #s of TSP and 60 gal of potable water.
1255	-Decant T-351 to TDP valve. wet well activated. water is clear no color.
	-Clean pH-315 probe w/ Acid solution. check the HMI 80 for oil or sheen: None observed. Spray down weir.
	-Check TP-130 for oily globules ; None observed. water is clear w/ light yellow-green tint.
1510	-Plants operating Good.

Influent Sources and Flow Rates: @ 0653
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, July 28, 2021**

Time:	
0550	Plant operations good. Start on weekly GC maintenance and calibrations.
0600	Turn up IX Feed to 2.2 GPM max to handle the small amount greater than
↓	2 GPM to extraction pump is making. Total volume through the IX system
↓	at 394,850 gallons.
0730	Blowdown operations good.
1400	GC's completed - Backup WTP data to Flash & CD. Automatic daily OneDrive backup
↓	working well.
1440	TP-150 molybdenum Hach value reading 0 ug/L.
1450	Decant T-351 top valve, wet well activated. Water is clear, no color - Clean the
	HMR-30 water and pH probe - no oil or sheen observed in the HMR-30. Check TP-150
	for oil globules - none observed. Water is clear - light yellow / green -
1550	Plants operations Good

Influent Sources and Flow Rates: @ 0656
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.1 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 1.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, July 29, 2021**

Time:	
0600	Plant operations good.
0650	Shutdown UV-ox for lamp change out. Asset # LT-358 @
0730	Change out lamp SERIAL NUMBER 10763094 after 3,295 service hours with new
↓	lamp serial number 1001175340/9
0750	Blowdown operations good. New lamp working well. Mike working on weekly systems
	checks and calibrations. New 4+10 pH STD's today. Calibrate site multirate to 50% LEL to check T-740 Ambient to ensure 0% LEL.
1000	- Decant T-351 to TOP valve wet well activated. water is clear no color
	- Clean pH-315 probe w/ acid solution. Check the HMR30 for oil or sheen: None observed. ~~[illegible]~~ spray down weir
	- Check TP-130 for oily globules: None observed. water is clear w/ light yellow-green tint.
1020	- TP-150 molybdenum HACH value @ 10 ug/L
1150	- Calibrate BTS pH probes w/ new 4+10 pH STD's (monthly)
1253	- Calibrate WTP pH probes w/ new 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1320	- Suspend Plant Effluent to calibrate pH-740 probe and LEL-740 sensor. Use site multimeter to ensure T-740 Ambient Air is 0% LEL
1331	- Plant shut down during calibration of LEL-740 @ 8% LEL. Automatic shut down operating correctly.
1339	- Restart plant while discharge still suspended.
1340	- Resume normal discharge.
1555	- Plants operations Good.

Influent Sources and Flow Rates: @ 0640
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.9 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.23" Rain P.M.

LOWRY WTP OPERATIONS LOG

Date: Friday, July 30, 2021

Time:	
0800	Plant operations good.
0830	- Decant T-351 from top valve - wet well activated - water is clear w/ no color - stopped decant when water got cloudy
	- Cleaned pH-315 probe w/ acid solution. Checked HMR30 for oil or sheens → none observed
	- Sprayed down HMR30 weir → good flow
	- Checked TP-130 for oil globules: none observed → water is clear w/ yellow greenish tint
0915	TP-150 molybdenum HACH value @ 10 ug/L
1430	Plant operations good.

Influent Sources and Flow Rates: @
NBBW – gpm
North End On Site- gpm
North End Off-Site – gpm
RWST – gpm
NTES – gpm(1pm daily)
MW38 T-540/541 – gpm(Source well and 38 pumping wells mix)
MW38 N & S– gpm
COND/NTES T-530- gpm(6am-1pm daily)
MW113 Area – gpm

OPERATOR Tom Gilbert

0.25" rain P.M.

LOWRY WTP OPERATIONS LOG

Date: Saturday, July 31, 2021

Time	
0620	ON site for weekend systems check. Plant operations good. Decant T-351 top valve, east well did not activate. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-120 for oil globules - none observed. Water is clear- light yellow/green. Refill phosphorus tank with 50 gallons potable water + 5 lbs TSP. Switch Reactor 1 feed from P-3321 to P-3324 (3321 partly clogging, motor speed 81%)
0750	Blowdown operations okay - HMR-30 Sludge lateral #2 partly clogged.
0835	TP-150 molybdenum Hach value reading 0 ug/L.
0900	Plant operations good.
8/1/21 0627	Check plant remotely - All okay.
1410	Check plant remotely - All okay.

Influent Sources and Flow Rates: @0627
NBBW – 7.5 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

OPERATOR Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, August 02, 2021**

Time: 0620	Plant operations good. Mike setting up autosampler for monthly MP-001 Flow paced molybdenum sampling.
0800	-START Auto Sampler. TOTAL Effluent → 24125882 8 gal → 6.75 MG → 17.5 AC → 33.4 gpm
1000	- Begin monthly Early warning and weekly IX System Sampling. Splitting IX HACH Samples w/ LAB.
1032	IX Performance HACH testing AFter 409947 gal treated; TP-183 → 130 ug/L ; TP-174A → 160 ug/L ; TP-173A → 6200 ug/L TP-170 → 6700 ug/L. TP-150 Molybdenum HACH value → 0 ug/L. All Lab samples put in Fridge until packing tomorrow.
1150	-START Flush of mp-001 and check for residual chlorine; None detected. OK to use HCl Preserved vials
1200	-Collect 1st set of Time paced grab samples for Low Level 1,4-Dioxane. Water IS Clear No color Place SAMPLES in to Fridge.
1240	- Decant T-351 to TOP valve. Wet well activated. Water IS clear No color
	-Clean pH-315 probe w/ Acid Solution. Check the HMR30 for oil or Sheen: None observed. Spray down weir.
	-Check TP-130 for oily globules: None observed. Water IS Clear w/ light yellow-green tint.
1550	- START Flush of MP-001 SAmple Port and check for Residual chlorine: None detected.
1600	-Collect 2nd set of time paced grab samples for Low Level 1,4-Dioxane. Water IS Clear No color. Place SAmples IN Fridge with others
1605	- Plants operations Good.
1945	Start flush of MP-001 sample port - check for residual chlorine - none detected.
2000	Collect 3rd set of time paced grab samples for low level 1,4-Dioxane. Water is very clear, NO color. Place sample in fridge with others. Plant operations good.
2345	Start MP-001 port Flush - check for residual chlorine - none detected.
0000	Collect 4th set of time paced grab samples for low level 1,4-Dioxane. Water is very clear, NO color. Place sample in fridge with others. Plant operations good.

Influent Sources and Flow Rates: @0650
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.02" rain P.M.

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, August 03, 2021**

Time:	
0340	- Plants operating Good
0350	- START Flush of MP-001 sample port and check for Residual chlorine: None detected.
0400	- Collect 5th set of time paced grab samples for Low Level 1,4-Dioxane. Water is clear No color. Place samples in fridge with others
0405	- Begin GTS sampling and Efficiency checks. TOM assisting/training
0600	- continuing on GTS field readings. TOM helping/training
0652	Restart MW38 N well extraction early (reached it's low level stop last night at 2059).
0750	- START Flush of MP-001 and check for residual chlorine: None detected.
0800	- collect 6th/final set of time paced grab samples for Low Level 1,4-Dioxane. Water is Clear No color. Place samples in fridge with others
	- STOP Auto sampler. Total Effluent = 241,309,032 gal. A Total of 50,204 gal treated during sample period. Process composite sample by
	Gently stirring and Check pH value. Composite pH value = 1.83 su. Fill bottle and pack All samples on Ice for shipment to Lab.
1105	- ~~Became~~ Re-fill GTS phosphorus tank w/ 5# of TSP and 50 gal of potable water.
1155	- Decant T-351 to top value. Wetwell activated. Water is Clear No color
	- Clean pH-315 probe w/ Acid solution. Check the HMI-30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oily globules: None observed. Water is clear w/ yellow-green tint.
1207	- TP-150 Molybdenum HACH value = 10 ug/L

Influent Sources and Flow Rates: @0345
NBBW – 7.6 gpm
North End On Site- 13.1 gpm
North End Off-Site – 2.6 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.2 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, August 04, 2021**

Time:	
0620	Plant operations good - start on weekly GC maintenance and calibrations.
0659	Stop both MW38N/S extraction to prepare for MW38 source well batch extraction.
0700	Shutdown UV-OX to prepare for planned high voltage outage later today for relocation of underground line near DADS scales.
0720	-TP-150 molybdenum HACH value ≈ 0 ug/L
0727	-Decant T-351 to TOP valve. wet well activated. water is clear no color.
	-Clean pH-315 probe w/ Acid solution. check the HMR-30 for oil or sheen: none observed. spray down weir.
	-check TP-130 for oil globules; none observed. water is clear w/ yellow-green tint.
	-Refill polymer tank w/ 2 cups of NALCO polymer and 2 oogal of potable water.
0745	Switch MW38 from direct HMR-30 influent to T-540/541 then start MW38 source well extraction.
0748	Stop MW170-EW-1 extraction
0750	Shutdown plant - Kill ~~48~~ Main plant power. RWST generator starting up - All ok. Kill Bio building power - backup generator on - All ok. Note: NTES backup generator running also.
0850	Shutdown HMIFTVIEW1 CPU (PLC traffic lagging with it on and some PLC's down). Mike working on flushing P-005 / P-006 / NTES feed line to BTS sediment tank and reactor feed lines.
1527	Restart HMIFTVIEW1 CPU - Weekly WTP data backup.
1710	Power restored - switch off from backup power to utility - restart compressor - Unable to get UV-ox PLC to full power up. Power and input cards rapidly flashing. Power cycling PLC CPU not working.
1732	Restart plant without UV-ox. UV-ox PLC CPU resumed normal start by itself after leaving it ~~alone~~ alone (made notes to ask Calgon about it - possibly old dried out diodes on circuit board?

Influent Sources and Flow Rates: @ 0658
NBBW – 7.6 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.9 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Wednesday, August 04, 2021 (continued)

Time:	
1808	Start UV-OX warm up. Mike going around site and restarting extractions / taking NTES off generator power. Set RWST influent to 3.0 gpm tonight while MW38 N's & S remain off for Source well batch extraction (T-540/541 @ 46%.) will leave source well running overnight - also leaving *P-006 off tonight so BTS can recover from downtime without source well water running into it.
1905	Plant operations good.
2100	- Receive BTS Overflow TANK High Alarm. Log in remotely and set things going Again, Increase BTS to Plant % to 19%. From 17%. Set TANK High to 95% to Clear Alarm - Blend Ratio Alarm came out during overflow TANK pumping down and I had BTD out of Hold. Reset TANK set point to 73% to get flows regulated and put back to 30% once Alarm Cleared out. Overflow High level set back to 90%
2145	- All ok. Plants operations Good.

Influent Sources and Flow Rates: @ 1905
NBBW – 7.6 gpm
North End On Site- 13.5 gpm
North End Off-Site – 8.4 gpm
RWST – 3.0 gpm
NTES – 0.51 gpm(10R only)
*MW38 T-540/541 – 0.0 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 0.0 gpm
COND/NTES T-530- 0.0 gpm(~~Send 1gpm daily~~)
MW113 Area – 2.0 gpm

OPERATOR Chris Carlson / Mike Gelenick

LOWRY WTP OPERATIONS LOG

Date: **Thursday, August 05, 2021**

Time:	
0640	- Plants operations Good. MW113-EW-1 flow Has slowed down slightly, will Adjust to slightly more than 2.1 gpm
0730	- Increase psi on MW113-EW1 to 45psi. will Adjust later if needed to maintain a more stable flow.
0950	- Working on weekly Plants System checks and calibrations. looks like MW113-EW1 needs a slight bit more adjustment. TANK filling too quickly.
	will decrease ~~[illegible]~~ to 42psi.
1030	- Decant T-351 to top valve. wetwell activated. water is clear no color.
	- Clean pH-315 probe w/ Acid solution. check the HMR30 for oil or sheen; none observed. Spray down weir.
	- Check TP-130 for oil globules; None observed. water is clear w/ yellow-green tint.
1115	- STOP MW38 source well Batch. MW113-EW-1 flow currently Good where its @. Doing slightly more than 2.1 gpm.
1155	- Restart MW38 N+S wells pumping to T-540/541 until at least 600 gal thru pipeline to displace any residual MW38 source well waters.
1331	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's.
1339	- Resume Normal Discharge. Continue with other WTP pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1425	- Plants weekly Systems checks and calibrations complete.
1430	- Change out 1 micron Bag Filter in front of T-113 (MW113-EW-1 Inf) with a new 1 micron bag filter. Flow slowed down during change out due to
	tank level pumping down.
1452	- TP-150 Molybdenum HACH value @ 0 ug/L
1510	- Plants operations Good.

Influent Sources and Flow Rates: @0645
NBBW – 7.6 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 3.0 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.0 gpm(Source well and 38 pumping wells mix)
MW38 ~~N & S~~ 5.1 gpm source well to T540/541
COND/NTES T-530- 0.21 gpm(6am-1pm daily)
MW113 Area – 1.4 gpm

Operator: **Mike Gelwick** / ~~Chris Carlson~~

LOWRY WTP OPERATIONS LOG

Date: **Friday, August 06, 2021**

Time:	
0620	- Plants operations Good. MW113-EW-1 flow a little to High. Filling TANK ~ Every 3 Hrs. will adjust down slightly to get closer to 2.1 gpm.
0628	- START P-006/T-540-541 @ 0.20 gpm
0630	- Switch manual valves on MW38 to HMR30 and switch MW38 N+S wells to HMR30 mode. Turndown RWST Flow to 0.60 gpm
0645	- work w/ TOM to PUT a NEW TOTE of Na_2OH on Line on chemical BAY.
0730	- Very Minor Decrease on psi @ MW113-EW-1. TANK STILL Filling but much slower. Slightly more than 2.1 gpm coming from MW113-EW-1.
	- Automatic blowdown operations Good.
0940	- Recount T-351 TO TOP valve. Wet well activated. water is clear no color.
	- Clean pH-315 probe w/ Acid Solution. Check the HMR30 for oil or sheen: None observed. Spray down well.
	- Check TP-130 for oil globules: None observed. water is clear w/ yellow green tint.
1010	- TP-150 Molybdenum HACH value 0 ug/L
1110	- Plants operations Good

Influent Sources and Flow Rates: @ 0810
NBBW – 7.6 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.20 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

Operator: **Mike Gelwick / ~~Chris Carlson~~**

LOWRY WTP OPERATIONS LOG

Date: August 7, 2021

Time:	
1100	Plants operations good.
1150	Decant T-351 from top valve, wet well activated, water is clear, no color.
	Clean pH-315 probe with acid solution.
	Check HMR-30 for oil sheen: none observed, spray down weir.
	Check TP-130 for oil globules: none observed. Water is clear with light yellow-greenish tint.
1215	TP-150 Molybdenum HACH test: result: 0 ug/L
1230	Refill phosphorus tank with 5# TSP and 50 gal of water.
	Both GC's operational within limits.
	All blowers ok.
1330	Plants operations good.

Influent Sources and Flow Rates: @ 1130
NBBW – 7.5 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.2 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.0 gpm

OPERATOR Manuela Seewald

LOWRY WTP OPERATIONS LOG

Date: August 9, 2021

Time:	
0800	Plant operations good.
0900	- Decant T-351 from top valve, wet well activated. Water is clear no color
	- Clean pH 315 probe w/ Muriatic Acid solution. Check HMR30 for oil or sheens
	- checked TP-130 for oil globules: ↳ none observed, Sprayed down weir
[redacted]	↳ none observed → water is clear w/ yellow-green tint
0930	TP-150 molybdenum Hach Value @ 0 ug/L ~~after 429,303 gallons treated~~
1000	Replaced V-326 Sparger air connection valve → was snapped upon arrival.
1230	@ shed 15 → no air in compressor. Troubleshoot → motor would not reset → turned on blue back up compressor. Will return later to ensure operation ok
1600	Back up Compressor running ok. Extraction wells are cycling Tank 15 level @ 35%
1700	Plant operations good.

Influent Sources and Flow Rates: @0830
NBBW – 7.5 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.6 gpm
RWST – .6 gpm
NTES – .52 gpm(10R only)
MW38 T-540/541 – .30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

OPERATOR Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, August 10, 2021**

Time: 0530	Plant operations good. Start on weekly efficiency checks and IX performance sampling.
0610	IX performance with lab splits after 431,640 gallons treated. TP-183 @ 110 ug/L;
↓	TP-174A @ 130 ug/L; TP-173A @ 6,000 ug/L and TP-170 @ 6,900 ug/L. Tom preparing
↓	for weekly BTS performance sampling / field readings
0735	Blowdown operations good.
0740	TP-150 molybdenum Hach reading @ 0 ug/L.
1340	Tom refilling phosphorus tank with 30 gallons potable water + 5lbs TSP.
↓	Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HMR-30
↓	weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules
↓	none observed - water is clear, light yellow/green.
1515	Plant operations good. End.

Influent Sources and Flow Rates: 0655
NBBW – 7.5GPM
N. END ON-SITE – 13.1GPM
N. END OFF-SITE – 8.3GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM(6AM–1PM)
MW38 – 2.4GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 2.0GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, August 11, 2021**

Time: 0525	Plant operations good. Start on weekly GC maintenance and calibrations.
0649	Reboot HMIFTVIEW1 to install latest virus software program update, Online 0659.
↓	Work on adding Tom Gilbert to alarm callouts.
0740	Blowdown operations good.
0845	Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HMP-30 weir and pH probe - no oil or sheen observed in the HMP-30. Check TP-130 for oil globules - NONE observed. Water is clear, light yellow/green.
↓	
0855	TP-150 molybdenum bleach valve reading 0 ug/L.
1230	Weekly WTP data backed up to Flash & CD. Automatic daily cloud backup working well.
1600	Plant operations good. UV-ox peroxide feed pump needed priming - All okay.

Influent Sources and Flow Rates: 0537
NBBW – 7.5GPM
N. END ON-SITE – 13.1GPM
N. END OFF-SITE – 8.6GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM(6AM–1PM)
MW38 – 2.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 2.0GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Thursday, August 12, 2021**

Time: 0540	Plant operations good. Start on weekly systems checks & calibrations
0650	Decant T-351 top valve, wet well click not activate. Water is clear, no color.
↓	Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30.
↓	Check TP-130 for oil globules - none observed. Water is clear, light green/yellow.
0810	Blowdown operations good. Tom given training on remotely accessing the plant
↓	computers and will be taking remote access computer #3 home with him today.
1030	Jim B. of Brown Hill on site to complete OneDay database on HMI2 - Also have him
↓	add a tag for N.End on site daily total to OneDay databases.
1055	Reboot HMI2 - online 1057. Jim done - leaving site
1126	HMI2 needed second reboot - online 1128.
1135	Reboot HMIFTVIEW1 to accept change of added tag. - online @ 1139.
1146	Suspend discharge for pH-740 calibration.
1157	pH-740 calibration completed - resume normal discharge - Continue on pH calibrations
↓	at pH-670, 113, 310, 315 & pH-365
1218	Weekly check completed.
1225	TP-150 moly Hach value reading 0 ug/L

Influent Sources and Flow Rates: 0550
NBBW – 7.5GPM
N. END ON-SITE – 13.0GPM
N. END OFF-SITE – 8.7GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM(6AM–1PM)
MW38 – 2.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 2.0GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: Friday, August 13, 2021

Time:	
0800	Plant operations good. Starting on plant dailys
0830	TP-150 molybdenum Hach value reading Ø ug/L
0845	Decant T-351 from top valve, wet well activated. Water is clear - no color
	Clean HMR-30 probe with Acid Solution, Sprayed weir holes with water - good flow
	Visually Inspected HMR-30 chamber - No oil or sheens observed
	Checked TP-130 for oil globules - none observed - water is clear w/ slight yellow tint
1400	Plant operations good.

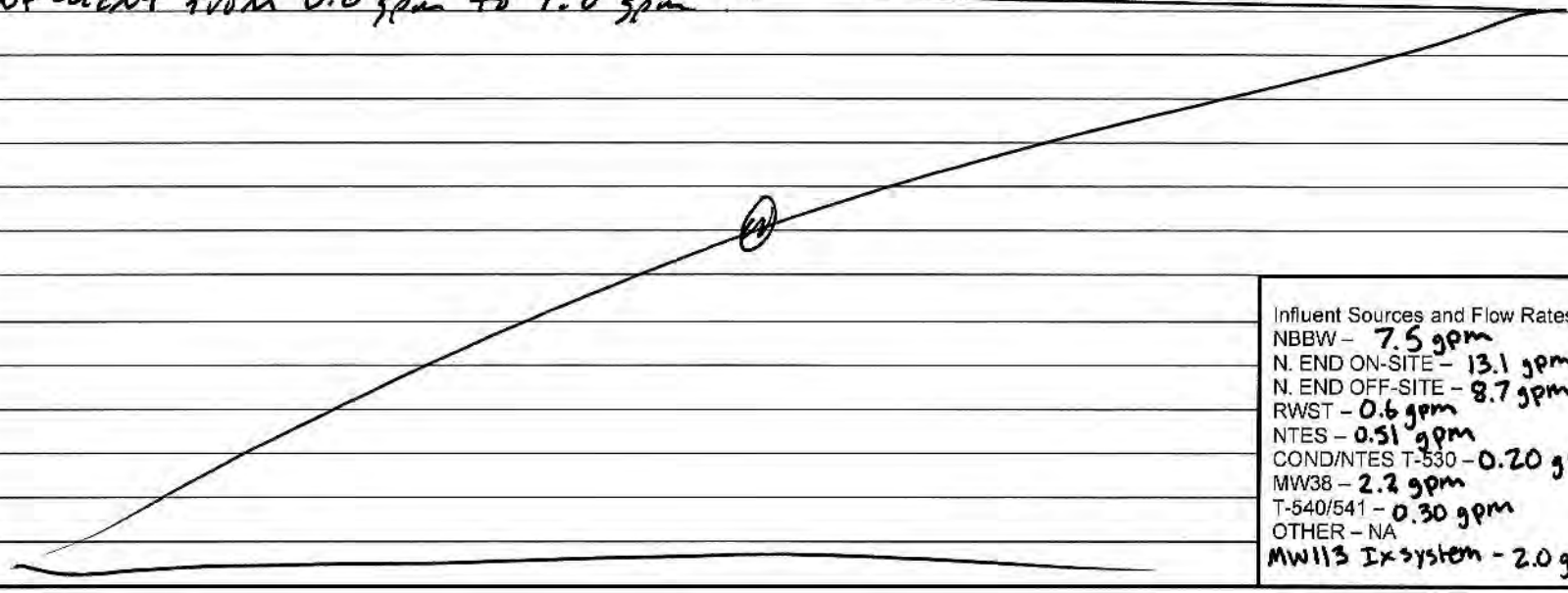
Influent Sources and Flow Rates: 0815
NBBW – 7.4 gpm
N. END ON-SITE – 13.0 gpm
N. END OFF-SITE – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.21 gpm
MW38 – 2.2 gpm
T-540/541 – .29 gpm
OTHER – NA
MW113 Ix - 2.0 gpm

OPERATOR(S) _____

LOWRY WTP OPERATIONS LOG

Date: Saturday, August 14, 2021

1015	Plant operations good. Start weekend operations dutys
	Decant T-351 from top valve, wet well activated. Water is clear - no color
	Clean HMR-30 probe w/ Muriatic acid solution. Sprayed weir with water - good flow
	Visually inspected HMR-30 chamber for oil or sheens - none observed
	Checked TP-130 for oil globules - none observed - water is clear w/ slight yellow-green tint
1230	TP-150 molybdenum Hach value reading Ø ug/L
1320	Plant operations good.
(W) 0630	Check plant remotely - All okay.
1650	Check plant remotely - All okay.
8/15/21 0900	Check plant remotely - All okay.
1750	Check plant remotely - MW38N reached it's low level stop @ 1650, increase RWST influent from 0.6 gpm to 1.0 gpm



Influent Sources and Flow Rates: 1030
NBBW – 7.5 gpm
N. END ON-SITE – 13.1 gpm
N. END OFF-SITE – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm
COND/NTES T-530 – 0.20 gpm
MW38 – 2.2 gpm
T-540/541 – 0.30 gpm
OTHER – NA
MW113 Ix system - 2.0 gpm

OPERATOR(S) Tom Gilbert / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, August 16, 2021**

Time:	
0600	Plant operations good.
0624	Windows error RSVIEW Project Manager Stopped on HMI2 - Reboot. Online okay @ 0627.
0720	Observe MW38 N well has reached it's high level restart setpoint, extraction @ 1.0 gpm. reduce RWST from 1.0 gpm to 0.6 gpm. Observe T-530 level at 21', place P-005 on standby.
0735	Blowdown operations good. Start on P-114 upgrade -
0820	- Decant T-351 to TP valve. clear well activated. water IS clear no color
	- clean PH-315 probe w/Acid solution. check TK HMW30 for oil or sheen: None observed. Spray down weir
	- check TP-130 for oily globules: None observed. water IS very clear w/light yellow tint.
0850	- TP-150 molybdenum HACH value > 10 ug/L
0921	Shutdown Ex system after 1149656 gallons treated. Swap out P-114 pump with a new pump that can pump 4 GPM -
1102	Restart Ex system with new pump - will keep slow at 2 gpm until after tomorrows lab samples are collected.
1200	New pump working very well - no leaks CV @ 27%. at 2.0 gpm and 56.8 psi.
1500	Plants operations Good.

Influent Sources and Flow Rates: @ 0730
NBBW – 7.5 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.0 gpm ~~(6am-1pm daily)~~
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, August 17, 2021**

Time:	
0530	Plant operations good.
0630	Mike working on weekly efficiency sampling.
0723	Mike starting weekly IX performance sampling after 452,131 gallons treated.
↓	TP-183 @ 100 ug/L, TP-174A @ 340 ug/L, TP-173A @ 5,800 ug/L and TP-170 @ 6,500 ug/L
↓	(All Hach test split with samples to be sent to the lab).
0805	TP-150 molybdenum Hach value reading 0 ug/L. TOM working on weekly BTS sampling and readings.
0809	Shutdown IX system to take column #1 offline, Note: TP-173A sample port moved
↓	to after column #2 which is now the lead column. IX Total treated @ 452,227 gal.
0833	Restart IX System @ 2 GPM.
0843	P-114 CV% @ 26%; PIT-113 @ 54.1 PSI TP-173A (post lead column 2) Hach value reading 530 ug/L
0900	IX system @ 452,282 gallons. Increase flow from 2 gpm to 3 gpm.
0915	P-114 CV @ 52%; PIT-113 @ 85.8 psi Flow @ 3.0 gpm (Mike has increased rate at MW113-FW-1 also). pH control adjusting to higher operating pressure, currently 4.2 and dropping slowly. Note: Higher pressure is throughout the system PIT-113 in same as columns IN.
1035	- Decant T-351 to TSP valve. Wet well activated water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMI-30 for oil or sheen: None observed. Spray down wash.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow tint
1115	- Refill BTS phosphate tank w/ 5 gal of TSP and 50 gal of potable water
1207	- Switch NTES to T-530 and START T-530 @ 0.50 gpm to BTS. while I work on MPZ-10R pump swap
1335	- Switch NTES BACK TO Normal and turn T-530 BACK OFF. MPZ-10R pump swapped.
1515	- Plants operations Normal. Chris Checking Discharge Line 4x8" leak detections and vaults and
	POTW MH175-078 Discharge manhole today. All ok.

Influent Sources and Flow Rates: @0645
NBBW – 7.5 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.3 gpm
COND/NTES T-530- 0.0 gpm ~~(Sent 1pm daily)~~
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, August 18, 2021**

Time:	
0540	Plant operations good. Note: IX system @ 90 psi at 2.8 gpm. Start on weekly
↓	GC maintenance and calibrations.
0608 ~~0608~~	Check moly after lead column, reading 580 ug/L (working very well, influent concentration
↓	running at 6,500 ug/L yesterday). Currently P-114 CV @ 47% at 90.0 psi - flow 2.8 gpm.
0615	Shutdown IX system - take columns #6, 7, 8 & 9 offline (place on standby for later
↓	use). IX treatment total at 455,970 gallons.
0630	Restart with Columns #2 (lead now that column #1 offline), #3, #4, #5 & Guard column.
0635	Flow set to 3.0 gpm. P-114 CV @ 51% at 59.1 psi.
0640	Flow set to 3.5 gpm. P-114 CV @ 63% at 69.5 psi
0645	Flow set to 4.0 gpm. P-114 CV @ 75% at 79.8 psi
0715	4.0 gpm. P-114 CV @ 75% at 78.7 psi - Mike increasing MW113-EW-1 extraction in the
↓	Field to keep up with 4 GPM rate.
0910	TP-150 molybdenum Hach value reading 0 ug/L.
0920	Check IX performance with Hach test at 4 gpm and 456,640 gallons treated. TP-183 @ 80 ug/L;
	TP-175A @ 180 ug/L; TP-174A @ 360 ug/L; TP-173A @ 690 ug/L and TP-170 @ 8,300 ug/L.
	Column #2 (lead) working very well at 4 GPM. Note: Observe T-113 level dropping at 4 GPM.
	Extraction well MW113-EW-1 maxed out at slightly less than 4 GPM. IX system will begin
	to auto regulate to the flow when tank level reaches 30%.
1125	- Decant T-351 to TOP valve. wet well activated. water is clear no color.
	- clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: none observed. Spray down wall
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow tint
1500	- Plants operations Good

Influent Sources and Flow Rates: @ 0740
NBBW – 7.4 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.0 gpm~~(6am-1pm daily)~~
MW113 Area – 4.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.39" rain
P.M.

LOWRY WTP OPERATIONS LOG

Date: **Thursday, August 19, 2021**

Time:	
0700	- Plants operations Good. Automatic Blowdown operations Good. IX System operations Good. Flow Fluctuating Between 3.5 + 4.0 gpm.
0825	- Checking IX Performance @ 4 gpm After 461,963 gal treated: TP-173A @ 540 ug/L. (Low Range HACH test)
0835	- TP-150 molybdenum HACH value @ 0 ug/L. Working on Plants Systems checks and calibrations today.
1000	- Decant T-351 to TOP valve. Wet well activated. Water is clear no color
	- Clean pH-315 probe w/Acid solution. Check THCHMR30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. Water is very clear w/ yellow tint.
1315	- Suspend Plant Discharge to calibrate pH-740 Probe to 4 + 10 pH STD's.
1320	- Resume Normal Discharge. Continue with other WTP pH probes calibrations to 4 + 10 pH STD's @ pH-113, 670, 310, 315 + 365.
1410	- Plants weekly systems checks and calibrations complete.
1500	- Plants operations Good.

Influent Sources and Flow Rates: @ 0810
NBBW – 7.5 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.1 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.0 gpm(~~6am – 1pm daily~~)
MW113 Area – 3.80 gpm

Operator: **Mike Gelwick / ~~Chris Carlson~~**

0.14" rain overnight

LOWRY WTP OPERATIONS LOG

Date: Friday, August 20, 2021

Time: 0530	Plant operations good.
0600	Jim B of Brownsfill onsite to troubleshoot OneDay data backup on HMI 2.
0648	Reboot HMI 2 after VBA & OneDay fixes. 0651 online. Jim waiting for 7AM blowdown /
↓	data backup to varify fixes worked.
0708	OneDay data backed up correctly. Jim leaving.
0653	- IX system performance HACH testing after 467103 gal treated: TP-173A → 430 ug/L
0700	- TP-150 molybdenum HACH value → 0 ug/L
0830	- Decant T-351 to top value. wet well activated. water is clear no color.
	- clean pH-315 probe w/ Acid solution. check the HMR30 for oil or sheen: none observed. Spray down weir.
	- check TP-130 for oil globules: none observed. water is very clear w/ light yellow tint.
	- Refill polymer tank w/ 2 cups of NALCO polymer and 200 gal of potable water
	- working on back wash of lead GAC-720. Pressure up to 20 psi.
0845	- Reduce flow on P-522 to 20 gpm. will work up to max flow slowly.
0935	- Backwash of GAC-720 complete. Pressure down to 6 psi → 39.5 gpm
1110	- Decant T-351 to top value again. wet well activated. water is clear no color.
1120	- Place BTS into maint hold and flush reactor feed lines
1155	- Resume normal BTS operations.
1235	- Plants operations Good.

Influent Sources and Flow Rates: 0600
NBBW – 7.5GPM
N. END ON-SITE – 12.9GPM
N. END OFF-SITE – 8.1GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.0GPM
MW38 – 2.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 4.0GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

0.19" rain today

LOWRY WTP OPERATIONS LOG

Date: SAturday, August 21, 2021

0715	- Plants operations Good. Automatic blowdown operations Good. Go to check other site systems.
0840	- IX Performance HACH Testing After 472984 gal Treated: TP-173 A @ 510 ug/L.
0850	- TP-150 Molybdenum HACH value @ 0 ug/L
0855	- Decant T-351 to top valve. wet well activated. Water IS clear No color.
	- Clean pH-315 probe w/ Acid solution. Check Tile Hanks for oil or sheen: None observed. Spray down water.
	- Check TP-130 for oil globules: None observed. water IS very clear w/ light yellow-green tint.
0915	- Refill BT3 phosphorus tank w/ 6# of TSP and 60 gal of potable water. All blowers ok. Both GC's operational within limits. Bag filter
	operations Good
1000	- Plants operations Good.

Influent Sources and Flow Rates: @0830
NBBW – 7.5 gpm
N. END ON-SITE – 12.9 gpm
N. END OFF-SITE – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm
COND/NTES T-530 – 0.0 gpm
MW38 – 2.2 gpm
T-540/541 – 0.31 gpm
OTHER – NA
IX/MW113 Area – 3.8 gpm

OPERATOR(S) Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Monday, August 23, 2021**

Time: 0540	Plant operations good.
0700	- Automatic blowdown operations Good. Working on Qtrly Building methane safety checks today sitewide.
0754	- IX performance HACH testing After 483615 gal treated: TP-173A @ 720 ug/L.
0800	- TP-150 molybdenum HACH value @ 0 ug/L.
0820	- Decant T-351 to top valve. wet well activated. water is clear No color.
	- Clean pH-315 probe w/Acid solution. Check the HMC30 for oil or sheen: None observed. Spray down weir.
	- check TP130 for oil globules: None observed. water is very clear w/ yellow green tint.
1300	- Sludge Rolloff Box Dumped/Empty
1515	- Plants operations Good.

Influent Sources and Flow Rates: @0645
NBBW – 7.4 gpm
North End On Site- 12.7 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.0 gpm~~(6am-1pm daily)~~
MW113 Area – 3.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, August 24, 2021**

Time:	
0500	- Plants operations Good. Working on TP-730 GC/LAB sample split + TP-740-710 1,4-Dioxane samples and START Efficiency checks
0530	Observe MW38S well reached it's low level stop this morning at 0500. Increase RWST influent from 0.6 gpm to 1.6 gpm while it's off and recharging.
0740	Blowdown operations good.
0815	Metro sampling technicians on site to setup MP-001 auto sampler(s).
0845	- IX performance HACH testing and Lab sample splits After 489254 gal treated: TP-183 ≈ 130 ug/L; TP-174A ≈ 160 ug/L; TP-173A ≈ 830 ug/L; TP-170 ≈ 5800 ug/L (using Low Range test on TP-183, 174A + 173A)
0915	- TP-150 molybdenum HACH value ≈ 0 ug/L. TOM working on BTS sampling and field Readings today
1000	- Decant T-351 to TOP valve. Wet well activated. Water is clear No color
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/Light yellow-green tint.
1020	- Line Sludge Roll off box R18306ML w/plastic sheeting.
1145	Change out both 1 micron bag on IX system. High rate and lowering levels in the MW113 Area ~~stirring~~ stirring up sediments.
1340	- Work on Empty out sludge press.
1515	Press cleanout completed - plant operations good.

Influent Sources and Flow Rates: @ 0535
NBBW – 7.4 gpm
North End On Site- 12.7 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.2 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, August 25, 2021**

Time: 0048	Receive GC2 comm alarm - access remotely to acknowledge alarm. GC2 CPU has
↓	rebooted after a Windows error. Restart GC2 sampling TP-730 at 0059 - All okay.
0540	Plant operations good - start weekly GC maintenance and calibrations.
0618	Reboot HMIFTVIEW1 to reset available temporary memory. Online @ 0622.
0714	Receive Heartbeat ERR2 alarm - HMI2 has rebooted itself after a Windows error (very
↓	similar to GC2 last night). HMI2 online again at 0717.
0730	Start Filterpress on T-351 (in stage 1).
0735	Metro Sample technicians on site.
0845	Refill phosphorus tank with 60 gallons potable water + 6lbs TSP.
1000	Backup plant data to flash & CD. Daily onedrive backup working well.
1010	Filterpress full.
1018	Restart MW385 and reduce RWST influent from 1.6 gpm to 0.6 gpm.
1040	- Clean pH-315 probe w/ Acid solution. Check the Hach 30 for oil or sheen: None observed. Spray down wash
	- check the 130 for oil globules: None observed. water is very clear w/ light yellow-green tint.
1055	- TP-750 Molybdenum HACH value → 0 ug/L
1510	- Plants operations good.

Influent Sources and Flow Rates: 0600
NBBW – 7.4GPM
N. END ON-SITE – 12.6GPM
N. END OFF-SITE – 8.5GPM
RWST – 1.6GPM
NTES – 0.50GPM
COND/NTES T-530 – 0.0GPM
MW38 – 1.0GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.9GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwicks

LOWRY WTP OPERATIONS LOG

Date: **Thursday, August 26, 2021**

Time: 0535	Plant operations good.
0745	Blowdown operations good. Work on adding one full tote of caustic to main plant supply.
0915	Backwash GACF-3340, completed 0945.
1000	- Working on weekly/monthly plants systems checks and calibrations. Calibrate site multimeter to 49% LEL to use during LEL-740 calibration to ensure T-740 ambient air @ 0% LEL. Change out pH 4+10 STDs w/new.
1045	- Decant T-351 to top valve. Wetwell activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMRS0 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
1100	- TP-150 molybdenum HACH value @ 0 ug/L
1130	- START main compressor max speed run oil moisture prevention for 2 hrs
1240	- Perform monthly BTS pH-probes calibrations w/ new 4+10 pH STDs
1330	- STOP MAX speed run of main compressor. Calibrating WTP pH probes to new 4+10 pH STDs @ pH-113, 670, 310, 315 + 365
1400	- Suspend plant discharge to calibrate pH-740 probe to 4+10 pH STDs and calibrate LEL-740 sensor to 49% LEL.
1410	- Plant shutdown @ 8% LEL during LEL-740 sensor calibration. Automatic shutdown operating properly.
1419	- Restart plant.
1420	- Restart normal discharge.
1440	- Plants operations back to normal.
1520	- Plants operations good.

Influent Sources and Flow Rates: 0550
NBBW – 7.4GPM
N. END ON-SITE – 12.6GPM
N. END OFF-SITE – 8.3GPM
RWST – 0.6GPM
NTES – 0.50GPM
COND/NTES T-530 – 0.0GPM
MW38 – 2.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.8GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Friday, August 27, 2021**

Time: 0550	Plant operations good. Observe MW38N extraction reached it's low level stop late yesterday at ~2100.
0605	Increase RWST influent from 0.6 gpm to 1.6 gpm.
0625	Decant T-351 top valve, wet well did not activate. Water is clear, no color. Clean the Hook-30 weir and pH probe - no oil or sheen observed in the Hook-30. Check TP-130 for oil globules - none observed. Water is very clear, light green/yellow.
0640	Check TP-150 molybdenum value, reading 0 ug/L. Note: NBBW-EW-3 has dewatered and is producing ~0.12 gpm now that gradient has dipped to MW113-EW-1. The threat of molybdenum migrating to NBBW-EW-3 has passed and daily monitoring of TP-150 is no longer needed. NBBW-EW-3 will continue to be sampled quarterly for molybdenum in the field, if possible based on the availability of water to be sampled.
0740	Blowdown operations good. Empty filter press.
0820	Press empty
0900	Plant operations good.
1400	MW170-EW-1 totalizer reading 0.0 gpm → Extraction OK
1850	Check plant remotely. Observe MW38N has reached it high level restart. Reduce RWST influent from 0.6 gpm to 1.6 gpm. Plant operations good.

Influent Sources and Flow Rates: 0556
NBBW – 7.5GPM
N. END ON-SITE – 12.6GPM
N. END OFF-SITE – 8.7GPM
RWST – 0.6GPM
NTES – 0.50GPM
COND/NTES T-530 – 0.0GPM
MW38 – 1.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 4.0GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Saturday, August 28, 2021**

Time: 0645	On site for weekend systems checks. Plant operations good.
0810	Bloudown operations good. Refill phosphorus tank with 40 gallons potable water + 4 lbs TSP. Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is very clear, light green/yellow.
0930	Shut down T-540/541 to BTS (tanks at 10% & 21%) Will plan for Sourcewell batch extraction on Monday.
1005	Plant operations good.
1750	Check plant remotely - HMI2 RSView program stopped responding - reboot CPU remotely. Online okay at 1755. Plant operations good.
8/29/21 0620	Check plant remotely - All okay.
1810	Check plant remotely - All okay.

Influent Sources and Flow Rates: 0812
NBBW – 7.4GPM
N. END ON-SITE – 12.6GPM
N. END OFF-SITE – 8.5GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.0GPM
MW38 – 2.2GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.8GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, August 30, 2021**

Time: 0550	Plant operations good.
0625	Stop both MW38N & S extraction in preperation for MW38 source well batch extraction.
0650	Increase RWST influent from 0.6 gpm to 2.6 gpm
0715	Switch MW38 to T-540/541 and start MW38 source well batch extraction.
0740	Blowdown operations good
0749	Blown high voltage fuse - Plant off. Starlings got into the lightning arrestor on the pole Southeast of the plant. Kuchar called to replace fuse this morning.
0830	Jim with Kuchar on site - power restored at 0854. Begin refill air supply - note, Primary compressor VFD has a high temp warning alarm but control is not working to allow reset - possibly damaged due to power outage - Restore air pressure using backup compressors
0911	Restart plant
1150	- Decant T-351 to top valve. wet well activated. water IS clear no color.
	- Clean AH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oily globules: None observed. water IS very clear w/ light yellow-green tint.
	- working on setup for BTS sediment tank feed line flush.
1225	- BTS into maint hold to flush sediment tank feed line
1300	- BTS out of hold. START P-006/T-540S @ 0.30 gpm.
1509	- Plants operations Good.

Influent Sources and Flow Rates: 0623
NBBW – 7.4GPM
N. END ON-SITE – 12.5GPM
N. END OFF-SITE – 8.2GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.0GPM
MW38 – 2.3GPM
T-540/541 – 0.0GPM
MW113 IX SYSTEM – 3.8GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, August 31, 2021**

Time:	
0530	- Plants operations Good. Begin working on Efficiency Sampling ⇒ TP-730. Also collect Lowland 1,4-Dioxane ⇒ TP-710 + 740.
0630	- IX Performance HACH testing w/ Lab Splits After 526768 gal treated: TP-183 ⇒ 140 ug/L; TP-174A ⇒ 200 ug/L TP-173A ⇒ 1690 ug/L using Low Range and 1900 ug/L using High Range; TP-170 ⇒ 5200 ug/L
0800	- working on BTS Sampling and Field Readings today
0950	- Decant T-351 to TOP Valve. Wet well activated. Water IS clear no color.
	- Clean pH-315 probe w/ Acid solution. Check THE HMEJO for oil or sheen: None observed. Spray down weir.
	- Check TP-180 for oil globules: None observed. Water IS very clear w/ light yellow-green tint.
1230 ↓	IR on site to trouble shoot primary air compressor - combination of LCD screen failed; B-phase primary fuse blown (Cover temp alarm trips when overload trips, overload tripped due to the phase imbalance). LCD screen needed the serial port connection cleaned and tightened) 1330 Unit online and working well IR technician off site.
1430	- STOP MW38 Source well and START MW38 N+S wells pumping to T-540's to displace any Residual MW38 source well water. (600 gal or more)
	- PUT P-005/T-530 IN TO Auto, will START ⇒ 6AM tomorrow.
1510	- GC2 comm loss Alarm. Reboot pc and restart on sample TP-730 Remotely.
1905 ↓	Mike switching ~~MW38~~ MW38 N+S to RWSTs after 618 gallons pumped into the conveyance line to displace source well water to T-540/541.
2039 ↓	Receive Bio GC warning alarm. 1,2-DCA at TP-3350 reading 117 ug/L - Mike to shut off T-540/541 and will try introducing the Fresh source well water into the BTS again tomorrow.
2123 ↓	Receive GC2 comm loss alarm again - CPU has had another Windows error and rebooted itself - Mike restarting it on TP-730 sampling remotely.

Influent Sources and Flow Rates: @ 0605
NBBW – 7.4 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.2 gpm
RWST – 2.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 ~~N & S~~ – 5.0 gpm ~~to T-540 Source well~~
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 3.7 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, September 01, 2021**

Time:	
0500	Plant operations good. Start on weekly GC maintenance and calibrations. Refill phos. tank with 60 gallons potable water + 6 lbs TSP.
0530	Latest TP-3350 (BTS effluent) result just posted and 1,2-DCA back down low at 10 ug/L.
0600	T-530 to BTS resumed at 0.2 gpm between 6AM - 1PM daily (tank @ 37%).
0725	Switch MW38N+S from RWSTs to Direct HMR-30 influent and reduce RWST influent from 2.6 gpm to 0.6 gpm - Also set T-540/541 to restart after blowdown at 0.2 gpm to BTS.
0735	Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is very clear, light green/yellow.
1100	Weekly data backup to Flash ½ ~~DVD~~ CD completed. Daily OneDrive back working well.
1120	Weekly GC maintenance and calibrations completed - All Okay
1330	Work on washing press / Step ~ 2/3 done.
1515	Plant operations good.

Influent Sources and Flow Rates: 0655
NBBW – 7.3GPM
N. END ON-SITE – 12.8GPM
N. END OFF-SITE – 8.1GPM
RWST – 2.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM(6AM-1PM)
MW38 – 2.1GPM (to RWSTs)
T-540/541 – 0.0GPM
MW113 IX SYSTEM – 3.7GPM
OTHER – NA

OPERATOR(S) Chris Carlson

0.1" wed pm.

LOWRY WTP OPERATIONS LOG

Date: **Thursday, September 02, 2021**

Time:	
0515	Plant operations good. Observe latest GC result of BTS effluent is normal for 1,2-DCA (Bio adjusting to the fresh source well water). Work on completing press wash-out.
0700	Start press on T-351 (stage 1).
0745	Blowdown operations good. Mike working on weekly WTP systems checks.
0812	Increase T-540/541 to BTS from 0.2 gpm to 0.3 gpm.
0830	- Clean pH-315 probe w/ Acid solution. Check tote HMI 30 for oil or sheen: none observed. Spray down water.
	- check TP-130 for oil globules: none observed. water is very clear w/ light yellow-green tint.
1000	Adam Bowers with Brownsthill on site to check control lan speeds / connections to see if anything can be done to improve stability when attempting to operate three HMI at once. Third HMI being the second factory talk (HMI FT2) that will eventually replace the old RSVIEW32 HMI2.
1058	Plant shutdown to upgrade CTL net switches and
1107	Reboot HMI FTVIEW1 - online 1110.
1117	Reboot HMI2 - observed main plc lag stops when only one HMI is online, adding third will not be possible because main PLC CPU is at it's limits running two HMI's. (network is not the choke point). ~~Added~~ Adam offsite.
1133	Restart plant - All okay except ~~#~~ FV-056 not opening automatically - running in manual until Jim can look at it.
1215	- Filter press is full.
1245	- Suspend plant discharge to calibrate pH-740 probe to 4+10 pH STD's.
1255	- Resume normal discharge. Continue with other pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1330	- weekly plants systems checks and calibrations complete.
1435	- START Empty filter press
1545	- Plants operations good. Finish press tomorrow.

Influent Sources and Flow Rates: @0807
NBBW – 7.3 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.0 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.2 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.7 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.4" rain P.M

LOWRY WTP OPERATIONS LOG

Date: **Friday, September 03, 2021**

Time:	
0715	- Plants operations Good. Received ONE min Log off Alarm from HMI2. Acknowledged. Automatic Blowdown operations Good.
0840	- Get started on finishing up filter press cleanout. No Internet currently. Scale House expansion contractor Dug up Line. Trying to get Repaired.
0900	- No Decant today below TOP valve on T-357. Bottom valve still sludgy
	- Clean pH-315 probe w/Acid solution. Check the HMI30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. Water is very clear w/Light yellow-green tint.
1100	- Filter press ready to fill.
1445	- Work on setting up Auto Sampler and calibrating EA. Triple Rinse dedicated composite container. Will Add Preservative Prior to Startup.
1510	- Plants operations Good.

Influent Sources and Flow Rates: @ 0835
NBBW – 7.3 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.21 gpm(6am-1pm daily)
MW113 Area – 3.7 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: Sunday, September 05, 2021

1300	Plants operations good.
1340	Decant T-351 to top valve wet well activated, water is clear, no color. Clean pH-315 probe with acid solution. Check HMR-30 for oil or sheen: none observed. Spray down weir. Check TP-130 for oil globules: none observed. Water is very clear with light yellow-green tint. Both GC's operational within limits. All Blowers ok. Phosphorus tank was @ 40 gals. Added 6# TSP and 60 gal water.
1530	Plants operations good. 0800 - Log in remotely Allow. ~~0900~~ 2100 - Log in remotely. GC3 can't see screen.
Monday 9-6-21	
0900	- log in remotely. Allow. GC3 still can't see screen.
1000	- Had a power surge or drop momentarily which caused some Alarms.
1015	- on site to fix things that didn't come back on and also Reboot GC3 computer. Able to see screen remotely Now ok.
1140	- Plants operations Good
2200	- log in remotely Allow.

Influent Sources and Flow Rates: @ 1330
NBBW – 7.4 gpm
N. END ON-SITE – 13.1 gpm
N. END OFF-SITE – 8.3 gpm
RWST – 0.69 gpm
NTES – 0.51 gpm
COND/NTES T-530 – 0.00 gpm
MW38 – 2.2 gpm
T-540/541 – 0.3 gpm
OTHER – NA
MW113 Area: 3.7 gpm

OPERATOR(S) Manuela Seewald / Mike Grelwick

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, September 07, 2021**

Time:	
0500	- Plants Operations Good. START Efficiency check sampling @ TP-730. Also collect TP-710 + 740 Low Level 1,4 Dioxane samples
0700	- Automatic Blowdown operations Good.
0740	- START Filter Press pumping from T-351. Add preservative to MP-001 composite container for Molybdenum.
0800	- START Auto Sampler. TOTAL effluent @ 243085701 gal @ 34.3 gpm @ 6.86 su @ 17.8°C
0915	- Working on weekly BTS sampling.
1010	- Working on monthly Early warning sampling. 1040-TP-150 Molybdenum HACH value @ 0 ug/L.
1050	- Working on weekly IX System Performance HACH testing w/Lab samples splits After 564510 gal Treated:
	TP-183 @ 120 ug/L; TP-174A @ 160 ug/L; TP-173A @ 2900 ug/L; TP-170 @ 4800 ug/L
1150	- START Flush of MP-001 sample port and check for residual chlorine: None detected.
1200	- Collect 1st set of time paced grab samples for Low Level 1,4-Dioxane. Water is very clear No color. Place samples in Fridge.
1205	- Clean pH-315 probe w/Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/yellow-green tint.
	- Refill polymer tank w/200 gal of potable water and 2 cups of NALCO polymer.
	- Pack all other samples on ice for shipment to labs
1228	- GC3 blue screened in middle of sample. Reboot and Restart on TP-3350.
1243	- Plant shut down due to Birds in wires/Fuses blown. Shut things down for a more controlled RESTART.
1320	- Kucher on site to repair fuses.
1426	- Restart Plant. All ok. Go to check other site systems.
1550	- START Flush of MP-001 sample port and check for residual chlorine: None detected
1600	- Collect 2nd set of time paced grab samples for Low Level 1,4-Dioxane. Water is very clear. Place
	samples in fridge with others. Plants operations Good. STOP Filter Press. Finish filling tomorrow.
1945	Start MP-001 port flush and check for residual chlorine - None detected.
2000	Collect 3rd set of time paced grab samples for low level 1,4-Dioxane.
2345	Start MP-001 port flush and check for residual chlorine - None detected.
9/8/21 0000	Collect 4th set of time paced grab samples for low level 1,4-Dioxane. Note:

Influent Sources and Flow Rates: @ 0515
NBBW – 7.3 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– ~~[illegible]~~ gpm 2.2 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.6 gpm

Observe a white film on the inside of the effluent Y-strainer, film not present where water enters the tank - chiller coils leaking Dowfrost into effluent tank - isolate coils from chiller unit. (W)

Operator: **Mike Gelwick** / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, September 08, 2021**

Time:	
0345	- Plants operations Good. RESTART Filter Press. Auto Sampler operational OK.
0350	- START Flush of MP-001 sample port and check for residual chlorine; None detected.
0400	- Collect 5th Set of time paced grab samples for Low Level 1,4-Bioxane. Water IS very clear NO color. Place samples in fridge with others.
0410	- Filter Press says full.
	- Clean pH-315 probe w/Acid solution. Check the HMI30 for oil or sheen: None detected. Spray down work.
	- Check xP-130 for oil globules: None observed. Water IS very clear w/light yellow-green tint
0430	- working on BTS field Readings
0750	- START Flush of MP-001 sample port & check for Residual chlorine; None detected.
0800	- STOP Auto Sampler. TOTAL EFFluent = 243134608 gal. A TOTAL of 48907 gal treated during sample period.
	- Collect 6th/final set of time paced grab samples for Low Level 1,4-Bioxane. Water IS clear NO color. Place SAMPLE in Fridge with others
	- process/check composite sample By Gently stirring and checking pH value. pH of composite = 1.71 s.u. Fill sample bottle. PACK All Samples on ICE for SHIPMENT to Lab.
0950	- Continue working on BTS field Readings
1311	- Slow Flow down to 3.6 gpm on IX System to Alleviate pump Hunting to Run @ Max Speed Constantly
1330	- Plants operations Good.

Influent Sources and Flow Rates: @0345
NBBW – 7.3 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.5 gpm

Operator: **Mike Gelwick** /

LOWRY WTP OPERATIONS LOG

Date: **Thursday, September 09, 2021**

Time:	
0535 ↓	Plant operations good. Start on weekly GC maintenance and calibrations. Refill phosphorus tank with 55 gallons potable water + 5.5 lbs TSP.
0740	Blowdown operations good. Mike working on weekly systems ~~checkers~~ checks / Tom & Mike emptying Filter press A.M. (Tom starting forklift training). Tom to wash press A.M. Add one full caustic tote to main plant supply.
1000 ~~1050~~	~~- START Filter Press Running on T-351~~ Decant T-351 to top value. wet well activated, water is clear no color
	- clean pH-315 probe w/ Acid solution. Check the Hum30 for oil or sheen: None observed. Spray down wear.
	- check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
1050	- START Filter Press Running on T-351.
1303	- Suspend Plant Discharge to calibrate pH-740 to 4+10 pH STD's.
1310	- Resume Normal Discharge. continue with other pH probes calibrations to 4+10 pH STD's ⇒ pH-113, 670, 310, 315 + 865.
1340	- Plants weekly systems checks and calibrations complete.
	- Filter Press Full.
1500	- Slow IX System Flow Down to 3.6 gpm for the night. Pump Runs @ 100% when Hitzer Flow Input.
1510	- Plants operations Good.

Influent Sources and Flow Rates: @ 0751
NBBW – 7.3 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.7 gpm

Operator: **Mike Gelwick / Chris Carlson** / Tom Gilbert.

LOWRY WTP OPERATIONS LOG

Date: **Friday, September 10, 2021**

Time: 0520	Plant operations good. Observe MW38N reached it's low level stop overnight, well is
↓	recharging slowly and is ~ 0.15' from it's restart level. Setup for BTS tank cleaning.
0540	Increase IX system rate from ~3.5 to ~3.7 gpm.
0600	Divert N. Toe to T-530 and stop T-540/540 to BTS - Begin to pump/decant water
↓	from sediment tank to blend tank.
0740	Blowdown operations good - Place BTS in maintenance hold and start tank cleanouts.
	(transferring sludges to T-351).
0925 ~~0925~~	BTS out of hold - tanks refilling Note: Sediment, Blend, Settling, overflow,
	containment sump cleaned out. Also Flushed Reactor Feed piping.
1115	Increase RWST influent from 0.6 gpm to 2.0 gpm while MW38N is off.
1125	- Clean pH-315 probe w/acid solution. Check the Hum 80 for oil or sheen: none observed. Spray down water.
	- Check TP-130 for oil globules; none observed. Water is very clear w/light yellow-green tint.
	Empty filter press.
1415	MW38N extraction has restarted. Lower RWST influent from 2.0 gpm to 0.6 gpm.
1430	Plant operations good.

Influent Sources and Flow Rates: 0530
NBBW – 7.3GPM
N. END ON-SITE – 13.0GPM
N. END OFF-SITE – 8.4GPM
RWST – 0.6GPM
NTES – 0.50GPM
COND/NTES T-530 – 0.0GPM
MW38 – 1.2GPM (MW38N Recharging)
T-540/541 – 0.0GPM
MW113 IX SYSTEM – 3.5GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: September 11, 2021

0945	- Plant operations good. Start perimeter check
	- cleaned HMR-30 probe w/ acid solution
	- Sprayed down HMR-30 weir - good flow
1200	- Plant operations good.
	- Checked Tp-130 for oil globules or sheens. None observed - water is clear w/ yellow/green tint

Influent Sources and Flow Rates @ 10:00
NBBW – 7.3 gpm
N. END ON-SITE – 13.0 gpm
N. END OFF-SITE – 8.4 gpm
RWST – .6 gpm
NTES – .53 gpm
COND/NTES T-530 – .20 gpm
MW38 – 2.2 gpm
T-540/541 – .29 gpm
OTHER – NA

OPERATOR(S) Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: **Monday, September 13, 2021**

Time:	
0720	- Plants Operations Good. Automatic Blowdown operations Good.
0830	- Decant T-351 From top valve. Wet well activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid Solution. Check the HMR30 for oil or sheen: None observed. Spray down water.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
	- TOM working on washing out filter press.
0910	- Refill BB phosphorus tank w/ 5 # of TSP and 50 gal of potable water.
1043	- Increase p-352 to 0.70 gpm. START Filterpress Running on T-351
1413	- Plant STOPPED Due to Blown Fuse/No power. Kuchar called. Turn some systems off for more controlled Startup (Birds in wires)
1515	- Kuchar on site to replace fuses.
1550	- Power Restored. Begin Returning Plant to Normal operations.
1556	- Restart Plant.
1630	- Plants operations Back to Normal. Will continue filling filter press in AM.
1640	- Plants operations ok.

Influent Sources and Flow Rates: @0845
NBBW – 7.3 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.5 gpm

Operator: **Mike Gelwick** / TOM Gilbert

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, September 14, 2021**

Time:	
0510	- Plants operations Good.
0520	- working on TP-730 GC/Lab split samples and TP-710 + 740 Low level 1,4-Dioxane samples. Starting Efficiency checks
0608	- Reboot HMI FT view 1 to reset temporary file memory
0612	- Back on Line
0710	- Restart filtrations running on T-351.
0830	- working on weekly BTS sampling and readings today
0958	- IX System Performance HACH testing w/Lab splits After 599342 gal Treated: TP-183 ⊃ 110 ug/L; TP-174A ⊃ 160 ug/L;
	TP-173A ⊃ 2900 ug/L; TP-170 ⊃ 4600 ug/L
1042	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- check TP-130 for oil globules: None observed. Water is very clear w/light yellow-green tint.
1600	- Plants operations Good.

Influent Sources and Flow Rates: @ 0510
NBBW – 7.3 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.6 gpm
RWST – 0.60 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily) 0.20 ⊃ 0.943
MW113 Area – 3.51 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, September 15, 2021**

Time: 0535	Plant operations good. Start on weekly GC maintenance and calibrations.
0900	- Decant T-351 from bottom valve. Wetwell activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray Down weir.
	- Check TP-130 for oil globules: None observed, water is very clear w/ light yellow-green tint
1540	- Plants operations Good

Influent Sources and Flow Rates: @0905
NBBW – 7.3 gpm
North End On Site- 13.4 gpm
North End Off-Site – 8.2 gpm
RWST – 0.60 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, September 16, 2021**

Time:	
0550	Plant operations good.
0700	James K of DANORA (Calgon) on site for annual UV-OX service & inspection.
0740	Blowdown operations good.
0811	James done inspecting unit while running - shutdown UV-OX. Note: James changing out crystal and O-rings also reactor tower temp sensor today. Noted one wire on lower capacitor broken - will replace also.
0940	- Decant T-351 from bottom valve. Wet well activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear with light yellow-green tint
	- working on weekly WTP's systems checks and calibrations today.
1115	- Back wash PDU-GAC while UV-OX is off.
1257	- Suspend plant discharge to calibrate pH-740 probe to 4+10 pH STD's.
1305	- Resume normal discharge. Continue with other pH probes calibrations to 4+10 pH STD's ⇒ pH-113, 670, 310, 315 + 365
1345	- Plants weekly checks and calibrations complete.
1413	Restart UV-OX - working well.
1500	James testing is complete - off site. Note: T1 service was temporarly down today while lines were moved to make room for additional scale on exit side of DADS facility. Internet back up at 1530.

Influent Sources and Flow Rates: @ 1030
NBBW – 7.3 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.2 gpm
RWST – 2.5 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, September 17, 2021**

Time:	
0550	Plant operations good. Jim B of Brownshill onsite to start planning the UV-OX
↓	PLC upgrade. Noted - will need an ethernet comm line ran between UV-OX and
↓	main PLC DA cabinet in order to network new PLC to the Rockwell Software.
0630	Jim off site.
0745	Blowdown operations good. Refill phosphorus tank with 50 gallons potable water + 5lbs TSP.
0855	- Decant T-351 from bottom valve. Wetwell activated. Water is clear no odor.
	- Clean pH-315 probe w/ acid solution. Check the Hach 50 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oily globules: None observed. Water is very clear w/ slight yellow-green hint.
0915	- Decrease psi @ MW113-EW1 to slow down tank filling so often and stopping the pump on well.
1100	- Decrease psi @ MW113-EW1 slightly more.
1245	- Plant is operating good.

Influent Sources and Flow Rates: @0745

- NBBW – 7.1 gpm
- North End On Site- 13.2 gpm
- North End Off-Site – 8.3 gpm
- RWST – 0.6 gpm
- NTES – 0.5 gpm(10R only)
- MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
- MW38 N & S– 2.2 gpm
- COND/NTES T-530- 0.2 gpm(6am-1pm daily)
- MW113 Area – 3.4 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: SATurday, September 18-2021

0630	- Plants operations Good, Go to check other site systems
0745	- Coming out of Automatic blowdown operations On.
	- Decant T-351 to bottom valve. wet well activated. water is clear No color
	- Clean pH-315 probe w/Acid solution. Check the Hand 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/light yellow-green tint.
0930	- Plants operations Good

Influent Sources and Flow Rates: @0630
NBBW – 7.3 gpm
N. END ON-SITE – 13.2 gpm
N. END OFF-SITE – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm
COND/NTES T-530 – 0.20 gpm
MW38 – 2.1 gpm
T-540/541 – 0.31 gpm
OTHER – ~~NA~~ 113 Area/IX – 3.42

OPERATOR(S) Mike Gelwich

LOWRY WTP OPERATIONS LOG

Date: **Monday, September 20, 2021**

Time:	
0745	- Plants operations Good. Coming out of Automatic blowdown ok.
0815	- Decant T-351 TO bottom valve. Wet well activated. water is clear no color
	- Check TP-130 for oily cobules: None observed. water is very clear w/ light yellow-green tint.
	- Clean pH-315 probe w/ Acid solution. Check the Hmk so for oil or sheen: None observed. Spray Down wet
1320	- Refill BB phosphorus tank w/ 5# of TSP and 50 gal of potable water
1515	- Plants operating Good

Influent Sources and Flow Rates: @0755
NBBW – 7.2 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.4 gpm

Operator: **Mike Gelwick**

0.08" Rain overnight

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, September 21, 2021**

Time:	
0520	- Plants operations Good. working on TP-730 LAb/GC splits and starting Efficiency checks. Also collect TP-740 + 710 Low Level 1,4-Dioxane samples.
0820	- Decant T-351 to bottom valve. wet well activated. water is clean no color.
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. spray down weir
	- Check TP-130 for oily globules: None observed. Water is very clear w/ light yellow-green tint
	- working on BTS weekly sampling and field Readings today
0830	- Increase RWST to 1.9 gpm. MW38 South pumping well reached its cut off point @ ~643. will leave RWST this way to make up water being lost to MW38 pumping well recharging/off. Also NBBW flow has dropped to 7.1 gpm currently.
0948	IX system performance weekly HACH testing w/LAb splits after 633, 470 gal treated: TP-183 @ 140 ug/L; TP-174A @ 170 ug/L; TP-173A @ 3000 ug/L; TP-170 @ 4300 ug/L. (NOTE: High range test on TP-170 + 173A, Low range test on TP-183 + 174A.) Pack all samples on ice for courier pickup.
1112	Shutdown IX system to flush P-114 pump with potable water
1158	Main PLC faulted when P-114 was taken out of manual and placed back into auto PID logic error. PLC was power cycled - did not clear - went into the PLC program and cleared the fault. Jim B of Brown Hill to take another look at the P-114 logic. Note: P-001 was off ~~breifl~~ breifly while PLC error occured. ran it breifly at 13 gpm to get sump level back to normal before switching back to normal HMR-30 influent. Note: Found main PLC UPS backup is now flashing replace battery after power cycle was performed - will switch out PLC for new unit (this unit is ~~eight~~ (8) eight years old and has had it's battery replaced once already in 2018).
1215	Able to run P-114 in manual mode while auto mode programing is bad. Leave MW38 S well off and turn MW38 N well off for MW38 source well batch extraction. Increase RWST influent from 2 gpm to 2.6 gpm and start source well pumping to T-540/541

Influent Sources and Flow Rates: @0542
NBBW – 7.1 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily) (0.20 gpm)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Tuesday, September 21, 2021 (continued)

1445	Shutdown plant to swap out UPS on main PLC.
1450	New UPS online PLC restarted.
1452	Restart plant.
1530	Plant operations good.

Influent Sources and Flow Rates: 1440
NBBW – 7.2 gpm
N. END ON-SITE – 13.4 gpm
N. END OFF-SITE – 8.6 gpm
RWST – 2.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.0 gpm
MW38 – 3.9 gpm (Source to T-540/541)
T-540/541 – 0.3 gpm
~~OTHER~~ – NA
IX System MW13 Area 3.4 gpm.

OPERATOR(S) Chris Carlson / Mike Gelwicks

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, September 22, 2021**

Time:	
0550	Plant operations good. MW38 Source well batch okay overnight, T-540/541 @ 55%.
↓	* Flushing of P-114 with potable water didn't improve flow rate. Start on weekly
↓	GC maintenance and calibrations.
0740	Blowdown operations good. Work with Mike to add full caustic tote ~~to~~ and ~~~25~~ ~50 gallons peroxide
	to main bay supply.
0850	- Decant T-351 from bottom valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/ acid solution. Check THE HMR30 for oil or sheen: None observed. Spray down wet.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow - green tint.
1540	- Plants operations Good
1550 ~~1720~~	Shutdown MW38 Source well extraction.
1720	Start MW38N & S extraction to T-540/541 to displace Source well water in the
↓	conveyence line to T-540/541.
2305	770 gallons of MW38N & S water has been used to displace source well water. Switch
↓	MW38 to RWST's for the night.

Influent Sources and Flow Rates: @0745
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.5 gpm
RWST – 2.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 ~~N & S~~ 4.9 gpm (Source to T-540/541)
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.3* gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, September 23, 2021**

Time:	
0550	Plant operations good.
0600	Jim B. of Brownshill on site to trouble shoot P-114 logic error - Note: Had
↓	to simulate the problem again in order the fix it. Main PLC Faulted at 0611
↓	but brought back online quickly after seeing the error. Jim able to fix it quickly
0710	Jim B. off site.
0740	Blowdown operations good. Mike working on weekly system checks and calibrations.
0900	- START Monthly Main Air compressor max speed Run for 2 Hrs for oil moisture prevention.
0910	- Decant T-351 From Bottom valve. Wetwell activated. Water is clear No color.
	- Check TP-130 for oily globules: None observed. Water is very clear w/light yellow-green tint.
	- Clean pH-315 probe w/Acid solution. Check the Hach 30 for oil or sheen: None observed. Spray down wash
	- Refill polymer TANK w/ 200gal of potable water and 2 cups of NALCO polymer.
1100	- STOP Main compressor MAX speed Run.
1235	- Plant loss of power Due to Birds on wires again. Only lost 1 leg which some power still on. Shut down Plant and turn
	things OFF for controlled RESTART. NOTE: Small grass fire started from Flaming Bird. Able to Extinguish with Fire Extinguisher and Have
	WM water Et down w/water TRUCK.
1350	- Work on calibrating Plant pH probes while power is down since they are still powered on. Calibrate pH-740, 113, 670, 310, 315 + 365 probes
	to 4 + 10 pH STDS.
1455	- Plants weekly systems checks and calibrations complete.
1525	- Restored Power.
1539	- RESTART Plant.
1600	- Systems Running Normal.
1630	- Plants operations Good.

Influent Sources and Flow Rates: @ 0905
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.4 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.4 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, September 24, 2021**

Time: 0545	Plant operations good.
0630	Decant T-351 bottom valve, wet well did not activate. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil
↓	globules - none observed. Water is very clear, light green/yellow.
0740	Blowdown operations good.
1230	Empty filter press.
1400	Plant operations good.

Influent Sources and Flow Rates: 0552
NBBW – 7.2GPM
N. END ON-SITE – 13.6GPM
N. END OFF-SITE – 8.2GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 2.1GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.3GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: Saturday September 25, 2021

0710	ONsite for weekend systems checks. Plant operations good. Refill phosphorus tank with
↓	65 gallons potable water + 6.5 lbs TSP.
0740	Blanchard operations good.
0915	Clean the Hach-30 weir and pH probe - No oil or sheen observed in the Hach-30. Check
↓	TP-130 for oil globules - none observed. Water is very clear, light green/yellow.
0950	Plant operations good.
9/26/21 0550	Check plant remotely - All Okay.
1740	Check plant remotely - All Okay.

Influent Sources and Flow Rates: 0750
NBBW – 7.1 gpm
N. END ON-SITE – 13.6 gpm
N. END OFF-SITE – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.2 gpm (6AM-1PM)
MW38 – 2.1 gpm
T-540/541 – 0.3 gpm
~~OTHER – NA~~
MW113 Area 3.3 gpm

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, September 27, 2021**

Time: 0545	Plant operations good.
0615	Decant T-351 top valve, wet well activated. Water is clear, no color. Clean the HMR-30
↓	weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules.
↓	None observed, water is very clear - light green/yellow. Setup for GAC-720 backwash.
0700	Backwash PDU with potable water while in blowdown. Δ psi improved from 5 to 1.
0715	Backwash GAC-720 with process and compressed air bubbled into the system. Load GAC-720
↓	Δ psi improved from 20 to 7.
0800	Check 4" B discharge line for leaks and visual check of discharge into sewer manhole.
↓	Note: DADS septic lift system is now online using 2" discharge line to sewer.
0900	POTW discharge line check completed - All okay. Note: did not witness the DADS
↓	lift system discharging (between cycles). Hi Hi limit switches not active - system is operational.
0930	Decant T-351 top valve, wet well activated. Water is clear, no color.
1000	Backwash GAC F-3340.
1415	Plant operations good.

Influent Sources and Flow Rates: 0550
NBBW – 7.2GPM
N. END ON-SITE – 13.4GPM
N. END OFF-SITE – 8.1GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 2.1GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.3GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, September 28, 2021**

Time:	
0500	- Plants operations Good.
0520	- Working on Collecting TP-730 GC/CAB Split sample and Starting Efficiency weekly checks. Also collect TP-710 + 740 Low Level 1, 4-Dioxane samples.
0640	Decant T-351 top valve, wet well activated. Water is clear, no color.
0900	- Working on BTS weekly sampling and field readings today
0950	- IX System performance HACH testing and Lab split sampling After 665,488 gal Treated: TP-183 ≈ 170 ug/L; TP-174A ≈ 220 ug/L; TP-173A ≈ 2800 ug/L; TP-170 ≈ 4500 ug/L
1029	- Decant T-351 to top valve again. wet well activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
	- Pack all samples on ice for courier to Lab.
1500	- Collect and fill sample JARS for sludge: TCLP, RADS + TENORM.
1545	- Plants operations Good.

Influent Sources and Flow Rates: @ 0528
NBBW – 7.2 gpm
North End On Site- 13.4 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, September 29, 2021**

Time:	
0545	Plant operations good. Start on weekly GC maintenance and calibrations - Refill phosphorus tank
↓	with 60 gallons potable water + 6 lbs TSP.
0740	Blowdown operations good. Work with Mike to consolidate ~~caust~~ caustic totes so
↓	older totes can be returned on today truck.
0845	Stop IX system and change out BF-113, Δ pressure improved from 10psi to 1psi.
	Note: This 1 micron bag was online for ~ 1 month. Bag drying - will put in satilife
↓	haz waste drum tomorrow.
0910	Stop P-521/522 and backwash lag GAC-730 with potable water and compressed air
↓	bubbles. Note: T-351 decanted before backwash - wet well activated water is clear, no color.
0930	Backwash completed. Restart P-521/522. Δ pressure improved from 10psi to 4psi.
1100	- Decant T-351 Again to top valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/acid solution. Check TH Hmr 50 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is clear w/yellow green tint.
	Add two full caustic totes to main bay supply.
1225	Weekly Data backup to flash and CD. Daily OneDrive backup working well.
1230	Reboot HMI2 to apply latest virus software update - online 1233.
1240	Reboot HMIFTVIEW1 to apply latest virus software update - Online 1244.
1520	- Plants operations Good.

Influent Sources and Flow Rates: @ 0905
NBBW - 7.2 gpm
North End On Site - 13.3 gpm
North End Off-Site - 8.5 gpm
RWST - 0.6 gpm
NTES - 0.54 gpm(10R only)
MW38 T-540/541 - 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S - 2.1 gpm
COND/NTES T-530 - 0.2 gpm(6am-1pm daily)
MW113 Area - 3.4 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, September 30, 2021**

Time:	
0740	- Plants operations Good. Coming out of Automatic Shutdown operations OK.
0830	- working on weekly/monthly Plants Systems checks and calibrations. Change out pH STD's w/ New 4+10 pH STD's. Calibrate Site multimeter to 50% LEL to use during LEL-740 calibration to ensure 0% LEL on T-740.
0940	- Decant T-351 to TO Pvalve. wetwell activated water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMI 30 for oil or sheen; None observed. Spray down west.
	- Check TP-130 for oil globules: None observed. Water is clear w/ yellow-green front.
1150	- Perform monthly BTS pH probes calibrations using New 4+10 pH STD's.
1313	- Begin WTP pH probes calibrations to New 4+10 pH STD's ⇒ pH-113, 670, 310, 315 & 365.
1350	- Suspend Discharge to calibrate pH-740 probe to 4+10 pH STD's & LEL-740 to 49% LEL.
1400	- Plant Shutdown @ 8% LEL during LEL-740 calibration. Hi LEL Shutdown operational.
1409	- Restart Plants.
1410	- Resume Normal Discharge.
1420	- Plants operations Back to Normal.
1540	End Plants operations Good

Influent Sources and Flow Rates: @0825
NBBW – 7.1 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.21 gpm(6am-1pm daily)
MW113 Area – 3.4 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: **Friday, October 01, 2021**

Time:	
0745	- Plants operations Good. Coming out of Automatic Blowdown operations ok
0805	- Decant T-351 to TOP valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen; None observed. Spray down weir.
	- Check TP-130 for oil globules; None observed. Water is very clear w/light yellow-green tint.
0845	- Switch NTES to Divert and Increase p-005 to 0.50 gpm to swap out MPZ-10R pump w/Backup. Blowing a little Air and stalling periodically.
1010	- Switch NTES Back to Normal and Put p005 Back to 0.20 gpm.
1020	- Working on QTRly Blowers Maint today.
1300	- All Blowers serviced w/New Gear oil, Air filters & Greased. Tightened All Belts.
1325	- Set up and calibrate Autosamplers for monday START UP. Change out Sampler Silicone tubing. Triple Rinse each composite container.
1605	- Plants operations Good.

Influent Sources and Flow Rates: @0800
NBBW – 7.1 gpm
North End On Site- 13.3 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.19 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: Saturday, October 02, 2021

0850	- Plant operations good. Phosphorus tank filled with 50 gallons potable water + 5 lbs TSP (ll)
	- Decant T-351 from Top valve - Wet well activated - water is clear no color
	- Clean plt-315 probe with acid solution. Check HMR30 for oil sheens: None observed
	- sprayed down HMR30 weir - good flow
	- Checked Tp-130 for oil globules: none observed water is very clear w/ yellow-green tint
[redacted] 1130	- Plant operations good
Sunday, October 3, 2021	
0800	- Log In Remotely. See that GC2 not showing peaks like normal. Come to site and investigate. Find that sample tubing is Air locked. Relieve Air in Line and Get a new sample going on TP-730. Checked Again Later and Allok.
1715	- Log in Remotely. Allok. GC2 filling cell
1945	- Log in Remotely Allok. GC2 normal operations. good peaks.

Influent Sources and Flow Rates: @ 0900
NBBW – 7.1 gpm
N. END ON-SITE – 13.2 gpm
N. END OFF-SITE – 8.0 gpm
RWST – 0.6 gpm
NTES – .51 gpm
COND/NTES T-530 – .20 gpm
MW38 – 2.0 gpm
T-540/541 – .30 gpm
OTHER – ~~NA~~ IX/113 Area - 3.3 gpm

OPERATOR(S) TDM Gilbert / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, October 06, 2021**

Time:	
0600	Plant operations good. Start on weekly GC maintenance and calibrations.
0740	Blowdown operations good. Mike working on weekly ~~GC~~ BTS Field readings.
0900	Work on reducing the size of the One Minute databases on HMIFTVIEW1 by removing older data after it has been backed up.
1053	Stop HMIFTVIEW1 to load reduced databases and to reset available temp memory. Online - 1103.
	-Decant T-351 to TOP Valve. wet well activated. water IS clear no color.
	-Clean pH-315 probe w/ Acid solution. Check the thickener for oil or sheen: None observed. Spray down wash.
	-check TA130 for oil globules: None observed- water IS clear w/ light yellow-green hue.
1132	Reboot HMI2 to update virus software version. Online - 1135.
1200	Wash out Filterpress.
1510	- Plants operations Good. Filterpress Ready to fill

Influent Sources and Flow Rates: @ 0740
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, October 07, 2021**

Time:	
0550	Plant operations good.
0600	Increase RWST influent from 0.6gpm to 2.0gpm - MW38N well reached it's low stop
↓	level at 2000 yesterday and is slowly recharging.
0630	Start Filterpress on ~~T-352~~ T-351 (in stage 1).
0740	Blowdown operations good.
0915	- working on weekly Plants Systems checks and calibrations
0935	- Clean pH-315 probe w/Acid solution. Check THE HMR 30 for oil or sheen; None observed. Spray down weir
	- Check TP-130 for oil globules; None observed. Water is clear w/yellow-green tint
1226	- Suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's.
1232	- Resume Normal Discharge. continue with other pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1245	- Plant shut down due to loss of Power/Blown Fuse. Shut things off/down for a controlled Restart once power is restored.
1335	- Plants weekly systems check and calibrations complete. *(W) Manuela scaling in MW38S extraction manual level
1440	- Power Restored. Begin Restart Process. for transducer cal. check. DTW @ 72.19' = GWE 5734.57'
1455	- Restart Plant. + UV-OK HMI reading 5734.52' - No calibration needed at
1509	- MW38N. Pump Restart. Turn RWSTS back down to 0.60gpm this time (W).
1523	- Plants operations back to normal.
1607	- Change low flow on N. End off site to 5gpm. MW77 Area No power. Blown fuse.
1610	- Plants operating Good.

Influent Sources and Flow Rates: @0748
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.7 gpm
RWST – 2.0 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, October 08, 2021**

Time:	
0550	Plant operations good.
0610	Start filterpress on T-351 (in stage 4)
0740	Blowdown operations good.
0815	Filterpress full.
0830	-Clean pH-315 probe w/Acid solution. Check the HMI 80 for oil or sheen: None observed. Strong chlorine
	-Check TP-130 for oil globules: None observed. water is clear w/yellow-green tint.
1111	Manuela sending in manual level at MW38N extraction well for transducer calibration check.
	DTW @ 52.62' = GWE ~~5744~~ 5719.68'. HMI reading 5719.70', No calibration needed.
1230	Plant operations good.

Influent Sources and Flow Rates: @ 0745
NBBW – 7.0 gpm
North End On Site- 13.5gpm
North End Off-Site – 7.8 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Sunday, October 10, 2021

1330	Plant operations good.
1440	Decant T-351 to top valve. Wet well activated. Water is clear, no color. Check TP-130 for oil globules: none observed. Water is very clear w/ yellow-green tint. Clean pH-315 probe w/ acid solution. Check HMR-30 for oil or sheen: none observed. Spray down weir. Both GC's operational within limits. All Blowers o/k. Phosphorus tank @ 30 gal. Added #7 TSP and 70 gallons of water.
1600	Plant operations good.
Sat 10/9/21 0620	Check plant remotely - All okay.
1301	Receive P-3322 Strainer Alarm - Able to get pump primed and running again remotely (air pocket hit inlet?) Plant operations good.
Sun 10/10/21 0650	Check plant remotely - All okay.
1950	Check plant remotely - All okay.

Influent Sources and Flow Rates: @1500
NBBW – 7.1 gpm
N. END ON-SITE – 13.3 gpm
N. END OFF-SITE – 7.9 gpm
RWST – 0.69 gpm
NTES – 0.52 (10R only)
COND/NTES T-530 – 0.0 gpm
MW38 – 2.0 gpm
T-540/541 – 0.3 gpm
OTHER – NA
MW113 Area: 3.2 gpm

OPERATOR(S) Manuela Seewald / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, October 04, 2021**

Time: 0600	Plant operations good.
0740	Blowdown operations good.
0800	-START Auto Samplers. Total Effluent = 244463456 gal = 34.5 gpm = 17.2°C = 6.75 su.
1015	-Begin WTP QTRLY Eddy water sampling for WTP Permit.
1110	- IX System Performance HACH TESTing with Lab Split sampling After 694142 gal Treated: TP-183 = 110 ug/L; TP-174A = 150 ug/L; TP-173A = 2900 ug/L; TP-170 = 4400 ug/L. (High Range on TP-170+173A/Low range on TP-183+174A)
1150	-START Flush of MP-001 Sample port and check for residual chlorine: NONE detected. OK TO USE HCl preserved vials.
1200	- Collect 1st set of time paced grab samples From MP-001 for Qtrly WTP Permit sampling - Low Level 1,4-Dioxane, VOCs + NONYPhenols.
	-Place samples in to Fridge until packing for Labs. (K) 1405 TOM WAS TAKEN A MANUAL
1300	-Decant T-351 TO TOP valve. WET well activated. water IS clear NO color. level at the NBIBW SUMP for T/ANS.
	-Clean pH-315 probe w/Acid solution. Check the HMI-30 for oil or sheen: None observed. Spray down with Cal. Check. DTW @ 27.06':
	-Check TP-430 for oil globules: None observed. water IS clear with yellow-green tint. 6WE 5685.49'. HMI reading
1550	-START Flush of MP-001 Sample port and check for residual chlorine: None detected. 6585.51' - No cal. Needed. (K)
1600	- Collect 2nd set of time paced grab samples for Low Level 1,4-Dioxane, VOCs, & NONYPhenols. Place samples in Fridge with others.
	-Auto samplers on track/ok.
1945	Start MP-001 port flush and check for residual chlorine - NONE detected.
2000	Collect 3rd set of time paced grab samples for low level 1,4-Dioxane, VOC's & NONYphenols - place samples in fridge.
2345	Start MP-001 port flush and check for residual chlorine - NONE detected.
10/5/21 0000	Collect 4th set of time paced grab samples for low level 1,4-Dioxane, VOC's & NONYphenols - place samples in fridge with other.

Influent Sources and Flow Rates: @0745
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.8 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, October 05, 2021**

Time:	
0335	-Plants operations Good. STOP GC's SOI can START Efficency checks with BTS sampling
0350	-START Flush of MP-001 sample port and check for resitual chlorine: None detected.
0400	- collect 5th set of time paced grab samples for Low Level 1,4-Dioxane, VOCs + NDMA phenols. Place samples in fridge with others
0415	- BTS sampling and START Efficency checks. Collect TP-730 710 + 740 weekly Low level 1,4-Dioxane samples After BTS sampling.
0710	- Decant T-351 to TOP valve. wet well activated. water is clear no color.
0750	- START Flush of MP-001 sample port and check for resitual chlorine: None detected.
0800	- collect 6th and final set of time paced grab samples for Low Level 1,4-Dioxane, VOC's + NDMA phenols, w/QC volume on all. Place samples in fridge.
	- STOP Autosamplers. TOTAL Effluent = 24451464 8gal, A total of 57192 gal treated during sample period. Process composite
	samples by gently stirring each with stir stick triple rinsed between composites and checking the pH value of each composite:
	SVOC composite = 7.585U and metals/leads composite = 1.945U. Fill sample bottles
1015	- PACK All samples on ICE for SHIPMENT to Labs (5 coolers)
1300	- clean pH-315 probe w/Acid solution. Check the Hand Jo for oil or sheen: None observed. Spray down work.
	- Check TP-130 for oil globules: None observed water is clear w/light yellow-green tint.
1320	- Refill BTS phosphorus tank w/5 # of TSP and 50 gal of potable water.
1515	- Plants operations Good.

Influent Sources and Flow Rates: @ 0340
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: **Monday, October 11, 2021**

Time:	
0550	Plant operations good.
0600	Stop MW38N & S Extraction in preparation for MW38 source well batch extraction.
0620	Increase RWST influent from 0.6 gpm to 2.6 gpm.
0720	~~Switch~~ Switch MW38 from direct HMR-30 influent to T-540/541 then start source well.
0840	- Decant T-351 to TOP valve. Wet well activated. Water is clear Nocolor.
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down wash.
	- Check TP-130 for oil globules: None observed. water is very clear and light yellow-green tint.
	- Refill polymer tanks w/ 2 cups of NALCO polymer and 200 gal of potable water.
0925	- working on filter press cleanout + General Plants cleanup
1420	Change out both 1 Micron bag filters on IX system - very silty from MW113-EW-1 currently.
	- Power restored to MW77 Area and system back running. Flow back up to ~8.1 gpm. Change Low Flow Alarm back to 6 gpm.
1540	- Plants operations Good
	*@ Tom has taken manual levels at N. Toe for transducer calibration checks.
	MPZ-12 DTW @ 23.79' = GWE 5739.30'. HMI Reading 5739.22' - No Calibration Needed.
	MPZ-11 DTW @ 31.98' = GWE 5734.45'. HMI Reading 5734.44' - No Calibration Needed.
	NTES-10UN DTW @ 35.93' = GWE 5729.50'. HMI Reading 5729.91' - No Calibration Needed.
	MPZ-10R DTW @ 33.96' = GWE 5226.67'. HMI Reading 5729.50' - No Calibration Needed.
	NTES SUMP DTW @ 28.79' = GWE 5734.04'. HMI Reading 5731.20' - No Calibration Needed. *@

Influent Sources and Flow Rates: @ 0830
NBBW – 2.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 2.5 gpm
RWST – 2.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 ~~N & S~~ 4.8 gpm (Source well 6HCL)
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, October 12, 2021**

Time:	
0500	- Plants operations Good. working on collecting TP-730 GC/LAS splits and starting Efficiency checks. Also collect TP-740 + 710
	Low level 1,4-Dioxane weekly samples.
0830	- Decant T-351 to top valve. wetwell activated. water is clear no color
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: none observed. Spray down weir.
	- Check TP-130 for oil globules: none observed. water is very clear w/ light yellow-green tint
	- working on SIS sampling and field readings today.
1000	- IX system performance HACH testing with Lab split sampling After 730,286 gal treated: TP-183 ≈ 110 ug/L; TP-174A ≈ 160 ug/L
	TP-173 A ≈ 3100 ug/L; TP-170 ≈ 4200 ug/L
1450	- Working on General Plant clean up.
1600	- Plants operations Good.

Influent Sources and Flow Rates: @ 0525
NBBW – 7.1 gpm
North End On Site- 13.2 gpm
North End Off-Site – 8.7 gpm
RWST – 2.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 ~~N & S~~ – 5.0 gpm (Source well batch)
COND/NTES T-530- 0.0 gpm(6am-1pm daily)(0.20)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

0.02" rain late yesterday

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, October 13, 2021**

Time:	
0500	Plant operations good. Start MW38N&S extraction to T-540/541 to displace source well water in the conveyance line to T-540/541. Start on weekly GC maintenance & calibrations.
↓	
0637	Reboot HMIFTVIEW1 to reset temporary memory, ONLine 0641.
0740	Blowdown operations good.
0750	Work with Mike to add 1 full caustic and 1 full HCL tote to main plant supply.
0955	783 gallons of MW38N&S have been used to displace source well water to T-540/541. Switch MW38N&S to RWST's.
	-Decant T-351 to TOP valve. wetwell activated. Water IS clear NO color.
	-Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down water
	-Check TP-130 for oil globules: None observed. water IS very clear with light yellow-green tint.
1051	-Place BTS switch Hold to Flush P-006 pipeline. and flush reactor feed Lines.
1210	-BTS out of Hold.
1335	Switch MW38N&S to direct HMR-30 influent - reduce RWST influent from 2.6gpm to 0.6gpm.
1400	Start on annual device calibrations checks, starting with PDT's
1430	Stop IX system so those devices can be checked
1615	Restart IX system.
1630	Plant operations

Influent Sources and Flow Rates: @1000
NBBW – 7.1 gpm
North End On Site- 13.7 gpm
North End Off-Site – 8.6 gpm
RWST – 2.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm to RWSTs
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, October 14, 2021**

Time:	
0210	Receive P-601 Fault - check remotely and acknowledge alarm. UV-OX Feed has switched automatically to P-600, will troubleshoot later this morning.
0610	On site - plant operations okay. Primary air compressor down with two blown Fuses. Backups running but also hear an air leak from the primary, making the backup run harder. Able to get primary running after changing out A & C Fuses but unit is struggling to generate air with motor at 100%. Stop primary and isolate it so backup can keep up better. Note: P-601 Faut was an over voltage fault, possibly related to when compressor fuses ~~when~~ went. Able to get P-601 started again.
0740	Blowdown operations good.
0900	- Mike working on weekly plants systems checks and calibrations.
0930	Hayden Meyer of Piper Electric on site to run conduit and network cable from UV-OX to main PLC for future PLC upgrade. Also will change out two photo cell outdoor light controls if he has time.
0955	- Decant T-351 to top valve wet well activated. Water is clear no color.
	- Clean pH-315 probe w/acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is clear w/light yellow-green tint.
1330	- Refill BTS phosphorus tank w/ 5.5# of TSP and 55 gal of potable water.
1340	- IR on site to troubleshoot/repair main compressor
1348	- Suspend plant discharge to calibrate pH-740 probe to 4+10 pH STD's
1355	- Resume normal discharge. Continue with other plants pH probes calibrations to 4+10 pH STD's @ pH-113, 629, 310, 315 + 365.
1440	- weekly plants systems checks and calibrations complete.
1620	Hayden has finished UV-OX to main PLC comm cable install and replace two outdoor photo cells on lights, leaving now.
1650	Travis with IR done with his assesment - VFD is damaged (most likely due to power surges). Will get new unit on ~~order~~ order.
1715	plant ops good. Backup compressors working well. End.

Influent Sources and Flow Rates: @ 0918
NBBW – 7.0 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.24 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, October 15, 2021**

Time: 0615	Plant operations good. Continue on general cleaning / organizing.
0720	Clean the HACH-30 weir and pH probe - no oil or sheen observed in the HACH-30. Check TP-130
↓	for oil globules - none observed. Water is very clear, light green / yellow.
0740	Blowdown operations good.
1015	Amy Burk and Mark Petersen of Metro Water Recovery on site for annual pretreatment audit.
1130	Decant T-351 bottom valve, wet well activated. Water is clear, no color.
1240	Plant operations good.

Influent Sources and Flow Rates: 0655
NBBW – 7.0GPM
N. END ON-SITE – 13.0GPM
N. END OFF-SITE – 8.3GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 2.1GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.3GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: Saturday, October, 16 2021

0640	ON site for Weekend systems checks - plant operations good.
0650	Decant T-351 bottom valve, wet well activated. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is very clear, light green / yellow.
0750	Blowdown operations good.
0940	PLANT operations good.
10/17/21 0745	Check plant remotely - All okay.
1815	Check plant remotely - All okay.

Influent Sources and Flow Rates: 0643
NBBW – 6.9 gpm
N. END ON-SITE – 13.1
N. END OFF-SITE – 3.4
RWST – 0.6
NTES – 0.53
COND/NTES T-530 – 0.2 gpm (6AM-1PM)
MW38 – ~~0.3 gpm~~ 2.1 gpm
T-540/541 – 0.3 gpm
~~OTHER – NA~~
MW113 Area (IX) 3.4 gpm

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, October 18, 2021**

Time: 0610	Plant operations good.
0620	Start Filter press on T-351 (2nd stage 1)
0945	Blowdown operations good. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is very clear, light green/yellow.
↓	
1220	filter press full.
	Refill phosphorus tank with 60 gallons potable water + 6lbs TSP.
1430	Plant operations good.

Influent Sources and Flow Rates: 0647
NBBW – 7.0GPM
N. END ON-SITE – 13.1GPM
N. END OFF-SITE – 8.5GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 2.1GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 3.3GPM
OTHER – NA

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, October 19, 2021**

Time:	
0500	- Plants operations Good. working on GC's split sampling and starting Efficiency checks. Collect TP-730 GC split samples
	and TP-740 & 710 Low level 1,4-Dioxane weekly samples.
0840	- Decant T-351 to bottom valve. water is clear No color. working on ATS sampling and field Readings today
	- Clean pH-315 probe w/Acid Solution. Check the HMI 30 for oil or sheen: None observed. Spray down wall.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ Light yellow-green tint.
0948	- IX System performance HASH Testing with Lab split sampling After 763,248 gal Treated: TP-183 @ 110 ug/L; TP-174A @ 170 ug/L;
	TP-173A @ 3200 ug/L; TP-170 @ 4000 ug/L.
1200	- working on ATS Field Readings
1540	- Plants operations Good.

Influent Sources and Flow Rates: @ 0535
NBBW – 7.0 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily) 0.20 gpm @ 0840
MW113 Area – 3.4 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, October 20, 2021**

Time:	
0545	Plant operations good. Start on weekly GC maintenance and calibrations.
0745	Reboot AMIFTVIEW1 to reset available temporary memory, ONline 0748. Blowdown operations good.
1030	Backup WTP data to flash & CD - daily OneDrive backup working well.
	-Decant T-351 to Bottom valve. Wetwell activated. Water is clear no color.
	-Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir
	-Check TP-130 for oil globules: None observed. Water is clear w/ Light yellow-green tint
1115	- E.T. (Hector + Joel) on site to clean out HMR30 Chamber B.
	- Shut down UV-ox and put BTS into Hold. Turn down P-280 CV from MAX IBs to 0% to stop cavitate from pumping.
1256	- START RWSTS @ 2.9 gpm to START Refilling the HMR30. Also using some potable water to speed up the filling process
	- E.T. off site. Chamber B on the HMR30 and its mixer cleaned.
1328	- START UVOX warming up.
1335	- Take BTS out of Hold.
1345	- Plants operations BACK to Normal.
1450	- Decant T-351 to bottom valve again. Wetwell activated. Water is clear No color.
1530	- Plants Operations Good

Influent Sources and Flow Rates: @1355
NBBW – 7.0 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.1 gpm
RWST – 0.60 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, October 21, 2021**

Time:	
0550	Plant operations good.
0640	Reboot HMIFTVIEW1 to upgrade virus detection software - Online 0644.
0745	Blowdown operations good.
0830	- Chris working on Empty filter press. Mike working on weekly plants checks and calibrations
0935	- Decant T-351 to bottom valve. wet well activated. Water is clear No color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow-green tint.
1215	- Filter press Ready to Fill.
1330	Work on annual device calibration checks FT-055 & FT-056.
1314	- Suspend plant discharge to calibrate pH-740 probe to 4+10 pH STD's.
1320	- Resume normal discharge. continue with other WTP pH probes calibrations to 4+10 pH STD's @ pH 113, 670, 310, 315 + 365
1400	- Weekly plants systems checks and calibrations complete.
1550	- Plants operations good.

Influent Sources and Flow Rates: @0956
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.1 gpm
RWST – 0.60 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.2 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWER WTP OPERATIONS LOG

Date: **Friday, October 22, 2021**

Time:	
0545	Plant operations good. Setup for MW38 pipeline Flushing (sending Flushed water to T-351/352)
↓	Refill phosphorous tank with 50 gallons potable water + 5 lbs TSP.
0800	Stop MW38 N & S extraction for pipline Flushing.
0826	Increase RWST influent to 2.6 gpm From 0.6 gpm.
	-Clean pH-315 probe w/Acid solution. Check the AMESO for oil or sheen: None observed. spray down wash.
↓	-Check pH-130 for oil globules: None observed. water is clear w/ a light yellow-green tint.
0950	MW38 line Flushing completed - observed a lot of orange / dark orange solids flushing out into T-351, estimated flushing rate was ~30 gpm (used the 2" Trash pump to send clean water from W.M. water truck into the pipeline.
↓	
1000	Work with Mike to pull and clean the MW170-ECN1 Flow sensor.
1020	MW170-ECN1 local Flow meter working well.
1035	Reduce RWST influent from 2.6 gpm to 0.6 gpm and restart MW38 N & S to direct HMR-30 influent.
1410	- Work on Backwash of lead carbon GAC-720. Pressure up to 19 psi.
1440	- Backwash complete. Pressure in GAC-720 Down From 19 to 7 psi. @ 39 gpm.
1530	- Plants operations Good. Stop Filter Pumps for the night. Alarms set.
1544	- Receive BTS Strainer warning Alarm.
1600	- BTS in to Hold to Flush Reactor feed Lines.
1630	- BTS out of Hold. Resume Normal operations.
1645	- Receive ADTW Pressure Drop Alarm. P-752 slows down too quickly. After Catch up from maint activities like Flushing or Calibrations
	- Switch to P-751 lead.
1700	- Plants operations Good.

Influent Sources and Flow Rates: @ 0754
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: SATURDAY, OCTober 23, 2021

0735	- Plants operations Good. Restart Filterpress, Coming out of Automatic blowdown ok. Go to check other site systems + site security
0900	- Filterpress full. Decant T-351 to bottom valve. wetwell activated. Water is clear no color
	- Clean pH-315 probe w/Acid solution. Check the HMRS for oil or sheen; None observed. Spray down wall
	- Check TP-130 for oil globules: None observed. Water is very clear w/light yellow-green tint.
1030	- Plants operations Good
2100	- Log in From Home All ok
Sunday, OCTober 24, 2021	
0900	- log in From Home. Plants operations Good. unable to see GC3, try again later.
1145	- Still unable to Log in to GC3. Come to site to check on it. Lost Network access. Rebooted 2x and Still Not able to Log in Remotely
	Chris to check out in morning. NOTE: GC3 is taking and Running samples properly just cant log in Remotely.
2030	- Log in From Home. All ok. Still cant see GC3.

Influent Sources and Flow Rates: @0800
NBBW – 7.0 gpm
N. END ON-SITE – 13.1 gpm
N. END OFF-SITE – 8.1 gpm
RWST – 0.60 gpm
NTES – 0.53 gpm
COND/NTES T-530 – 0.20 gpm
MW38 – 2.1 gpm
T-540/541 – 0.30 gpm
OTHER – ~~NA~~ IX System/113 Area – 3.3 gpm

OPERATOR(S) Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: Monday, October 25, 2021

Time:	
0530	Plant operations good. Able to get GE3 reconnected to the internet by unplugging and replugging in the LAN connection on the back of the CPU. Work on annual device calibration of flow meters that can be checked while plant is running.
0745	Blowdown operations good
0915	Switch MW38 to RWST and increase RWST influent from 0.6 gpm to 2.6 gpm so calibration of FT-012 can be checked.
1000	Resume MW38 direct influent to HMR-30 and stop RWST influent so FT-015 calibration can be checked.
1040	Restart RWST influent.
1410	- Decant T-351 to bottom valve. wet well activated. water is clear no color. CC working on Empty Filter press
	- Clean pH-315 probe w/Acid solution. check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is clear w/light yellow-green tinh
1525	- Plants operations Good.

Influent Sources and Flow Rates: @0850
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 7.9 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

[illegible] OPERATIONS LOG

Date: **Tuesday, October 26, 2021**

Time:	
0500	- Plants operations Good. working on TP-730 GC/LAb split sampling and TP-740+710 Low Level 1,4-Dioxane sheeples. START Efficiency checks.
0845	- working on BTS weekly sampling + Field Readings today. Refill phosphorus tank w/ 6# of TSP and 60 gal of potable water.
0950	- IX System Performance HACH Testing and weekly lab split sampling After 795,734 gal Treated: TP-183 ⊃ 110 ug/L; TP-174A ⊃ 180 ug/L; TP-173A ⊃ 3300 ug/L; TP-170 ⊃ 4100 ug/L.
1150	- Decant T-351 to bottom valve. wet well activated. Water is clear No color.
	- Clean PH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is clear w/ Yellow-green tint.
1330	Place N. TOE in divert to T-530 and ~~[illegible]~~ set T-530 to BTS at 0.5 gpm for FT-035 calibration check.
1402	Place NBBW in divert to RWST for FT-025 calibration check. 1425 NBBW back to normal HMR-30 influent.
1440	Stop T-530 to BTS and return N. TOE to direct BTS influent.
1545	- Plants operations Good.
2005	- lose Partial power to the plant. Come to site to troubleshoot and turn things off for restart.
	- Leave MW170-End running and the discharge pumps. These not Affected by power outage. Bio In Hold Rest of plant off NBBW Into RWSTS + Also MW38. Could not see Any fuses on site blown. May be an Xcel Fuse. Leave In this mode over Night.
2145	- Leave site

Influent Sources and Flow Rates: @ 0535
NBBW – 7.0 gpm
North End On Site- 13.1 gpm
North End Off-Site – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, October 27, 2021**

Time	
0450	Check plant remotely - Look like power was restored to normal by Xcel at 0028. Start
↓	on weekly GC maintenance and calibrations.
0517	Take BTS out of hold
0600	On site - get compressors restarted
0615	Start UV-Ox (warming up).
0620	Start N. End off site influent
0622	Start Ion Exchange - continue on GC's.
0740	Blowdown operations good.
0810	Increase RWST influent from 0.6 gpm to 1.2 gpm (tanks @ 34%).
0906	Receive UV-Ox shutdown - Lamp No Contact #1 indicated on local display - when trying restart
↓	observed no Amps, indicating the lamp has failed. Note: 2188 hours and 18 restarts on
↓	this lamp. Checked capacitor bank - All look good - no burnt wiring. Change out lamp
↓	and restart - Unit warmed up and started discharging with new lamp. Hopefully just
↓	a bad lamp - lamp put in is from the same batch.
0945	- Decant T-351 to bottom valve. Wet well activated. water is clear no color.
	- Clean pH-315 probe w/ acid solution. Check the HMI-30 for oil or sheen: none observed. Spray down work.
	- Check TP-130 for oil globules: None observed. water is clear w/ light yellow green tint.
1102	- Switch NTES to divert and increase P-005 to 0.50 gpm while I setup for pipeline flushing. Need to change out a valve.
1224	- NTES back to normal operations. Switch back to normal mode and turn P-005 back down to 0.20 gpm.
1500	- Plants operations Good.

Influent Sources and Flow Rates: @ 0740
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 9.3 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.25 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.23 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, October 28, 2021**

Time:	
0735	- Plants operations Good. Coming out of blowdown ok. Work on setting up to push potable water thru the NTES pipeline @ 0.50 gpm
	to the BTS to displace NTES water in pipeline. Using 1" Diaphram pump set @ low psi to match what NTES has been doing. Will treat
	the water being pushed out until at least 400 gal ~~has been~~ of potable water has been put into the pipe line. MP2-10R is off
0840	- START 1" Diaphram pump @ NTES pumping potable water to NTES pipeline. FT-035 NTES to BTS total at start 6664160 gal.
1023	- lose pressure on pipeline to NTES. troubleshoot problem. STOP 1" Diaphram pump. Put NTES into divert and set p-005 to 0.50 gpm
	until I fix the issue.
1115	- NTES flow back to normal mode. Pump had a peice of HDPE shaving stuck in check ball. Seems to be ok now. working on weekly/monthly
	Plants systems checks and calibrations
1245	- Decant T-351 to top valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/ acid solution. Check the HMR 30 for oil or sheen: none observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow-green tint.
1430	- Plants system checks complete. Still need to perform weekly/monthly pH probe calibrations and LEL-740 calibration.
1600	- Plants operations Good. leaving pump running potable water into NTES pipeline and will return later to stop it.
2230 ~~2235~~	- switch NTES to divert to T-530 and turn on p-005 @ 0.50 gpm. will let whatever is left in pipeline gravity feed to T-530
	- STOP 1" Diaphram pump and close valves @ NTES. FT-035 NTES to BTS total @ 6664563 gal / 403 gal potable water into pipeline
0035	- Receive BTS 3323 strainer Alarm. Login remotely and switch to 3324 Backup for Reactor 3.

Influent Sources and Flow Rates: @ 0735
NBBW – 6.8 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.3 gpm
RWST – 1.2 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, October 29, 2021**

Time:	
0545	Plant operations good.
0610	Restart clean water displacement of N. Toe water in conyeance pipeline for preflushing prep.
0800	- STARTing Flush of NTES pipeline w/clean water using a 2" TRASH pump and WM water truck. ~500gal of clean water
	Introduced to pipeline prior to flushing
0930	- Flushing w/clean water thru NTES pipeline complete. water started out thick and black but cleared up to very clear.
0945	- RESTART MP210R pumping. set @ 60psi for now to clear some of the clean water out to T-530, T-530/p-005 → 0.50gpm to BTS.
1140	- Decant T-351 to top valve. wet well activated. water is clear no color.
	- Check the HMR 30 for oil or sheen: None observed. Spray down weir, will clean pH-315 just prior to calibration
	- check TP-130 for oil globules: None observed. water is very clear no color. Still clean water coming thru pipeline
	- Refill polymer tank w/ 2 cups of NALCO polymer and 200gal of potable water.
1200	- work on setup and calibration of Autosamplers for monday monthly sampling Event. Will be resampling SVOC's for Analyte
	bis (2-Ethylyhexyl) pthalate. Triple rinse each dedicated composite container. will add preservatives just prior to start up.
1240	- Calibrate BTS pH probes (monthly) w/ new 4+10 pH STD's.
1320	- START on calibrations of WTP pH probes to new 4+10 pH STD's.
1352	- Suspend plant discharge to calibrate pH-740 probe to new 4+10 pH STD's and LEL-740 sensor to 49% LEL, using calibrated
	size multimeter to ensure 0% LEL in T-740
1403	- Plant shutdown for High LEL during calibration @ 8% LEL. High LEL shutdown operations Good.
1412	- RESTART Plant.
1413	- Resume Normal Discharge
1445	- Plants operations Good. leaving NTES going to T-530 for awhile to ensure clean water out of pipeline.

Influent Sources and Flow Rates: @ 1140
NBBW – 6.9 gpm
North End On Site- 13.0gpm
North End Off-Site – 8.5 gpm
RWST – 1.2 gpm
NTES – 1.29 gpm(10R only) to T-530
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.48 gpm(~~6am-4pm daily~~) to BTS in outside
MW113 Area – 2.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: 10/31/21 Sunday

1200	Plant operations good (Mike was remotely logged in) Check TP-130 for oil globules: None observed. Water is very clear with yellow-green tint. Clean pH-315 probe with acid solution. Check HMR-30 for oil or sheen: none observed. Spray down weir. Both GC's operational within limits All Blowers ok Phosphorus tank @ 90 gal
1400	Plants operations good.

~~Saturday~~ Sunday, October 31, 2021

0754	- Receive NTES unstable Alarm. Log in and switch NTES to Normal mode and set p-005 to 0.20 gpm 6Am → 1pm daily. Looks like trench has pumped down to a recharge level and NOT quite making 0.50 gpm.
1200	- Log in Remotely. Allow.
2230	- Log in Remotely. Allow.

Saturday, October 30, 2021

1400	- Log on Remotely. p-352 in Alarm for Starter but did NOT Receive Alarm. It has turned itself off OK. Acknowledge alarm and leave off until I can clean strainer. All else ok. NTES shilgoing to T-530.
~~2015~~ 1952	- Receive p-332 starter warning. Unable to fix from Home due to using BACKUP on R3 currently. Go to 5.2 to Flush BTB Lines
2040	- BTB In to maint. Hold to Flush BTB Feed Lines. & Fill phosphorus tank w/ 6# of TSP and 60 gal of potable water
2105	- BTB out of Hold
2115	- BTB Running ok now. End.

Influent Sources and Flow Rates: @ 1300
NBBW – 6.9 gpm
N. END ON-SITE – 13.0 gpm
N. END OFF-SITE – 8.9 gpm
RWST – 1.2 gpm
NTES – 0.51 gpm
COND/NTES T-530 – 0.20 gpm
MW38 – 2.1 gpm
T-540/541 – 0.3 gpm
OTHER – NA
MW113 Area: 2.9 gpm

OPERATOR(S) Manuela Seewald

LOWRY WTP OPERATIONS LOG

Date: **Monday, November 01, 2021**

Time:	
0600	Plant operations good.
0610	Decant T-551 top valve, wet well activated. Water is clear, no color. Clean the HMR-30 weir and pH probe - No oil or sheen observed in the HMR-30. Check TP-130 for oil globules - none observed. Water is slightly cloudy green/yellow (to be expected - NTES trench was pumped harder saturday and level is now down to the pump activation level. - Stop IX system and change out the 1 micron bag filter before T-113 - flow improved a little when restarted but stopped again to change out 1 micron bag filter after the retention tank T-114. This bag looked okay and could go longer but changed out anyway - will note to run this bag for ~2 months before inspecting and changing next time.
0740	Blowdown operations good. Mike - adding preservitives to composite containers for month effluent sampling (note: resampling for quarterly SVOAs due to blank contamination at the lab when running the sample collected in October). - Auto samplers pre setup by Mike on Friday.
0800	Mike starting both auto samplers. Effluent total reading 245,852,464 gallons, FT-770 @ 34.6 gpm, pH-740 @ 6.77 @ 16.8°c
0810	Observed NTES conveyance pipeline pressure is lower than normal. Trench may not be producing 0.5 gpm (current flow set point) or pipeline issue - Mike checking the N. Toe double containment sump to rule out any pipline issue - sump is still dry as normal. Adjust flow set point to 0.49 GPM @ 0825.
1015	-working on monthly Early warning sampling
1100	- IX system performance HACH testing with LAB split sampling AFTER 820202 gal treated: TP183 ≈ 150 ug/L
	TP-174A ≈ 250 ug/L; TP-173A ≈ 3400 ug/L; TP-170 ≈ 4200 ug/L.
1150	-START FLUSH OF MP-001 sample port and check for Residual Chlorine: None detected. OK to use tested personal vials
1200	-collect 1st set of time paced GRAB samples for Low-Level 1,4-Dioxane. Place samples onto Fridge.

Influent Sources and Flow Rates: @0805
- NBBW – 6.6 gpm
- North End On Site- 13.0 gpm
- North End Off-Site – 8.2 gpm
- RWST – 1.2 gpm
- NTES – 0.48 gpm(10R only)
- MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
- MW38 N & S– 2.1 gpm
- COND/NTES T-530- 0.2 gpm(6am-1pm daily)
- MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Monday, November 01, 2021 – Cont'd**

Time: 1225	-Clean P-352 y strainer and flush line a bit
1230	-START P-352 pumping to HARSO @ 0.50 gpm.
1550	-START Flush of MP-001 sample port and check for Residual Chlorine: NONE Detected. Auto samplers on track ok.
1600	-Collect 2nd set of time paced GRAB samples for Low Level 1,4-Dioxane and place samples in fridge with others.
	-Plants operations Good.
1945	Start MP-001 port flush and check for residual chlorine - none detected.
2000	Collect 3rd set of time paced grab samples for low level 1,4-Dioxane - place sample in fridge.
2345	Start MP-001 port Flush and check for residual chlorine - none detected.
0000	Collect 4th set of time paced grab samples for low level 1,4-Dioxane - place sample in fridge.

Influent Sources and Flow Rates: @1350
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.8 gpm
RWST – 1.2 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, November 02, 2021**

Time:	
0335	- Plants operations Good. Get ready for BTS sampling and START Tng of Efficiency checks
0350	- START Flush of MP-001 and check for Residual Chlorine: None Detected
0400	- Collect 5th set of Time paced grab samples for Low Level 1,4-Dioxane. Places Samples in Fridge with others
0408	- Working on BTS sampling and START Efficiency checks
0455	- Collect TP-730 GC Lab split samples and TP-710 + 740 Low Level 1,4-Dioxane Labs Samples
0515	- work on getting ready for BTS Field Readings.
0750	- START Flush of MP-001 sample port and check for Residual chlorine: None detected
0800	- collect 6th and final set of time paced grab samples for Low-Level 1,4-Dioxane. Place samples in Fridge with others.
	- STOP Auto samplers and process composites by Gently stirring each w/Rinse of SHR Stick in between composites and checking the pH values of each composite. SVOC's Resample composite pH ⇒ 6.92 SU and Metals composite 7.39 SU. Fill sample bottles.
	- TOTAL EFFluent ⇒ 24590 774 gal. A TOTAL of 50,310 gal treated during sample period. NOTE: only Analyte getting Resampled in the SVOC's composite is bis(2-ethylhexyl) pthalate. PACK Samples on Ice for courier pickup
1004	Observe MW113-EW-1 extraction pump had stalled, restarted at 1111.
1119	Reboot HMI FT VIEW1 to ~~reste~~ reset available temporary memory. Online 1124.
1240	- Decant T-351 to TOP valve. wetwell activated. water is clear no color
↓	- Clean pH-315 probe w/ Acid solution. Check the Hood 80 for oil or sheen: None observed. Spray down area.
↓	- Check PA130 for oil globules: None observed. water is Clear w/ Yellow-green tint.
1400	Plant operations good.

Influent Sources and Flow Rates: @0350
NBBW – 6.9 gpm
North End On Site- 13.0 gpm
North End Off-Site – 9.2 gpm
RWST – 1.2 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily) 0.20 ⇒ 0745
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, November 03, 2021**

Time:	
0540	Plant operations good. Start on weekly GC maintenance and calibrations. Refill phos.
↓	tank with 50 gallons potable water + 5lbs TSP.
0750	Blowdown operations good. Work on device calibration checks (BTS reactor flow meter)
0835	- Decant T-351 to TDP valve. Wet well accumulated. Water ES clear no odor.
	- Clean pH-315 probe w/Acid solution. Check the HMI#30 for oil or sheen: None observed. Spray down wall.
	- Check TP-130 for oil globules: None observed. Water ES Clear w/yellow green tint. Pressure on Line back up to normal.
1130	Weekly WTP data back up to CD & FlashDrive. Daily OneDrive backup working well.
1230	- Washout Filter Area 5
1345	- Filter Press Ready to fill.
1545	- Plants operating Good.

Influent Sources and Flow Rates: @0456
NBBW – 6.6 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.2 gpm
RWST – 1.2 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, November 04, 2021**

Time:	
0530	Plant operations good. Perform waste characterization on full sludge roll-off box R19306ML
0850	- Decant T-351 to top valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/Acid solution. check the HMR 80 for oil or sheen; none observed. Spray down weir.
	- Check TP-130 for oil globules; none observed. water is very clear w/light yellow-green tint.
	- Working on Plants Systems checks and calibrations today.
1145	- Reduce RWST Flow to 0.60 gpm. TANKS @ 27%.
1150	- Suspend WTP Discharge to calibrate pH-740 to 4+10 pH STD'.
1157	- Resume normal Discharge. continue with other WTP pH probes calibrations to 4+10 pH STD' @ pH-113, 670, 310, 315 + 365.
1245	- Plants weekly systems checks and calibrations complete.
	Continue on annual device calibration check at RWST then outdoor ultasonic level sensor
	on T-530, 540 & 541.
1500	Plant operations good.

Influent Sources and Flow Rates: @0863
NBBW – 6.6 gpm
North End On Site- 13.0 gpm
North End Off-Site – 8.1 gpm
RWST – 1.2 gpm
NTES – ~~0.4~~ gpm(10R only) 0.5
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.0 gpm

Operator: Mike Gelwick / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Friday, November 05, 2021**

Time:	
0540	Plant operations good. Refill phosphorus tank with 30 gallons of potable water + 3 lbs TSP.
↓	Continue annual device calibration checks at TT-710, TT-670, TT-740 & ~~FE~~ FT-3341.
0740	Blowdown operations good.
0800	Annual RCRA training - given by Brian Kelly of WSP. Dan G., Manuela S., Tom G, Mike G & Chris C. in attendance.
1125	-Decant T-351 to top valve. wet well activated. water is clean no color.
	-Clean pH-315 probe w/Acid solution. Check the HMR 30 for oil or sheen: none observed. Spray down weir.
	-Check TP-130 for oil globules: None observed. water is very clear w/ light yellow-green tint.

Influent Sources and Flow Rates: @0952
NBBW – 6.8 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 3.1 gpm

Operator: Mike Gelwick / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: Saturday, November 06, 2021

0800	Plant operations good.
0945	- Decant T-351 from top valve - wet well activated - water is clear no color
	- Clean ph-315 probe w/ muriatic Acid solution
	- Checked HMR30 for oil or sheens; none observed - sprayed down weir.
	- Check TP-130 for oil globules; none observed, water is clear w/ green/yellow tint
1030	- Plant operations good
(E) 0301	Receive T-540/541 low warning alarm, level at 20%. - Stop P-006 for the remainder of the weekend. Note: Held of on doing source well batch because it's close to be sampled and sample crew couldn't get to it until Monday at the earliest. Plant operations good.
1415	Check plant remotely - All Okay
11/7/21 0510	(0610 plant time) Not adjusting clocks until Monday. All okay.
1304	(1403 plant time) Receive multi Alarms / plant off. Power interruption - Acknowledge alarm remotely then go to site.
1336	On site A phase fuse on Xcel feed ~~pole~~ (W) power pole on west side of Gun Club blown. - call in outage to Xcel. And prepare to be down for a while - both backup generators working. Last NTES generator started.
1400 1600 (E)	Plant set to be off with BTS in hold for the night @ 1615 (plant time)
1701	(1601 plant time) Xcel has restored power - Restart plant remotely. Will run on BTS & N. End on-site overnight (both do not need compressed air - compressors powered off so they can be restarted under controlled conditions. (E)

Influent Sources and Flow Rates: 0918
NBBW – 6.9 GPM
N. END ON-SITE – 13.0 GPM
N. END OFF-SITE – 8.7 GPM
RWST – 0.6 GPM
NTES – 0.47 GPM
COND/NTES T-530 – 0.21 GPM
MW38 – 2.1 GPM
T-540/541 – 0.0 OFF
OTHER – NA

OPERATOR(S) Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: Monday, November 08, 2021

Time:	
0254	(0354 plant time) Receive P-3323 strainer alarm. Remotely acknowledge alarm and
↓	switch R3 feed from P-3323 to P-3324.
0400	(0500 plant time) On site. Plant operations okay - BTS & N. End onsite only overnight.
↓	Power on air compressors - adjust GC CPU clocks back to standard time and reboot.
0420	(0520 plant time) Stop plant and begin to adjust HMI's and PLC times back to standard
↓	time.
0426	HMI FTVIEW1 Online with new time setting and reboot.
0431	HMI2 Online with new time setting and reboot.
0432	PLC times sync'd.
0435	Restart plant, including UV-Ox, IX & N. End off site. Keep RWST influent at 2.5gpm
↓	in preperation for MW38 source well batch extraction.
0600	MW38 N & S wells off - Switch MW38 from direct HMR-30 influent to T-540/541 - Then
↓	go to source well and start batch extraction.
0740	Blowdown operations good.
0900	- Put new tote of NaOH in bay ready for draindown
0945	- Decant T351 to TOP valve, wet well activated, water is clear no color.
	- Clean pH-315 probe w/acid solution. Check the HMR30 for oil or sheen: none observed. Spray down water.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow green tint.
1015	Begin quarterly/monthly POTW discharge line valve exercising / leak
↓	check at discharge manhole - Flow looks good.
1030	Suspend discharge and exercise isolation valve on west side of
↓	E-470 - 1032 Restart discharge - 1046 Suspend discharge for valve
↓	exercising on east side of E470 - 1049 Restart discharge - 1118
↓	Suspend discharge for on site valve exsercising - 1121 resume discharge.
1130	Discharge line check / valve exercising completed - no leaks All okay.

1530 - Plants operations Good

Influent Sources and Flow Rates: 0533
NBBW – 6.8GPM
N. END ON-SITE – 12.9GPM
N. END OFF-SITE – 9.6GPM
RWST – 2.5GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 0.8GPM
T-540/541 – 0.0GPM
MW113 IX SYSTEM – 3.1GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, November 09, 2021**

Time:	
0450	- Plants operations Good. working on TP-730 GC/Lab split sampling and Also collect TP-710+740 low level 1,4-Dioxane samples and Start working on Efficiency checks.
0545	Plant operations good - work on GC2 trap change out.
0700	Receive FV-746 Fail to open alarm when plant dropped into blowdown - UV-OX shutdown due to low flow. Solinoid connection loose, valve opened when solinoid moved. Leave UV-OX off for now (Need to check calibration of FT-670 anyway).
0845	- Decant T-351 to Top valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/Acid solution. Check the Hmr 30 for oil or sheen: None observed. Spray down wet
	- Check TP-130 for oil globules: None observed. Water is very clear w/light yellow-green tint.
	- Refill BTS phosphorus tank w/6# of TSP and 60 gal of potable water. working on BTS sampling and weekly BTS Field Readings today.
1000	FT-670 calibration completed - All ok.
~~1023~~	~~Stop P-521/522 so FT-675 calibration could be checked~~
1030	- IX performance HACH testing and Lab split samples after 852,214 gal treated: TP-183 ≈ 130 ug/L; TP-174A ≈ 190 ug/L; TP-173A ≈ 3700 ug/L; TP-170 ≈ 4600 ug/L.
1230	T-540/541 at 80%. Stop MW38 batch extraction.
1255	Restart MW38 N&S extraction to T-540/541 to displace source well water in the pipeline to T-540/541
1258	Restart UV-OX - Note 1308 when warm up completed FV-746 worked - will continue to watch for more failures and replace solinoid if needed.
1311	Stop P-521/522 so FT-675 calibration can be checked.
1330	Restart P-521/522
1525	- Plants operations Good.
1820	- Switch MW38 N+S wells from T-540/541 to RWSTS. 633 gal Run thru pipeline Prior to switch

Influent Sources and Flow Rates: @0522
NBBW – 6.8 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.2 gpm
RWST – 2.5 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 ~~N&S~~ – 5.0 gpm source well batch
COND/NTES T-530- 0.24 gpm(~~6am-1pm daily~~)
MW113 Area – 3.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Wednesday, November 10, 2021

Time:	
0545	Plant operations good. Start on weekly GC maintenace and calibrations.
0615	Jim B. of Brownsttill on site to troubleshoot P-114 high CV alarm and talk about UV-OX
↓	PLC upgrade. Jim able to do a quick fix for P-114 logic - alarm tested and working.
0715	Observe HMI2 CPU is not responding (locked up during data backup). Reboot CPU - Online 0719.
0740	Blowdown operation good.
0750	Reduce RWST influent from 2.5 gpm to 1.0 gpm and switch MW38 N & S from RWST influent to direct HMR-30 influent.
0915	- Decant T-351a to TOP valve, wet well activated. water is clear no color
	- Clean pH-315 probe w/Acid solution. Check the HMR 30 for oil or sheen; None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. water is very clear w/light yellow-green tint.
1200	Backup data to CD & Flash. Daily OneDrive backup working well.
1340	- Add ~20 gal of Water Phase Layer of MNA-09 Satellite Drum to T-530. NO NAPL collected. Decanted from Drum using a perisaltic pump.
1500	- Plants operations Good.

Influent Sources and Flow Rates: @ 0905
NBBW – 6.8 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.2 gpm
RWST – 1.0 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, November 11, 2021**

Time:	
0530	Plant operations good. Setup for yearly personal SVMA air sampling - Mike, Tom & self to wear the air samples during a normal 8hr shift today.
0740	Blowdown operations good.
0846	Shutdown Ion exchange to change out 1 micron bag filter before P-114.
0858	Restart Ion Exchange.
0905	- Decant T-351 to top valve, wetwell activated. water is clear no color.
	- clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: none observed. spray down weir.
	- Check TP-130 for oil globules: none observed. water is very clear w/ light yellow-green tint. working on weekly Plants systems checks and calibrations.
1152	- Suspend plant discharge to calibrate pH-740 probe to 4 + 10 pH STDS. Switch to P-751 lead to clean P-752 check ball after checks
1201	- Resume normal discharge. Continue with other pH probes calibrations to 4+10 pH STDS @ pH-113, 670, 310, 315 + 365.
1250	- weekly plants systems checks and calibrations complete. work on clean of P-752 check ball.
1310	- Cleaned check ball on P-752. Not too bad. A little dirty. Upon switching back to lead on P-752 received pressure drop alarm again. Check ball may still be sticking. May need to change out w/ new ones.
1314	- Discharging normal again. Leave on P-751 until next week and will switch to P-752 after calibration of pH-740.
1530	- Plants operations Good.

Influent Sources and Flow Rates: @ 0754
NBBW – 6.8 gpm
North End On Site- 12.8 gpm
North End Off-Site – 8.8 gpm
RWST – 1.0 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, November 12, 2021**

Time:	
0730	- Plants operations Good.
0800	- Decant T-351 to TOP valve. wet well activated. Water is clear no color
	- Clean pH-315 Probe w/Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. Water is very clear w/ Light yellow-green tint.
0845	- IR on site (2 techs) to fix motor on one of the Back up compressors and service others.
0907	- Place BTS Into maint. Hold and work on Flushing p-006/T-540/541/sediment tank piping and BTS Reactor Feed piping
1022	- ~~out of~~ BTS out of Hold.
1215	- Refill BTS phosphorus tank w/5# of TSP and 50 gal of potable water. Put Bottle orders Away.
1255	- Decrease flow on IX System to 2.7 gpm from 2.8 gpm. CV on the pump came up fairly quickly around 8Am and we just changed out the BAG filter yesterday. Decreasing flow helped CV come down a little. Will see if it increases again, well may be slowing down.
1300	IR off site. All Backup compressors serviced and New motor installed on #1 lead Back up compressor.
1320	- IX system pump CV coming down. Well production must be slowing.
1425	- Plants operations Good.

Influent Sources and Flow Rates: @0736
NBBW – 6.8 gpm
North End On Site- 12.8 gpm
North End Off-Site – 8.8 gpm
RWST – 1.0 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.19 gpm(6am-1pm daily)
MW113 Area – 2.8 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: SATURDAY, NOVEMBER 13th, 2021

0620	- Plants operations Good. Notice the PDU carbon psi came up a bit to 6 psi and pumps CV @ 84%. Will Backwash PDU during blowdown.
0700	- Into blowdown ok. BACKWAS PDU with potable water while in recycle for blowdown. IX Running well @ 2.7 gpm.
0725	- STOP BACKWASH and Get Valves Back to Normal Positions for After blowdown.
0740	- Flow going thru PDU again, bleed Residual Air from PDU. psi down to 1. Go over and will Bleed any Air out of GC Feedline After
	fill cycle completes.
0810	- Go to check other site systems.
0910	- Decant T-357 to TOP valve. Wet well activated. Water is clear no color.
	- Clean PH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen; None observed. Spray Down a weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
1015	- Plants operations Good
2100	- Remote log in. All ok.
Sunday, November 14, 2021	
0830	- Remote log in. All ok.
1810	- Remote log in. Reduce IX system flow to 2.6 gpm. CV on pump @ 100%. All Else ok.
2100	- Remote log in. All ok. IX system Running well. CV down to 76% @ 2.6 gpm.

Influent Sources and Flow Rates: @ 0640
NBBW – 6.8 gpm
N. END ON-SITE – 12.8 gpm
N. END OFF-SITE – 8.5 gpm
RWST – 1.0 gpm
NTES – 0.50 gpm
COND/NTES T-530 – 0.20 gpm
MW38 – 2.0 gpm
T-540/541 – 0.30 gpm
OTHER – ~~NA~~ MW113 Arm Inf/IX System 2.7 gpm

OPERATOR(S) Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Monday, November 15, 2021**

Time:	
0545	Plant operations good. Work on annual device calibrations FT-3342 & FT-3307.
#	Observe the flow rate being produced at MW113-EW-1 is dropping off (saturated zone getting less & less in that area)
	Blowdown operations good.
0820	- Decant T-351 to TOP valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TPY30 for oil globules: None observed. water is very clear w/ light yellow-green tint.
0821	Place BTS in hold while checking Blend & overflow tank level sensor calibrations
0910	Take BTS out of hold. Shut down UV-OX.
0915	Place effluent in timed suspension while checking FT-770 calibration.
↓	Simulated flow logged between 0934 & 0937
0943	Take effluent out of suspension - plant discharging normally again.
↓	Work on LT-510 device calibration check - note BTS went into hold when T-510 level
↓	went low. Leave BTS in hold. LT-510 calibration check done at 1020 start on LT-520
1037	Plant shutdown when Hi Hi alarm level of T-520 was triggered with calibration equipment.
↓	Leave plant off, move to LT-740 (effluent discharge tank) calibration check, then PIT-530,
↓	PIT-770 - All have ~~critical~~ critical plant shut down alarms attached to them
1211	Restart plant, UV-OX & take BTS out of hold. UV-OX warming up.
↓	Only one device remaining. FT-043 (missed it when doing the RWST earlier)
1340	Annual device calibration checks completed.
1520	- Plants operations Good
1545	Plant operations good.

Influent Sources and Flow Rates: @ 0802
NBBW – 6.7 gpm
North End On Site- 12.8 gpm
North End Off-Site – 8.8 gpm
RWST – 1.0 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, November 16, 2021**

Time:	
0450	- Plants operations Good. On Site to collect TP-730 GC Split samples w/LAB and TP-740 + 710 Lowlevel 1,4-Dioxane weekly samples
	- START Efficiency checks. working on WEEKly BTS Sampling and Readings today
1010	- IX System performance HACH testing w/LAB split samples After 879,192 gal Treated; TP-183 @ 110 ug/L; TP-174A @ 210 ug/L;
	TP-173A @ 3500 ug/L; TP-170 @ 4600 ug/L
1200	- Decant T-351 to TOP valve wetwell activated water is clear No color.
	- Clean pH-315 probe w/acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow-green tint.
	- Refill Polymer tank w/200 gal of potable water and 2 cups of NALCO polymer.
	- Refill BTS phosphorus tank w/5.5# of TSP and 55 gal of potable water.
1530	- Reduce RWSTS Flow to 0.60 gpm. Tanks @ 35%. Plants operations Good.

Influent Sources and Flow Rates: @ 0528
NBBW – 6.8 gpm
North End On Site- 12.9 gpm
North End Off-Site – 8.5 gpm
RWST – 1.0 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.6 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, November 17, 2021**

Time:	
0600	Plant operations good. Start on weekly GC maintenance and calibrations - Add two more carbon unit inline on the potable water source before the GC's and sink under the BTS building sink. Hope to get longer life out of the carbon used for GC blank water.
0607	Observe Ion Exchange P-114 CV running high again - reduce rate from 2.6gpm to 2.5gpm.
0830	- Decant T-351 to top valve. Wet well activated. Water is clear no color
	- Clean AH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down wet
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow green tint.
	- Working on Qtrly Buildings methane safety checks today. Calibrate GEM 5000 Rental SN G 506880 to 2.5% CH_4: Reading 2.5% CH_4.
1050	Backup data to CD & Flashdrive - Daily OneDrive backup working well.
1530	- Plants operations Good.

Influent Sources and Flow Rates: @ 0820
NBBW – 6.7 gpm
North End On Site- 12.9gpm
North End Off-Site – 7.8 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, November 18, 2021**

Time:	
0720	- Plants operations Good.
0830	- Add 200 gal of peroxide to tote from new one. Add New TOTE OF NAOH to BTS. Add one new tote to main supply for drain
	down later. work w/cc to do this.
0930	- Reduce flow on UV-Ox to 7.5 gpm from 8.0 gpm to help ~~[illegible]~~ T-510 Be more stabil / full.
1000	- working on weekly Plants checks and calibrations today
1020	- Decant T-351 to top valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. Check the HWS 30 for oil or sheen: no one observed. Spray down weir.
	- Check TP-130 for oily lobules: none observed. water is very clear w/light yellow-green tint.
1324	- Suspend Plant Discharge to calibrate pH-740 to 4+10 pH STD's.
1333	- Resume Normal Discharge. Continue with other pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 and 365.
1415	- Weekly Plants systems checks and calibrations complete.
1500	- Plants operation Good

Influent Sources and Flow Rates: @ 1005
NBBW – 6.7 gpm
North End On Site- 12.8 gpm
North End Off-Site – 9.3 gpm
RWST – 0.6 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.1 gpm
COND/NTES T-530- 0.22 gpm(6am-1pm daily)
MW113 Area – 2.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Friday, November 19, 2021

0000	Receive P-114 strainer alarm - acknowledged alarm remotely - attempt to restart P-114 remotely
↓	- Flow to P-114 restricted, possibly P-113 has stalled.
0100	ON site - able to get P-113 running / IX system running, also turned up MW113-FLW-1 (P-113)
↓	pressure to ~70 psi. Also switch R3 feed from P-3323 to P-3324 (P-3323 starting to clogg up a little).
0140	IX system and plant operations good. Leave site.
0730	- Plant operations good
	- Decant T-351 from top valve, wet well activated, water is clear no color
	- Clean ph-315 probe with acid solution. check HMR30 for oil or sheens: none observed. Sprayed down weir
	- check Jp-130 for oil globules: none observed: water is clear with yellow/green tint
1500	- Plant operations good
	- Filled phosphorous tank w/ 50 gallons / 5LBS TSP

Influent Sources and Flow Rates: 0137
NBBW – 6.8 gpm
N. END ON-SITE – 12.9 gpm
N. END OFF-SITE – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm
COND/NTES T-530 – 0.0 gpm
MW38 – 2.1 gpm
T-540/541 – 0.3 gpm
OTHER – ~~NA~~ MW113 area 2.9 gpm

OPERATOR(S) Chris Carlson / Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: Saturday, November 20, 2021

0625	ON site for weekend systems checks. Plant operations good.
0650	Decant T-351 top valve, wet well did not activate. Water is clear, no color. Clean the HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30. Check TO-130 for oil globules - none observed. Water is very clear light green / yellow.
0740	Blowdown operations good.
0840	Plant operations good.
1630	Check plant operations remotely - All okay.
11/21/21 0600	Check plant remotely - All okay.
1400	Check plant remotely - All okay

Influent Sources and Flow Rates: 0645
NBBW – 6.7 gpm
N. END ON-SITE – 12.6 gpm
N. END OFF-SITE – 6.2 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm
COND/NTES T-530 – 0.2 gpm (6 hrs · IRM)
MW38 – 2.1 gpm
T-540/541 – 0.3 gpm
OTHER ~~NA~~ MW33 Area 2.3 gpm

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, November 22, 2021**

Time:	
0700	-Plants operations Good. Automatic blowdown operations Normal
0704	-Receive P-114 Strainer Alarm. Increased slightly this morning to 2.6 gpm. Too much. Reduce to 2.5 gpm and restart. Will Watch and make
	sure this is not too much flow. Ran @ 2.4 gpm this weekend ok.
0940	-Decant T-351 to top valve. Wetwell activated, water is clear no color.
	-Clean pH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	-Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint
	-Decrease IX flow to 2.4 gpm. Pump curve up to 83%.
1010	-Refill BTS phosphorus tank w/ 5# of TSP + 50 gal of potable water.
1030	-Work on change out of Acid Fume Hood vent motor belt.
1510	-Plants operations Good.

Influent Sources and Flow Rates: @ 0735
NBBW – 6.7 gpm
North End On Site- 12.8 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.5 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, November 23, 2021**

Time:	
0145	- Receive P-3321 strainer Alarm. Not @ shutoff point, just warning. Acknowledge from Horn.
0230	- Acknowledge P-3321 strainer Alarm again and come to site to Flush BTS Reactors Feed Piping. Already using Back up Pump for 3323.
0300	- on site. Plants operations Good.
0308	- BTS in to maint Hold to Flush Reactor Feed Piping.
0345	- BTS out of Hold. All ok.
0415	- Work on BTS weekly sampling and START Efficiency checks.
0505	- Collect TP-730 weekly GC/Lab split samples. Also collect TP-710+740 weekly Low Level 1, 4-Dioxane samples.
0549	- IX Performance HACH testing with Lab split samples After 902, 713 gal treated: TP-183 @ 190 ug/L; TP-174A @ 290 ug/L;
	TP-173A @ 4000 ug/L; TP-170 @ 5000 ug/L.
0940	- Work on on BTS Field Readings
1210	- Decant T-351 to TOP valve, wetwell activated. Water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check the Hood 30 for oil or sheen; None observed. Spray down water.
	- check TP-130 for oily globules; None observed water is very clear w/ light yellow green tint.
1320	Plant operations good.

Influent Sources and Flow Rates: @ 0445
NBBW – 6.8 gpm
North End On Site- 12.8 gpm
North End Off-Site – 9.1 gpm
RWST – 0.60 gpm
NTES – 0.49 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.4 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, November 24, 2021**

Time:	
0525	Plant operations good. Start on weekly GC maintenance and calibrations.
0740	Blowdown operations good. Mike working on weekly/monthly plants systems checks and calibrations today. Calibrate site
	multimeter to 2.5% CH_4/50% LEL to use during LEL-740 calibration to ensure 0% LEL in T-740.
0845	- Decant T-351 to TOP valve. wetwell activated. water is clear no color.
	- Clean pH-315 probe w/ acid solution. check THC HMR30 for oil or sheen: none observed. Spray down weir.
	- Check TP-130 for oil globules: none observed. water is very clear w/ light yellow-green tint.
	- Prepare new 4+10 pH STDs for calibrations today
1020	Backup plant data to flash drive & DVD disk. Daily OneDrive backup working well.
1045	- Work on monthly BTS pH probes calibrations to new 4+10 pH STDs
1150	- START WTP pH probes calibrations to new 4+10 pH STDs @ pH-113, 670, 310, 315 + 365.
1225	- Suspend plant discharge to calibrate pH-740 to new 4+10 pH STDs and LEL-740 to 50% LEL.
	- Having trouble getting the new cal gas to calibrate on LEL-740. New Gas they sent me is 2.45% CH_4 and a Nitrogen balance which
	will not work for calibration. use another can of cal gas which is 2.5% CH_4 + Air balance. works better now.
1236	- Plant shut down for High LEL @ 8% LEL during calibration. High LEL shut down operations Good.
1315	- Restart Plant.
1400	- Plants operations Good.

Influent Sources and Flow Rates: @ 0650
NBBW – 6.7 gpm
North End On Site- 12.8 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.3 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Friday, November 26, 2021

0800	- Plant operations good.
	- Decant T-351 top valve. Wet well activated. Water is very clear, no color
	- clean pH-315 probe w/ Acid solution. Check AMR30 for oil or sheen: none observed - Sprayed down weir
	- Check Tp-130 for oil globules: none observed. Water is clear w/ yellow-green tint
	- Filled phosphorus tank w/ 60 gallons H_2O + 6LBS TSP
1100	- Plant operations good

Influent Sources and Flow Rates: @0815
NBBW – 6.7 gpm
N. END ON-SITE – 12.7 gpm
N. END OFF-SITE – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm
COND/NTES T-530 –0.20gpm (6AM–1PM daily)
MW38 – 1.9 gpm
T-540/541 – 0.29 gpm
MW113 Area – 2.3 gpm

OPERATOR(S) Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: Saturday, November 27, 2021

0900	Plant operations good.
	- cleaned HMR-30 probe w/ Acid Solution
	- checked chambers A and B for oil or sheen: none observed - sprayed down weir
	- check TP-130 for oil globules and sheens: none observed water is clear w/ green-yellow tint
	- Sprayed down floc mixer belt
1130	- Plant operations good
	- Decant T-351 top valve. wet-well activated. Water is clear, no color
	Sunday, November 28, 2021
1300	Remotly logged in - plant operations good.

Influent Sources and Flow Rates: @ 0915
NBBW – 6.7 gpm
N. END ON-SITE – 12.7 gpm
N. END OFF-SITE – 8.4 gpm
RWST – 0.6 gpm
NTES – 0.52
COND/NTES T-530 – 0.21 gpm (6AM–1PM daily)
MW38 – 1.9 gpm
T-540/541 – 0.33 gpm
MW113 Area – 2.3 gpm

OPERATOR(S) Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: **Monday, November 29, 2021**

Time:	
0530 ↓	Plant operations good. Observe MW38N extraction reached its low level stop yesterday at 1540 and is recharging but slower than in the past.
0610	Stop MW38S extraction and prepare for MW38 source well batch extraction (T-540/541 @ 25%)
0617	Increase RWST influent from 0.6 gpm to 2.6 gpm.
0634	Switch MW38 from direct HMR-30 influent to T-540/541 then startup MW38 source well.
0800	Blowdown operations good.
0810	Reboot HMIFTVIEW to reset temporary memory file space, online @ 0815 -
0915	- Decant T-351 to TOP valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- check TP-130 for oil globules: None observed. water is very clear w/ Light yellow green tint.
	Lube up solinoids of Flow control valves FV-708 & FV-746 of the UV-OX, fix loose air bleed fitting.
0930	Restart UV-OX - 0940 Warm up completed - FV-708 & FV-746 working well.
	- Mike working on swap out of RWST's MISC. waters Flow Tube.
1345	- Test flow tube by running ~100 gal of potable water thru it. It is Registering flow ok and Registered 66 gal. Residual in piping and Hoses accounting for rest. All seems on.
1520	Plant operations good.
~~01520~~	~~Plant~~

Influent Sources and Flow Rates: 0545
NBBW – 6.7GPM
N. END ON-SITE – 12.7GPM
N. END OFF-SITE – 8.7GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 1.1GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 2.2GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, November 30, 2021**

Time:	
0500	- Plants operations Good. Working on STARTing Efficiency checks and collecting TP-730 GC/Lab Split samples. Also collecting TP-710 and TP-740 Low Level 1,4-Dioxane SAMPLES.
	Refill phosphorus tank with 60gallons potable water + 6lbs TSP
0700	Backwash PDU and clean PDU air releases.
0845	- Decant T-351 to top valve. wetwell activated. water is Clear No color.
	- Clean pH-315 probe w/Acid solution. Check the Hach-30 for oil or sheen: None observed. Spray down weirs
	- Check TP-130 for oil globules: None observed. water is very clear w/light yellow/green hue
	- working on weekly BTS sampling and Field readings today.
0955	- IX System Performance HACH testing w/Lab Split Sampling AFTER 926,078 gal treated: TP-183 = 190 ug/L; TP-174A = 270 ug/L; TP-173A = 4300 ug/L; TP-170 = 5200 ug/L
1030	GC results of TP-3340 indicate 1,2-DCA is increasing in the BTS effluent (Fresh MW38 Source well water is impacting BTS). Reduce T-540/541 influent from 0.3gpm to 0.2 gpm until BTS can adjust to the increased 1,2-DCA load. Note: T-540/541 now at 80%, Mike to stop Source well batch extraction after packing up samples.
1125	-STOP MW38 source well pumping.
1238	Restart MW38N's extraction to T-540/541 to displace the MW38 source well water in the pipeline to T-540/541.
1500	- Plants operations Good. Will remote in and switch MW38N+S wells to RWSTS Later tonight.
1845	740 gallons from MW38N's have been pumped to displace source well water in the conveyance pipeline to T-540/541. MW38 switched from T-540/541 to RWSTS - Plant operation good.

Influent Sources and Flow Rates: @ 0535
NBBW – 6.6 gpm
North End On Site- 12.7 gpm
North End Off-Site – 8.4 gpm
RWST – 2.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 ~~N&S~~ – 5.0 gpm source well to T-540
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, December 01, 2021**

Time:	
0510	Plant operations good. Start on weekly GC maintenance and calibrations
0745	Blowdown operations good.
0851	Reduce RWST inFluent from 2.6 gpm to 0.6 gpm and switch MW38 N&S extraction back to normal direct HMR-30 inFluent. Increase T-540/541 from 0.2 gpm to 0.3 gpm (GC results from TP-3350 have dropped overnight for 1,2-DCA).
1145	- Decant T-351 to TOP valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/ acid solution, check the HMR-30 for oil or sheen; None observed. Spray down water.
	- Check TP-130 for oil globules; None observed. water is very clear w/ light yellow-green tint.
1315	Backup plant data to Flash drive and CD. Daily OneDrive backup working well.
1523	- Plant is operations Good.

Influent Sources and Flow Rates: @ 0850
NBBW – 6.6 gpm
North End On Site- 12.7 gpm
North End Off-Site – 8.7 gpm
RWST – 2.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.2 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm (to RWST)
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, December 02, 2021**

Time:	
0525	Plant operations good.
0750	Blowdown operations good. Mike and Tom (training) working on weekly systems checks and calibrations today.
~~0815~~	~~Mike [illegible] Tom on weekly plants systems checks and~~
0845	Hayden with Piper Electric on site to install line reactor in front of primary air compressors VFD to protect it from spikes in power - 1240 - Line reactor installed
0850	- Decant T-351 to TOP valve. wet well activated. Water is clear no color
	- Clean pH-315 probe w/ Acid solution. Check the Hmr 30 for oil or sheen; none observed. Spray down weir
	- Check TP-130 for oily globules; none observed. Water is very clear w/ light yellow green tint.
1410	- Suspend Plant Discharge to calibrate pH-740 probe to 4 + 10 pH STDs.
1420	- Resume normal discharge. Continue with other pH probes calibrations to 4+10 pH STDs @ pH-113, 670, 310, 315 + 365
1515	- Weekly plants systems checks and calibrations complete.
1530	- Plants operations Good.
1715	Check plant remotely - All okay

Influent Sources and Flow Rates: @ 0750
NBBW – 6.7 gpm
North End On Site- 12.7 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.2 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Friday, December 03, 2021**

Time:	
0730	- Plants operations Good. Coming out of blowdown ok
0845	- START setting up to Backwash lead GAC-720 with process water.
	- Decant T-351 to TOP valve. Wet well activated. Water is clear No color
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow-green tint.
	- Refill polymer tank w/ 2 cups of NALCO polymer and 200 gal of potable water.
1050	- Refill BTS phosphorus TANK w/ 5# of TSP and 50 gal of potable water.
1110	- Work on setting up Auto sampler and calibrating delivery volume for Monthly WTP sampling Event.
	- Triple Rinse dedicated poly graduated composite container. Will add Nitric Acid preservative jus prior to START up on monday.
1130	- Work on Backwash of lead GAC-720.
1215	- GAC-720 Backwash complete. Pressure in vessel went from 20. to 7 psi. @ 37 gpm
1225	- Work on Getting 2 New Bitumonous carbon vessels Hydrated with potable water.
1430	- Plants operations Good.

Influent Sources and Flow Rates: @ 0800
NBBW – 6.6 gpm
North End On Site- 12.6 gpm
North End Off-Site – 8.4 gpm
RWST – 0.60 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.29 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.18 gpm(6am-1pm daily)
MW113 Area – 2.2 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: Saturday, December 4, 2021

0800	Plant's operations good.
0840	Decant T-351 to top valve. Wet well activated. Water is clear no color. Clean pH-315 probe w/ acid solution. Check HMR-30 for oil or sheen: None observed. Spray down weir. Check TP-130 for oil globules - none observed. Water clear with light yellow/green tint.
0900	Both GCs operational within limits. All blowers okay. Phosphorus tank: 90 gal
1015	Plant operations good.
@ 0550	Check plant remotely - All okay.
1700	Check plant remotely - All okay.
12/5/21 0630	Check plant remotely - All okay.
1704	Receive NTES Flow unstable alarm - Remotely see Flow rate is below 0.3gpm and trench level raising slightly P-002W pump stalled. Switch NTES from direct BTS influent to T-530 and start up T-530 at 0.5gpm to BTS. Will run like this overnight - check plant operations. Observe GC2 had a file error WARNING pop up on screen - restart program and ~~for~~ T-730 sampling on it, note last sample results look normal. File error occured after that sample was completed.
2015	Check plant remotely - NTES P-002W has resumed pumping but will leave in divert to T-530 for the night in case it stalls again. Plant operations good.

Influent Sources and Flow Rates: @ 0825
NBBW – 6.6 gpm
N. END ON-SITE – 12.7 gpm
N. END OFF-SITE – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.21 gpm (6AM–1PM daily)
MW38 – 2.0 gpm
T-540/541 – 0.3 gpm
MW113 Area – 2.1 gpm

OPERATOR(S) Manuela Seewald / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, December 06, 2021**

Time:	
0600	Plant operations good
0610	Observe NTES ran all night to T-530 without stalling again. Switch it back to direct BTS influent and lower T-530 to 0.2 gpm with timer activated for 6AM-1PM.
↓	Decant T-351 top valve, wet well activated. Water is clear, no color.
0620	Start Filter press on T-351 (in stage 1).
0740	Blowdown operations good.
0800	Mike has added preservative to composite container for monthly MP-001 Flow paced sampling and started auto sampler. Effluent totalizer reading 247522652 gallons, pH-740 reading 6.91@15.9°C & FT-770 Flow rate reading 32.5 gpm.
0940	-Clean pH-315 probe w/Acid solution. Check the HMR30 for odor/screen: None observed. Spray down wash.
	-Check PM130 for oil globules: None observed. water is slightly cloudy w/yellow-orange tint.
1015	-working on Monthly Early warning sampling for Total molybdenum and Low level 1,4-Dioxane.
1100	- IX System performance HACH testing with weekly Lab split sampling after 944,704 gal treated: TP-185 → 180 ug/L; TP-174A → 250 ug/L; TP-173A → 4300 ug/L; TP-170 → 5500 ug/L. All Lab samples placed in fridge via shipment tomorrow to Lab.
1150	-START FLUSH of MP-001 and check for Residual Chlorine; None Detected. Starting MP-001 monthly time paced sampling.
1200	-collect 1st set of MP-001 time paced grab samples for Low Level 1,4-Dioxane. Place samples into fridge. Water is very clear NO color
1300	-Filter press is full.
1515	-Refill BTS phosphorus tank w/5# of TSP and 50 gal of potable water.
1550	-START Flush of MP-001 sample port and check for Residual chlorine: None detected
1600	-collect 2nd set of time paced grab samples for low level 1,4-Dioxane. Water is very clear no color.
	-Place samples in fridge with others. Auto Sampler on track/Good
	-Plants operations Good.
1950	Start MP-001 port flush; check for residual chlorine, None detected.
2000	Collect 3rd set of time paced grab samples for low level 1,4 Dioxane, water is clear NO color. Place sample in fridge with others.

Influent Sources and Flow Rates: @0605
NBBW – 6.6 gpm
North End On Site- 12.6 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.2 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: Monday, December 06, 2021 (Continued)

2345	Start MP-001 port flush and check for residual chlorine, NONE detected.
0000	Collect 4th set of time paced grab samples for low level 1,4-Dioxane, water is very clear no color. Place samples in fridge with others.

Influent Sources and Flow Rates: @
NBBW – gpm
N. END ON-SITE – gpm
N. END OFF-SITE – gpm
RWST – gpm
NTES –
COND/NTES T-530 – gpm (6AM–1PM daily)
MW38 – gpm
T-540/541 – gpm
MW113 Area – gpm

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, December 7, 2021**

Time:	
0315	- Plants operations Good. Prepare GC's for Efficency checks.
0350	- START Flush of MP-001 sample port and check for Residual chlorine; None Detected
0400	- collect 5th set of MP-001 time paced grab samples for Low-Level 1,4-Dioxane. Water is very clear No color. Place samples in Fridge with others
0415	- working on BTS weekly sampling along with starting Efficency checks and collecting TP-730 GC/Lab split samples and TP-740 + 710 Low level 1,4-Dioxane weekly samples.
0515	- working on Prep for BTS Field Readings.
0750	- START Flush of MP-001 sample port and check for Residual chlorine: None Detected.
0800	- collect 6th and final set of MP-001 Time paced grab samples for Low-Level 1,4-Dioxane. Water is very clear No color. Place samples in Fridge with others. STOP Auto sampler. TOTAL Effluent @ 247,570,300 gal. A total of 47,648 gal treated during sample period. Process Gently stir composite with rinsed stir stick sample composite Check pH of sample composite. pH @ 1.62 SU. Fill sample bottle. Pack all samples on Ice for courier Pickup for Lab.
	- TOM working on Filterpress cleanout
1100	- Decant T-351 to top valve. wet well did not activate water is clear No color
	- Clean pH-315 probe w/ Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is clear w/ yellow-green tint.
	- filterpress Ready to fill.
1125	- work on BTS Field Readings
1415	Plant operations good.

Influent Sources and Flow Rates: @ 0340
NBBW – 6.7 gpm
North End On Site- 12.6 gpm
North End Off-Site – 9.0 gpm
RWST – 0.60 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

OPERATOR **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, December 08, 2021**

Time:	
0515	Plant operations good. Start on weekly GC maintenance and calibrations
0600	Start Filter-press on T-351 (Stage 1)
0740	Blowdown operations good.
0815	- Clean pH-315 probe w/Acid solution. Check tote Hmx 80 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed - water is clear w/ yellow-green tint.
0822	- Divert NTES TO T-530 and Increase T-530/p-005 to 0.50 gpm to work on swap out of MP2-10R pump.
0915	Backup plant data to Flashdrive & CD. Daily OneDrive backup working well.
1100	- Switch NTES Back to Normal mode and Decrease T-530/p-005 Back to 0.20 gpm.
1150	- Work w/Chris to add a full tote of NaOH to chemical Bay for Drain down later and Drain/Empty HCl tote into on line tote.
1700	Shutdown filter press (in stage 4). Plant operations good.

Influent Sources and Flow Rates: 0645
NBBW – 6.6GPM
N. END ON-SITE – 12.5GPM
N. END OFF-SITE – 8.7GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 2.0GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 2.1GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Thursday, December 09, 2021**

Time:	
0740	- Plants operations Good, Coming out of Automatic blowdown ok. Restart Filter Press. (In stage 4)
	- Tom Training on weekly Plants checks again this week. Starting weekly Plants systems checks and calibrations.
1017	- Filter Press full.
1035	- Decant T-351 from bottom valve. wet well activated water is clear no color.
1027	- Clean ph-315 probe w/ Acid solution. Check HMR 30 for oil or sheens: none observed. Sprayed down weir
1150	- Check TP-130 for oil globules: none observed water is clear w/ yellow-green tint.
1458	- Discharge suspended to calibrate pH-740 to 10 and 4 PH STDS.
1512	- Resume normal discharge
	- Finish WTP probe calibrations tomorrow morning
1522	- Switch STS p-3324 to p-3321 position. CV on p-3321 increasing with flow plugging
1600	- Plants operations Good.

Influent Sources and Flow Rates: @ 0745
NBBW – 6.6 gpm
North End On Site- 12.5 gpm
North End Off-Site – 8.3 gpm
RWST – 0.6 gpm
NTES – 0.54 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.18 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

Operator: **Mike Gelwick / Tom Gilbert**

LOWRY WTP OPERATIONS LOG

Date: **Friday, December 10, 2021**

Time:	
0745	- Plants operations Good. Automatic blowdown operations Good.
0840	- work on Finishing up on WTP pH probes calibrations to 4+10pH STD's.
0905	- Clean pH-315 probe w/Acid solution. Check the HMK30 for oil or sheen; ~~and~~ None observed. Spray down weir
0925	- pH probes weekly calibration complete @ pH-113, 365, 310, 315 + 670.
0930	- check TP-130 for oil globules; None observed. water IS clear w/ yellow-green tint.
0935	- Decant T-351 from bottom valve. wet well activated. water IS clear No color.
1115	- Refill BTS phosphorus tank w/5# of TSP and 50gal of potable water
1130	- Place BTS Into Maint. Hold to flush Reactors Feed Piping and pumps.
1205	- BTS out of Hold.
1405	- Plants operations Good.

Influent Sources and Flow Rates: @0825
NBBW – 6.6 gpm
North End On Site- 12.5 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.20 gpm(6am-1pm daily)
MW113 Area – 2.1 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: SATURDAY, December 11, 2021

0700	- Plants operations Good. Automatic blowdown operations Good. Go to check other site systems
0825	- Decant T-351 from bottom valve. wet well activated. water is clear no color
	- Clean pH-315 probe w/ Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray Down weir
	- Check TP-430 for oil globules: None observed. water is clear w/ yellow-green tint.
	- Notice p-3321 on BTS is @ 0.0 gpm. Check on pump. Not Running. Message on Totalizer Readout says "Electronics Failure". Switch to
	p-3324 Backup. Did not receive any Alarm for this. Looks like it stopped Around 1510 on 12-10-21 yesterday. Troubleshooting: Rebooted
	the totalizer Readout by taking fuse out and Reinserting. Electronics Failure message off now. Restart pump. Seems to be working ok now.
	will watch it closely and switch to p-3324 Backup if it occurs again.
1000	- plants operations Good.
1123	- Receive GC2 BTS VOC Alarm. BTS into Hold. 1, 4-Dioxane level came up to 290 ppb. Reset Alarm Remotely and put GC2 on Standby
	for Awhile and stop T-530/p-005 and T-540's/p-006 to Allow BTS time to catch up. May be high due to p-3321 issue.
1400	- ~~Rem~~ Remote log in and start a New TP-3350 sample on GC2. T-540's/p-006 + T-530/p-005 still off.
1600	- Remote log in. GC2 1, 4-Dioxane Results for TP-3350 are coming down. Now @ 160 ppb. will leave T-540's/p-006 + T-530/p-005 off for the Night
1930	- Remote log in. All ok. No New GC2/TP-3350 sample yet

Influent Sources and Flow Rates: @ 0815
NBBW – 6.6 gpm
N. END ON-SITE – 12.5 gpm
N. END OFF-SITE – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.19 gpm (6AM–1PM daily)
MW38 – 2.0 gpm
T-540/541 – 0.31 gpm
MW113 Area – 2.1 gpm

OPERATOR(S) Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: Sunday, December 12, 2021

0708 - Receive POTW pressure drop alarm. Log in remotely and reset/restart. Seems after the T-740 tank is pumped down to 20% it stops the discharge pump abruptly and causes a pipeline pressure issue. GC2 in delay, check again in a bit. Plant running again ok.

0845 - Log in remotely. GC2/TP-3350 1,4-Dioxane results are down to 2ppb. START T-540'/P-006 @ 0.20gpm. Will start a new GC2 TP-3350 sample later.

0911 - Receive POTW pressure drop alarm again. Log in remotely and reset/check out. Seems to be the same issue. T-740 tank pumped down to 20% and discharge pump stopped abruptly causing the pressure issue in the pipeline. Pump and plant running ok again.

1130 - Remote log in and START a new GC2/TP-3350 sample.

1315 - Log in remotely. GC2/TP-3350 1,4-Dioxane results are @ 3ppb. Increase T-540'/P-006 to 0.30gpm. Leaving T-530/P-005 off for awhile. START a new GC2/TP-3350 sample later.

1745 - START a new GC2/TP-3350 sample remotely.

1930 - Log in remotely. GC2/TP-3350 results for 1,4-dioxane @ 18ppb. ok. Plants operations ok.

2059 Receive UV-OX GC Fault - high VOC alarm. Check remotely and can see GC1 has logged a ~~fault~~ false high value to the normal looking 1,1-DCE peak. Take screen snapshots to support the ~~fault~~ false value determination then start next ~~TP-17~~ TP-730 sample early on GC1 after taking UV-OX out of recycle mode.

2130 Plant operations good.

Influent Sources and Flow Rates: @
NBBW – gpm
N. END ON-SITE – gpm
N. END OFF-SITE – gpm
RWST – gpm
NTES –
COND/NTES T-530 – gpm (6AM–1PM daily)
MW38 – gpm
T-540/541 – gpm
MW113 Area – gpm

OPERATOR(S) Mike Gedwicke / Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, December 13, 2021**

Time:	
0600	Plant operations good.
0745	Blowdown operations good.
0806	Reboot HMIFTVIEW1 to update virus program software, online 0811.
1110	- Decant T-351 to bottom valve. wetwell activated. water IS clear no color. TOM working on Filterpress cleanout.
	- Clean pH-315 probe w/ Acid solution. Check TPL HMK30 for oil or sheen; none observed. Spray down weir
	- Check TPL130 for oil globules; none observed. water IS clear w/ yellow-green tint.
1300	- Filterpress Ready to fill.
1505	- Plants operations Good. Checked POTW leak detection points and vaults Air Relief. Allok. Also check POTW MH175-078 Discharge point Allok. today

Influent Sources and Flow Rates: @ 0815
NBBW – 6.6 gpm
North End On Site- 12.5 gpm
North End Off-Site – 8.6 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm~~(6am-1pm daily)~~
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, December 14, 2021**

Time:	
0450	- Plants operations Good. working on collecting TP-730 weekly GC/Lab split samples. Also collect TP-740 + 710 weekly Low Level 1, 4-Dioxane samples. START weekly Efficiency checks
0630	Start filter press on T-351 (in stage 1), use firehose nozzle and potable water to begin to breakup thick sludge in T-351.
0800	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ Light yellow-green tint
	- working on weekly BTS sampling + field readings today
0820	Clean P-352 y-strainer
0950	- IX performance HACH testing with Lab split sampling After 968,257 gal treated: TP-183 @ 190 ug/L; TP-174A @ 280 ug/L; TP-173A @ 4300 ug/L; TP-170 @ 5500 ug/L. Flow thru system @ ~2.0 gpm.
1150	- Refill BTS phosphorus tank w/ 6# of TSP and 60 gal of potable water.
1545	- STOP Filter press. Not Quite Full. In Stage 4. Plants operations Good

Influent Sources and Flow Rates: @ 0540
NBBW – 6.5 gpm
North End On Site- 12.5 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.[illegible] gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, December 15, 2021**

Time:	
0545	Plant operations good. Start on weekly GC maintenace and calibrations
0645	Restart Filter press (IN stage 4).
0835	-Clean pH-315 probe w/ Acid solution. Check the HMI-30 for oil or sheen; None observed. Spray down wash.
	-check TA-130 for oil globules; None observed. water is very clear w/ light yellow green tint.
0900	-Filter Press Full.
1020	-Replace mixers on T-540 + T-541.
1215	Backup WTP data to CD & Flash drive. Daily OneDrive backup working well.
1350	-Empty out filter Press
1540	-Plants operations Good. filter Press empty needs washout

Influent Sources and Flow Rates: @ 0830
NBBW – 6.7 gpm
North End On Site- 12.4 gpm
North End Off-Site – 9.1 gpm
RWST – 0.6 gpm
NTES – 0.50 gpm(10R only)
MW38 T-540/541 – 0.32 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.0 gpm~~(6am-1pm daily)~~
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, December 16, 2021**

Time:	
0700	- Plants operations Good. Automatic Blowdown operations Good. MW38 North pumping well Reached STS Low level cut off yesterday @ ~1730. Increase RWSTS Flow to 1.2 gpm to Aid T-510 Tank in keeping a stable level until MW38 N. well comes back on. Working with Tom today to Do the weekly Plants Systems checks and calibrations with some monthly work.
0935	- Clean ph-315 probe w/ acid Solution. Checked HMR30 for oil or Sheens: None observed: Sprayed down weir
	- Decant T-351 from bottom Valve - wet well activated. Water IS clear No odor
1100	- Checked TP-130 for oil globules: None observed - water is very clear w/ green - yellow tint
1424 ~~1443~~	- Suspended plant discharge to calibrate ph-740 probe to 10 and 4 PH STDS
1438	Resume normal discharge.
1443	Continued other plant probe calibrations to 4 and 10 PH STDS @ PH-113, 670, 310, 315, 365
1545	Plant System Check and calibrations complete
1552	- MW38 N. Pumping well Restarted. Turn Down RWSTS gate to 0.6 gpm.
1620	- Plants operations Good.

Influent Sources and Flow Rates: @ 0750
NBBW – 6.6 gpm
North End On Site- 12.4 gpm
North End Off-Site – 8.9 gpm
RWST – 1.2 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.31 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.0 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Tom Gilbert**

LOWRY WTP OPERATIONS LOG

Date: Friday, December 17, 2021

0730	- Plant operations good.
0830	- Clean ph-315 probe w/ HCL acid solution. Checked HMR30 for oil or sheens: none observed; sprayed down weir
	- Deant T-351 from bottom valve - wet well activated. Water is very clear no color
	- checked TP-130 for oil globules: none observed - water is very clear w/ green-yellow tint
1230	- Acknowledged alarm: GC1 computer failed to communicate @ (Windows error - CPU rebooted)
1430	- Plant operations good
(R) 1030	Check plant remotely - All okay.
(W) 1335	Remotely restart GC1 sampling on TP-730. Check plant operations. All okay.

Influent Sources and Flow Rates: @1415
NBBW – 6.6 gpm
N. END ON-SITE – 12.4 gpm
N. END OFF-SITE – 8.8 gpm
RWST – 0.6 gpm
NTES – 0.52
COND/NTES T-530 – 58 gpm (6AM–1PM daily)
MW38 – 1.9 gpm
T-540/541 – 0.32 gpm
MW113 Area – 2.0 gpm

OPERATOR(S) Tom Gilbert / Chris Gibson (remote)

LOWRY WTP OPERATIONS LOG

Date: Saturday, December 18, 2021

0630	On site For weekend systems checks - plant operations good. GC I working well
↓	since yesterday Windows CPU error / crash.
0645	Decant T-351 bottom valve, wet well did not activate. Water is clear, no color.
↓	Clean the Hach-30 water and pH probe - no oil or sheen observed in the Hach-30. Check
↓	TP-130 for oil globules - none observed. Water is clear, light yellow/green.
0715	Refill phosphorus tank with 50 gallons potable water + 5lbs TSP
0735	Blowdown operations good.
0945	Check plant operations before leaving - All okay.
12/19/21	0835 Check plant operations - All okay.
1745	Check plant operations - All okay.

Influent Sources and Flow Rates: @ 0650
NBBW – 0.5 gpm
N. END ON-SITE – 12.4 gpm
N. END OFF-SITE – 6.7 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm
COND/NTES T-530 – 0.0 gpm (6AM-1PM ~~daily~~)
MW38 – 1.9 gpm
T-540/541 – 0.3 gpm
MW113 Area – 2.0 gpm

OPERATOR(S) Chris Carlson

LOWRY WTP OPERATIONS LOG

Date: **Monday, December 20, 2021**

Time:	
0615	Plant operations good. Decant T-351 from bottom valve. wetwell activated. water ES clear no odor.
0655	Mike starting up filterpress on T-351 (Stage 1).
0900	Blowdown operations good.
0840	- Clean pH-315 probe w/ Acid solution. Check the Hach TO for oil or sheen: None observed. Spray down room.
	- Check TP-130 for oily globules: None observed. water ES very clear w/ light yellow green tint.
0900	- Working on BTS Qtrly Blowers Maint.
1415	- Filterpress full
1500	- Plants operations good.

Influent Sources and Flow Rates: @ 0845
NBBW – 6.5 gpm
North End On Site- 12.3 gpm
North End Off-Site – 8.9 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, December 21, 2021**

Time:	
0530	- Plants operations Good. Prep for BTS Sampling and Efficiency checks sampling. GC1 still in a TP-730 sample. Wait untill it finishes then start with TP-730 GC/Lab split samples and TP-740/710 1,4-Dioxane Low level sampling. Set up to backwash PDU during blowdown
0630	- Collect TP-730 GC/Lab split sample and TP-740 + TP-710 Low level 1,4-Dioxane weekly samples. START Efficiency checks.
0700	- Blowdown operations Good. Backwash PDU with potable water and clean Air Releifs. PSI from 6 psi to 1 psi @ 7.5 gpm.
0830	- Decant T-351 to bottom valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. check the Hmx 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow-green tint.
	- Refill polymer + tank w/ 2 cups of NALCO polymer and 200 gal of potable water.
	- Working on BTS sampling + field readings today
0955	- IX system performance HACH testing w/Lab split samples after 988425 gal treated: TP-183 @ 170 ug/L; TP-174A @ 280 ug/L; TP-173A @ 4600 ug/L; TP-170 @ 5500 ug/L.
1500	- Plants operations Good.

Influent Sources and Flow Rates: @0605
NBBW – 6.5 gpm
North End On Site- 12.3 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.51 gpm(10R only)
MW38 T-540/541 – 0.27 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, December 22, 2021**

Time:	
0500	Plant operations good. Start on weekly GC maintenance and calibrations. Prepare for MW38 source well batch extraction by stopping MW38 N.'s extraction.
↓	
0550	Increase RWST influent from 0.6 gpm to 2.6 gpm. Switch MW38 from direct HMR-30 influent to T-540/541.
↓	
0630	Start MW38 source well batch extraction.
0710	Blowdown operations good.
0820	- Decant T-851 to bottom valve. wetwell activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. Check the HMR30 for oil or sheen; None observed. Spray down weir.
	- Check TP-130 for oil globules: None observed. water is very clear w/ yellow-green tint.
	- Setup to flush sediment tank on BTS feed piping.
0910	- Place BTS into manual Hold and begin flushing P-006/T-540/541 / sediment tank piping. Also flush BTS Reactor Feed Lines.
1025	- BTS out of Hold. Clean up Housing + Floor.
1500	- Plants operations Good.

Influent Sources and Flow Rates: @ 0747
NBBW – 6.5 gpm
North End On Site- 12.3 gpm
North End Off-Site – 8.6 gpm
RWST – 2.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.7 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 0.0 gpm
COND/NTES T-530- 0.0 gpm~~(6am-1pm daily)~~
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Thursday, December 23, 2021**

Time:	
0645	- Plants Operations Good.
0700	- Automatic blowdown operations Good. Working on weekly/monthly Plants systems checks and calibrations. Calibrate 5.7e multimeter to 50% LEL house during LEL-740 calibration to ensure 0% LEL @ T-740. Prepare New 4+10 pH STD's house during calibrations today
0915	- Decant T-351 to bottom valve. wet well activated. water is clear No color
	- Clean pH-315 probe w/Acid solution. Check the HMI-30 for oil or sheen: None observed. Spray down work
	- Check TP-130 for oil globules: None observed. water is very clear w/ light yellow green tint.
	- START monthly oil moisture prevention on main compressor. Run @ max speed for ~2 Hrs
0955	- STOP pump @ MW38 source well.
1040	- RESTART MW38 N+S pumping wells to T-540/541 until @ least 600 gal Flushed thru pipeline to displace any residual source well waters.
1115	- STOP oil moisture prevention on main compressor.
1210	- Perform monthly BTS pH probes calibrations using New 4+10 pH STD's.
1310	- Begin calibration of WTP pH probes using New 4+10 pH STD's @ pH-113, 670, 310, 315 & 365.
1401	- Suspend WTP Discharge to calibrate pH-740 to New 4+10 pH STD's and LEL-740 to 49% LEL.
1421	- Plant shut down during LEL-740 calibration for High LEL @ 8% LEL. Automatic shutdown for LEL operational.
1424	- RESTART Plant process
1425	- Resume Normal Discharge.
1435	- Weekly/monthly plants systems & checks and calibrations complete.
1617	- Switch MW38 N+S pumping wells to RWST's while I switch manual valves @ the HMI-30.
1620	- Switch MW38 N+S pumping wells to HMI-30 mode. A Total of 651 gal of MW38 N+S wells Run thru Pipeline Prior to switch over. Turn RWST's flow down to 0.60 gpm.
1630	- Plants Operations Good.

Influent Sources and Flow Rates: @ 0750
NBBW – 6.5 gpm
North End On Site- 12.2 gpm
North End Off-Site – 8.6 gpm
RWST – 2.6 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.20 gpm(Source well and 38 pumping wells mix)
MW38 ~~N&S~~ – 5.0 gpm ~~source well batch~~
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: **Friday, December 24, 2021**

Time: 0645	- Plants operations Good.
0700	- Automatic blowdown operations Good.
0800	- Refill BTS phosphorus TANK w/ 4# of TSP and 40gal of potable water. weigh out media in oven. Both GC's operational within limits
	all blowers ok. No leaks observed.
0825	- Decant T-351 TO bottom valve. Wet well activated. Water is clear No color.
	- Clean pH-315 probe w/ Acid solution. Check The HMR 30 for oil or sheen: None observed. Spray Down weir.
	- Check TP-130 for oil globules: None observed. Water is very clear w/ light yellow green tint.
	- Clean office + bathroom.
0915	- Plants operations Good.
1500	- Log in remotely. All ok
2100	- log in remotely. All ok
SATurday	December 25, 2021
0830	- log in remotely. All ok.
1500	- log in remotely. All ok. Increase RWBTS flow to 1.0 gpm. T-510 Tank needs a little more water to stay at a good level. Other Influent Flows have decreased
2100	- Log in remotely. All ok.

Influent Sources and Flow Rates: @0645
NBBW – 6.5 gpm
North End On Site- 12.3 gpm
North End Off-Site – 8.4 gpm
RWST – 0.60 gpm
NTES – 0.52 gpm(10R only)
MW38 T-540/541 – 0.19 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 2.0 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 2.0 gpm

Operator: **Mike Gelwick**

LOWRY WTP OPERATIONS LOG

Date: Sunday, December 26, 2021

0745	- Plants operations Good. Go to check other site systems. OUT OF Automatic blowdown ok.
0850	- Decant T-351 to bottom valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/Acid solution. Check TAK HMR30 for oil or sheen: None observed. Spray down weir
	- Check TP-130 for oil globules: None observed. water is very clear w/ yellow-green tint
	- Both GC' operational within limits, BTS BAG filters BACKWASH operations Good. All blowers ok.
1005	- Plants operations Good.
1600	- Remote log in. All ok
2200	- Remote log in. All ok.

Influent Sources and Flow Rates: @ 0900
NBBW – 6.5 gpm
N. END ON-SITE – 12.0 gpm
N. END OFF-SITE – 8.5 gpm
RWST – 1.0 gpm
NTES – 0.55 gpm
COND/NTES T-530 – 0.0 gpm ~~(6AM–1PM daily)~~
MW38 – 1.9 gpm
T-540/541 – 0.20 gpm
MW113 Area – 1.9 gpm

OPERATOR(S) Mike Gelwick

LOWRY WTP OPERATIONS LOG

Date: **Monday, December 27, 2021**

Time:	
0600	Plant operations good.
0810	Blowdown operations good. Observe last TP3350 GC result looking normal (BTS has adjusted to fresh source well batch), increase ~~P-002~~ P-006 (T540/541) from 0.2 gpm to 0.3 gpm. Reduce RWST influent from 1.0 gpm to 0.6 gpm (RWSTs @ 27%).
1030	- Working on weekly plants systems checks and calibrations Early today due to work schedule this week.
	- Decant T-351 to bottom valve. wet well activated. water is clear no color.
	- Clean pH-315 probe w/ Acid solution. Check THC HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TPH 30 for oil globules: None observed. water is very clear w/ yellow green tint.
1230	- work w/ CC to add a New tote of Na OH to the chemical bay and top off peroxide with Remainder in tote.
1340	- CC Empty out filter press. still needs wash out.
1351	- suspend Plant Discharge to calibrate pH-740 probe to 4+10 pH STD's.
1359	- Resume Normal Discharge. continue with other WTP pH probes calibrations to 4+10 pH STD's @ pH-113, 670, 310, 315 + 365.
1445	- weekly Plants systems checks and calibrations complete.
1510	- Plants operations Good.

Influent Sources and Flow Rates: @1030
NBBW – 6.5 gpm
North End On Site- 11.9 gpm
North End Off-Site – 8.5 gpm
RWST – 0.6 gpm
NTES – 0.5 gpm(10R only)
MW38 T-540/541 – 0.3 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 1.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Tuesday, December 28, 2021**

Time:	
0600	- Plants operations Good. Prep For GC/Lab Split Sampling and TP-740+710 Samplings.
0630	- Collect TP-730 GC/Lab split samples and TP-710 and TP-740 weekly Low Level 1,4-Dioxane samples. START Efficiency checks.
0830	- Decant T-351 to bottom valve. wet well activated. water IS clear no color
	- Clean pH-315 probe w/Acid solution. Check the HMR 30 for oil or sheen: None observed. Spray down weir.
	- Check TP-130 For oil globules: None observed. water IS very clear w/yellow-green tint.
	- working on BTS weekly sampling and Field Readings today. Refill BTS phosphorus TANK w/6# of TSP + 60 gal of potable water.
1005	- IX System Performance HACH testing w/Lab split sampling After 1,008,156 gal Treated: TP-183 ≈ 160 ug/L; TP-174A ≈ 250 ug/L;
	TP-173A ≈ 4900 ug/L; TP-170 ≈ 5600 ug/L. Currently the flow Rate IS ≈ 1.9 gpm.
1530	Plant operations good. End.

Influent Sources and Flow Rates: @ 0640
NBBW – 6.5 gpm
North End On Site- 11.9 gpm
North End Off-Site – 8.7 gpm
RWST – 0.6 gpm
NTES – 0.53 gpm(10R only)
MW38 T-540/541 – 0.30 gpm(Source well and 38 pumping wells mix)
MW38 N & S– 1.9 gpm
COND/NTES T-530- 0.0 gpm(~~6am-1pm daily~~)
MW113 Area – 1.9 gpm

Operator: **Mike Gelwick / Chris Carlson**

LOWRY WTP OPERATIONS LOG

Date: **Wednesday, December 29, 2021**

Time: 0550	Plant operations good. Start on weekly GC maintenance & calibrations.
0630	Restart T-530 to BTS at 0.2 gpm (timed to run between 6AM-1PM), T-530 @ 34%.
0655 ↓	Start Filterpress on T-352 (in stage 1). Decant T-351 bottom valve, wet well did not activate. Clean HMR-30 weir and pH probe - no oil or sheen observed in the HMR-30.
0710 ↓	Blowdown operations good. Decant T-351 bottom valve again, wet well activated.
0623 ↓	Water is clear, no color. Check TP-130 for oil globules, none observed. water is very clear light yellow Place BTS in maintenance hold and flush the reactor. Feed lines with potable water / compressed air.
0922	BTS out of maintenance hold.
0940 ↓	Switch Filter press feed from T-352 to T-351. Clean decant P-352 pumps y-strainer. Begin P-381 pump rebuild.
1200	Backup plant data to Flash and DVD. Daily OneDrive backup working well.
1445	Shutdown Filterpress (in stage 4). Plant operations good.

Influent Sources and Flow Rates: 0635
NBBW – 6.5GPM
N. END ON-SITE – 11.9GPM
N. END OFF-SITE – 8.8GPM
RWST – 0.6GPM
NTES – 0.51GPM
COND/NTES T-530 – 0.2GPM (6AM-1PM)
MW38 – 1.9GPM
T-540/541 – 0.3GPM
MW113 IX SYSTEM – 1.9GPM
OTHER – NA

OPERATOR(S) Chris Carlson / Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: Thursday, December 30, 2021

0740	- Plant operations good.
1150	- Decant T-351 from bottom valve, wet well activated, water is very clear
	- Clean ph-315 probe w/ acid solution. Check HMI330 for oil or sheens: None observed; sprayed down weir.
	- Checked TP-130 for oil globules: none observed. Water is very clear w/ green-yellow tint.
1500	- Plant operations good.
(W) 0900	Check plant remotely - All okay.

Influent Sources and Flow Rates: @ 1143
NBBW – 6.5 gpm
N. END ON-SITE – 11.9 gpm
N. END OFF-SITE – 8.8 gpm
RWST – 0.6 gpm
NTES – 0.52 gpm
COND/NTES T-530 – 0.22 gpm (6AM–1PM daily)
MW38 – 1.9 gpm
T-540/541 – 0.30 gpm
MW113 Area – 1.9 gpm

OPERATOR(S) Tom Gilbert

LOWRY WTP OPERATIONS LOG

Date: Friday, December 31, 2021

0730	- Plant operations good.
0830	- Filled phosphorus tank with 5LBS/50 gallons T.S.P.
0845	- Decant T-351 from bottom valve, wet well activated, water is very clear
	- Clean PH-315 probe with HCL acid solution. Checked HMR30 for oil or sheens: None observed; Sprayed down weir.
	- Checked TP-130 for oil globules: none observed. Water is very clear with yellow tint.
0915	- Plant operations good.
(W) 0935	Check plant remotely - All Okay

Influent Sources and Flow Rates: @0900
NBBW – 6.4 gpm
N. END ON-SITE – 11.9 gpm
N. END OFF-SITE – 8.2 gpm
RWST – 0.6 gpm
NTES – 0.54 gpm
COND/NTES T-530 – 0.20 gpm (6AM–1PM daily)
MW38 – 1.9 gpm
T-540/541 – 0.30 gpm
MW113 Area – 1.9 gpm

OPERATOR(S) Tom Gilbert

APPENDIX A-2

NBBW SUMP GRAPH

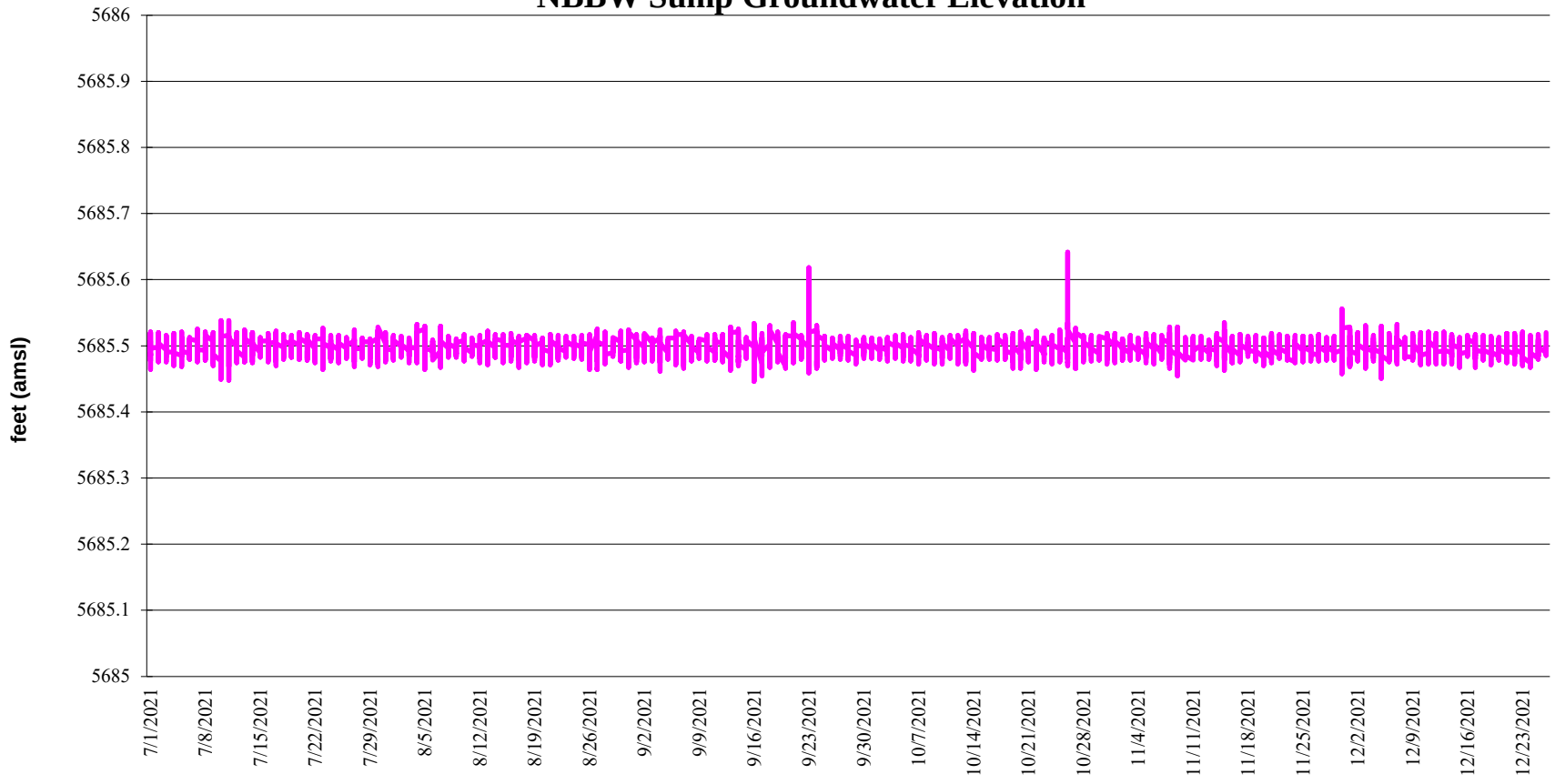


FIGURE A-2
NORTH BOUNDARY BARRIER WALL
GROUNDWATER ELEVATIONS
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

PARSONS
Denver, Colorado

S:\ES\MajProj\LWRYLNFL\QUARTERLY REPORTS\2ND HALF 2021\APPENDIX A-2 NBBW ELEVATIONS\
Figure A-2.xlsx

APPENDIX A-3

SLUDGE ANALYSIS DATA

APPENDIX A-3
WTP SLUDGE RESULTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Parameter Name	Method	Units[a/]	Regulatory Limit[b/]	WTP SLUDGE 9/28/2021	RL/Lc[c/]	WTP SLUDGE-1[d/] 9/28/21	Lc	WTP SLUDGE-2[d/] 9/28/21	Lc	WTP SLUDGE-3[d/] 9/28/21	Lc
Radium-228	EPA 901.1	pCi/g	5	NAn	NAn	0.94 +/- 0.29	0.2	0.37 +/- 0.48	0.38	1.19 +/- 0.37	0
Radium-226	EPA 901.1	pCi/g	5	NAn	NAn	0.18 +/- 0.24	0.17	0.37 +/- 0.30	0.22	0.26 +/- 0.24	0.18
Lead-210	EPA 901.1	pCi/g	5	NAn	NAn	0.052 +/- 0.16	0.13	-0.035 +/- 0.20	0.14	-0.044 +/- 0.21	0.15
Polonium-210	EML Po-2	pCi/g	5	NAn	NAn	0.048 +/- 0.093	0.031	0.17 +/- 0.14	0.0085	0.069 +/- 0.10	0.034
Uranium-234	ASTM D2907	pCi/g	1590	14.40 +/- 1.92	0.017	NAn[e/]	NAn	NAn	NAn	NAn	NAn
Uranium-235	ASTM D2907	pCi/g	1800	0.61 +/- 0.22	0.0078	NAn	NAn	NAn	NAn	NAn	NAn
Uranium-238	ASTM D2907	pCi/g	1940	10.78 +/- 1.49	0.024	NAn	NAn	NAn	NAn	NAn	NAn
Plutonium-238	EPA 600/7-79-081	pCi/g	540	-0.0047 +/- 0.054	0.22	NAn	NAn	NAn	NAn	NAn	NAn
Plutonium-239/240	EPA 600/7-79-081	pCi/g	1090	0.016 +/- 0.050	0.0099	NAn	NAn	NAn	NAn	NAn	NAn
Americium-241	ER110 LANL	pCi/g	646	-0.036 +/- 0.038	0.038	NAn	NAn	NAn	NAn	NAn	NAn
Arsenic	TCLP[f/]/6010B	mg/L	5	0.5 U	0.5	NAn	NAn	NAn	NAn	NAn	NAn
Barium	TCLP/6010B	mg/L	100	0.3 J	10	NAn	NAn	NAn	NAn	NAn	NAn
Cadmium	TCLP/6010B	mg/L	1	0.1 U	0.1	NAn	NAn	NAn	NAn	NAn	NAn
Chromium	TCLP/6010B	mg/L	6	0.5 U	0.5	NAn	NAn	NAn	NAn	NAn	NAn
Lead	TCLP/6010B	mg/L	5	0.038 J	0.5	NAn	NAn	NAn	NAn	NAn	NAn
Selenium	TCLP/6010B	mg/L	1	0.25 U	0.25	NAn	NAn	NAn	NAn	NAn	NAn
Silver	TCLP/6010B	mg/L	5	0.5 U	0.5	NAn	NAn	NAn	NAn	NAn	NAn
Mercury	TCLP/7470A	mg/L	0.2	0.0001 J	0.002	NAn	NAn	NAn	NAn	NAn	NAn
2,4-D	TCLP/8151A	mg/L	10	0.04 U	0.04	NAn	NAn	NAn	NAn	NAn	NAn
1,1-Dichloroethene	TCLP/8260B	mg/L	0.7	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
1,2-Dichloroethane	TCLP/8260B	mg/L	0.5	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
2-Butanone (MEK)	TCLP/8260B	mg/L	200	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
Benzene	TCLP/8260B	mg/L	0.5	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Carbon tetrachloride	TCLP/8260B	mg/L	0.5	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Chlorobenzene	TCLP/8260B	mg/L	100	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Chloroform	TCLP/8260B	mg/L	6	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Tetrachloroethene	TCLP/8260B	mg/L	0.7	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Trichloroethene	TCLP/8260B	mg/L	0.5	0.01 U	0.01	NAn	NAn	NAn	NAn	NAn	NAn
Vinyl chloride	TCLP/8260B	mg/L	0.2	0.02 U	0.02	NAn	NAn	NAn	NAn	NAn	NAn
1,4-Dichlorobenzene	TCLP/8270C	mg/L	7.5	0.02 U	0.02	NAn	NAn	NAn	NAn	NAn	NAn
2,4,5-Trichlorophenol	TCLP/8270C	mg/L	400	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
2,4,6-Trichlorophenol	TCLP/8270C	mg/L	2	0.025 U	0.025	NAn	NAn	NAn	NAn	NAn	NAn
2,4-Dinitrotoluene	TCLP/8270C	mg/L	0.13	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
2-Methylphenol	TCLP/8270C	mg/L	200	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
3 & 4 Methylphenol	TCLP/8270C	mg/L	200	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
Hexachlorobenzene	TCLP/8270C	mg/L	0.13	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
Hexachlorobutadiene	TCLP/8270C	mg/L	0.5	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
Hexachloroethane	TCLP/8270C	mg/L	3	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn
Nitrobenzene	TCLP/8270C	mg/L	2	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn

APPENDIX A-3
WTP SLUDGE RESULTS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Parameter Name	Method	Units[a/]	Regulatory Limit[b/]	WTP SLUDGE 9/28/2021	RL/Lc[c/]	WTP SLUDGE-1[d/] 9/28/21	Lc	WTP SLUDGE-2[d/] 9/28/21	Lc	WTP SLUDGE-3[d/] 9/28/21	Lc
Pentachlorophenol	TCLP/8270C	mg/L	100	0.25 U	0.25	NAn	NAn	NAn	NAn	NAn	NAn
Pyridine	TCLP/8270C	mg/L	5	0.1 U	0.1	NAn	NAn	NAn	NAn	NAn	NAn
Total Cresols	TCLP/8270C	mg/L	200	0.05 U	0.05	NAn	NAn	NAn	NAn	NAn	NAn

a/ Units = mg/L = milligrams per liter
pCi/g = picoCuries per gram

b/ 40 CFR 261.24 Toxicity Characteristic and the Updated Waste Management Plan (EMSI/Parsons 2020)

c/ RL/Lc = Reporting Limit/Critical Value

d/ Sampled for Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) Assessment

e/ Not analyzed for

f/ TCLP = Toxicity Characteristic Leaching Procedure

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.
The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

APPENDIX A-4

WTP WATER QUALITY DATA

APPENDIX A-4.1

SUMMARY OF WATER TREATMENT PLANT EFFLUENT (MP-001) WATER QUALITY

APPENDIX A-4.1.1

COMPLIANCE SUMMARY OF WATER TREATMENT PLANT EFFLUENT (MP-001)WATER QUALITY

1,4-DIOXANE

APPENDIX A-4.1.1

COMPLIANCE SUMMARY OF TREATMENT PLANT EFFLUENT (MP-001) WATER QUALITY
1,4-DIOXANE

Date→	7/6/2021	7/6/2021	7/6/2021	7/7/2021	7/7/2021	7/7/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L[a/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day[b/]	Total (lbs/day[c/])	Permit Limit (lbs/day)
1,4-Dioxane[d/]	16	18	19	18	18	19	18.00	51396	0.0077	0.032

Date→	8/2/2021	8/2/2021	8/2/2021	8/3/2021	8/3/2021	8/3/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane[d/]	16	18	19	18	17	17	17.50	50204	0.0073	0.032

Date→	9/7/2021	9/7/2021	9/7/2021	9/8/2021	9/8/2021	9/8/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane[d/]	25	23	21	20	21	21	21.83	48907	0.0089	0.032

Date→	10/4/2021	10/4/2021	10/4/2021	10/5/2021	10/5/2021	10/5/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L[a/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane[d/]	17	18	17	18	17	17	17.33	51192	0.0074	0.032

Date→	11/1/2021	11/1/2021	11/1/2021	11/2/2021	11/2/2021	11/2/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane[d/]	18	19	19	19	19	19	18.83	50310	0.0079	0.032

Date→	12/6/2021	12/6/2021	12/6/2021	12/7/2021	12/7/2021	12/7/2021				
Time→	12:00	16:00	20:00	0:00	4:00	8:00				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Volume per day	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane[d/]	18	20	22	22	22	22	21.00	47648	0.0084	0.032

a/ ug/L = micrograms per liter

b/ Volume per day recorded on Composite Sampling Record

c/ lbs/day = pounds per day

d/ 1,4-Dioxane analyzed by low-level method (SW8260SIM)

APPENDIX A-4.1.2

COMPLIANCE SUMMARY OF WATER TREATMENT PLANT EFFLUENT (MP-001)WATER QUALITY

VOLATILE ORGANIC COMPOUNDS AND NONYLPHENOL

APPENDIX A-4.1.2
COMPLIANCE SUMMARY OF TREATMENT PLANT EFFLUENT (MP-001) WATER QUALITY
VOLATILE ORGANIC COMPOUNDS AND NONYLPHENOL

Date/Time→	7/6/2021 12:00	7/6/2021 16:00	7/6/2021 20:00	7/7/2021 00:00	7/7/2021 04:00	7/7/2021 08:00			
Compound	Conc (ug/L[a/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Permit Limit (ug/L)	Max Value (ug/L)
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA [b/]	0
1,1,1-Trichloroethane	7	7.2	6.7	7	7.1	6.8	6.97	NA	7.2
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,1-Dichloroethane	22	22	21	21	22	21	21.5	NA	22
1,1-Dichloroethene	1.2	1.4	1.2	1.2	1.4	1.2	1.3	NA	1.4
1,2,3-Trichloropropane	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
1,2-Dibromo-3-chloropropane	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
1,2-Dibromoethane	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,2-Dichloroethane	0.81 J	0.77 J	0.71 J	0.74 J	0.72 J	0.74 J	0.75 J	NA	0.81 J
1,2-Dichloroethene	5.2	5.3	4.9	5	5.1	4.9	5.07	NA	5.3
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
2-Butanone (MEK)	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
2-Chloroethylvinylether	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
4-Methyl-2-pentanone (MIBK)	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
Acetone	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Acrolein	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Bromoform	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Bromomethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Carbon Disulfide	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Chloroethane	4 U	4 U	4 U	4 U	4 U	4 U	0	NA	0
Chloroform	0.52 J	0.51 J	0.46 J	0.5 J	0.52 J	0.43 J	0.49 J	NA	0.52 J
Chloromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
cis-1,2-Dichloroethene	5.2	5.3	4.9	5	5.1	4.9	5.07	NA	5.3
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dichlorodifluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Hexane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Methylene Chloride	0.21 U	5 U	5 U	0.22 U	0.18 U	5 U	0	NA	0
Methyl-t-butyl ether	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
m-Xylene & p-Xylene	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Naphthalene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
o-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	1500	0
Tetrahydrofuran	7 U	7 U	7 U	7 U	7 U	7 U	0	NA	0
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trichlorofluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Vinyl Acetate	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Xylenes, Total	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Nonylphenol	4.9 U	5 U	4.9 U	4.8 U	5 U	5 U	0	NA	0

Date/Time→	10/4/2021 12:00	10/4/2021 16:00	10/4/2021 20:00	10/5/2021 00:00	10/5/2021 04:00	10/5/2021 08:00			
Compound	Conc (ug/L[a/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Average conc (ug/L)	Permit Limit (ug/L)	Daily Max Value (ug/L)
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA [b/]	0
1,1,1-Trichloroethane	7.5	7.7	7.7	7.6	7.8	7.6	7.7	NA	7.8
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,1-Dichloroethane	19	20	19	20	19	19	19.3	NA	20.0
1,1-Dichloroethene	0.88 J	1	1.1	1	0.98 J	0.99 J	1.0	NA	1.1
1,2,3-Trichloropropane	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
1,2-Dibromo-3-chloropropane	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
1,2-Dibromoethane	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,2-Dichloroethane	0.67 J	0.65 J	0.65 J	0.61 J	0.6 J	0.62 J	0.63 J	NA	0.67 J
1,2-Dichloroethene	4.7	4.7	4.7	4.9	4.7	5	4.8	NA	5.0
1,2-Dichloropropane	0.21 J	0.27 J	1 U	1 U	1 U	0.23 J	0.24 J	NA	0.27 J
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
2-Butanone (MEK)	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
2-Chloroethylvinylether	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
4-Methyl-2-pentanone (MIBK)	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
Acetone	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Acrolein	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	0	NA	0
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Bromoform	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Bromomethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Carbon Disulfide	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Carbon Tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Chloroethane	4 U	4 U	4 U	4 U	4 U	4 U	0	NA	0
Chloroform	0.43 J	0.39 J	0.44 J	0.45 J	0.41 J	0.43 J	0.43 J	NA	0.45 J
Chloromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
cis-1,2-Dichloroethene	4.7	4.7	4.7	4.9	4.7	5	4.8	NA	5.0
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Dichlorodifluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Hexane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
Methyl-t-butyl ether	5 U	5 U	5 U	5 U	5 U	5 U	0	NA	0
m-Xylene & p-Xylene	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Naphthalene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
o-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	1500	0
Tetrahydrofuran	7 U	7 U	7 U	7 U	7 U	7 U	0	NA	0
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Trichlorofluoromethane	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Vinyl Acetate	3 U	3 U	3 U	3 U	3 U	3 U	0	NA	0
Vinyl Chloride	1 U	1 U	1 U	1 U	1 U	1 U	0	NA	0
Xylenes, Total	2 U	2 U	2 U	2 U	2 U	2 U	0	NA	0
Nonylphenol	4.7 U	4.8 U	4.8 U	4.8 U	4.9 U	4.9 U	0	NA	0

a/ ug/L = micrograms per liter

b/ NA = Not applicable - No permit limit

Frequency: Quarterly

Methods: Volatile Organic Compounds 8260B

Nonylphenol ASTM D7065

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.

The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

APPENDIX A-4.1.3

COMPLIANCE SUMMARY OF WATER TREATMENT PLANT EFFLUENT (MP-001) WATER QUALITY

METALS , pH
AND
SEMIVOLATILE VOLATILE ORGANIC COMPOUNDS

APPENDIX A-4.1.3
SUMMARY OF TREATMENT PLANT EFFLUENT WATER QUALITY
METALS and SEMIVOLATILE ORGANIC COMPOUNDS

				MP-001 Sample Date					
Compound	**Units**	**Permit Limit**	**Frequency**	**7/6/2021 and 7/7/2021**	**8/2/2021 and 8/3/2021**	**9/7/2021 and 9/8/2021**	**10/4/2021 and 10/5/2021**	**11/1/2021 and 11/2/2021**	**12/6/2021 and 12/7/2021**
1,2,4-Trichlorobenzene	ug/L[a/]	NA[b/]	Quarterly	1.3 J	NAn[c/]	NAn	9.5 U	NAn	NAn
2,4,6-Trichlorophenol	ug/L	NA	Quarterly	19 U	NAn	NAn	19 U	NAn	NAn
2,4-Dichlorophenol	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
2,4-Dimethylphenol	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
2,4-Dinitrophenol	ug/L	NA	Quarterly	57 U	NAn	NAn	57 U	NAn	NAn
2,4-Dinitrotoluene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
2,6-Dinitrotoluene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
2-Chloronaphthalene	ug/L	NA	Quarterly	1.7 J	NAn	NAn	9.5 U	NAn	NAn
2-Chlorophenol	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
2-Methylnaphthalene	ug/L	NA	Quarterly	2.2 J	NAn	NAn	3.8 U	NAn	NAn
2-Nitrophenol	ug/L	NA	Quarterly	19 U	NAn	NAn	19 U	NAn	NAn
3,3'-Dichlorobenzidine	ug/L	NA	Quarterly	48 U	NAn	NAn	47 U	NAn	NAn
4,6-Dinitro-2-Methylphenol	ug/L	NA	Quarterly	57 U	NAn	NAn	57 U	NAn	NAn
4-Bromophenyl phenyl ether	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
4-Chloro-3-Methylphenol	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
4-Chlorophenyl phenyl ether	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
4-Nitrophenol	ug/L	NA	Quarterly	48 U	NAn	NAn	47 U	NAn	NAn
Acenaphthene	ug/L	NA	Quarterly	0.55 J	NAn	NAn	9.5 U	NAn	NAn
Acenaphthylene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Acetophenone	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Aniline	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Anthracene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzo(a)anthracene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzo(a)pyrene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzo(b)fluoranthene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzo(g,h,i)Perylene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzo(k)fluoranthene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Benzoic Acid	ug/L	NA	Quarterly	57 U	NAn	NAn	57 U	NAn	NAn
Bis(2-Chloroethoxy)methane	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Bis(2-Chloroethyl)Ether	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Bis(2-Chloroisopropyl) Ether	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
bis(2-Ethylhexyl)phthalate	ug/L	NA	Quarterly	2 U	NAn	NAn	NAn	9.5 U	NAn
Butyl benzyl phthalate	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
C10	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
C18	ug/L	NA	Quarterly	9.5 U	NAn	NAn	9.5 U	NAn	NAn
Carbazole	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Chrysene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Dibenz(a,h)anthracene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Diethylphthalate	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Dimethylphthalate	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Di-N-Butylphthalate	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Di-n-octylphthalate	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Fluoranthene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Fluorene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Hexachlorobenzene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Hexachlorobutadiene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Hexachlorocyclopentadiene	ug/L	NA	Quarterly	48 U	NAn	NAn	47 U	NAn	NAn
Hexachloroethane	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn

Compound	Units	Permit Limit	Frequency	7/6/2021 and 7/7/2021	8/2/2021 and 8/3/2021	9/7/2021 and 9/8/2021	10/4/2021 and 10/5/2021	11/1/2021 and 11/2/2021	12/6/2021 and 12/7/2021
Indeno(1,2,3-c,d)pyrene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Isophorone	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Naphthalene	ug/L	NA	Quarterly	1.1 J	NAn	NAn	9.5 U	NAn	NAn
Nitrobenzene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
N-Nitrosodimethylamine	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
N-Nitroso-Di-N-Propylamine	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
N-Nitrosodiphenylamine	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Pentachlorophenol	ug/L	NA	Quarterly	57 U	NAn	NAn	57 U	NAn	NAn
Phenanthrene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Phenol	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Pyrene	ug/L	NA	Quarterly	9.6 U	NAn	NAn	9.5 U	NAn	NAn
Pyridine	ug/L	NA	Quarterly	19 U	NAn	NAn	19 U	NAn	NAn
Molybdenum	ug/L	430	Monthly	12	12	20	19	19	14
Selenium	ug/L	660	Quarterly	15	NAn	NAn	16	NAn	NAn
Zinc	ug/L	15600	Quarterly	2.6 J	NAn	NAn	2.4 J	NAn	NAn
pH	pH Units	>5	Monthly	6.85	6.75	6.86	6.75	6.77	6.91

a/ ug/L = micrograms per liter

b/ NA = Not applicable - No permit limit

c/ Nan = Not analyzed

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.
The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ= The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the sample.

UJ-= Same as UJ qualification but with an indication of negative bias in the sample concentration.

UJ+= Same as UJ qualification but with an indication of positive bias in the sample concentration.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

J-= Same as J qualification but with an indication of negative bias in the sample concentration.

J+= Same as J qualification but with an indication of positive bias in the sample concentration.

APPENDIX A-4.1.4

COMPLIANCE SUMMARY OF WATER TREATMENT PLANT EFFLUENT (MP-001) WATER QUALITY RADIONUCLIDES

APPENDIX A-4.1.4
SUMMARY OF TREATMENT PLANT EFFLUENT WATER QUALITY
RADIONUCLIDES (MP-001)

Isotope		Conc (pCi/L)[b/]	FINAL Q	MDC[c/]	CSU[d/]	Result minus CSU	Daily Maximum Value (pCi/L)	Permit Limit (pCi/L)
Americium-241	7/6 and 7/7/2021[a/]	0.041	J	0.058	0.04	-0.001	-0.001	NA[e/]
Alpha, Gross	7/6 and 7/7/2021	8.22	UJ+	19.1	5.81	2.41	2.41	NA
Beta, Gross	7/6 and 7/7/2021	11.3	U	14.8	4.69	6.61	6.61	NA
Plutonium-238	7/6 and 7/7/2021	0.025	UJ	0.063	0.04	-0.013	-0.013	NA
Plutonium-239/240	7/6 and 7/7/2021	0.011	UJ	0.071	0.03	-0.022	-0.022	NA
Radium-226	7/6 and 7/7/2021	-0.16	U	0.4	0.15	-0.3	-0.3	NA
Radium-228	7/6 and 7/7/2021	0.86	J	0.96	0.53	0.33	0.33	NA
Total Radium	7/6 and 7/7/2021	0.23	U	0.25	0.13	0.096	0.096	NA
Americium-241	10/4 and 10/5/2021[a/]	0.15	J	0.18	0.14	0.012	0.012	NA
Alpha, Gross	10/4 and 10/5/2021	14.24	UJ+	14.04	5.17	9.07	9.07	NA
Beta, Gross	10/4 and 10/5/2021	19.07	U	13.62	5.07	14	14	NA
Plutonium-238	10/4 and 10/5/2021	-0.016	UJ	0.083	0.03	-0.043	-0.043	NA
Plutonium-239/240	10/4 and 10/5/2021	-0.008	UJ+	0.068	0.03	-0.033	-0.033	NA
Radium-226	10/4 and 10/5/2021	0.17	J	0.413	0.25	-0.074	-0.074	NA
Radium-228	10/4 and 10/5/2021	0.49	J	0.75	0.39	0.095	0.095	NA
Total Radium	10/4 and 10/5/2021	0.44	U	0.28	0.19	0.25	0.25	NA

a/ Duration of test - 24 hours beginning 08:00 a.m.and ending 08:00 a.m on the next day

b/ picoCuries per liter

c/ minimum detectable concentration

d/ Combined standard uncertainty

e/ NA = Not applicable - No permit limit

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.
The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ= The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the sample.

UJ-= Same as UJ qualification but with an indication of negative bias in the sample concentration.

UJ+= Same as UJ qualification but with an indication of positive bias in the sample concentration.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

J-= Same as J qualification but with an indication of negative bias in the sample concentration.

J+= Same as J qualification but with an indication of positive bias in the sample concentration.

APPENDIX A-4.2

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

APPENDIX A-4.2.1

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(VOLATILE ORGANIC COMPOUNDS)

INDIVIDUAL AND COMPOSITE DATA

APPENDIX A-4.2.1
SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY
(Volatile Organic Compounds)
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

	Date→		7/6/2021							
			INFLUENT SOURCE CONCENTRATIONS							
	Sample Port→		TP-110[a/]	TP-120[b/]	TP-140[c/]	TP-150[d/]	TP-160[e/]	TP-170[f/]	TP3310[g/]	
	% of Flow ►		1.7%	21.5%	6.8%	37.6%	24.0%	5.6%	2.8%	
Parameter Name	**Permit Limit[h/]**	**Units**								**Composite Concentration**
1,1,1,2-Tetrachloroethane	NA[i/]	ug/L[j/]	< 0.4	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 20	0
1,1,1-Trichloroethane	NA	ug/L	12	57	0.77	2.1	< 0.2	< 0.2	< 20	13.3
1,1,2,2-Tetrachloroethane	NA	ug/L	< 0.25	< 1.2	< 0.12	< 0.12	< 0.12	< 0.12	< 12	0
1,1,2-Trichloroethane	NA	ug/L	< 0.46	< 2.3	< 0.23	< 0.23	< 0.23	< 0.23	< 23	0
1,1-Dichloroethane	NA	ug/L	41	190	12	4.6	< 0.2	0.88	43	45.35
1,1-Dichloroethene	NA	ug/L	11	54	0.62	3.2	< 0.24	< 0.24	< 24	13.04
1,2,3-Trichloropropane	NA	ug/L	< 0.59	< 2.9	< 0.29	< 0.29	< 0.29	< 0.29	< 29	0
1,2-Dibromo-3-chloropropane	NA	ug/L	< 0.76	< 3.8	< 0.38	< 0.38	< 0.38	< 0.38	< 38	0
1,2-Dibromoethane	NA	ug/L	< 0.43	< 2.2	< 0.22	< 0.22	< 0.22	< 0.22	< 22	0
1,2-Dichlorobenzene	NA	ug/L	< 0.34	< 1.7	< 0.17	< 0.17	< 0.17	< 0.17	< 17	0
1,2-Dichloroethane	NA	ug/L	5.3	< 1.7	0.6	< 0.17	< 0.17	< 0.17	1900	53.3
1,2-Dichloroethene	NA	ug/L	150	730	4.1	10	< 0.15	0.19	< 15	163
1,2-Dichloropropane	NA	ug/L	< 0.36	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0
1,3-Dichlorobenzene	NA	ug/L	< 0.33	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0
1,3-Dichloropropene	NA	ug/L	< 0.28	< 1.4	< 0.14	< 0.14	< 0.14	< 0.14	< 14	0
1,4-Dichlorobenzene	NA	ug/L	< 0.31	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0
2-Butanone (MEK)	NA	ug/L	< 2.9	< 14	< 1.4	< 1.4	< 1.4	< 1.4	2100	58.8
2-Chloroethylvinylether	NA	ug/L	< 0.42	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0
2-Hexanone	NA	ug/L	< 0.84	< 4.2	< 0.42	< 0.42	< 0.42	< 0.42	< 42	0
4-Methyl-2-pentanone (MIBK)	NA	ug/L	< 0.93	< 4.6	< 0.46	< 0.46	< 0.46	< 0.46	< 46	0
Acetone	NA	ug/L	< 16	< 80	< 8	< 8	< 8	< 8	2600	72.8
Acrolein	NA	ug/L	< 3.6	< 18	< 1.8	< 1.8	< 1.8	< 1.8	< 180	0
Acrylonitrile	NA	ug/L	< 2.2	< 11	< 1.1	< 1.1	< 1.1	< 1.1	< 110	0
Benzene	NA	ug/L	< 0.36	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	660	18.48
Bromodichloromethane	NA	ug/L	< 0.31	< 1.5	< 0.15	< 0.15	< 0.15	< 0.15	< 15	0
Bromoform	NA	ug/L	< 1.3	< 6.7	< 0.67	< 0.67	< 0.67	< 0.67	< 67	0
Bromomethane	NA	ug/L	< 2.2	< 11	< 1.1	< 1.1	< 1.1	< 1.1	< 110	0
Carbon Disulfide	NA	ug/L	< 0.64	< 3.2	< 0.32	< 0.32	< 0.32	< 0.32	< 32	0
Carbon Tetrachloride	NA	ug/L	< 0.48	< 2.4	< 0.24	< 0.24	< 0.24	< 0.24	< 24	0
Chlorobenzene	NA	ug/L	< 0.35	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0
Chloroethane	NA	ug/L	< 0.71	< 3.6	< 0.36	< 0.36	< 0.36	< 0.36	130	3.64
Chloroform	NA	ug/L	0.84	2.8	5.5	< 0.22	< 0.22	< 0.22	< 22	0.99
Chloromethane	NA	ug/L	< 1.1	< 5.7	< 0.57	< 0.57	< 0.57	< 0.57	< 57	0
cis-1,2-Dichloroethene	NA	ug/L	150	730	4.1	10	< 0.15	0.19	< 15	163
cis-1,3-Dichloropropene	NA	ug/L	< 0.28	< 1.4	< 0.14	< 0.14	< 0.14	< 0.14	< 14	0
Dibromochloromethane	NA	ug/L	< 0.43	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0
Dibromomethane	NA	ug/L	< 0.24	< 1.2	< 0.12	< 0.12	< 0.12	< 0.12	< 12	0
Dichlorodifluoromethane	NA	ug/L	< 0.69	< 3.5	< 0.35	< 0.35	< 0.35	< 0.35	< 35	0
Ethylbenzene	NA	ug/L	< 0.36	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	130	3.64
Hexane	NA	ug/L	< 0.52	< 2.6	< 0.26	< 0.26	< 0.26	< 0.26	< 26	0
Methylene Chloride	NA	ug/L	< 0.35	1.9	< 0.17	< 0.17	< 0.17	< 0.17	21	1
Methyl-t-butyl ether	NA	ug/L	1.3	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0.022
m-Xylene & p-Xylene	NA	ug/L	< 0.41	< 2	< 0.2	< 0.2	< 0.2	< 0.2	120	3.36
Naphthalene	NA	ug/L	< 0.21	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 10	0
o-Xylene	NA	ug/L	< 0.42	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	62	1.74
Styrene	NA	ug/L	< 0.43	< 2.2	< 0.22	< 0.22	< 0.22	< 0.22	< 22	0
Tetrachloroethene	1500	ug/L	2.5	9.2	1.3	1.2	< 0.19	< 0.19	< 19	2.56
Tetrahydrofuran	NA	ug/L	< 1.1	< 5.3	< 0.53	< 0.53	< 0.53	< 0.53	17000	476
Toluene	NA	ug/L	< 0.48	< 2.4	< 0.24	< 0.24	< 0.24	< 0.24	< 24	0
Trans-1,2-Dichloroethene	NA	ug/L	< 0.42	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0
Trans-1,3-Dichloropropene	NA	ug/L	< 0.35	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0
Trichloroethene	NA	ug/L	1.5	5.3	3.8	0.41	< 0.18	< 0.18	< 18	1.58
Trichlorofluoromethane	NA	ug/L	< 0.41	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 20	0
Vinyl Acetate	NA	ug/L	< 1.9	< 9.4	< 0.94	< 0.94	< 0.94	< 0.94	< 94	0
Vinyl Chloride	NA	ug/L	< 0.56	< 2.8	< 0.28	< 0.28	< 0.28	< 0.28	< 28	0
Xylenes, Total	NA	ug/L	< 0.41	< 2	< 0.2	< 0.2	< 0.2	< 0.2	180	5.04

APPENDIX A-4.2.1
SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY
(Volatile Organic Compounds)
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

	Date→		10/4/2021							
			INFLUENT SOURCE CONCENTRATIONS							
	Sample Port→		TP-110[a/]	TP-120[b/]	TP-140[c/]	TP-150[d/]	TP-160[e/]	TP-170[f/]	TP3310[g/]	
	% of Flow ►		1.7%	19.9%	6.2%	37.0%	23.2%	9.2%	2.8%	
Parameter Name	**Permit Limit[h/]**	**Units**								**Composite Concentration**
1,1,1,2-Tetrachloroethane	NA[i/]	ug/L[j/]	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 20	0
1,1,1-Trichloroethane	NA	ug/L	13	80	0.27	1.7	< 0.2	< 0.2	< 20	16.79
1,1,2,2-Tetrachloroethane	NA	ug/L	< 0.12	< 1.2	< 0.12	< 0.12	< 0.12	< 0.12	< 12	0
1,1,2-Trichloroethane	NA	ug/L	0.25	< 2.3	< 0.23	< 0.23	< 0.23	< 0.23	< 23	0.0043
1,1-Dichloroethane	NA	ug/L	41	220	12	4.1	< 0.2	0.92	140	50.74
1,1-Dichloroethene	NA	ug/L	12	71	0.33	3.2	< 0.24	< 0.24	< 24	15.54
1,2,3-Trichloropropane	NA	ug/L	< 0.29	< 2.9	< 0.29	< 0.29	< 0.29	< 0.29	< 29	0
1,2-Dibromo-3-chloropropane	NA	ug/L	< 0.38	< 3.8	< 0.38	< 0.38	< 0.38	< 0.38	< 38	0
1,2-Dibromoethane	NA	ug/L	< 0.22	< 2.2	< 0.22	< 0.22	< 0.22	< 0.22	< 22	0
1,2-Dichlorobenzene	NA	ug/L	< 0.17	< 1.7	< 0.17	< 0.17	< 0.17	< 0.17	< 17	0
1,2-Dichloroethane	NA	ug/L	3.8	3.3	0.7	0.17	< 0.17	< 0.17	3500	102
1,2-Dichloroethene	NA	ug/L	140	840	3.8	9.6	< 0.15	0.28	39	174
1,2-Dichloropropane	NA	ug/L	0.56	3.1	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0.63
1,3-Dichlorobenzene	NA	ug/L	< 0.16	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0
1,3-Dichloropropene	NA	ug/L	< 0.14	< 1.4	< 0.14	< 0.14	< 0.14	< 0.14	< 14	0
1,4-Dichlorobenzene	NA	ug/L	< 0.16	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0
2-Butanone (MEK)	NA	ug/L	< 1.4	< 14	< 1.4	< 1.4	< 1.4	< 1.4	910	25.48
2-Chloroethylvinylether	NA	ug/L	< 0.21	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0
2-Hexanone	NA	ug/L	< 0.42	< 4.2	< 0.42	< 0.42	< 0.42	< 0.42	< 42	0
4-Methyl-2-pentanone (MIBK)	NA	ug/L	< 0.46	< 4.6	< 0.46	< 0.46	< 0.46	< 0.46	< 46	0
Acetone	NA	ug/L	< 8	< 80	< 8	< 8	< 8	< 8	1300	36.4
Acrolein	NA	ug/L	< 1.8	< 18	< 1.8	< 1.8	< 1.8	< 1.8	< 180	0
Acrylonitrile	NA	ug/L	< 1.1	< 11	< 1.1	< 1.1	< 1.1	< 1.1	< 110	0
Benzene	NA	ug/L	< 0.18	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	770	21.56
Bromodichloromethane	NA	ug/L	< 0.15	< 1.5	< 0.15	< 0.15	< 0.15	< 0.15	< 15	0
Bromoform	NA	ug/L	< 0.67	< 6.7	< 0.67	< 0.67	< 0.67	< 0.67	< 67	0
Bromomethane	NA	ug/L	< 1.1	< 11	< 1.1	< 1.1	< 1.1	< 1.1	< 110	0
Carbon Disulfide	NA	ug/L	< 0.32	< 3.2	< 0.32	< 0.32	< 0.32	< 0.32	< 32	0
Carbon Tetrachloride	NA	ug/L	< 0.24	< 2.4	< 0.24	< 0.24	< 0.24	< 0.24	< 24	0
Chlorobenzene	NA	ug/L	< 0.18	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0
Chloroethane	NA	ug/L	< 0.36	< 3.6	< 0.36	< 0.36	< 0.36	< 0.36	140	3.92
Chloroform	NA	ug/L	0.62	2.2	4.8	< 0.22	< 0.22	< 0.22	< 22	0.75
Chloromethane	NA	ug/L	< 0.57	< 5.7	< 0.57	< 0.57	< 0.57	< 0.57	< 57	0
cis-1,2-Dichloroethene	NA	ug/L	140	840	3.8	9.6	< 0.15	0.28	39	174
cis-1,3-Dichloropropene	NA	ug/L	< 0.14	< 1.4	< 0.14	< 0.14	< 0.14	< 0.14	< 14	0
Dibromochloromethane	NA	ug/L	< 0.21	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0
Dibromomethane	NA	ug/L	< 0.12	< 1.2	< 0.12	< 0.12	< 0.12	< 0.12	< 12	0
Dichlorodifluoromethane	NA	ug/L	0.77	< 3.5	0.46	< 0.35	< 0.35	< 0.35	< 35	0.041
Ethylbenzene	NA	ug/L	< 0.18	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	170	4.76
Hexane	NA	ug/L	< 0.26	< 2.6	< 0.26	< 0.26	< 0.26	< 0.26	< 26	0
Methylene Chloride	NA	ug/L	< 0.17	< 1.7	< 0.17	< 0.17	< 0.17	< 0.17	< 17	0
Methyl-t-butyl ether	NA	ug/L	1.5	< 1.6	< 0.16	< 0.16	< 0.16	< 0.16	< 16	0.026
m-Xylene & p-Xylene	NA	ug/L	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	140	3.92
Naphthalene	NA	ug/L	< 0.1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 10	0
o-Xylene	NA	ug/L	< 0.21	< 2.1	< 0.21	< 0.21	< 0.21	< 0.21	87	2.44
Styrene	NA	ug/L	< 0.22	< 2.2	< 0.22	< 0.22	< 0.22	< 0.22	< 22	0
Tetrachloroethene	1500	ug/L	2.6	12	1.3	1.1	< 0.19	< 0.19	< 19	2.92
Tetrahydrofuran	NA	ug/L	< 0.53	< 5.3	< 0.53	< 0.53	< 0.53	< 0.53	20000	560
Toluene	NA	ug/L	< 0.24	< 2.4	< 0.24	< 0.24	< 0.24	< 0.24	43	1.2
Trans-1,2-Dichloroethene	NA	ug/L	0.47	2.2	< 0.21	< 0.21	< 0.21	< 0.21	< 21	0.45
Trans-1,3-Dichloropropene	NA	ug/L	< 0.18	< 1.8	< 0.18	< 0.18	< 0.18	< 0.18	< 18	0
Trichloroethene	NA	ug/L	1.6	7	3.6	0.38	< 0.18	< 0.18	< 18	1.78
Trichlorofluoromethane	NA	ug/L	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	< 20	0
Vinyl Acetate	NA	ug/L	< 0.94	< 9.4	< 0.94	< 0.94	< 0.94	< 0.94	< 94	0
Vinyl Chloride	NA	ug/L	< 0.28	< 2.8	< 0.28	< 0.28	< 0.28	< 0.28	42	1.18
Xylenes, Total	NA	ug/L	< 0.2	< 2	< 0.2	< 0.2	< 0.2	< 0.2	230	6.44

Footnotes:

a/ RWST - Raw Water Storage Tank water

b/ NBBW - North Boundary Barrier Wall water

c/ MW38 Area water

d/ North End On-Site water

e/ North End Off-Site water

f/ MW113 Area water

g/ BTS Tank 3310 influent is comprised of North Toe Extraction System water and Landfill Gas Condensate

h/ Permit Limit - limit in ug/L for tetrachloroethene and pounds per day for 1,4-dioxane in discharge according to Industrial Discharge Permit No. 2360-6 issued by the Metro Wastewater Reclamation District (Metro), effective January 5, 2020.

i/ NA - Not Applicable - no limit listed in the Metro permit

j/ µg/L - micrograms per liter

APPENDIX A-4.2.2

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(1,4-DIOXANE)

APPENDIX A-4.2.2.1

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(1,4-DIOXANE)

INDIVIDUAL AND COMPOSITE RESULTS

APPENDIX A-4.2.2.1
SUMMARY OF EARLY WARNING INFLUENT WATER QUALITY
1,4-Dioxane
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Date→	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021				
% of Flow→	1.7%	21.5%	6.8%	37.6%	24.0%	5.6%	2.8%				
Sample Port→	TP-110[a/]	TP-120[b/]	TP-140[c/]	TP-150[d/]	TP-160[e/]	TP-170[f/]	TP3310[g/]				
Compound	Conc (ug/L[h/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm[i/]	Total (lbs/day[j/])	Permit Limit[k/]
1,4-Dioxane[l/]	210	750	22	15	1.7	97	19000	710	35.4	0.30	0.032

Date→	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021				
% of Flow→	1.7%	21.8%	6.3%	37.9%	23.6%	5.7%	2.9%				
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane	290	750	23	23	1.8	100	18000	707.00	34.8	0.30	0.032

Date→	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021				
% of Flow→	1.7%	20.3%	6.1%	36.1%	22.8%	10.3%	2.8%				
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170[l/]	TP3310				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane	230	700	21	14	0.72	92	16000	610.00	36	0.26	0.032

Date→	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021				
% of Flow→	1.7%	19.9%	6.2%	37.0%	23.2%	9.2%	2.8%				
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane	210	820	18	16	1.5	100	15000	603	35.7	0.26	0.032

APPENDIX A-4.2.2.1
SUMMARY OF EARLY WARNING INFLUENT WATER QUALITY
1,4-Dioxane

Date→	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021				
% of Flow→	3.4%	19.3%	6.0%	36.6%	23.0%	8.8%	2.8%				
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane	310	700	20	12	1.3	120	17000	638.00	35.2	0.27	0.032

Date→	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021				
% of Flow→	1.8%	19.7%	6.0%	37.6%	25.7%	6.3%	3.0%				
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310				
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	gpm	Total (lbs/day)	Permit Limit (lbs/day)
1,4-Dioxane	320	860	18	13	1.9	120	18000	729	33.5	0.29	0.032

Footnotes:

a/ RWST - Raw Water Storage Tank water

b/ NBBW - North Boundary Barrier Wall water

c/ MW38 Area water

d/ North End On-Site water

e/ North End Off-Site water

f/ MW113 Area water

g/ BTS Tank 3310 influent is comprised of North Toe Extraction System water and Landfill Gas Condensate

h/ ug/L = micrograms per liter

i/ gpm = gallons per minute

j/ lbs/day = pounds per day

k/ Permit Limit - limit in ug/L for discharge according to Industrial Discharge Permit No. 2360-6 issued by the Metro Wastewater Reclamation District (Metro), effective January 5, 2020.

l/ 1,4-Dioxane analyzed by low-level method (SW8260SIM) and SW8260B

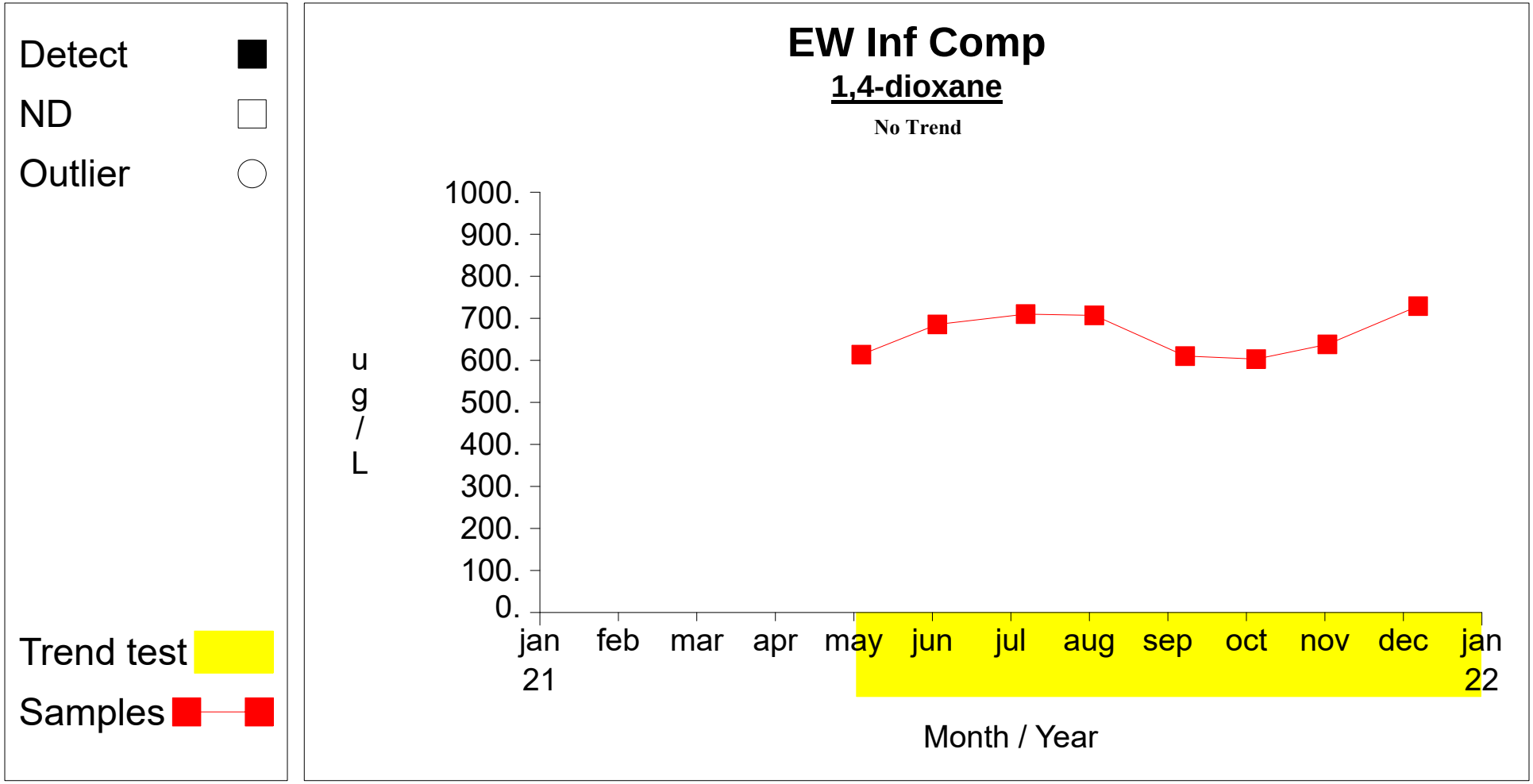
APPENDIX A-4.2.2.2

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(1,4-DIOXANE)

TREND ANALYSIS

APPENDIX A-4.2.2.2
1,4-DIOXANE
EARLY WARNING TREND ANALYSIS



Analysis prepared using DUMPSTAT and Sen's Test for trend

APPENDIX A-4.2.3

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

MOLYBDENUM

APPENDIX A-4.2.3.1

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(MOLYBDENUM)

INDIVIDUAL AND COMPOSITE RESULTS

APPENDIX A-4.2.3.1
SUMMARY OF EARLY WARNING INFLUENT WATER QUALITY
MOLYBDENUM
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Date→	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021	7/6/2021		
% of Flow→	1.7%	21.5%	6.8%	37.6%	24.0%	5.6%	2.8%		
Sample Port→	TP-110[a/]	TP-120[b/]	TP-140[c/]	TP-150[d/]	TP-160[e/]	TP-170[f/]	TP3310[g/]		
Compound	Conc (ug/L[h/])	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	Permit Limit[i/] (ug/L)
Molybdenum	1.4	0.51	1.3	1.7	2	7200	8.9	405	430

Date→	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021	8/2/2021		
% of Flow→	1.7%	21.8%	6.3%	37.9%	23.6%	5.7%	2.9%		
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310		
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	Permit Limit (ug/L)
Molybdenum	1	0.6	1.4	1.8	2.1	6000	20	344	430

Date→	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021	9/7/2021		
% of Flow→	1.7%	20.3%	6.1%	36.1%	22.8%	10.3%	2.8%		
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170[l/]	TP3310		
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	Permit Limit (ug/L)
Molybdenum	0.69	0.6	4.5	2.1	1.9	3700	36	384	430

APPENDIX A-4.2.3.1
SUMMARY OF EARLY WARNING INFLUENT WATER QUALITY
MOLYBDENUM

Date→	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021	10/4/2021		
% of Flow→	1.7%	19.9%	6.2%	37.0%	23.2%	9.2%	2.8%		
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310		
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Sample Conc (ug/L)	Permit Limit (ug/L)
Molybdenum	1.1	0.89	1.9	2.6	2.2	3600	7.5	333	430

Date→	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021	11/1/2021		
% of Flow→	3.4%	19.3%	6.0%	36.6%	23.0%	8.8%	2.8%		
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310		
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	Permit Limit (ug/L)
Molybdenum	< 0.37	< 0.37	0.76	2.3	2.1	4200	13	371	430

Date→	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021	12/6/2021		
% of Flow→	1.8%	19.7%	6.0%	37.6%	25.7%	6.3%	3.0%		
Sample Port→	TP-110	TP-120	TP-140	TP-150	TP-160	TP-170	TP3310		
Compound	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Conc (ug/L)	Composite Conc (ug/L)	Permit Limit (ug/L)
Molybdenum	0.68	0.57	3.5	1.7	2.1	5600	10	354	430

Footnotes:

a/ RWST - Raw Water Storage Tank wat
b/ NBBW - North Boundary Barrier Wall water
c/ MW38 Area water
d/ North End On-Site water
e/ North End Off-Site water
f/ MW113 Area water
g/ BTS Tank 3310 influent is comprised of North Toe Extraction System water and Landfill Gas Condensate
h/ ug/L = micrograms per liter
i/ Permit Limit - limit in ug/L for discharge according to Industrial Discharge Permit No. 2360-6 issued by the Metro Wastewater Reclamation District (Metro), effective January 5, 2020.

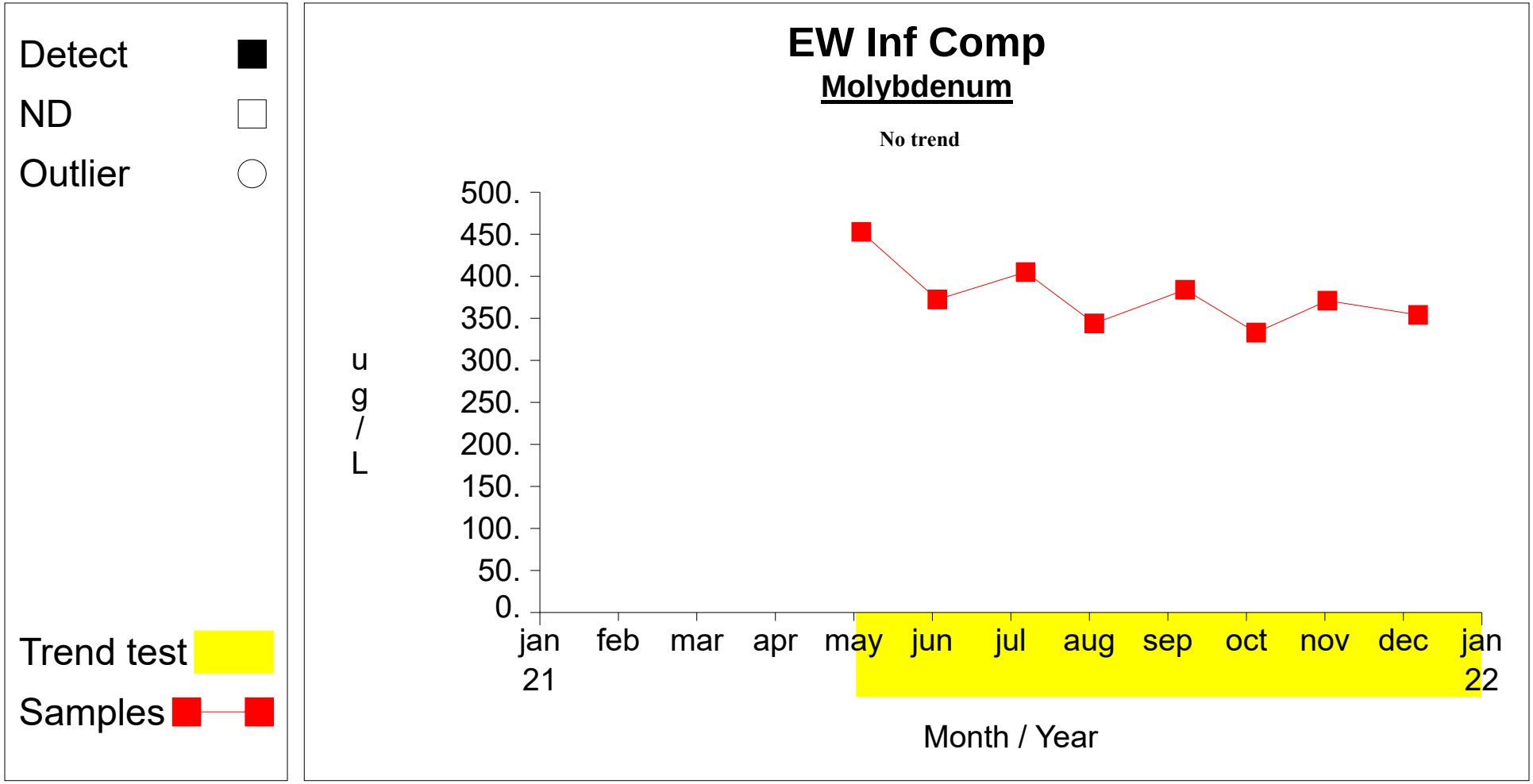
APPENDIX A-4.2.3.2

SUMMARY OF TREATMENT PLANT EARLY WARNING INFLUENT WATER QUALITY

(MOLYBDENUM)

TREND ANALYSIS

APPENDIX A-4.2.3.2
MOLYBDENUM
EARLY WARNING TREND ANALYSIS



Analysis prepared using DUMPSTAT
and Sen's Test for trend

APPENDIX A-5

TECHNICAL MEMORANDUM – ANION EXCHANGE OPERATIONAL PERFORMANCE AT LOWRY LANDFILL SUPERFUND SITE

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September 24, 2021

Dave Wilmoth (City and County of Denver)
Steve Richtel (Waste Management)

Subject: Technical Memorandum – Anion Exchange Operational Performance at Lowry Landfill Superfund Site

Parsons Environment & Infrastructure Group (Parsons) is pleased to provide this technical memorandum presenting an evaluation of the operational performance of the anion exchange (AIEX) system for Molybdenum treatment from water generated from monitoring well MW-113 at the Lowry Landfill Superfund Site in Colorado.

The memorandum is organized into the following sections:

- Executive Summary
- Project Background and System Description
- Molybdenum AIEX Performance Curve and Observations
- Molybdenum Speciation, pH Adjustments and Observations

Executive Summary

Based on Parsons treatability work, Parsons designed an AIEX Molybdenum treatment system, installed the system in late 2020 and started it up in January 2021. Parsons has operated this system since January 2021 as part of the Lowry treatment plant. Initial influent concentrations of Molybdenum have reduced over the operating period from levels in excess of 25,000 ug/L total Molybdenum to current levels in the approximate 7,000 ug/l range. In all cases, the treatment system has removed a significant portion of the influent Molybdenum such that the combined landfill leachate treatment process effluent is in compliance with the pretreatment limit for discharge to Metropolitan Water Reclamation District's (Metro) treatment plant. Treatment results also indicate that there is a heel of Molybdenum that is not being treated by the ion exchange system. The concentration of this heel is not significant enough to impact the overall treatment system goals of the leachate treatment process.

Treatability study testing indicated the potential for a significant improvement in ion exchange capacity if the process was conducted at a reduced pH. By operating at a reduced pH, the AIEX resin exchange capacity has been far more efficient than what was predicted by independent third-party equilibrium model predictions and was consistent with previously conducted treatability testing. The treatability study memorandum summarizing these tests has been included as Attachment 1.

Project Background and System Description

Groundwater at the Lowry Landfill Superfund Site is currently recovered and pretreated for discharge to the Metropolitan Water Reclamation District's (Metro) treatment plant. Molybdenum is a component of the recovered groundwater generated at MW-113, one of the North End On-Site wells and is treated at AIEX Molybdenum treatment system. A brief process summary of the system is discussed below. The existing process flow diagram is shown in Figure 1.

Recovered groundwater is conveyed from MW-113 to a feed tank. To overcome the high head requirements of the system, a rotary vane positive displacement pump is used to pump the water from the feed tank into the AIEX system. In-line pH adjustment is performed prior to AIEX treatment. The AIEX system consists of a "cage" of 18 AIEX Contactors and a guard tank, each measuring 8"x44" (diameter x column height). To allow for redundancy, an identical stand-by "cage" of 18 AIEX

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Contactors is also available. Advised by isotherm studies conducted by Parsons during treatability work, the use of strong base anion resin in the chloride form was considered as the prime candidate treatment. ResinTech SPG1 strong base anion resin is currently being used for treatment. A similar resin, but not the same resin as is currently using for treatment, was used during the treatability study.

Additional resin details, including the total volume of resin in each Contactor, are shown in Table 1. For additional process details, the record process and instrumentation diagram (P&ID) of the system has been included as Attachment 2.

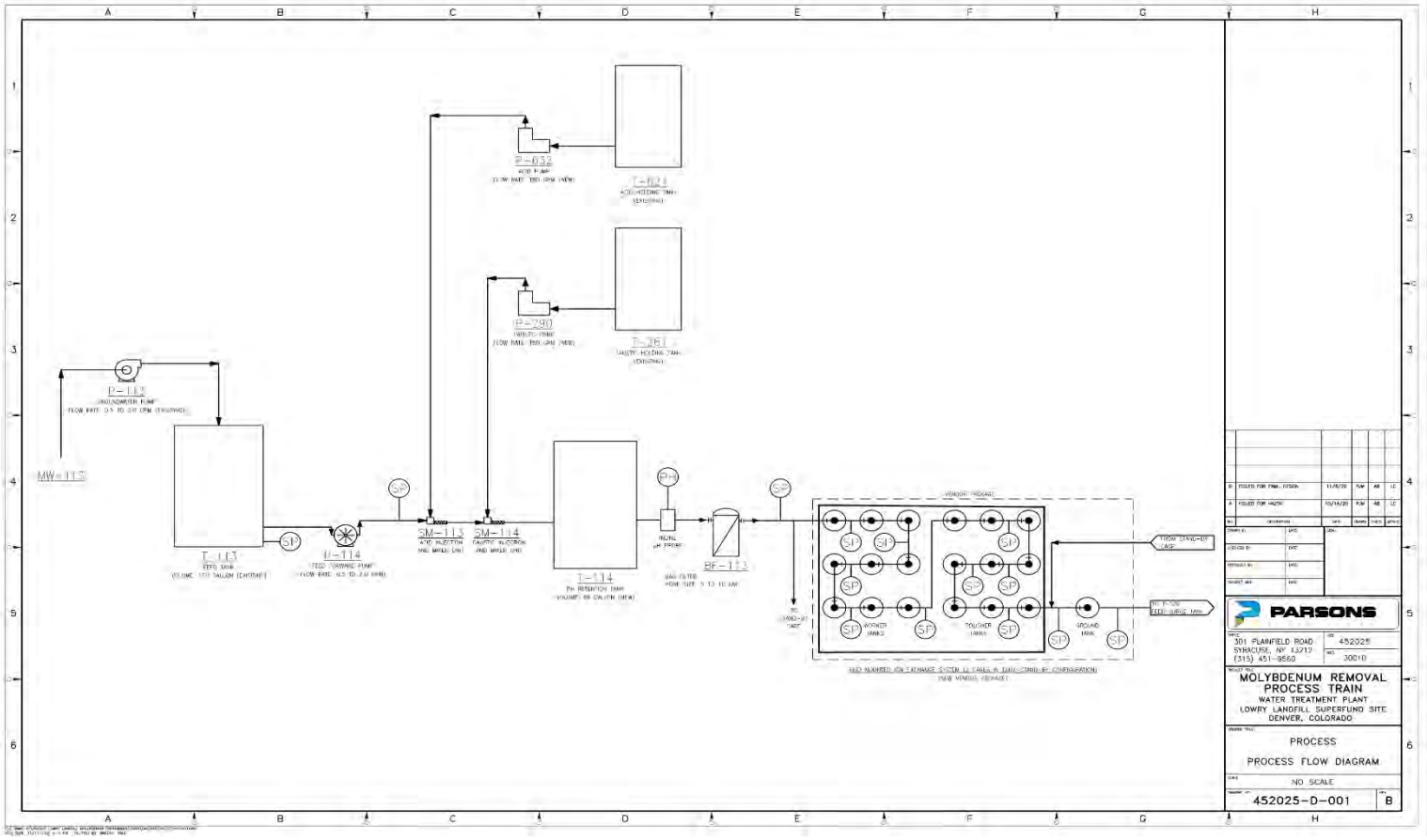

Figure 1-Process Flow Diagram

AIEX Resin Details		
Item	**Name/Value**	**Units**
Resin Used	ResinTech SPG1 strong base anion resin	NA
Resin Density	44	lbs/ft^3
Resin Vol. in One Contactor	1.2	ft3
Resin Weight in One Contactor	52.8	lbs
Total Resin Weight in Cage (18 Contactors)	950	lbs

Table 1 – AIEX Resin Details

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Molybdenum AIEX Performance Curve and Observations

This section discusses the Molybdenum AIEX performance curve in the lead Contactor (Contactor 1) of the AIEX system. Based on historical data, Molybdenum had been confirmed to primarily be present in the molybdate (Mo^{2-}) form. Isotherm studies also indicated that a reduction of pH to the 4.0 range prior to treatment significantly increased the anion exchange capacity and reduced the resin utilization rate (likely through the reduction of carbonate and bicarbonate anionic species which would compete for Molybdenum exchange sites.) These findings were implemented in the detailed design and operation of the existing Molybdenum Treatment System and have been validated by the operational data generated to date.

Weekly influent and effluent Molybdenum readings, treatment volumes and Molybdenum adsorbed on the resin were used to generate an AIEX performance curve for the ResinTech SPG1 strong base anion resin in Contactor 1. The operational data and calculations are tabulated in Table 2. Figure 2 shows the AIEX performance curve generated based on data from Table 2.

	Treatment Volumes				Mo. Conc. (Contactor 1)				
Duration (2021)	Vol. Treated in specific duration	Vol. Treated	Cumulative Volume Treated	Cumulative Volume Treated	Influent Mo.	Contactor 1 Effluent Mo.	Mo Adsorbed on Resin-Contactor 1 for specific duration		Cumulative Mo adsorbed on Resin in Contactor 1
	gal	liters	gal	liters	ug/l	ug/l	ug	mg	mg
1/27 to 1/27	232	878	232	878	27000	5	2.37E+07	2.4E+04	2.4E+04
1/27 to 1/28	650	2460	882	3338	27000	5	6.64E+07	6.6E+04	9.0E+04
1/28 to 2/2	3540	13399	4422	16737	26000	6600	2.60E+08	2.6E+05	3.5E+05
2/2 to 2/9	5250	19871	9672	36609	21000	4000	3.38E+08	3.4E+05	6.9E+05
2/9 to 2/16	5298	20053	14970	56661	19000	4500	2.91E+08	2.9E+05	9.8E+05
2/16 to 2/23	5930	22445	20900	79107	20000	2800	3.86E+08	3.9E+05	1.4E+06
2/23 to 3/2	9964	37714	30864	116820	18000	3000	5.66E+08	5.7E+05	1.9E+06
3/2 to 3/9	10201	38611	41065	155431	17000	2200	5.71E+08	5.7E+05	2.5E+06
3/9 to 3/16	18142	68667	59207	224098	16000	2700	9.13E+08	9.1E+05	3.4E+06
3/16 to 3/23	19633	74311	78840	298409	15000	2200	9.51E+08	9.5E+05	4.4E+06
3/23 to 3/30	19810	74981	98650	373390	14000	2200	8.85E+08	8.8E+05	5.3E+06
3/30 to 4/05	19768	74822	118418	448212	12000	1200	8.08E+08	8.1E+05	6.1E+06
4/05 to 4/13	17496	66222	133360	504768	12000	3000	5.96E+08	6.0E+05	6.7E+06
4/13 to 4/20	15629	59156	148989	563923	13000	2300	6.33E+08	6.3E+05	7.3E+06
4/20 to 4/29 (1)	19836	75079	168825	639003	12700	2500	7.66E+08	7.7E+05	8.1E+06
4/29 to 5/03 (2)	8375	31699	177200	670702	12000	15000	-9.51E+07	-9.5E+04	8.0E+06
5/03 to 5/11 (3)	17346	65655	194546	736357	10000	9500	3.28E+07	3.3E+04	8.0E+06
5/11 to 5/18 (4)	15011	56817	209557	793173	8900	4900	2.27E+08	2.3E+05	8.2E+06
5/18 to 5/25 (5)	15129	57263	224686	850437	9900	3000	3.95E+08	4.0E+05	8.6E+06
5/25 to 6/01	14869	56279	239555	906716	9200	5900	1.86E+08	1.9E+05	8.8E+06
6/01 to 6/08	15081	57082	254636	963797	8600	5000	2.05E+08	2.1E+05	9.0E+06
6/08 to 6/15	20233	76582	274869	1040379	9600	6900	2.07E+08	2.1E+05	9.2E+06
6/15 to 6/21	16949	64152	291818	1104531	8300	6400	1.22E+08	1.2E+05	9.3E+06
6/21 to 6/29	21778	82430	313596	1186961	7900	6600	1.07E+08	1.1E+05	9.4E+06
6/29 to 7/06	19858	75163	333454	1262123	7500	7000	3.76E+07	3.8E+04	9.5E+06
7/06 to 7/13	19382	73361	352836	1335484	7200	6000	8.80E+07	8.8E+04	9.6E+06
7/13 to 7/20	19600	74186	372436	1409670	6800	5200	1.19E+08	1.2E+05	9.7E+06
7/20 to 7/27	19755	74773	392191	1484443	6800	5700	8.22E+07	8.2E+04	9.8E+06
								Total Mo Adsorbed on Resin in Contactor 1 for duration	9.77E+06

Footnotes	
1	4/20 Influent data based on HACH field test result
2	pH increased to 5.0 (from 4.0) as part of Mo speciation evaluation
3	pH reduced to 4.5 (from 5.0) as part of Mo speciation evaluation
4	pH reduced to original design pH of 4.0
5	pH adjusted to 3.7

Table 2-Operational Data

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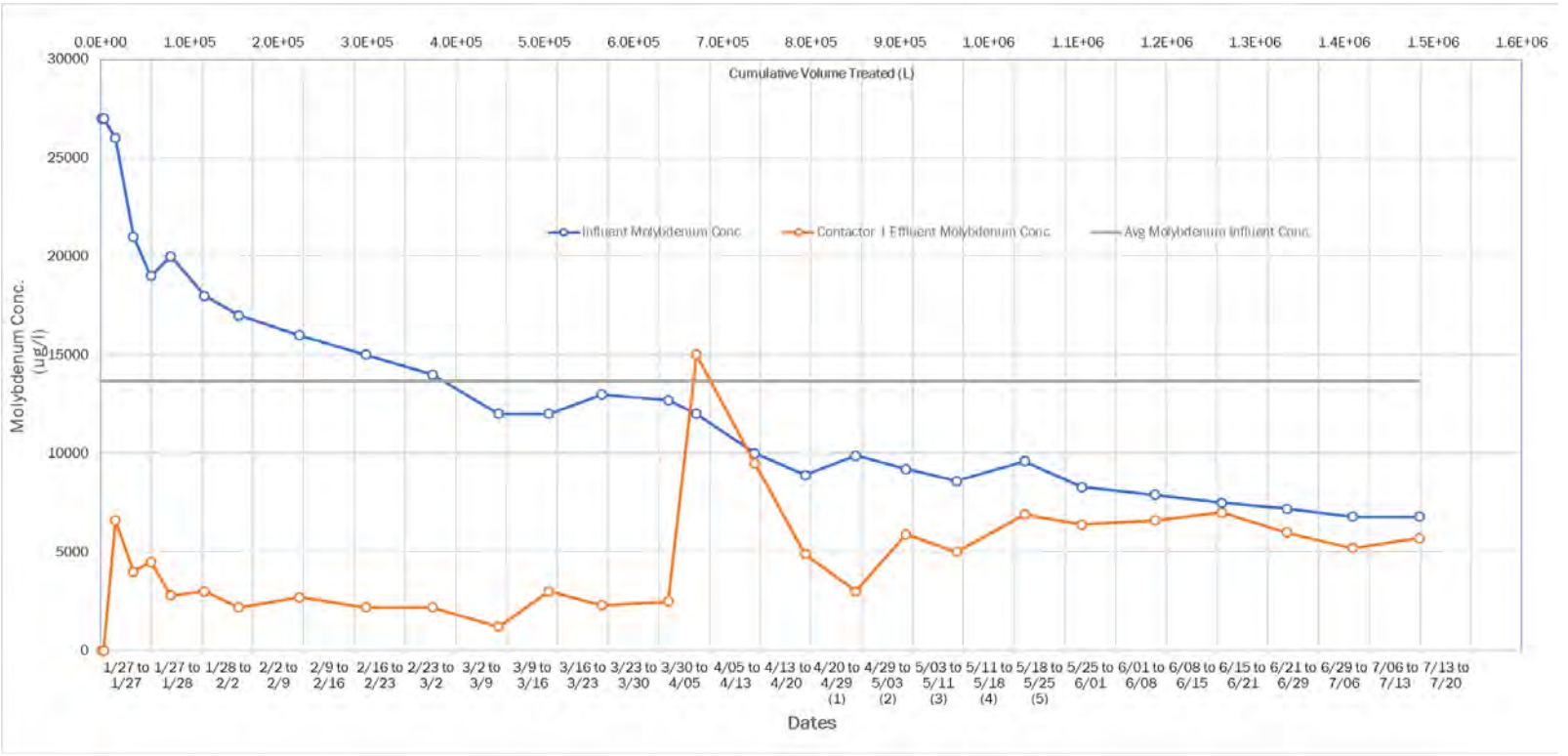

Figure 2-Molybdenum AIEX Performance Curve

Observations:

A. **Breakthrough:** Breakthrough is defined as the first detectable concentration of note of the targeted compound to be treated in the Contactor effluent. Molybdenum demonstrated breakthrough in Contactor 1 after approximately 13,500 liters at an influent total Molybdenum concentration of >20,000 ug/l. Contactor 1 appeared to show complete breakthrough (influent concentration nearly equaling effluent concentration) in late June, but still appeared to have exchange capacity through early August, while possibly passing through a Molybdenum "heel". Molybdenum "heel" and speciation are discussed in detail later in the report under the "Molybdenum Speciation, pH Adjustments and Observations" section. Contactor 1 was deemed exhausted/spent and was taken offline in mid-August 2021.

B. **Influent pH Adjustments:** Parsons performed pH adjustments in April & May of 2021 to observe the effects on the AIEX system. These adjustments are reflected on the above curve from dates 4/20 to 5/25 and are discussed in detail later in the report under the "Molybdenum Speciation, pH Adjustments and Observations" section.

C. **Mass loading (x/m) Comparison:** Table 3 below compares the following:

1) Operational observed mass loading in Contactor 1 (x/m as mg of Molybdenum adsorbed per gram of resin, mg/g) with the loading predicted using Parsons' isotherm studies
2) Operational resin utilization (grams of resin utilized per liter of influent, g/l) in Contactor 1 with the utilization predicted using Parsons' isotherm studies and utilization predicted by Third Party Equilibrium Modeling.

The Parsons isotherm study was conducted at an initial Molybdenum concentration of 8,300 ug/L based on historic Molybdenum concentration information from the Site. Mass loading comparison has been generated by extrapolating the

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isotherm plot to predict adsorption capacity for the average influent concentration of 13,657 ug/l and highest influent concentration of 27,000 ug/L during the time period of this analysis.

Mass Loading Rate (x/m) Comparison-Isotherm Data, Operational Data and Third Party Chemical Equilibrium Model							
			Loading (x/m as mg/g)		Resin Usage (g/l)		
	Mo Influent Concentration Basis	C_0 (ug/L)	Using Isotherm Data	Observed based on Operational Data	Using Isotherm Data (g/l)	Observed based on Operational Data (g/l)	Third Party Chemical Equilibrium Model (g/l)
Based on Isotherm Data	Highest Observed during Operations (for Comparison)	27000	325.6	-	0.083		-
	Avg. Conc. Observed during Operations (for Comparison)	13657	214.1	-	0.064		-
Based on Operational Data	Conc. Range Based on Operational Data	6800 to 27000	-	411.73		-	-
	Avg. Conc. Based on Operational Data	13657	-	411.73		0.033	-
Based on Third Party Chemical Equilibrium Model	Third Party Chemical Equilibrium Model (for comparison)	< 1000	-	-	-	-	1.32

Table 3-Mass Loading Comparison

The following is noted from the comparison:

- The operational observed mass loading compares favorably against the mass loading predicted during isotherm studies at the lower pH of 4.0 and has generally trended as predicted by the study. For the range of Molybdenum influent concentration (6800 ug/l to 27000 ug/l) the treatment system has been treating, the isotherm studies predicted loading of 214.1 mg/g and 325 mg/g for the average and maximum observed concentrations during operations, respectively, versus the observed operational mass loading of ~411 mg/g. In terms of resin utilization, the isotherm studies approximately predicted 0.049 to 0.083 g/l versus the observed operational resin utilization 0.033 g/l.
- Third-Party Chemical Equilibrium Model predicted ~1.32 g/l resin utilization assuming AIEX treatment at a native pH, versus the observed operational utilization of 0.033 g/l, which is forty (40) times higher than the current utilization rate. Mass loading data was not generated by the third-party chemical equilibrium model.

Molybdenum Speciation, pH Adjustments and Observations

A. **Heel and Potential Speciation**: Based on historical discussions with the stakeholders, the AIEX treatment system was designed to treat Molybdenum species in the -II state, which the system is successfully doing and meeting permit requirements.

Based on operational data, the AIEX system appears to have a “heel” of Molybdenum associated compounds that pass at low concentrations through the 18 contactors and the guard tank. These “heel” concentrations have ranged from 160 ug/l to 1600 ug/l in the guard tank effluent, however, most recent results from June 1, 2021 onwards, have shown them to be between 160 ug/l to 290 ug/l.

Molybdenum forms chemical complexes in oxidation states from -II to +VI. Molybdenum can form several ionic species in the existing native and adjusted pH range, which was supported by performing speciation calculations using equilibrium modeling. Examples of such Molybdenum species are tetrahedral $[MoO_4]^{2-}$ ion or the heptamolybdate ion $[Mo_7O_{24}]^{6-}$ or octamolybdate ion $[Mo_8O_{26}]^{4-}$. Laboratory results are reported as Total Molybdenum. Molybdenum species cannot be separately analyzed for and reported via a standard lab analysis

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method. The "heel" is likely a Molybdenum species that does not have a -II oxidation state. Additionally, if competing Molybdenum species have an oxidation state < -II, it would be expected to outcompete a Molybdenum species in the -II oxidation state, adding to the analytical challenge and operational clarity. It should be noted that neutral or positive ionic species will not be removed by AIEX treatment.

To investigate the composition of the Molybdenum "heel", Parsons and the stakeholders worked with an external specialty lab (Brooks Applied). Their results are included as Attachment 3. Their analysis was not conclusive in terms of quantifying the different Molybdenum species. However, based on the usage of $[MoO_4]^{2-}$ molybdate as the calibration standard, the subsequent results indicated Mo (VI) as the majority of the Molybdenum component. The lab results tended to confirm the operational and design assumption that the majority of the Molybdenum component exists in the -II state, although there is a potential for other labile polymolybdates to exist, and neutral Molybdenum or non -II Molybdenum species to form and generate a low concentration "heel" that cannot be exchanged with AIEX. The operational team consistently monitors the "heel" of the system using lab and field analysis to ensure permit compliance.

B. **Adjustment of Influent pH:** The native groundwater influent is approximately at pH 7.3. As discussed previously, based on isotherm studies, during operations the influent pH is reduced to 4.0 upstream of the AIEX system. The Molybdenum Eh–pH diagram (Figure 3) is shown below to guide the discussion.

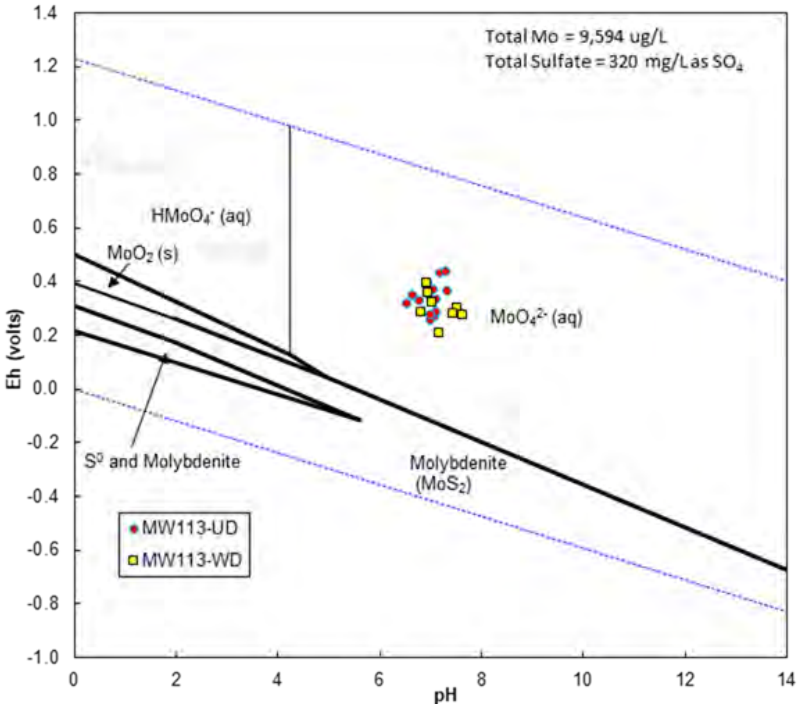

Figure 3-Molybdenum Eh-pH diagram

Based on the Eh-pH diagram, Parsons performed the following operational pH adjustments in April & May of 2021 to observe the effects on the "heel" and speciation discussed earlier:

1) Adjustment to pH 5.0 from 4.0: Based on the Eh-pH diagram, it was theorized that at a pH of 4.0, there may be neutral or -I Molybdenum species present in the influent. Neutral Molybdenum species will not be treated

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by AIEX and -I anions will outcompete a -II anion therefore potentially passing through the AIEX system and contributing to the heel. The Eh–pH diagram indicated that shifting the pH higher to 5.0 would potentially move most of the Molybdenum species to the -II form. To observe the impact on the "heel" and potentially mitigate it, Parsons adjusted the influent pH to 5.0. However, this adjustment in the pH resulted in some Molybdenum being desorbed from Contactor 1, increasing the Molybdenum influent concentration to Contactor 2, and increasing the effluent concentration from the guard tank. This can be observed in the spike in Molybdenum effluent concentration in Figure 2 on/around 4/29/21 through 5/5/21. The system operated as designed and permit compliance was always ensured during this adjustment.

2) Adjustment to pH 4.5 from 5.0: The pH of the system was gradually reduced to 4.5 from 5.0 as the performance of the system appeared to be better at a lower pH. Sampling results at pH 4.5 indicated improved performance in comparison to system operations at pH 5.0.

3) Adjustment to pH 4.0 from 4.5: Although the system performance improved at pH of 4.5, when compared to operations at pH 5.0, based on the sampling results the Molybdenum exchange was not as efficient as that at pH 4.0, and therefore the system pH was brought back to the design pH.

4) Impact on Molybdenum speciation and impacts on the "heel" during the pH adjustments was undetermined since the external lab was unable to quantify the individual species based on available lab methods.

5) Adjustment to pH 3.7 from 4.0: System was adjusted to pH of 3.7 from 4.0 in late May 2021. This adjustment marginally improved the Molybdenum exchange. The system is currently at pH 3.7.

C. Field and Lab Molybdenum Data Co-Relation:

In addition to analyzing for Molybdenum in a lab, Parsons has also been analyzing Molybdenum using Hach field test kits. Due to the immediate availability of results, field analysis is particularly beneficial to the treatment system in identifying an upset condition. However, results from field test kits are not as accurate as lab results. Initial field results showed a large error. Following these initial errors, the field test methods were revised starting 3/4/21. Based on discussions and field sampling observations, potential Molybdenum concentrations >1000ug/l were field tested for by Hach Method 8036 and potential Molybdenum concentrations <1000ug/L were field tested by Hach Method 8169. Following this adjustment, the accuracy of the field sampling results improved. Table 4 below identifies the percent error for Contactor 1 effluent samples analyzed in the field and compared against the lab results. The mean absolute error of the field data has also been calculated below. It should be noted that while there is significant measurement error between the field test and partnered lab tests, the field test results are biased consistently high which means that the field results are conservative and a good real time indicator of changes in system performance. Only results following the revision of field test methods are included in this co-relation.

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Molybdenum Contactor 1 Effluent Samples-Field and Lab Analysis			
	Mo (ug/l)		
Date	Field Result	Lab Result	Error (%)
1/27/2021	20	5	See Footnote 1
1/28/2021	960	6600	See Footnote 1
2/2/2021	2310	4000	See Footnote 1
2/9/2021	1850	4500	See Footnote 1
2/16/2021	2180	2800	See Footnote 1
3/9/2021	2600	2700	-3.7
3/16/2021	2300	2200	4.5
3/23/2021	2400	2200	9.1
3/30/2021	1600	1200	33.3
4/5/2021	3300	3000	10.0
4/13/2021	2600	2300	13.0
4/20/2021	2400	2500	-4.0
4/29/2021	14700	15000	-2.0
4/29/2021	15900	13000	22.3
5/3/2021	11400	9500	20.0
5/3/2021	11300	10000	13.0
5/11/2021	5400	4900	10.2
5/18/2021	3100	3000	3.3
5/25/2021	7100	5900	20.3
6/1/2021	5200	5000	4.0
6/8/2021	7700	6900	11.6
6/15/2021	7300	6400	14.1
6/21/2021	7000	6600	6.1
6/29/2021	6800	7000	-2.9
7/6/2021	6800	6000	13.3
7/13/2021	6600	5200	26.9
7/20/2021	6900	5700	21.1
Mean Absolute Error (%)		12.2	
Footnotes			
1	After initial observations, field test methods were revised starting 3/4/21. Data prior to this date has not been used for error analysis.		

Table 4-Field and Lab Molybdenum Analysis Co-Relation

* * *

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Parsons appreciates the opportunity to be of continued service to the Lowry Landfill Site. If you have any questions or comments regarding this memorandum, please do not hesitate to contact me at 315-440-2993.

Sincerely,



Les Cordone, VP, PE
Manager-Industrial Wastewater Treatment Practice

cc: Adway Biniwale, PE (Parsons)
Chris Carlson (Parsons)
Lyn Brill (Parsons)
Dan Griffiths, PG (Parsons)

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ATTACHMENTS

Attachment 1: Lowry Landfill Molybdenum Treatability Study

Attachment 2: Record P&ID

Attachment 3: External Lab Reports on Molybdenum Speciation

Attachment 1

PARSONS

MEMORANDUM

September 23, 2021

To: Lyn Brill and Chris Carlson; Parsons

From: Les Cordone; Parsons

Subject: Lowry Landfill Molybdenum Treatability Study – Interim Results

Summary

This summary presents the results of treatability testing for molybdenum (Mo) treatment in Lowry landfill monitoring well MW-113. It covers results of jar testing to determine molybdate removal by chemical complexation with iron at low pH (~4.0), and by precipitation / co-precipitation with iron at minimum solubility for iron hydroxide (pH 7.5 – 8.0). Additionally, results from isotherm studies with strong-base anionic exchange resins including Purolite A520E (general) and Ambersep™ 21K XLT (molybdenum-specific) are presented.

Acid and Alkalinity Titrations

Aliquots of the MW-113 well water were titrated to endpoint 3.0 and 12.0 s.u. using 0.5N H_2SO_4 and 0.5N NaOH, respectively. The complete titration curves have been presented in Figure 1. These titrations were used to estimate the required quantity of acid or base require to adjust and/or re-adjust pH to target endpoints for iron complexation and isotherm tests.

Jar Testing

Jar Test Procedure: Complexation with Iron at Reduced pH

Jar tests were performed with aliquots of the MW-113 well water. Ferric chloride ($FeCl_3$) was used to add iron (Fe) as a complexing agent. $FeCl_3$ doses of 10 and 50 mg Fe/L were applied along with a control without Fe addition. The pH was reduced to 4.0 s.u. and allowed a reaction time of 15 minutes while stirring. The pH was readjusted to 7.5 – 8.0 s.u. using either NaOH for one set of jars or hydrated lime ($Ca(OH)_2$) for the other set. Following the reaction phase each jar was dosed with anionic polymer to achieve a concentration of 1 mg/L. Following tapered mixing at 120 and 50 RPM for 2 and 20-minute flash and slow mixing, respectively, the jars were allowed to settle for 2 hours. Supernatant was collected unfiltered and filtered through 5 µm, 1 µm and 0.45 µm pore sizes.

Jar Test Procedure: Precipitation / Co-precipitation

Precipitation/co-precipitation of Mo with iron at minimum solubility for iron hydroxide (7.5 – 8.0) was tested following similar jar testing procedures to iron complexation. Aliquots of the MW-113 well water were dosed with $FeCl_3$ at doses of 10 and 50 mg/L along with a control without Fe addition. The pH was adjusted to 7.5 – 8.0 s.u. using NaOH for one set of jars and $(Ca(OH)_2)$ on a second set. Following the reaction phase each jar was dosed with anionic polymer to achieve a concentration of 1 mg/L. The jars were allowed to settle for 2 hours after tapered mixing after which supernatant was sampled unfiltered and filtered through at 5 µm, 1 µm and 0.45 µm pore sizes.

Jar Test Results

All samples were screened in-house using a HACH molybdate test kit. Screening results are presented in Table 1A. Undosed controls along with samples dosed at 50 mg Fe/L (unfiltered and filtered at 0.45 µm) were submitted to Eurofins/TestAmerica (Denver, CO); results from these contract-lab analyses are presented in Table 1B. The results indicate that:

- Complexation testing achieved Mo removal by 50-60% at a dose of 50 mg Fe/L.
- Precipitation / co-precipitation at the same dose achieved a removal efficiency of 40-50%.
- Filtration did not result in noticeable improvement in Mo removal in either test series.
- There was no substantial difference in results arising from the use of NaOH versus $Ca(OH)_2$ for pH readjustment.
- The HACH test kits provided a reasonably accurate screening tool for measuring molybdenum in this test matrix.

Isotherm Study

Two (2) ion exchange resins including a standard strong base anionic exchange resin (Purolite A520E) and Molybdenum-specific anionic exchange resin (Ambersep™ 21K XLT) were used in an isotherm study for Mo removal. For each resin, two (2) pH conditions were tested; 1) pH reduced to 4.0 s.u. (to remove carbonate / bicarbonate alkalinity); and 2) native pH. The jars were dosed with various amounts of resin and mixed for a period of 48 hours. The supernatant was filtered through 1 µm pore size to exclude any ion exchange resin particles. The results from Mo analysis of the isotherm tests are presented in Tables 2. The results indicate the following:

- Both ion exchange resins performed significantly more efficiently at lower pH (4.0) versus native pH.
- Ambersep™ 21K XLT was somewhat more efficient at removing Mo at lower pH compared to Purolite A520E especially as indicated by the lower-dosed jars.
- Ambersep™ 21K XLT did not provide better removal performance compared to Purolite A520E at native pH.

Projected Resin Utilization: Purolite A-520E

Isotherms were generated using the data obtained from the Purolite A-520E study. The isotherms for the pH-adjusted and native pH studies are presented in Figures 2A and 2B, respectively. The isotherm results were used to project the annual amount of resin required to treat flow rates of 2 gpm and 6 gpm continuous (1.1 and 3.2 million gallons per year) reflecting minimum and maximum flows, respectively. The isotherm study parameters and associated projected utilization rates using an influent Mo concentration basis of 8.3 mg/L are presented as follows:

pH	K_f	1/n	x/m_{C0} (mg/g)	Usage Rate (g/L)	2 gpm	6 gpm
4.0	42.9	0.615	157.8	0.053	460	1380
Native	1.03	0.692	4.45	1.87	16,400	49,100

Projected Resin Utilization: Ambersep® 21K XLT

Isotherms were not generated for the Mo-specific Ambersep 21K XLT resin due to the near-complete removal of Mo at pH 4 even at the lowest resin dose tested; the data did not lend themselves to generation of an isotherm curve. However, based on the lowest dose test a utilization rate somewhat lower than that projected for Purolite A-520E would be estimated.

Conclusions / Recommendations

Based on the results obtained from treatability testing, the following conclusions and recommendations were developed:

- Efficient removal to < 1 mg/L was demonstrated with ion exchange resins following adjustment of pH to 4.0. At this low pH, molybdenum-specific ion exchange resin provided more efficient removal at lower doses.
- Complexation with iron at low pH (~4.0) followed by readjustment of pH to around 7.5 – 8.0 performed slightly better than precipitation/co-precipitation of Mo with iron. Additional studies at higher doses may be warranted in the event this process is preferable to ion exchange.
- Determining the effect of adjusting the water from this location to pH 4 on the overall pH of process water at the site may be warranted.

Table 1A. Jar Test Results: HACH Test Kit Screening Mo Analyses

Test:	Complexation (pH 4, 15 min; Adj to 7.5-8.0)			Precip/Co-Precip (Adj pH 7.5 – 8.0)			Units
$FeCl_3$ Concentration (mg/L):	0	10	50	0	10	50	
pH Adjust to 7.5-8.0 with NaOH							
Unfiltered	9.0	7.9	4.5	9.5	9.1	5.9	mg/L
5um-Filtered	9.3	8.2	4.5	9.9	9.3	5.7	mg/L
1um-Filtered	9.3	8.3	4.9	9.9	8.9	5.5	mg/L
0.45um-Filtered	9.1	8.1	4.4	9.3	8.7	5.6	mg/L
pH Adjust to 7.5-8.0 with $Ca(OH)_2$							
Unfiltered	9.3	7.4	4.5	9.3	9.2	5.1	mg/L
5um-Filtered	9.6	7.6	4.7	9.3	9.2	5.3	mg/L
1um-Filtered	9.3	7.8	4.6	9.0	8.9	5.2	mg/L
0.45um-Filtered	9.3	7.5	4.2	9.0	8.9	5.0	mg/L

Table 1B. Jar Test Results: Contract Lab Mo Analyses

Test:	Complexation (pH 4, 15 min; Adj to 7.5-8.0)			Precip/Co-Precip (Adj pH 7.5 – 8.0)			Units
$FeCl_3$ Concentration (mg/L):	0	10	50	0	10	50	
pH Adjust to 7.5-8.0 with NaOH							
Unfiltered	7.5	--	3.9	7.6	--	4.7	mg/L
0.45um-Filtered	7.2	--	3.8	7.4	--	4.2	mg/L
pH Adjust to 7.5-8.0 with $Ca(OH)_2$							
Unfiltered	7.9	--	3.4	7.3	--	4.3	mg/L
0.45um-Filtered	7.6	--	3.3	7.2	--	4.1	mg/L

Table 2. Isotherm Test Results

Sample ID	Resin Dose (g/L)	Mo Conc. (mg/L)	Sample ID	Resin Dose (g/L)	Mo Conc. (mg/L)
pH 4					
Purolite A-520E			Ambersep 21K XLT		
ISO-Puro-Jar 1A	0.0000	8.3	ISO-Ambe-Jar 1A	0.0000	8.6
ISO-Puro-Jar 2A	0.0576	2.0	ISO-Ambe-Jar 2A	0.0521	0.5
ISO-Puro-Jar 3A	0.1036	0.6	ISO-Ambe-Jar 3A	0.1011	0.4
ISO-Puro-Jar 4A	0.1756	0.4	ISO-Ambe-Jar 4A	0.1758	0.3
ISO-Puro-Jar 5A	0.2505	0.3	ISO-Ambe-Jar 5A	0.2517	0.3
ISO-Puro-Jar 6A	0.4052	0.3	ISO-Ambe-Jar 6A	0.4006	0.3
ISO-Puro-Jar 7A	0.7509	0.2	ISO-Ambe-Jar 7A	0.7503	0.3
ISO-Puro-Jar 8A	1.5011	0.2	ISO-Ambe-Jar 8A	1.5470	0.2
Native pH					
Purolite A-520E			Ambersep 21K XLT		
ISO-Puro-Jar 1B	0.0000	8.0	ISO-Ambe-Jar 1B	0.0000	7.3
ISO-Puro-Jar 2B	0.0523	7.7	ISO-Ambe-Jar 2B	0.0516	8.0
ISO-Puro-Jar 3B	0.1019	7.1	ISO-Ambe-Jar 3B	0.1091	7.2
ISO-Puro-Jar 4B	0.1752	6.8	ISO-Ambe-Jar 4B	0.1751	6.9
ISO-Puro-Jar 5B	0.2538	6.2	ISO-Ambe-Jar 5B	0.2507	6.3
ISO-Puro-Jar 6B	0.4045	5.3	ISO-Ambe-Jar 6B	0.4018	5.4
ISO-Puro-Jar 7B	0.7504	4.0	ISO-Ambe-Jar 7B	0.7514	5.4
ISO-Puro-Jar 8B	1.5019	2.4	ISO-Ambe-Jar 8B	1.5090	2.1

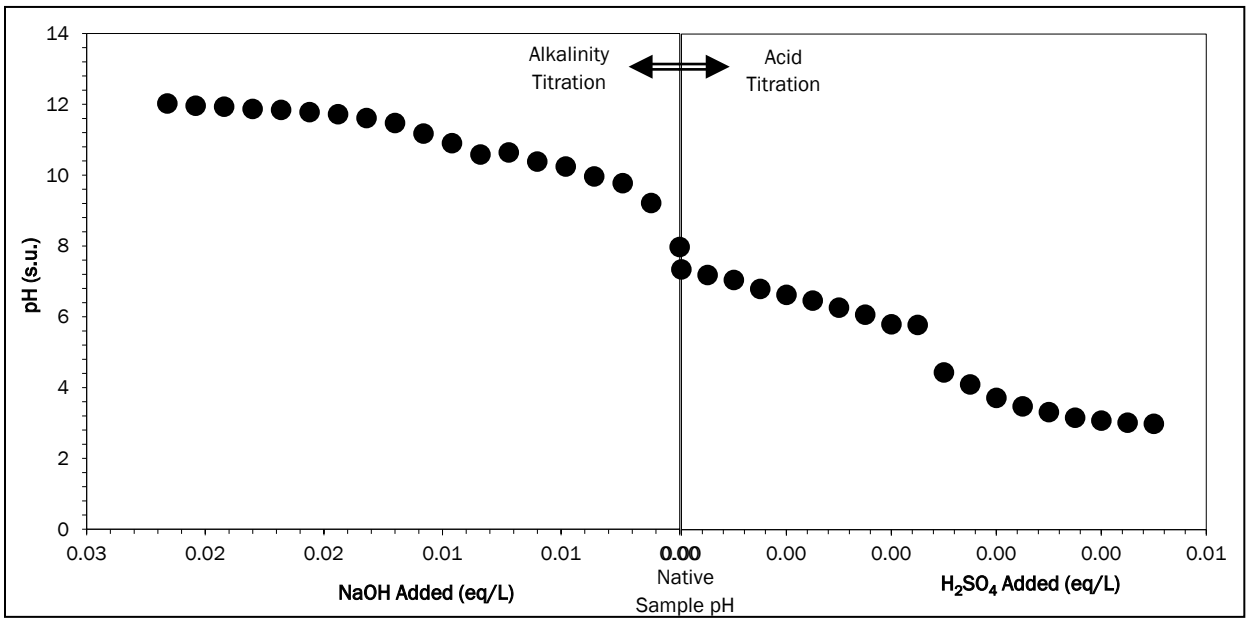


Figure 1. Acid and Alkalinity Titration Curves.

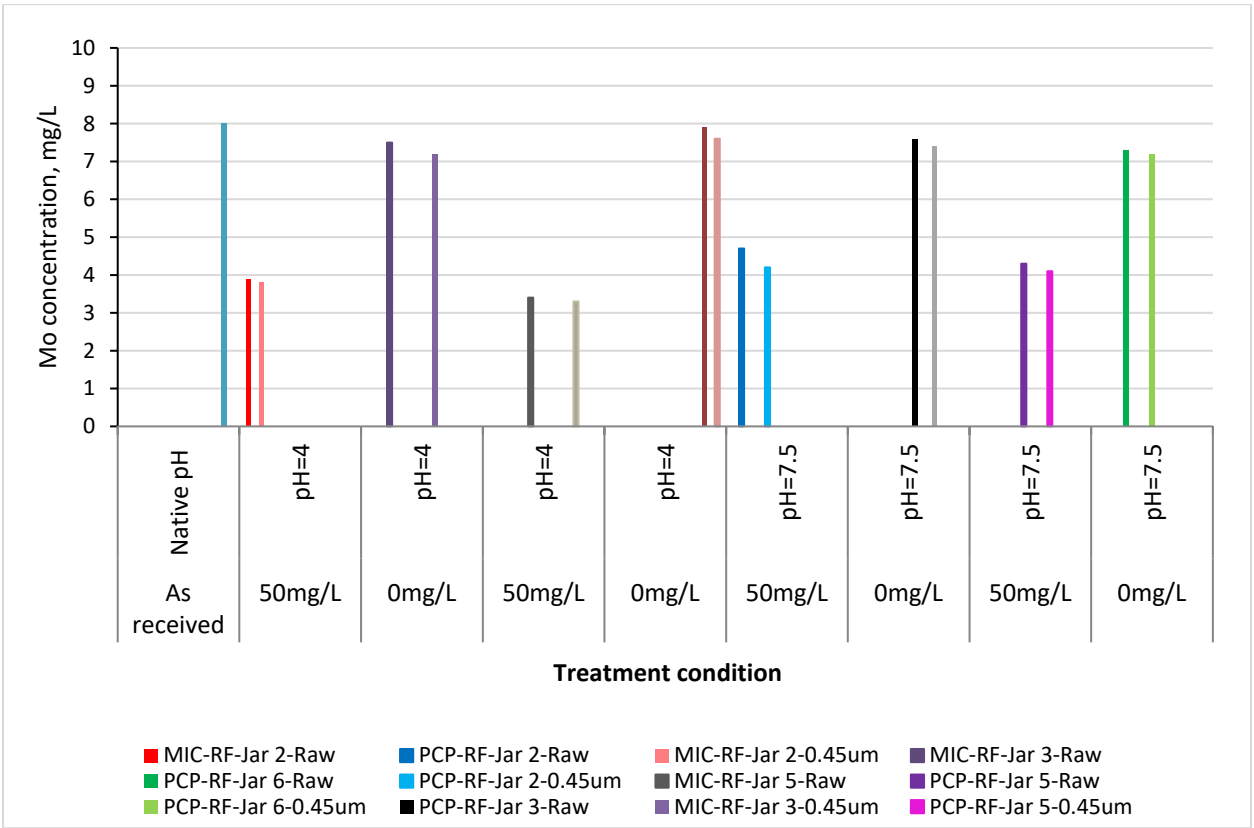


Figure 2. Molybdenum removal by Iron Complexation and Precipitation/Co-Precipitation by Jar Testing (Figure based on Independent Analytical Lab Mo Analyses).

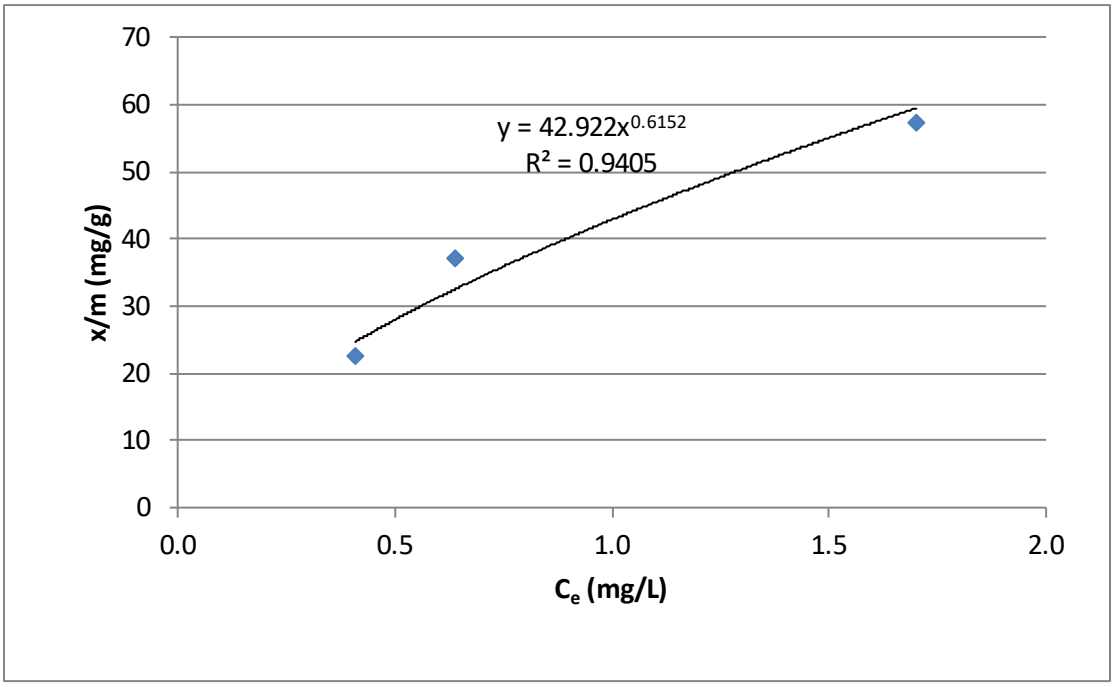


Figure 3A. Purolite A-520E Isotherm – pH 4
(Isotherm with Jars 2 – 4 presented)

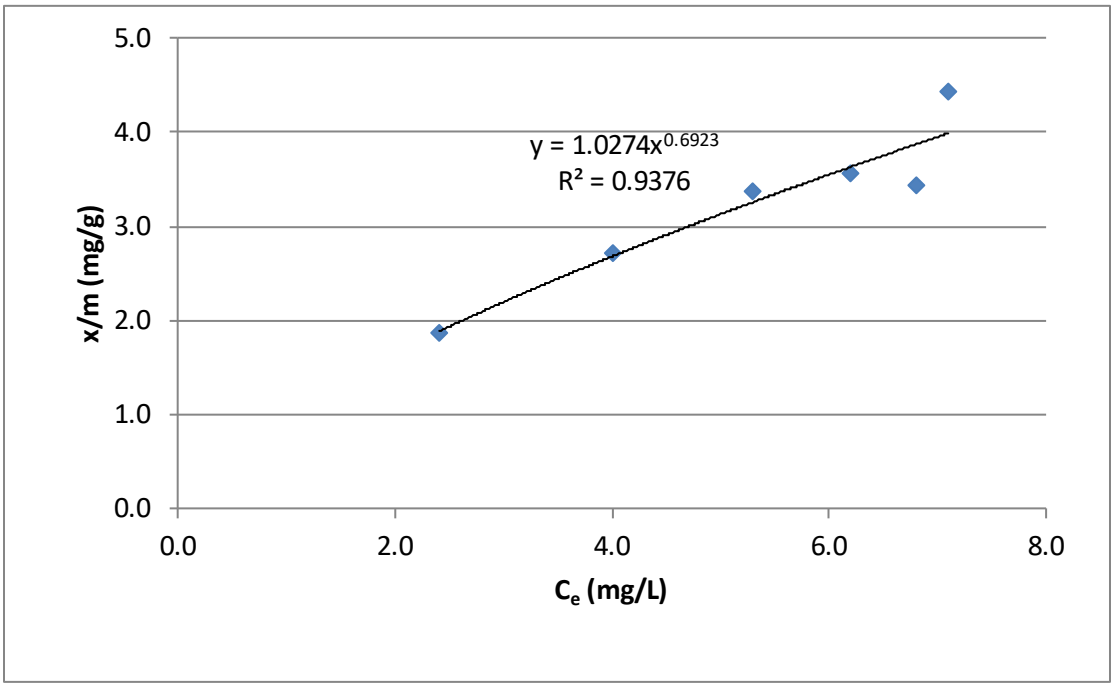
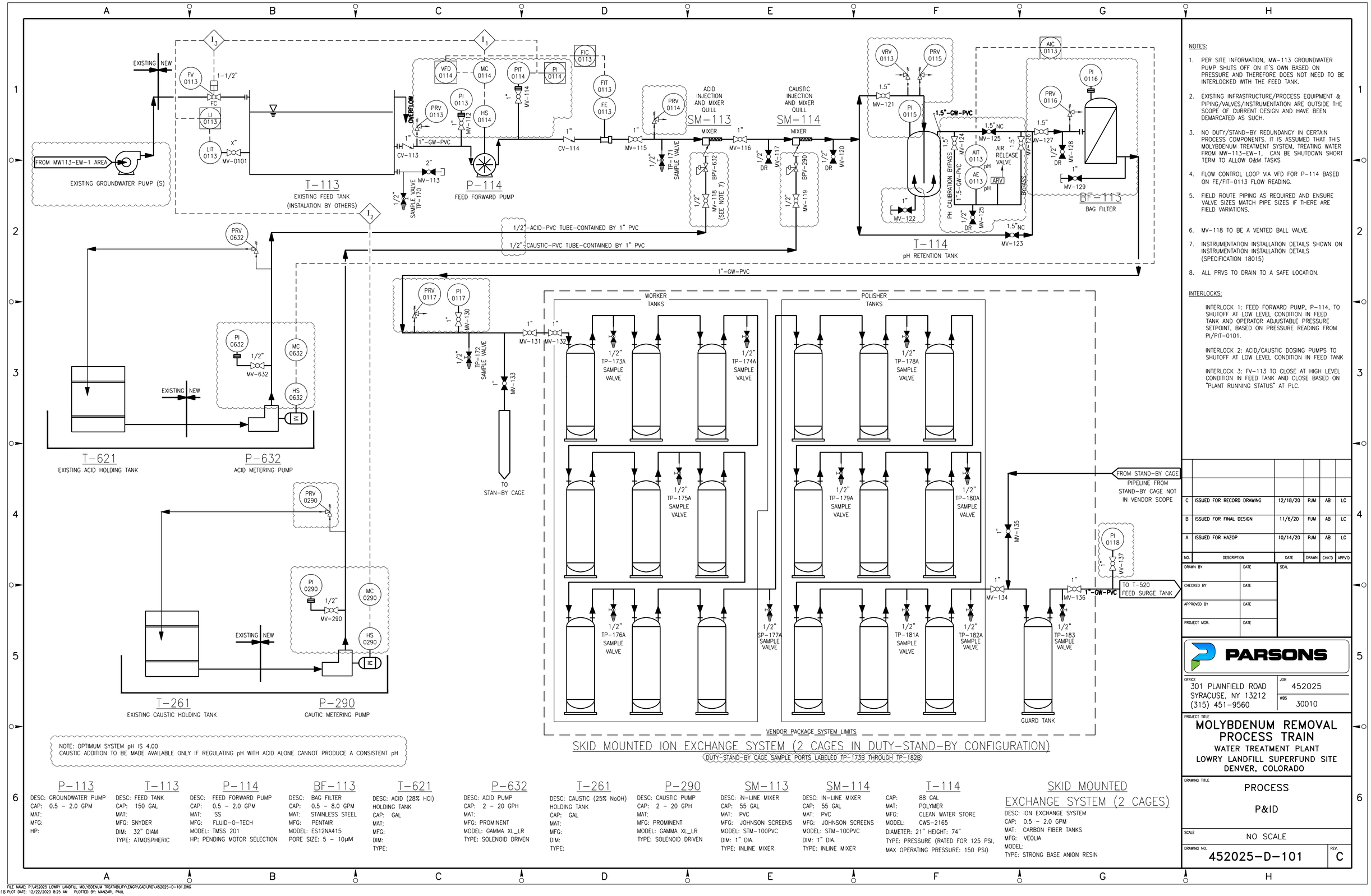


Figure 3B. Purolite A-520E Isotherm – Native pH

Attachment 2



NOTES:

1. PER SITE INFORMATION, MW-113 GROUNDWATER PUMP SHUTS OFF ON IT'S OWN BASED ON PRESSURE AND THEREFORE DOES NOT NEED TO BE INTERLOCKED WITH THE FEED TANK.
2. EXISTING INFRASTRUCTURE/PROCESS EQUIPMENT & PIPING/VALVES/INSTRUMENTATION ARE OUTSIDE THE SCOPE OF CURRENT DESIGN AND HAVE BEEN DEMARCATED AS SUCH.
3. NO DUTY/STAND-BY REDUNDANCY IN CERTAIN PROCESS COMPONENTS. IT IS ASSUMED THAT THIS MOLYBDENUM TREATMENT SYSTEM, TREATING WATER FROM MW-113-EW-1, CAN BE SHUTDOWN SHORT TERM TO ALLOW O&M TASKS
4. FLOW CONTROL LOOP VIA VFD FOR P-114 BASED ON FE/FIT-0113 FLOW READING.
5. FIELD ROUTE PIPING AS REQUIRED AND ENSURE VALVE SIZES MATCH PIPE SIZES IF THERE ARE FIELD VARIATIONS.
6. MV-118 TO BE A VENTED BALL VALVE.
7. INSTRUMENTATION INSTALLATION DETAILS SHOWN ON INSTRUMENTATION INSTALLATION DETAILS (SPECIFICATION 18015)
8. ALL PRVS TO DRAIN TO A SAFE LOCATION.

INTERLOCKS:

INTERLOCK 1: FEED FORWARD PUMP, P-114, TO SHUTOFF AT LOW LEVEL CONDITION IN FEED TANK AND OPERATOR ADJUSTABLE PRESSURE SETPOINT, BASED ON PRESSURE READING FROM PI/PIT-0101.

INTERLOCK 2: ACID/CAUSTIC DOSING PUMPS TO SHUTOFF AT LOW LEVEL CONDITION IN FEED TANK

INTERLOCK 3: FV-113 TO CLOSE AT HIGH LEVEL CONDITION IN FEED TANK AND CLOSE BASED ON "PLANT RUNNING STATUS" AT PLC.

P-113
DESC: GROUNDWATER PUMP
CAP: 0.5 - 2.0 GPM
MAT:
MFG:
HP:

T-113
DESC: FEED TANK
CAP: 150 GAL
MAT:
MFG: SNYDER
DIM: 32" DIAM
TYPE: ATMOSPHERIC

P-114
DESC: FEED FORWARD PUMP
CAP: 0.5 - 2.0 GPM
MAT: SS
MFG: FLUID-O-TECH
MODEL: TMSS 201
HP: PENDING MOTOR SELECTION

BF-113
DESC: BAG FILTER
CAP: 0.5 - 8.0 GPM
MAT: STAINLESS STEEL
MFG: PENTAIR
MODEL: ES12NA415
PORE SIZE: 5 - 10µM

T-621
DESC: ACID (28% HCl) HOLDING TANK
CAP: GAL
MAT:
MFG:
DIM:
TYPE:

P-632
DESC: ACID PUMP
CAP: 2 - 20 GPH
MAT:
MFG: PROMINENT
MODEL: GAMMA XL_LR
TYPE: SOLENOID DRIVEN

T-261
DESC: CAUSTIC (25% NaOH) HOLDING TANK
CAP: GAL
MAT:
MFG:
DIM:
TYPE:

P-290
DESC: CAUSTIC PUMP
CAP: 2 - 20 GPH
MAT:
MFG: PROMINENT
MODEL: GAMMA XL_LR
TYPE: SOLENOID DRIVEN

SM-113
DESC: IN-LINE MIXER
CAP: 55 GAL
MAT: PVC
MFG: JOHNSON SCREENS
MODEL: STM-100PVC
DIM: 1" DIA.
TYPE: INLINE MIXER

SM-114
DESC: IN-LINE MIXER
CAP: 55 GAL
MAT: PVC
MFG: JOHNSON SCREENS
MODEL: STM-100PVC
DIM: 1" DIA.
TYPE: INLINE MIXER

T-114
CAP: 88 GAL
MAT: POLYMER
MFG: CLEAN WATER STORE
MODEL: CWS-2165
DIAMETER: 21" HEIGHT: 74"
TYPE: PRESSURE (RATED FOR 125 PSI, MAX OPERATING PRESSURE: 150 PSI)

SKID MOUNTED EXCHANGE SYSTEM (2 CAGES)
DESC: ION EXCHANGE SYSTEM
CAP: 0.5 - 2.0 GPM
MAT: CARBON FIBER TANKS
MFG: VEOLIA
MODEL:
TYPE: STRONG BASE ANION RESIN

NO.	DESCRIPTION	DATE	DRAWN	CHK'D	APPV'D
C	ISSUED FOR RECORD DRAWING	12/18/20	PJM	AB	LC
B	ISSUED FOR FINAL DESIGN	11/6/20	PJM	AB	LC
A	ISSUED FOR HAZOP	10/14/20	PJM	AB	LC

DRAWN BY / DATE
CHECKED BY / DATE
APPROVED BY / DATE
PROJECT MGR. / DATE
SEAL

PARSONS
OFFICE
301 PLAINFIELD ROAD
SYRACUSE, NY 13212
(315) 451-9560

JOB 452025
WBS 30010

PROJECT TITLE
MOLYBDENUM REMOVAL PROCESS TRAIN
WATER TREATMENT PLANT
LOWRY LANDFILL SUPERFUND SITE
DENVER, COLORADO

DRAWING TITLE
PROCESS
P&ID

SCALE
NO SCALE

DRAWING NO.
452025-D-101

REV.
C

FILE NAME: P:\452025 LOWRY LANDFILL MOLYBDENUM TREATABILITY\ENGR\CAD\PID\452025-D-101.DWG
A-5-18 PLOT DATE: 12/22/2020 8:25 AM PLOTTED BY: MANZARI, PAUL

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

May 14, 2021

Parsons
Attn: Lyn Brill
1776 Lincoln Suite 600
Denver, CO 80203
Lyn.Brill@Parsons.com

RE: Lowry Environmental Protection Cleanup Trust WTP 452483.60080

Dr. Brill,

Brooks Applied Labs (BAL) received twelve field-filtered aqueous samples requesting molybdenum (Mo) speciation on either April 28 or April 30, 2021. All samples were received in acceptable condition and stored according to BAL SOPs.

Dissolved Mo Speciation by IC-ICP-CRC-MS
Each submitted sample was analyzed for molybdenum species using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on April 30, 2021. Mo species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS). The instrument response was calibrated using a known molybdate [Mo(VI)] standard and any unidentified Mo species [Sum Unk. Mo] were quantified using this Mo(VI) calibration curve.

Dissolved Mo Quantitation by ICP-QQQ-MS
An aliquot of each submitted sample was acidified to a pH < 2 using concentrated nitric acid and allowed to digest overnight. All samples were then analyzed for dissolved Mo on May 12, 2021 by a modified EPA Method 6020 employing inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results.

Analytical Issues
No significant analytical issues were encountered with either the Mo speciation or the dissolved Mo analyses, with the exceptions noted below.

The relative percent difference (RPD) associated with the matrix spike set performed upon sample 2104257-01 for dissolved Mo (27.3%) exceeded the control limit of 20%. The RPD of the associated matrix duplicate (4.0%) was within acceptance limits and there was close agreement between the dissolved Mo and Mo(VI) results for this sample (13,400 and 12,300 µg/L, respectively). Consequently, no corrective action was taken since the elevated RPD for the matrix spike set was deemed to be unrepresentative of the performance of the applied method.

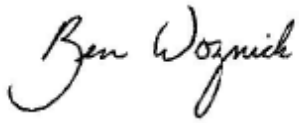
Excellent agreement between the measured dissolved Mo and molybdate concentrations was obtained for all submitted samples except for 2104287-03 (TP-174A sampled on 4/29/21) and 2104287-06 (TP-175A sampled on 4/29/21). For these latter two samples the dissolved Mo concentrations were confirmed by reanalysis. While the source of these discrepancies remains unconfirmed at this time, the fact that no unknown Mo species were detected during the speciation analyses suggests that molybdate is the

primary Mo-containing species in these samples. Upon client request BAL can further investigate the cause for the differing dissolved Mo and molybdate concentrations for samples 2104287-03 and 2104287-06.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements.

Please contact us if you have any questions regarding this report.

Sincerely,



Ben Wozniak
Technical Services
Ben@brooksapplied.com

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-170

Laboratory Sample ID
2104257-01

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	13400	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	12300	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-173A

Laboratory Sample ID
2104257-02

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	7000	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	7660	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-174A

Laboratory Sample ID
2104257-03

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	1500	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	1660	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-183

Laboratory Sample ID
2104257-04

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	755	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	807	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-193

Laboratory Sample ID
2104257-05

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	6790	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	7420	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL
J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/27/2021 Date Received: 04/28/2021

Client Sample ID
TP-172

Laboratory Sample ID
2104257-06

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	12600	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	10000	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-170

Laboratory Sample ID
2104287-01

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	12800	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	12000	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-173A

Laboratory Sample ID
2104287-02

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	15500	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	15200	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-174A

Laboratory Sample ID
2104287-03

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	4610	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	7520	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-183

Laboratory Sample ID
2104287-04

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	1010	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	1010	2.5	25	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 2.5 U	2.5	25	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-172

Laboratory Sample ID
2104287-05

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	13000	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	12100	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 04/29/2021 Date Received: 04/30/2021

Client Sample ID
TP-175A

Laboratory Sample ID
2104287-06

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	1890	34	100	µg/L
Mo(VI)	IC-ICP-CRC-MS	2640	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Method Blank Summary

Analyte	BLK1	BLK2	BLK3	BLK4	MDL	MRL	Units
Diss Mo	0.009	0.005	0.003	0.002	0.034	0.10	µg/L
Mo(VI)	0.002	0.001	-0.001	0.000	0.005	0.050	µg/L
Sum Unk. Mo	0.000	0.000	0.000	0.000	0.005	0.050	µg/L

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Laboratory Control Sample (LCS)

Analyte	LCS	True Value	Result	Recovery (%)
Diss Mo	NIST 1643f	115.3	116.3	100.9
Mo(VI)	Blank Spike	4.995	5.115	102.4

All results presented in µg/L

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Matrix Duplicates

Analyte	Lab Sample ID	Native Result	Duplicate Result	Mean	RPD (%)
Diss Mo	2104257-01	13402	13940	13402	4.0
Diss Mo	2104287-01	12811	10800	11806	17.0
Mo(VI)	2104257-04	807.3	812.0	809.7	0.6
Mo(VI)	2104287-06	2636	2101	2369	22.6
Sum Unk. Mo	2104257-04	< 5.0 U	< 5.0 U	NC	NC
Sum Unk. Mo	2104287-06	< 5.0 U	< 5.0 U	NC	NC

All results presented in µg/L
U = Sample concentration is below the MDL
J = Sample concentration is between the MDL and the MRL
NC = Not Calculated (Result < RL)

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Lab Sample ID	Native Result	MS Spike Conc.	MS Result	MS Recov. (%)	MSD Spike Conc.	MSD Result	MSD Recov. (%)	RPD (%)
Diss Mo	2104257-01	13402	1010	13380	NC	1010	10170	NC	27.3*
Diss Mo	2104287-01	12811	1010	13000	NC	1010	12744	NC	2.0
Mo(VI)	2104257-04	807.3	5000	6386	111.6	5000	6481	113.5	1.5
Mo(VI)	2104287-06	2636	5000	7636	100.0	5000	7415	95.6	2.9

All results presented in µg/L
NC - Not Calculated (Spike < Native Result)
* The RPD is above the established control limit of 20%; please see narrative.

Chain of Custody

PARSONS 1776 LINCOLN SUITE 600 DENVER, CO 80203 (303) 831-8100 FAX (303) 831-8208 CONTACT: LYN BRILL LYN.BRILL@PARSONS.COM PROJECT: LOWRY ENVIRONMENTAL PROTECTION/CLEANUP TRUST WTP 452483.60080	CHAIN OF CUSTODY # **42720215224** LAB CONTACT: BEN WOZNIAK BROOKS APPLIED LABS, BOTHELL, WA

SAMPLE ID	DATE	TIME	MATRIX
TP-170	4/27/21	1230	AQ
TP-173A	4/27/21	1030	AQ
TP-174A	4/27/21	1000	AQ
TP-183	4/27/21	0930	AQ
TP-193	4/27/21	1030	AQ
TP-172	4/27/21	1200	AQ

SUITE DESCRIPTION: WTP MOLYBDENUM MONITORING

Analysis requested for the sample points listed.	Container(s) Volume, Type & Preservatives
(IC-ICP-MS) Molybdenum Speciation	1 x 500 ml Poly Cool ≤ 4° C (.45 micron field filtered)

Special Instructions/Conditions of Receipt:

REC'D BAL 4/28/2 @ 1015

5-10 Day Turn Around Time

1. Relinquished By	Date	Time	1. Received By	Date	Time
Mike Gelwick	4-27-21	1500			
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Sample shipment: X UPS: **1Z 19X 705 01 9048 8530**

Comments:
IX System pH: 4.0su
IX System flow rate: ~1.5gpm
IX System Total Eff: ~164500gal

COC QC

MICHAEL GELWICK
303-356-6559
PARSONS
3500 S. GUNCLUB RD
AURORA CO 80018

35 LBS 1 OF 1

SHIP TO:
SAMPLE RECEIVING
1-206-632-6206
BROOKS APPLIED LABS
SUITE 100
18804 NORTH CREEK PARKWAY
BOTHELL WA 98011



Reference No.1: 452483/60080
Reference No.2: Lowry Landfill
XOL 21 03.15 NV45 45 0A 04/2021*

Sample Receipt Checklist:

Container Type:

- [x] Cooler
- [ ] Cardboard box
- [ ] Styrofoam cooler
- [ ] Other (Specify):

- [x] Custody Seal Present?
  Custody Seal Intact? (Y)/ N
- [x] Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#: 31

- [ ] None
- [ ] Blue Ice: °C
- [x] Ice: 2.6 °C
- [ ] Dry Ice: °C
- [ ] Temp Blank: °C

Corrected Temp: 1.6 °C

Coolant Note:

Bottle Type:

- [x] Client Provided 500mL HDPE
- [ ] Class :
  Size / Type: No plbs.
  Lot:
  Preservation:
  Preservative Lot:
- [ ] Class :
  Size / Type:
  Lot:
  Preservation:
  Preservative Lot:
- [ ] Class :
  Size / Type:
  Lot:
  Preservation:
  Preservative Lot:

All information accurate
Initial/date: ADN 4/28/21

Chain of Custody

PARSONS	CHAIN OF CUSTODY #
1776 LINCOLN SUITE 600 DENVER, CO 80203 (303) 831-8100 FAX (303) 831-8208 CONTACT: LYN BRILL LYN.BRILL@PARSONS.COM PROJECT: LOWRY ENVIRONMENTAL PROTECTION/CLEANUP TRUST WTP 452483.60080	4292021522 5 LAB CONTACT: BEN WOZNIAK BROOKS APPLIED LABS, BOTHELL, WA

SAMPLE ID	DATE	TIME	MATRIX
TP-170	4/29/21	1255	AQ
TP-173A	4/29/21	1200	AQ
TP-174A	4/29/21	1140	AQ
TP-183	4/29/21	1155	AQ
TP-172	4/29/21	1230	AQ
TP-175A	4/29/21	1115	AQ

SUITE DESCRIPTION: WTP MOLYBDENUM MONITORING

Analysis requested for the sample points listed.	Container(s) Volume, Type & Preservatives
(IC-ICP-MS) Molybdenum Speciation	1 x 500 ml Poly Cool ≤ 4° C (.45 micron field filtered)

Special Instructions/Conditions of Receipt:

5-10 Day Turn Around Time

1. Relinquished By	Date	Time	1. Received By	Date	Time
Mike Gelwick	4-29-21	1345	Shaila Priscilla	4/30/21	10:17
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Sample shipment: X UPS: **1Z 19X 705 01 9072 8557**

Comments:
IX System pH: 5.0su
IX System flow rate: ~1.5gpm
IX System Total Eff: ~~gal~~ 168825 gal

COC QC

MICHAEL GELWICK
303-356-6559
PARSONS
3500 S. GUNCLUB RD
AURORA CO 80018

30 LBS

1 OF 1

SHIP TO:
SAMPLE RECEIVING
1-206-632-6206
BROOKS APPLIED LABS
STE 100
18804 N CREEK PKWY
BOTHELL WA 98011-8024

WA 982 9-36

UPS NEXT DAY AIR 1

TRACKING #: 1Z 19X 705 01 9072 8557

BILLING: P/P

Reference No.1: 452483/60080
Reference No.2: Lowry Landfill
XOL 21 03.15 NV45 45 0A 04/2021*

Sample Receipt Checklist:

Container Type:

- [x] Cooler
- [ ] Cardboard box
- [ ] Styrofoam cooler
- [ ] Other (Specify):

- [ ] Custody Seal Present?
- Custody Seal Intact? Y / N
- [x] Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#: 30

- [ ] None
- [ ] Blue Ice: °C
- [x] Ice: -0.4 °C
- [ ] Dry Ice: °C
- [ ] Temp Blank: °C

Corrected Temp: °C

Coolant Note:

Bottle Type:

- [x] Client Provided
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:

All information accurate

Initial/date:

SP / 4-30-21

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

May 14, 2021

Parsons
Attn: Lyn Brill
1776 Lincoln Suite 600
Denver, CO 80203
Lyn.Brill@Parsons.com

RE: Lowry Environmental Protection Cleanup Trust WTP 452483.60080

Dr. Brill,

Brooks Applied Labs (BAL) received eight field-filtered aqueous samples requesting molybdenum (Mo) speciation on May 4, 2021. All samples were received in acceptable condition and stored according to BAL SOPs.

Dissolved Mo Speciation by IC-ICP-CRC-MS
Each submitted sample was analyzed for molybdenum species using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on May 5, 2021. Mo species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS). The instrument response was calibrated using a known molybdate [Mo(VI)] standard and any unidentified Mo species [Sum Unk. Mo] were quantified using this Mo(VI) calibration curve.

Dissolved Mo Quantitation by ICP-QQQ-MS
An aliquot of each submitted sample was acidified to a pH < 2 using concentrated nitric acid and allowed to digest overnight. All samples were then analyzed for dissolved Mo on May 5, 2021 by a modified EPA Method 6020 employing inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results.

Analytical Issues
No significant analytical issues were encountered with either the Mo speciation or the dissolved Mo analyses.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements.

Please contact us if you have any questions regarding this report.

Sincerely,

Ben Wozniak

Ben Wozniak
Technical Services
Ben@brooksapplied.com

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-170

Laboratory Sample ID
2105014-01

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	10900	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	10600	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-173A

Laboratory Sample ID
2105014-02

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	10500	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	10200	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-174A

Laboratory Sample ID
2105014-03

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	4980	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	5240	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-183

Laboratory Sample ID
2105014-04

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	1310	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	1320	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-175A

Laboratory Sample ID
2105014-05

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	4600	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	4790	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-176A

Laboratory Sample ID
2105014-06

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	3530	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	3640	5.0	50	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 5.0 U	5.0	50	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-193

Laboratory Sample ID
2105014-07

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	10300	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	10300	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Date Sampled: 05/03/2021 Date Received: 05/04/2021

Client Sample ID
TP-172

Laboratory Sample ID
2105014-08

Analyte	Method	Concentration	MDL	MRL	Units
Diss Mo	EPA 6020 Mod.	10400	69	200	µg/L
Mo(VI)	IC-ICP-CRC-MS	10700	13	130	µg/L
Sum Unk. Mo	IC-ICP-CRC-MS	< 13 U	13	130	µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Method Blank Summary

Analyte	BLK1	BLK2	BLK3	BLK4	MDL	MRL	Units
Diss Mo	0.000	-0.001	0.000	-0.001	0.034	0.10	µg/L
Mo(VI)	0.001	0.000	0.000	0.001	0.005	0.050	µg/L
Sum Unk. Mo	0.000	0.000	0.000	0.000	0.005	0.050	µg/L

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Laboratory Control Sample (LCS)

Analyte	LCS	True Value	Result	Recovery (%)
Diss Mo	NIST 1643f	115.3	114.4	99.2
Mo(VI)	Blank Spike	4.995	4.961	99.3

All results presented in µg/L

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Matrix Duplicates

Analyte	Lab Sample ID	Native Result	Duplicate Result	Mean	RPD (%)
Diss Mo	Batch QC	11298	11100	11199	1.8
Mo(VI)	2105014-06	3642	3839	3741	5.3
Sum Unk. Mo	2105014-06	< 5.0 U	< 5.0 U	NC	NC

All results presented in µg/L

U = Sample concentration is below the MDL

J = Sample concentration is between the MDL and the MRL

NC = Not Calculated (Result < RL)

Molybdenum Speciation for Parsons
Contact: Lyn Brill

Date: May 14, 2021
Report Generated by: Ben Wozniak
Brooks Applied Labs, LLC

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Lab Sample ID	Native Result	MS Spike Conc.	MS Result	MS Recov. (%)	MSD Spike Conc.	MSD Result	MSD Recov. (%)	RPD (%)
Diss Mo	Batch QC	11298	2041	13090	87.8	2041	13050	85.8	0.3
Mo(VI)	2105014-06	3642	5000	8750	102.2	5000	8669	100.5	0.9

All results presented in µg/L

Chain of Custody

PARSONS 1776 LINCOLN SUITE 600 DENVER, CO 80203 (303) 831-8100 FAX (303) 831-8208 CONTACT: LYN BRILL LYN.BRILL@PARSONS.COM PROJECT: LOWRY ENVIRONMENTAL PROTECTION/CLEANUP TRUST WTP 452483.60080	CHAIN OF CUSTODY # 5320215224 LAB CONTACT: BEN WOZNIAK BROOKS APPLIED LABS, BOTHELL, WA

SAMPLE ID	DATE	TIME	MATRIX
TP-170	5/3/21	1100	AQ
TP-173A	5/3/21	1010	AQ
TP-174A	5/3/21	0945	AQ
TP-183	5/3/21	0830	AQ
TP-175A	5/3/21	0925	AQ
TP-176A	5/3/21	0900	AQ
TP-193	5/3/21	1010	AQ
TP-172	5/3/21	1035	AQ

SUITE DESCRIPTION: WTP MOLYBDENUM MONITORING

Analysis requested for the sample points listed.	Container(s) Volume, Type & Preservatives
(IC-ICP-MS) Molybdenum Speciation	1 x 500 ml Poly Cool ≤ 4° C (.45 micron field filtered)

Special Instructions/Conditions of Receipt:

5-10 Day Turn Around Time

1. Relinquished By	Date	Time	1. Received By	Date	Time
Mike Gelwick	5-3-21	1410	Spencer Shuleyer	5/4/21	10:28
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Sample shipment: X UPS: **1Z 19X 705 01 9714 6137**

Comments:
IX System pH: 4.5su
IX System flow rate: ~1.5gpm
IX System Total Eff: ~177,440gal

COC QC

MICHAEL GELWICK
303-356-6559
PARSONS
3500 S. GUNCLUB RD
AURORA CO 80018

30 LBS

1 OF 1

SHIP TO:
SAMPLE RECEIVING
BROOKS APPLIED LABS
STE 100
18804 N CREEK PKWY
BOTHELL WA 98011-8024

WA 982 9-36

UPS NEXT DAY AIR

TRACKING #: 1Z 19X 705 01 9714 6137

BILLING: P/P

Reference No.1: 452483/60080
Reference No.2: Lowry Landfill
XOL 21 03.15 NV45 45 0A 04/2021*

Sample Receipt Checklist:

Container Type:

- [x] Cooler
- [ ] Cardboard box
- [ ] Styrofoam cooler
- [ ] Other (Specify):

- [x] Custody Seal Present?
- Custody Seal Intact? (Y / N)
- [x] Chain of Custody Present?

Coolant and Temperature

Coolant Type IR#: 30

- [ ] None
- [ ] Blue Ice: °C
- [x] Ice: 2.0 °C
- [ ] Dry Ice: °C
- [ ] Temp Blank: °C

Corrected Temp: °C

Coolant Note:

Bottle Type:

- [x] Client Provided
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:
- [ ] Class :
  - Size / Type:
  - Lot:
  - Preservation:
  - Preservative Lot:

All information accurate

Initial/date: SKS 5/4/21

APPENDIX B

WASTE DISPOSAL RECORDS

APPENDIX B-1

SUMMARY OF WASTE DISPOSED

TABLE B-1
SUMMARY OF WASTE DISPOSED AND TREATED OFFSITE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Date	Manifest No.	Waste Description	Quantity	Units	Facility	EPA Authorization[a/]
8/23/2021	10722500	WTP Sludge (Profile # 1004322)	15	CY[b/]	DADS[c/]	Not Required by WMP[d/]
11/26/2021	10722501	WTP Sludge (Profile # 1004322)	15	CY	DADS	Not Required by WMP

a/ Acceptance of the treatment and disposal facility was obtained from EPA before shipment offsite.
EPA authorizations are maintained in the project files on site and are available for review.

b/ CY=cubic yards

c/ DADS=Denver Arapaho Disposal Site

d/ WMP=Waste Management Plan

APPENDIX B-2

WASTE MANIFESTS

WASTE MANAGEMENT

Denver Arapahoe Disposal
3500 S Gun Club , PO Box 460397
Aurora, CO, 80018
Ph: (720) 876-2620

Original
Ticket# 3860437

Customer Name JDSPROFESSIONALGROUP JDS PROF
Ticket Date 08/23/2021
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code SW
Manifest 10722500
Destination
PO
Profile 1004322 (Spwaste Solid Oth)
Generator 125-LOWRYENVIRONMENTAL LOWRY ENVIRONMENTAL

Carrier DENVERARAP DENVER ARAPAHOE DISPOSAL
Vehicle# 1
Container
Driver
Check#
Billing # 0015317
Gen EPA ID
Grid
Volume

	Time	Scale	Operator	Inbound		
In	08/23/2021 13:46:41	Scale3	dbusinge		Gross	56920 lb
Out	08/23/2021 14:36:49	Scale3	dbusinge		Tare	32720 lb
					Net	24200 lb
					Tons	12.10

Comments

PLEASE MAKE SURE YOUR TICKET IS CORRECT BEFORE SIGNING.

	Product	LD%	Qty	UOM	Rate	Fee	Amount	Origin
1	Spwaste Solid Oth-	100	12.10	Tons				
2	RCR-P-Regulatory C	100		%				
3	FUEL-Fuel Surcharg	100		%				
4	EVF-P-Standard Env	100		%				
5	WWM-P650-Waste Wat	100		%				

Total Fees
Total Ticket

Driver's Signature Nullmai Lalan

Nullmai Lalan

NON-HAZARDOUS MANIFEST

WASTE MANAGEMENT

NON-HAZARDOUS MANIFEST | 1. Generator's US EPA ID No: COD980953723 | Manifest Doc No. | 2. Page 1 of: 1 | 3860437

3. Generator's Mailing Address:
LOWRY ENVIRONMENTAL PROTECTION
3500 S GUN CLUB RD
AURORA, CO 80018
4. Generator's Phone: 303-710-9419

Generator's Site Address (If different than mailing):

A. Manifest Number: WMNA 10722500

B. State Generator's ID:

5. Transporter 1 Company Name | 6. US EPA ID Number | C. State Transporter's ID | D. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number | E. State Transporter's ID | F. Transporter's Phone

9. Designated Facility Name and Site Address
DENVER ARAPAHOE DISPOSAL
3500 S GUNCLUB RD
AURORA, CO 80018

10. US EPA ID Number | G. State Facility ID | H. State Facility Phone: 720-876-2620

GENERATOR

11. Description of Waste Materials	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.	I. Misc. Comments
a. NON-REGULATED SOLID – WATER TREATMENT PLANT SLUDGE WM Profile # 1004322	1	Roll-off	15	yds	
b. WM Profile #					
c. WM Profile #					

REGULATORY AGENCY:
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80222-1530

J. Additional Descriptions for Materials Listed Above
ACCT #: D 15317 CUST NAME: JDS PROFESSIONAL GROUP

K. Disposal Location
Cell: 32 Level:
Grid:

15. Special Handling Instructions and Additional Information

Purchase Order # | EMERGENCY CONTACT / PHONE NO.: 1-800-424-9300 24HR TOLL FREE

16. GENERATOR'S CERTIFICATE:
I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.

Printed Name	Signature "On behalf of"	Month	Day	Year
Daniel Griffiths as agent of and on behalf of the bury trust		8	23	21

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed Name	Signature	Month	Day	Year
Nathaniel Lalas		8	23	21

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed Name	Signature	Month	Day	Year

FACILITY

19. Certificate of Final Treatment/Disposal
I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.

20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest.

Printed Name	Signature	Month	Day	Year
Dustin		8	25	21

White- TREATMENT, STORAGE, DISPOSAL FACILITY COPY
Blue- GENERATOR #2 COPY
Yellow- GENERATOR #1 COPY
Pink- FACILITY USE ONLY
Gold- TRANSPORTER #1 COPY

WASTE MANAGEMENT

NON-HAZARDOUS MANIFEST

NON-HAZARDOUS MANIFEST	1. Generator's US EPA ID No. COD980953723 Manifest Doc No.	2. Page 1 of 1	3922834
3. Generator's Mailing Address: LOWRY ENVIRONMENTAL PROTECTION 3500 S GUN CLUB RD AURORA, CO 80018 4. Generator's Phone 303-710-9419	Generator's Site Address (if different than mailing):	A. Manifest Number WMNA	10722501
		B. State Generator's ID	
5. Transporter 1 Company Name WM NM406553	6. US EPA ID Number	C. State Transporter's ID	
7. Transporter 2 Company Name	8. US EPA ID Number	D. Transporter's Phone	
		E. State Transporter's ID	
9. Designated Facility Name and Site Address DENVER ARAPAHOE DISPOSAL 3500 S GUNCLUB RD AURORA, CO 80018	10. US EPA ID Number	F. Transporter's Phone	
		G. State Facility ID	
		H. State Facility Phone 720-876-2620	

GENERATOR	11. Description of Waste Materials	12 Containers No.	12 Containers Type	13. Total Quantity	14. Unit Wt./Vol.	I. Misc. Comments
	a. NON-REGULATED SOLID – WATER TREATMENT PLANT SLUDGE WM Profile # 1004322	1	Roll-off	15	yd3	
	b. WM Profile #			11.57TN		
	c. WM Profile #					
	REGULATORY AGENCY: Colorado Department of Public Health and Environment 4300 Cherry Creek Drive South Denver, CO 80222-1530					

J. Additional Descriptions for Materials Listed Above: ACCT #: D 15317 CUST NAME: JDS PROFESSIONAL GROUP

K. Disposal Location: 32 Cell Level Grid

15. Special Handling Instructions and Additional Information

Purchase Order # EMERGENCY CONTACT / PHONE NO.: 1-800-424-9300 24HR TOLL FREE

16. GENERATOR'S CERTIFICATE:

I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.

	Printed Name	Signature / On behalf of:	Month	Day	Year
GENERATOR	Daniel Griffiths	as agent of and on behalf of the Lowry Trust	11	24	21
TRANSPORTER	17. Transporter 1 Acknowledgement of Receipt of Materials: Guy McMaster		11	26	21
	18. Transporter 2 Acknowledgement of Receipt of Materials: Printed Name	Signature	Month	Day	Year
FACILITY	19. Certificate of Final Treatment/Disposal: I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.				
	20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest. Printed Name	Signature	Month 11	Day 26	Year 21

White- TREATMENT, STORAGE, DISPOSAL FACILITY COPY Blue- GENERATOR #2 COPY Yellow- GENERATOR #1 COPY

Pink- FACILITY USE ONLY Gold- TRANSPORTER #1 COPY

WASTE MANAGEMENT

Denver Arapahoe Disposal
3500 S Gun Club , PO Box 460397
Aurora, CO, 80018
Ph: (720) 876-2620

Reprint
Ticket# 3922834

Customer Name JDSPROFESSIONALGROUP JDS PROF
Ticket Date 11/26/2021
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code SW
Manifest 10722501
Destination
PO
Profile 1004322 (Spwaste Solid Oth)
Generator 125-LOWRYENVIRONMENTAL LOWRY ENVIRONMENTAL

Carrier WMNRO WMN - ROLLOFF
Vehicle# 406553
Container
Driver
Check#
Billing # 0015317
Gen EPA ID
Grid

Volume

	Time	Scale	Operator	Inbound		
In	11/26/2021 12:44:56	Scale3	cmoran3		Gross	56360 lb
Out	11/26/2021 13:19:31	Scale3	cmoran3		Tare	33220 lb
					Net	23140 lb
					Tons	11.57

Comments

PLEASE MAKE SURE YOUR TICKET IS CORRECT BEFORE SIGNING.

	Product	LD%	Qty	UOM	Rate	Fee	Amount	Origin
1	Spwaste Solid Oth-	100	11.57	Tons				
2	RCR-P-Regulatory C	100		%				
3	FUEL-Fuel Surcharg	100		%				
4	EVF-P-Standard Env	100		%				
5	WWM-P650-Waste Wat	100		%				

Total Fees
Total Ticket

Driver`s Signature

APPENDIX C

GROUNDWATER

APPENDIX C-1

NEW MONITORING WELL LOGS

NO NEW MONITORING WELLS WERE INSTALLED FROM JULY TO DECEMBER 2021

APPENDIX C-2

MONITORING WELL HYDROGRAPHS

A folder containing the monitoring well hydrographs is included separately in this submittal

APPENDIX C-3

COMPLIANCE EVALUATION STATISTICAL TESTING AND ANALYTE STATISTICAL TREND ANALYSIS PLOTS

The material contained in this appendix represents the output of the statistical evaluations completed EPA's ProUCL Software and manual calculations for regression analysis.

APPENDIX C-3.1

COMPLIANCE EVALUATION STATISTICAL TESTING

Data Summary Table

TABLE C-3.1
COMPLIANCE WELL DATA FOR STATISTICS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
B-313	1,4-Dioxane	4/16/2019	14		ug/L	0.9
B-313	1,4-Dioxane	7/16/2019	2.3		ug/l	0.9
B-313	1,4-Dioxane	10/15/2019	7.2		ug/l	0.9
B-313	1,4-Dioxane	1/28/2020	20		ug/L	0.9
B-313	1,4-Dioxane	4/28/2020	21		ug/L	0.9
B-313	1,4-Dioxane	7/28/2020	18		ug/L	0.9
B-313	1,4-Dioxane	12/9/2020	17		ug/L	0.9
B-313	1,4-Dioxane	2/17/2021	16		ug/L	0.9
B-313	1,4-Dioxane	5/18/2021	15		ug/L	0.9
B-313	1,4-Dioxane	11/16/2021	17		ug/L	0.9
B-313	Nitrogen, Nitrate	1/3/2019	21000		ug/L	5000
B-313	Nitrogen, Nitrate	4/16/2019	22000		ug/L	10000
B-313	Nitrogen, Nitrate	7/16/2019	47000		ug/L	10000
B-313	Nitrogen, Nitrate	10/17/2019	40000		ug/L	2500
B-313	Nitrogen, Nitrate	1/28/2020	30000		ug/L	2500
B-313	Nitrogen, Nitrate	4/28/2020	28000		ug/L	10000
B-313	Nitrogen, Nitrate	7/28/2020	32000		ug/L	2500
B-313	Nitrogen, Nitrate	2/17/2021	22000		ug/L	2500
B-313	Nitrogen, Nitrate	5/18/2021	39000	J	ug/L	500
B-313	Nitrogen, Nitrate	8/12/2021	55000	J	ug/L	2500
B-326-UD	1,4-Dioxane	8/26/2019	7		ug/l	0.9
B-326-UD	1,4-Dioxane	12/11/2019	7.1		ug/l	0.9
B-326-UD	1,4-Dioxane	2/12/2020	7.7		ug/L	0.9
B-326-UD	1,4-Dioxane	5/27/2020	6.9		ug/L	0.9
B-326-UD	1,4-Dioxane	9/2/2020	6.7		ug/L	0.9
B-326-UD	1,4-Dioxane	12/10/2020	6.4		ug/L	0.9
B-326-UD	1,4-Dioxane	2/4/2021	6.7		ug/L	0.9
B-326-UD	1,4-Dioxane	6/1/2021	6		ug/L	0.9
B-326-UD	1,4-Dioxane	8/30/2021	6.1		ug/L	0.9
B-326-UD	1,4-Dioxane	10/12/2021	5		ug/L	0.9
B-326-UD	Nitrogen, Nitrate	4/28/2015	19000		ug/L	2500
B-326-UD	Nitrogen, Nitrate	5/1/2017	40000		ug/L	2500
B-326-UD	Nitrogen, Nitrate	7/31/2018	66000		ug/L	5000
B-326-UD	Nitrogen, Nitrate	3/21/2019	49000		ug/L	2500
B-326-UD	Nitrogen, Nitrate	6/17/2019	9300		ug/L	500
B-326-UD	Nitrogen, Nitrate	8/26/2019	990		ug/L	500
B-326-UD	Nitrogen, Nitrate	12/11/2019	700		ug/L	500
B-326-UD	Nitrogen, Nitrate	2/12/2020	730		ug/L	500
B-326-UD	Nitrogen, Nitrate	9/2/2020	90	U	ug/L	500
B-326-UD	Nitrogen, Nitrate	2/4/2021	90	U	ug/L	500
B-326-WD	1,4-Dioxane	8/26/2019	10		ug/l	0.9
B-326-WD	1,4-Dioxane	12/11/2019	8.8		ug/l	0.9
B-326-WD	1,4-Dioxane	2/12/2020	10		ug/L	0.9
B-326-WD	1,4-Dioxane	5/28/2020	11		ug/L	0.9
B-326-WD	1,4-Dioxane	8/26/2020	3.5		ug/L	0.9
B-326-WD	1,4-Dioxane	11/23/2020	3.9		ug/L	0.9
B-326-WD	1,4-Dioxane	2/3/2021	17		ug/L	0.9
B-326-WD	1,4-Dioxane	6/1/2021	7.5		ug/L	0.9
B-326-WD	1,4-Dioxane	8/30/2021	0.77	J	ug/L	0.9
B-326-WD	1,4-Dioxane	10/12/2021	1		ug/L	0.9
BM-11X-100N	Tetrachloroethene	4/20/2017	5.1		ug/L	1
BM-11X-100N	Tetrachloroethene	10/20/2017	4.6		ug/L	1

TABLE C-3.1
COMPLIANCE WELL DATA FOR STATISTICS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
BM-11X-100N	Tetrachloroethene	4/17/2018	5.9		ug/L	1
BM-11X-100N	Tetrachloroethene	10/12/2018	6.3		ug/L	1
BM-11X-100N	Tetrachloroethene	4/23/2019	6.5		ug/L	1
BM-11X-100N	Tetrachloroethene	10/14/2019	6.8		ug/L	1
BM-11X-100N	Tetrachloroethene	4/30/2020	6.9		ug/L	1
BM-11X-100N	Tetrachloroethene	11/16/2020	7.2		ug/L	1
BM-11X-100N	Tetrachloroethene	5/6/2021	6	J	ug/L	1
BM-11X-100N	Tetrachloroethene	10/28/2021	5.4		ug/L	1
BM-11X-100N	Trichloroethene	4/20/2017	4.5		ug/L	1
BM-11X-100N	Trichloroethene	10/20/2017	3.6		ug/L	1
BM-11X-100N	Trichloroethene	4/17/2018	4.7		ug/L	1
BM-11X-100N	Trichloroethene	10/12/2018	4.5		ug/L	1
BM-11X-100N	Trichloroethene	4/23/2019	4.3		ug/L	1
BM-11X-100N	Trichloroethene	10/14/2019	4.9		ug/L	1
BM-11X-100N	Trichloroethene	4/30/2020	5		ug/L	1
BM-11X-100N	Trichloroethene	11/16/2020	5.7		ug/L	1
BM-11X-100N	Trichloroethene	5/6/2021	5.5		ug/L	1
BM-11X-100N	Trichloroethene	10/28/2021	4.8		ug/L	1
BM-15N6	Nitrogen, Nitrate	4/25/2017	46000		ug/L	5000
BM-15N6	Nitrogen, Nitrate	10/24/2017	43000		ug/L	2500
BM-15N6	Nitrogen, Nitrate	4/23/2018	42000		ug/L	5000
BM-15N6	Nitrogen, Nitrate	10/19/2018	49000		ug/L	10000
BM-15N6	Nitrogen, Nitrate	4/26/2019	35000		ug/L	10000
BM-15N6	Nitrogen, Nitrate	12/12/2019	42000	J	ug/L	500
BM-15N6	Nitrogen, Nitrate	5/13/2020	35000		ug/L	2500
BM-15N6	Nitrogen, Nitrate	2/23/2021	32000		ug/L	5000
BM-15N6	Nitrogen, Nitrate	4/22/2021	31000		ug/L	2500
BM-15N6	Nitrogen, Nitrate	10/13/2021	30000		ug/L	5000
GW-109	1,4-Dioxane	5/31/2016	2.1		ug/L	0.9
GW-109	1,4-Dioxane	11/2/2016	3.3		ug/L	0.9
GW-109	1,4-Dioxane	5/10/2017	0.76	J	ug/L	0.9
GW-109	1,4-Dioxane	10/27/2017	0.95		ug/L	0.9
GW-109	1,4-Dioxane	5/4/2018	0.54	J	ug/L	0.9
GW-109	1,4-Dioxane	7/31/2018	0.54	J	ug/L	0.9
GW-109	1,4-Dioxane	1/3/2019	0.53	J	ug/L	0.9
GW-109	1,4-Dioxane	4/16/2019	9.7		ug/L	0.9
GW-109	1,4-Dioxane	3/2/2020	41		ug/L	0.9
GW-109	1,4-Dioxane	6/1/2020	20		ug/L	0.9
GW-109	Bromodichloromethane	11/16/2015	2.8		ug/L	1
GW-109	Bromodichloromethane	5/31/2016	0.44	J	ug/L	1
GW-109	Bromodichloromethane	11/2/2016	0.17	U	ug/L	1
GW-109	Bromodichloromethane	5/10/2017	0.17	U	ug/L	1
GW-109	Bromodichloromethane	10/27/2017	0.17	U	ug/L	1
GW-109	Bromodichloromethane	5/4/2018	0.17	U	ug/L	1
GW-109	Bromodichloromethane	7/31/2018	0.17	U	ug/L	1
GW-109	Bromodichloromethane	1/3/2019	0.17	U	ug/L	1
GW-109	Bromodichloromethane	4/16/2019	0.17	U	ug/L	1
GW-109	Bromodichloromethane	6/1/2020	0.17	U	ug/L	1
GW-109	Chloroform	11/16/2015	4.4		ug/L	1
GW-109	Chloroform	5/31/2016	0.81	J	ug/L	1
GW-109	Chloroform	11/2/2016	0.3	J	ug/L	1
GW-109	Chloroform	5/10/2017	0.16	U	ug/L	1

TABLE C-3.1
COMPLIANCE WELL DATA FOR STATISTICS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
GW-109	Chloroform	10/27/2017	0.16	U	ug/L	1
GW-109	Chloroform	5/4/2018	0.16	U	ug/L	1
GW-109	Chloroform	7/31/2018	0.16	U	ug/L	1
GW-109	Chloroform	1/3/2019	0.16	U	ug/L	1
GW-109	Chloroform	4/16/2019	0.16	U	ug/L	1
GW-109	Chloroform	6/1/2020	0.16	U	ug/L	1
MW106-UD	1,4-Dioxane	11/21/2006	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	2/28/2007	6.5		ug/l	5
MW106-UD	1,4-Dioxane	5/25/2007	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	8/12/2009	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	7/26/2011	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	8/1/2013	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	7/13/2015	0.5	U	ug/l	5
MW106-UD	1,4-Dioxane	7/26/2017	0.15	U	ug/L	0.9
MW106-UD	1,4-Dioxane	8/9/2018	0.15	U	ug/L	0.9
MW106-UD	1,4-Dioxane	8/26/2020	0.09	U	ug/L	0.9
MW23-C-SD	1,4-Dioxane	3/15/2006	0.5	U	ug/l	5
MW23-C-SD	1,4-Dioxane	8/21/2007	0.5	UJ	ug/l	5
MW23-C-SD	1,4-Dioxane	8/19/2009	0.5	U	ug/l	5
MW23-C-SD	1,4-Dioxane	8/11/2011	0.5	U	ug/l	5
MW23-C-SD	1,4-Dioxane	8/27/2013	0.5	U	ug/l	5
MW23-C-SD	1,4-Dioxane	9/2/2015	0.15	U	ug/L	0.9
MW23-C-SD	1,4-Dioxane	8/1/2017	0.15	U	ug/L	0.9
MW23-C-SD	1,4-Dioxane	7/31/2018	0.15	U	ug/L	0.9
MW23-C-SD	1,4-Dioxane	9/15/2020	1.4		ug/L	0.9
MW23-C-SD	1,4-Dioxane	2/18/2021	0.09	U	ug/L	0.9
MW38-830N-230E	1,4-Dioxane	4/26/2017	12		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	11/1/2017	12		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	4/26/2018	9.3		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	8/7/2018	13		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	5/1/2019	7.1		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	10/22/2019	2.4		ug/l	0.9
MW38-830N-230E	1,4-Dioxane	1/28/2020	2		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	11/12/2020	2.1		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	4/15/2021	4.5		ug/L	0.9
MW38-830N-230E	1,4-Dioxane	10/14/2021	4.6		ug/L	0.9
MW38-830N-230E	Chloroform	4/26/2017	6.4		ug/L	1
MW38-830N-230E	Chloroform	11/1/2017	6.9		ug/L	1
MW38-830N-230E	Chloroform	4/26/2018	6.2		ug/L	1
MW38-830N-230E	Chloroform	8/7/2018	5.9		ug/L	1
MW38-830N-230E	Chloroform	5/1/2019	5.4		ug/L	1
MW38-830N-230E	Chloroform	10/22/2019	2.1		ug/L	1
MW38-830N-230E	Chloroform	1/28/2020	2.1		ug/L	1
MW38-830N-230E	Chloroform	11/12/2020	2.6		ug/L	1
MW38-830N-230E	Chloroform	4/15/2021	4.3		ug/L	1
MW38-830N-230E	Chloroform	10/14/2021	3.7		ug/L	1
MW62-WDR	1,4-Dioxane	10/13/2017	4.6		ug/L	0.9
MW62-WDR	1,4-Dioxane	3/7/2018	3.9		ug/L	0.9
MW62-WDR	1,4-Dioxane	5/10/2018	4.2		ug/L	0.9
MW62-WDR	1,4-Dioxane	7/31/2018	3.8		ug/L	0.9
MW62-WDR	1,4-Dioxane	5/14/2019	3.9		ug/L	0.9
MW62-WDR	1,4-Dioxane	12/17/2019	3.5		ug/l	0.9

TABLE C-3.1
COMPLIANCE WELL DATA FOR STATISTICS
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Well ID	Constituent/Parameter	Date Sampled	Result	Qualifier[a/]	Units[b/]	Reporting Limit
MW62-WDR	1,4-Dioxane	5/14/2020	3.4		ug/L	0.9
MW62-WDR	1,4-Dioxane	11/11/2020	3.2		ug/L	0.9
MW62-WDR	1,4-Dioxane	4/27/2021	3.3		ug/L	0.9
MW62-WDR	1,4-Dioxane	10/27/2021	3.2		ug/L	0.9
MW62-WDR	Nitrogen, Nitrate	10/13/2017	120000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	3/7/2018	110000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	5/10/2018	120000		ug/L	25000
MW62-WDR	Nitrogen, Nitrate	7/31/2018	120000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	5/14/2019	120000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	12/17/2019	120000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	5/14/2020	130000		ug/L	10000
MW62-WDR	Nitrogen, Nitrate	11/11/2020	130000	J	ug/L	2500
MW62-WDR	Nitrogen, Nitrate	4/27/2021	120000		ug/L	25000
MW62-WDR	Nitrogen, Nitrate	10/27/2021	110000		ug/L	25000
MW62-WDR	Nitrogen, Nitrite	10/13/2017	3600		ug/L	500
MW62-WDR	Nitrogen, Nitrite	3/7/2018	5400		ug/L	1000
MW62-WDR	Nitrogen, Nitrite	5/10/2018	4000		ug/L	500
MW62-WDR	Nitrogen, Nitrite	7/31/2018	2400		ug/L	1000
MW62-WDR	Nitrogen, Nitrite	5/14/2019	1900		ug/L	1000
MW62-WDR	Nitrogen, Nitrite	12/17/2019	980	U	ug/L	10000
MW62-WDR	Nitrogen, Nitrite	5/14/2020	1500	J	ug/L	10000
MW62-WDR	Nitrogen, Nitrite	11/11/2020	890		ug/L	500
MW62-WDR	Nitrogen, Nitrite	4/27/2021	1800		ug/L	1000
MW62-WDR	Nitrogen, Nitrite	10/27/2021	2200		ug/L	500
MW77-WD	1,4-Dioxane	4/24/2017	20		ug/L	0.9
MW77-WD	1,4-Dioxane	10/26/2017	5.3		ug/L	0.9
MW77-WD	1,4-Dioxane	5/3/2018	9		ug/L	0.9
MW77-WD	1,4-Dioxane	8/2/2018	2.6		ug/L	0.9
MW77-WD	1,4-Dioxane	5/2/2019	3		ug/L	0.9
MW77-WD	1,4-Dioxane	10/22/2019	12		ug/l	0.9
MW77-WD	1,4-Dioxane	5/4/2020	5		ug/L	0.9
MW77-WD	1,4-Dioxane	10/28/2020	16		ug/L	0.9
MW77-WD	1,4-Dioxane	4/21/2021	4.3		ug/L	0.9
MW77-WD	1,4-Dioxane	10/27/2021	11		ug/L	0.9

a/ Final Q definitions: U= The analyte was analyzed for and is not present above the level of the associated value. The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample. The associated value is the method detection limit as required by the statistical procedure in the GWMP

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

b/ µg/L = micrograms per liter

APPENDIX C-3.2

COMPLIANCE EVALUATION STATISTICAL TESTING

Mann-Kendall Trend Analysis

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-b-313

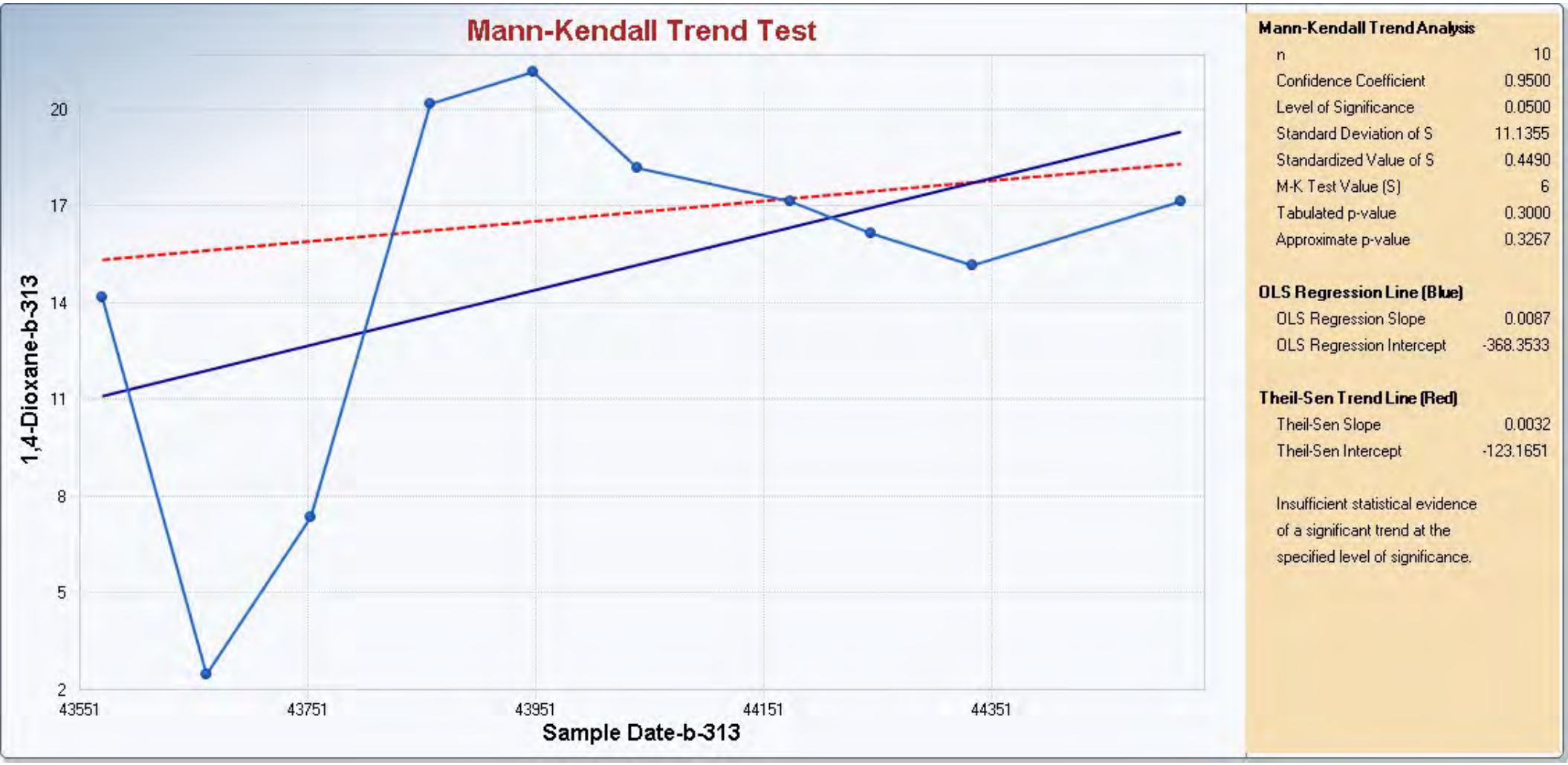
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	2.3
Maximum	21
Mean	14.75
Geometric Mean	12.84
Median	16.5
Standard Deviation	5.788
Coefficient of Variation	0.392

Mann-Kendall Test

M-K Test Value (S)	6
Tabulated p-value	0.3
Standard Deviation of S	11.14
Standardized Value of S	0.449
Approximate p-value	0.327

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
1,4-Dioxane-b-313
20
17
14
11
8
5
2
43551
43751
43951
44151
44351
Sample Date-b-313
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1355
Standardized Value of S 0.4490
M-K Test Value (S) 6
Tabulated p-value 0.3000
Approximate p-value 0.3267
OLS Regression Line (Blue)
OLS Regression Slope 0.0087
OLS Regression Intercept -368.3533
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0032
Theil-Sen Intercept -123.1651
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:24:06 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-b-313

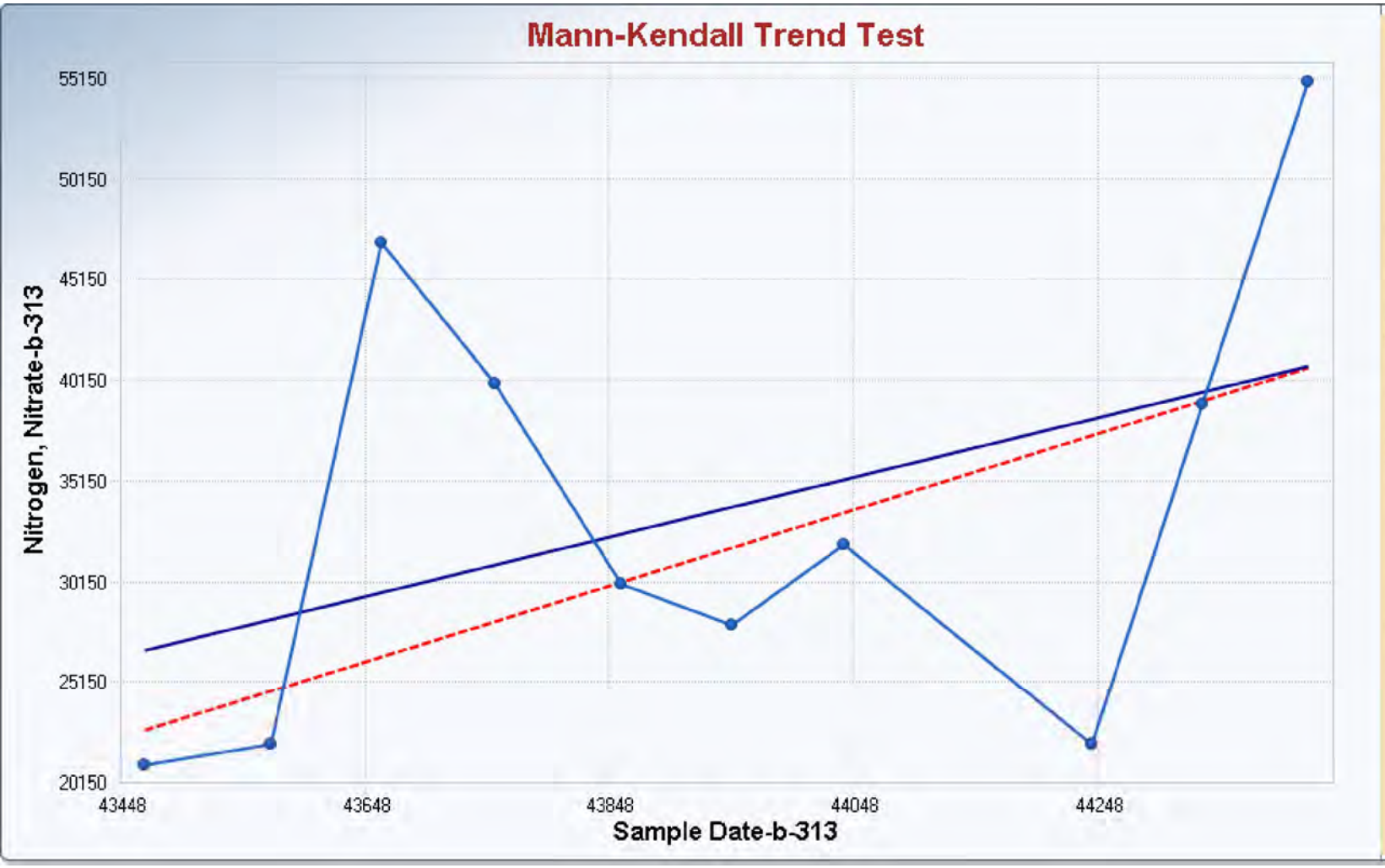
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	21000
Maximum	55000
Mean	33600
Geometric Mean	31931
Median	31000
Standard Deviation	11462
Coefficient of Variation	0.341

Mann-Kendall Test

M-K Test Value (S)	14
Tabulated p-value	0.108
Standard Deviation of S	11.14
Standardized Value of S	1.167
Approximate p-value	0.122

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1355
Standardized Value of S	1.1674
M-K Test Value (S)	14
Tabulated p-value	0.1080
Approximate p-value	0.1215

OLS Regression Line (Blue)

OLS Regression Slope	14.8045
OLS Regression Intercept	-616,761.4886

Theil-Sen Trend Line (Red)

Theil-Sen Slope	18.9076
Theil-Sen Intercept	-799,108.1933

Insufficient statistical evidence of a significant trend at the specified level of significance.

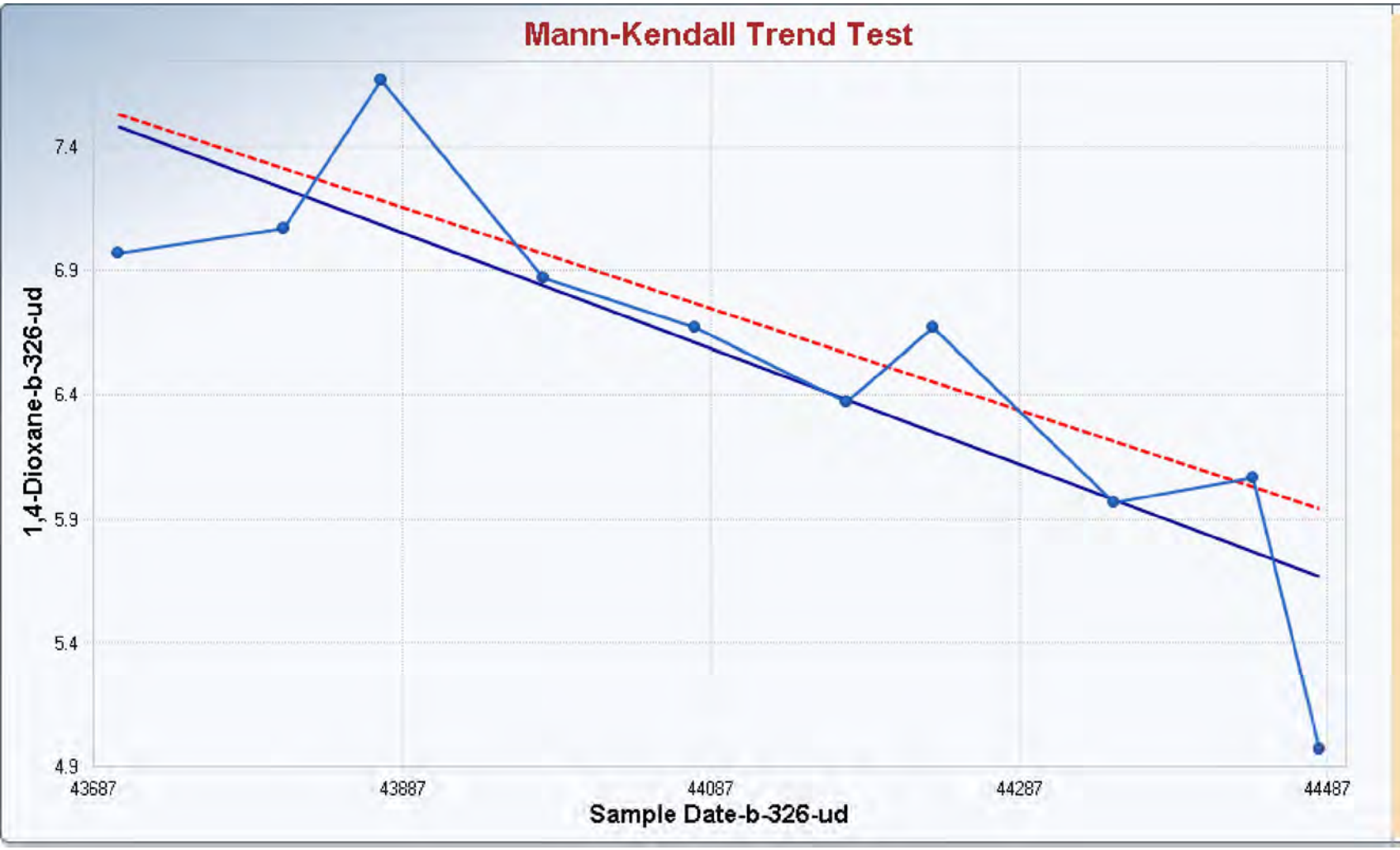
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-b-326-ud

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	5
Maximum	7.7
Mean	6.56
Geometric Mean	6.52
Median	6.7
Standard Deviation	0.74
Coefficient of Variation	0.113

Mann-Kendall Test	
M-K Test Value (S)	-34
Tabulated p-value	0
Standard Deviation of S	11.14
Standardized Value of S	-2.963
Approximate p-value	0.00152

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1355
Standardized Value of S	-2.9635
M-K Test Value (S)	-34
Tabulated p-value	0.0000
Approximate p-value	0.0015

OLS Regression Line (Blue)

OLS Regression Slope	-0.0023
OLS Regression Intercept	109.3515

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-0.0020
Theil-Sen Intercept	96.9194

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:24:06 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-b-326-ud

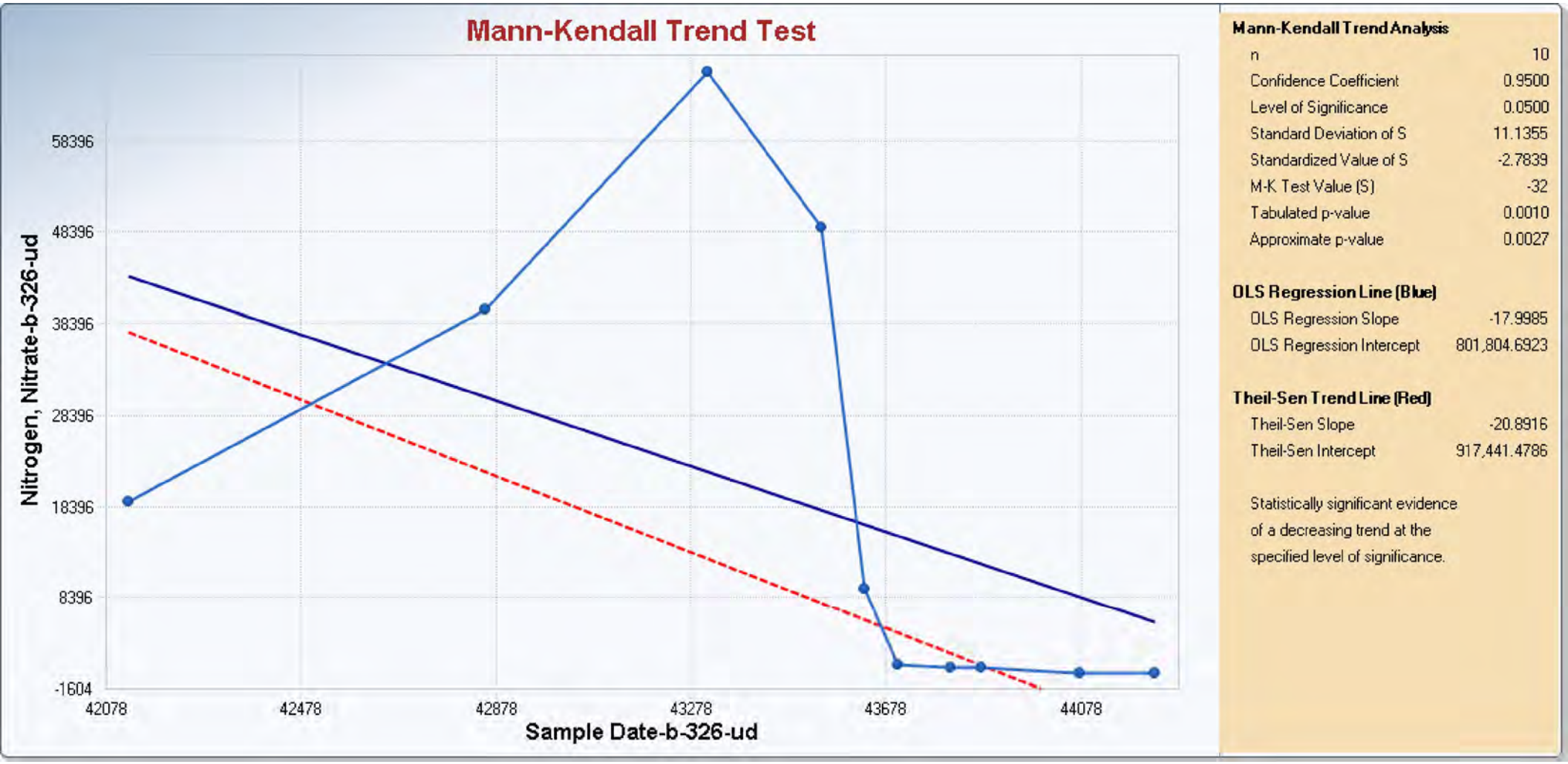
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	45
Maximum	66000
Mean	18581
Geometric Mean	2735
Median	5145
Standard Deviation	24390
Coefficient of Variation	1.313

Mann-Kendall Test

M-K Test Value (S)	-32
Tabulated p-value	0.001
Standard Deviation of S	11.14
Standardized Value of S	-2.784
Approximate p-value	0.00269

Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test
58396
48396
38396
28396
18396
8396
-1604
Nitrogen, Nitrate-b-326-ud
42078
42478
42878
43278
43678
44078
Sample Date-b-326-ud
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1355
Standardized Value of S -2.7839
M-K Test Value (S) -32
Tabulated p-value 0.0010
Approximate p-value 0.0027
OLS Regression Line (Blue)
OLS Regression Slope -17.9985
OLS Regression Intercept 801,804.6923
Theil-Sen Trend Line (Red)
Theil-Sen Slope -20.8916
Theil-Sen Intercept 917,441.4786
Statistically significant evidence of a decreasing trend at the specified level of significance.

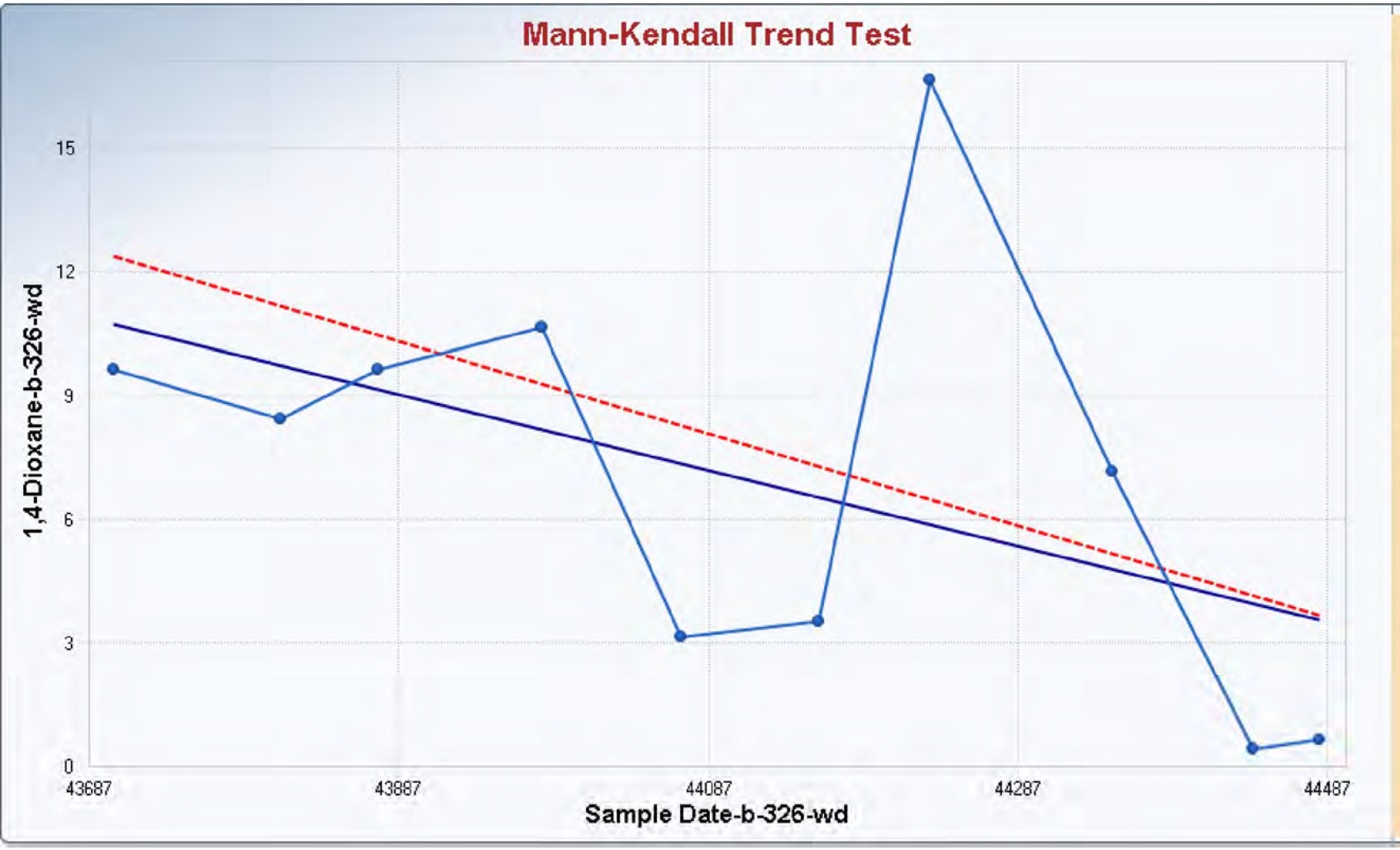
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-b-326-wd

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.77
Maximum	17
Mean	7.347
Geometric Mean	5.144
Median	8.15
Standard Deviation	5.088
Coefficient of Variation	0.692

Mann-Kendall Test	
M-K Test Value (S)	-16
Tabulated p-value	0.078
Standard Deviation of S	11.14
Standardized Value of S	-1.347
Approximate p-value	0.089

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1355
Standardized Value of S	-1.3470
M-K Test Value (S)	-16
Tabulated p-value	0.0780
Approximate p-value	0.0890

OLS Regression Line (Blue)

OLS Regression Slope	-0.0092
OLS Regression Intercept	411.4565

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-0.0112
Theil-Sen Intercept	501.2759

Insufficient statistical evidence of a significant trend at the specified level of significance.

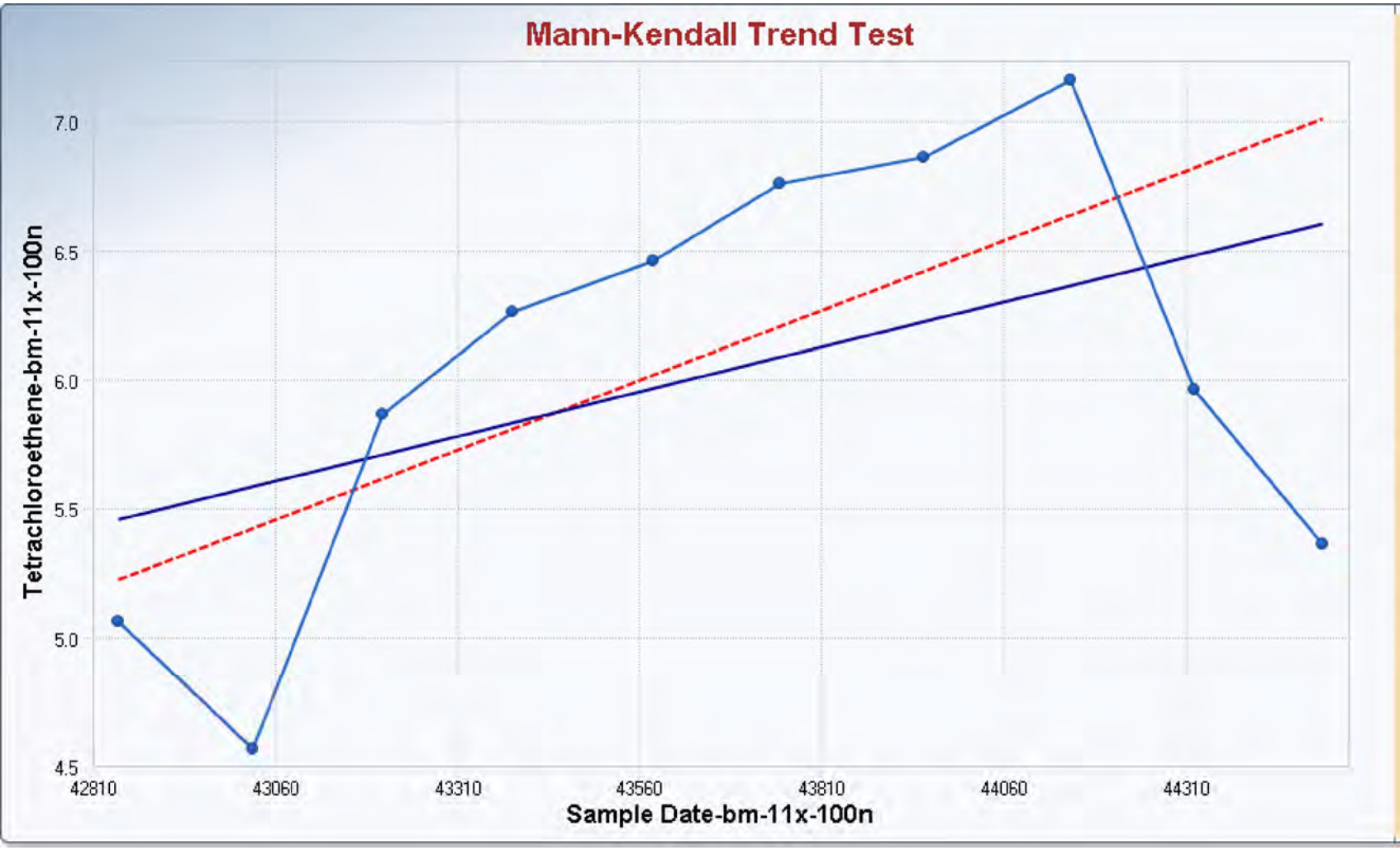
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:30:51 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_d.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Tetrachloroethene-bm-11x-100n

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	4.6
Maximum	7.2
Mean	6.07
Geometric Mean	6.015
Median	6.15
Standard Deviation	0.838
Coefficient of Variation	0.138

Mann-Kendall Test	
M-K Test Value (S)	19
Tabulated p-value	0.054
Standard Deviation of S	11.18
Standardized Value of S	1.61
Approximate p-value	0.0537

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	1.6100
M-K Test Value (S)	19
Tabulated p-value	0.0540
Approximate p-value	0.0537

OLS Regression Line (Blue)

OLS Regression Slope	0.0007
OLS Regression Intercept	-24.1667

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0011
Theil-Sen Intercept	-41.0919

Insufficient statistical evidence of a significant trend at the specified level of significance.

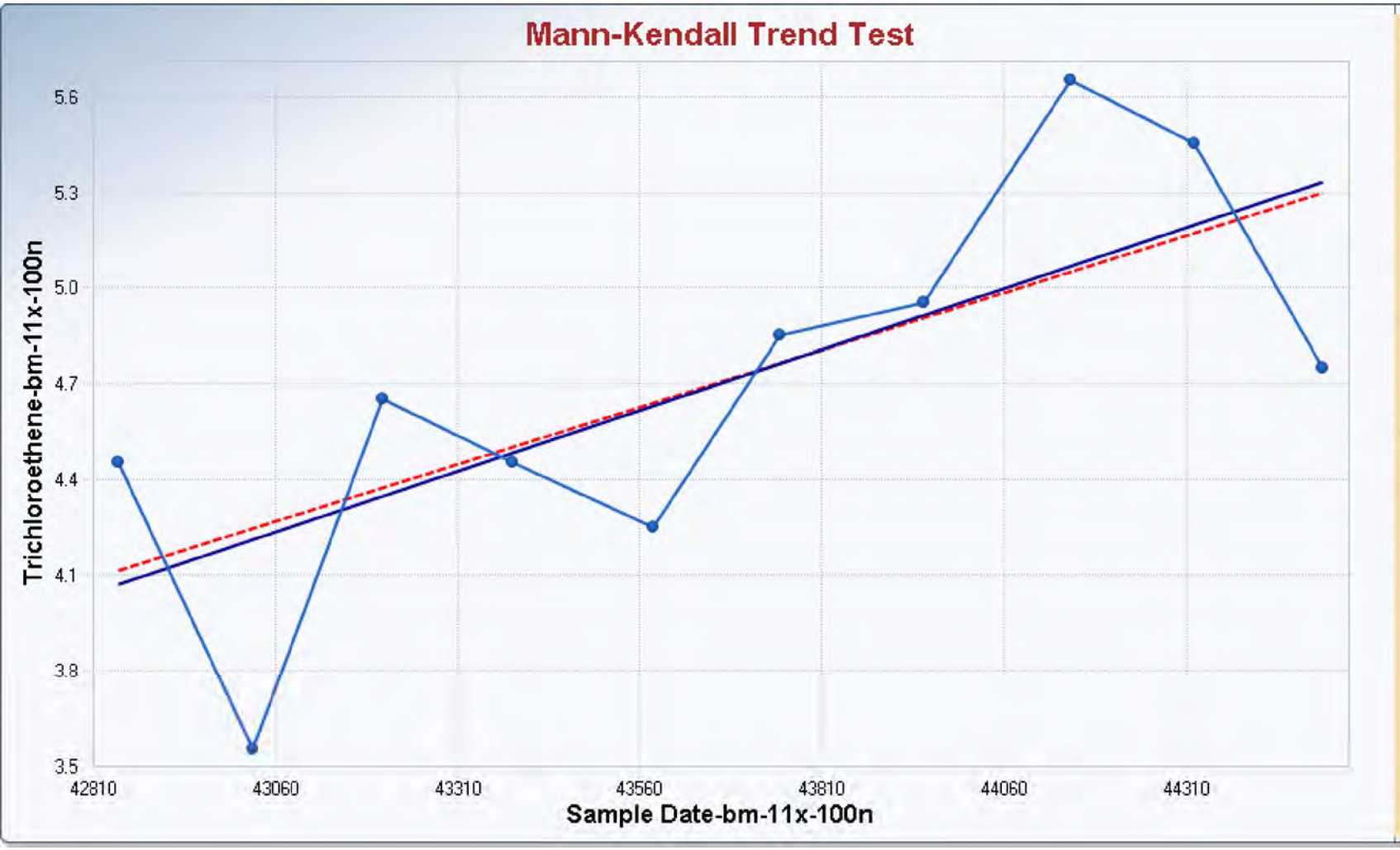
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:32:47 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_e.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Trichloroethene-bm-11x-100n

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	3.6
Maximum	5.7
Mean	4.75
Geometric Mean	4.715
Median	4.75
Standard Deviation	0.597
Coefficient of Variation	0.126

Mann-Kendall Test	
M-K Test Value (S)	24
Tabulated p-value	0.014
Standard Deviation of S	11.14
Standardized Value of S	2.065
Approximate p-value	0.0194

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1355
Standardized Value of S	2.0655
M-K Test Value (S)	24
Tabulated p-value	0.0140
Approximate p-value	0.0194

OLS Regression Line (Blue)

OLS Regression Slope	0.0008
OLS Regression Intercept	-28.5146

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0007
Theil-Sen Intercept	-26.5791

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:24:06 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-bm-15n6

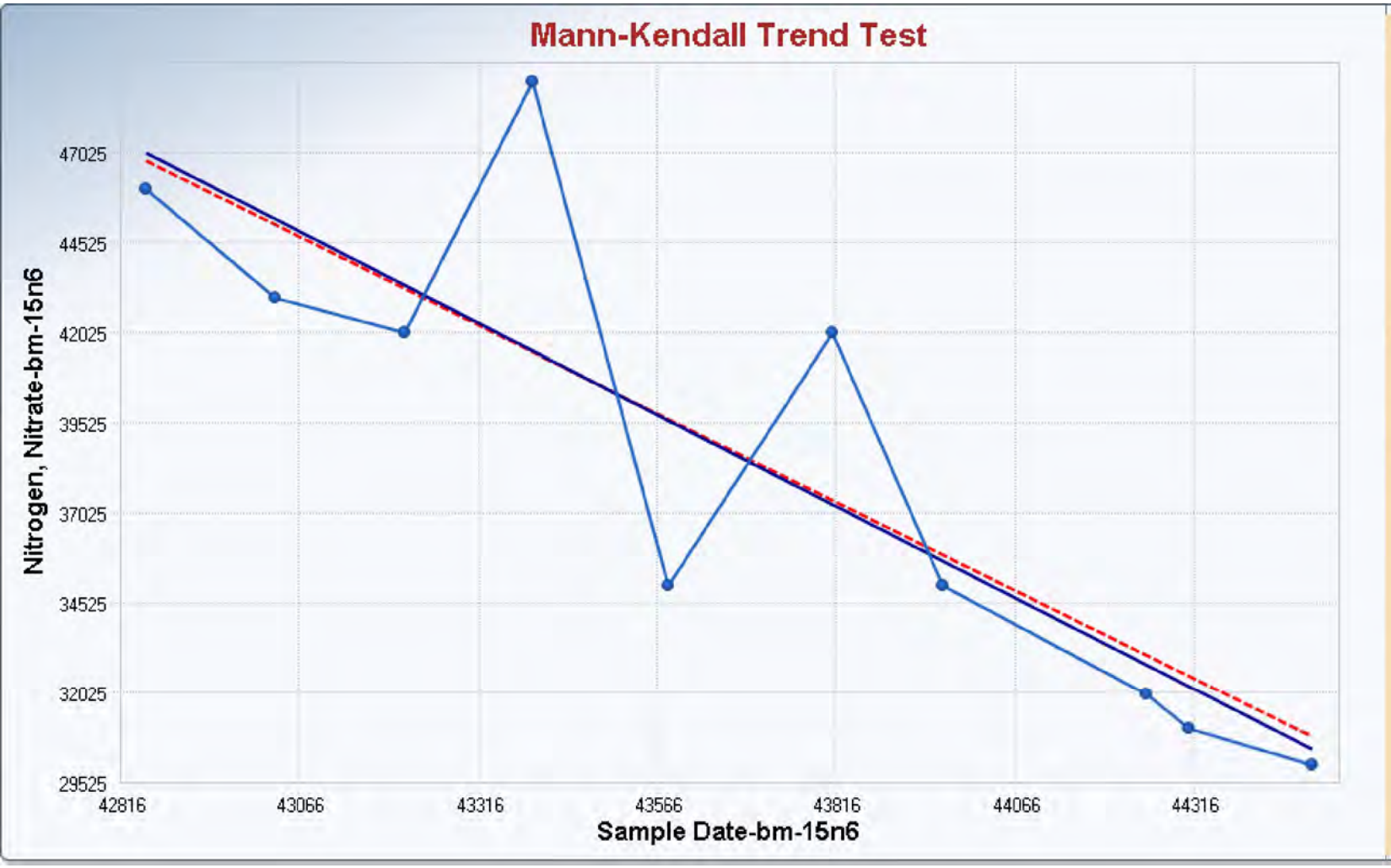
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	30000
Maximum	49000
Mean	38500
Geometric Mean	37972
Median	38500
Standard Deviation	6721
Coefficient of Variation	0.175

Mann-Kendall Test

M-K Test Value (S)	-35
Tabulated p-value	0
Standard Deviation of S	11.09
Standardized Value of S	-3.066
Approximate p-value	0.00109

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.0905
Standardized Value of S	-3.0657
M-K Test Value (S)	-35
Tabulated p-value	0.0000
Approximate p-value	0.0011

OLS Regression Line (Blue)

OLS Regression Slope	-10.1486
OLS Regression Intercept	481,876.6267

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-9.8039
Theil-Sen Intercept	466,892.1569

Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-mw23-c-sd

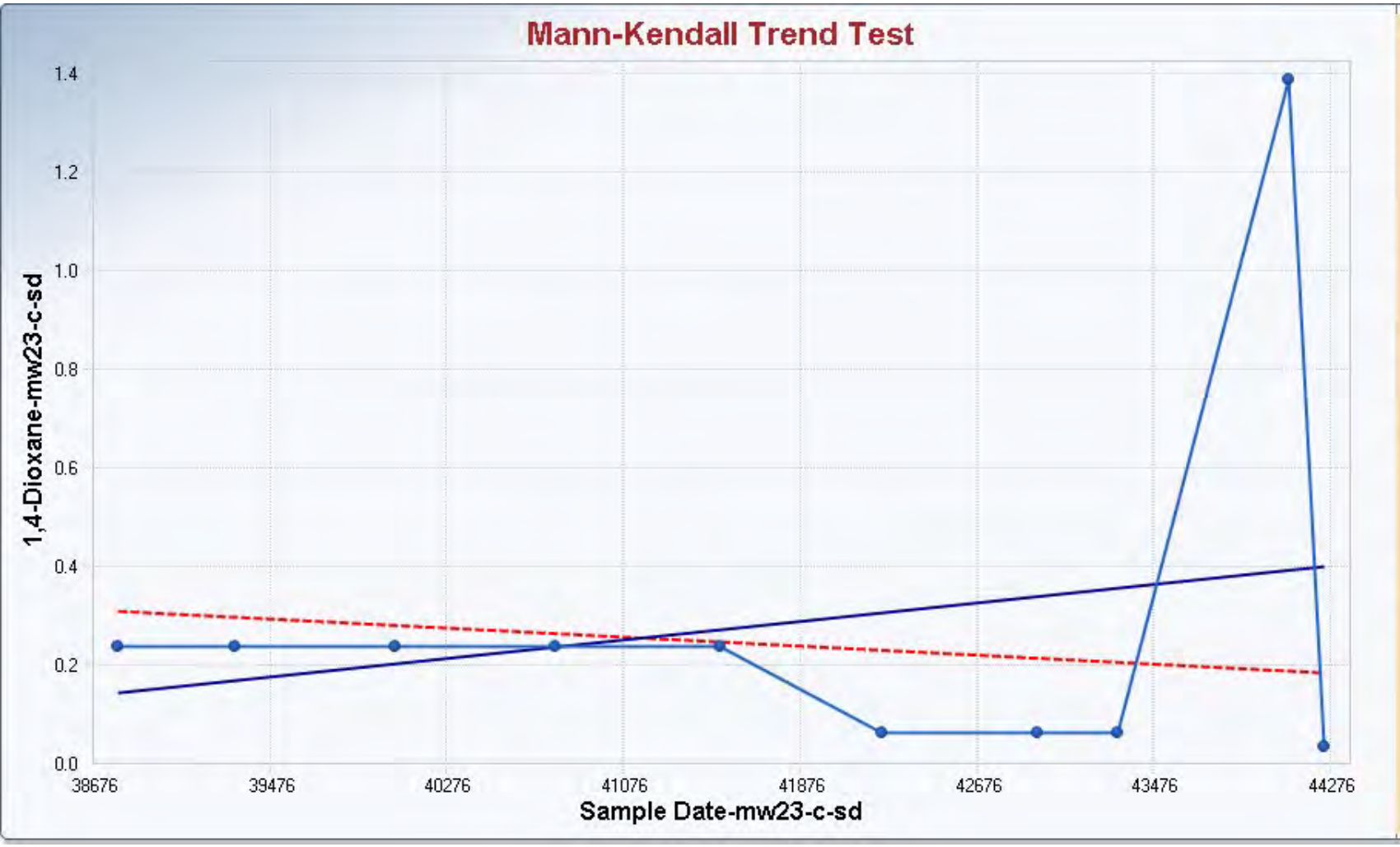
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.045
Maximum	1.4
Mean	0.292
Geometric Mean	0.174
Median	0.25
Standard Deviation	0.4
Coefficient of Variation	1.369

Mann-Kendall Test

M-K Test Value (S)	-16
Tabulated p-value	0.078
Standard Deviation of S	10.23
Standardized Value of S	-1.466
Approximate p-value	0.0713

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	10.2307
Standardized Value of S	-1.4662
M-K Test Value (S)	-16
Tabulated p-value	0.0780
Approximate p-value	0.0713

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-1.6682

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	1.2187

Insufficient statistical evidence of a significant trend at the specified level of significance.

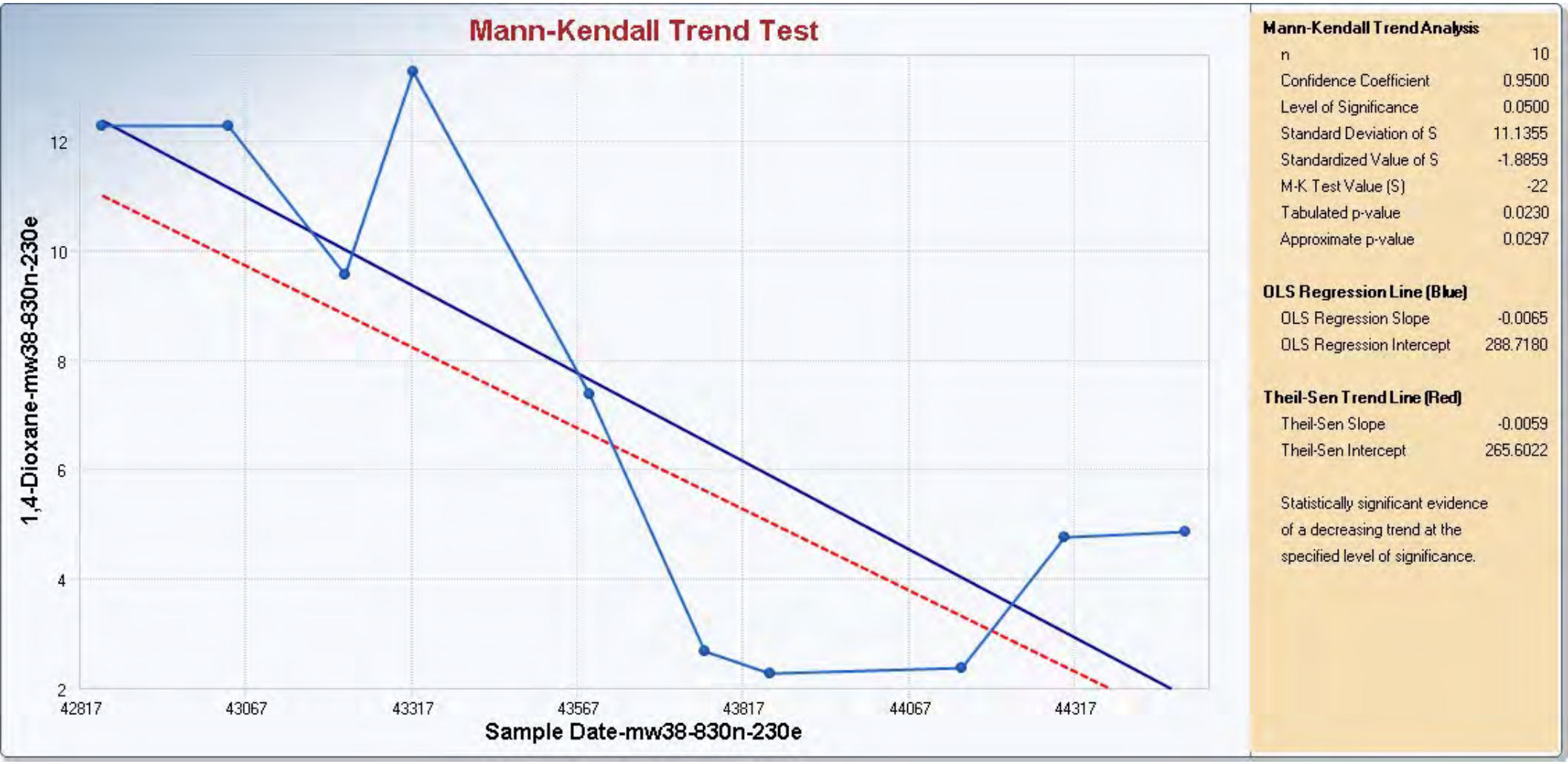
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-mw38-830n-230e

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	2
Maximum	13
Mean	6.9
Geometric Mean	5.51
Median	5.85
Standard Deviation	4.389
Coefficient of Variation	0.636

Mann-Kendall Test	
M-K Test Value (S)	-22
Tabulated p-value	0.023
Standard Deviation of S	11.14
Standardized Value of S	-1.886
Approximate p-value	0.0297

Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test
1,4-Dioxane-mw38-830n-230e
12
10
8
6
4
2
42817
43067
43317
43567
43817
44067
44317
Sample Date-mw38-830n-230e
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1355
Standardized Value of S -1.8859
M-K Test Value (S) -22
Tabulated p-value 0.0230
Approximate p-value 0.0297
OLS Regression Line (Blue)
OLS Regression Slope -0.0065
OLS Regression Intercept 288.7180
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0059
Theil-Sen Intercept 265.6022
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:22:20 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_a.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Chloroform-mw38-830n-230e

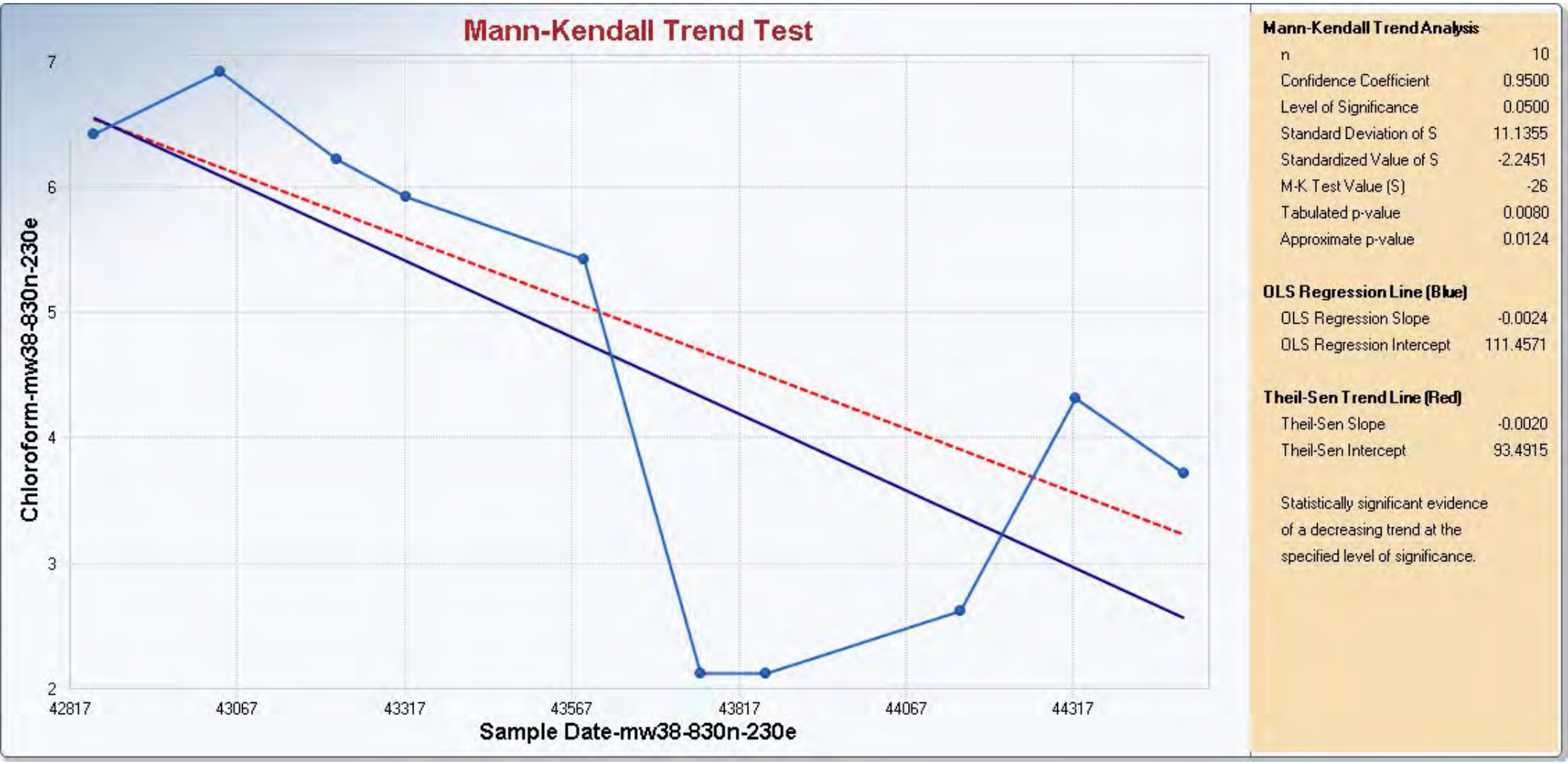
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	2.1
Maximum	6.9
Mean	4.56
Geometric Mean	4.17
Median	4.85
Standard Deviation	1.85
Coefficient of Variation	0.406

Mann-Kendall Test

M-K Test Value (S)	-26
Tabulated p-value	0.008
Standard Deviation of S	11.14
Standardized Value of S	-2.245
Approximate p-value	0.0124

Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test
Chloroform-mw38-830n-230e
7
6
5
4
3
2
42817
43067
43317
43567
43817
44067
44317
Sample Date-mw38-830n-230e
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1355
Standardized Value of S -2.2451
M-K Test Value (S) -26
Tabulated p-value 0.0080
Approximate p-value 0.0124
OLS Regression Line (Blue)
OLS Regression Slope -0.0024
OLS Regression Intercept 111.4571
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0020
Theil-Sen Intercept 93.4915
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-mw62-wdr

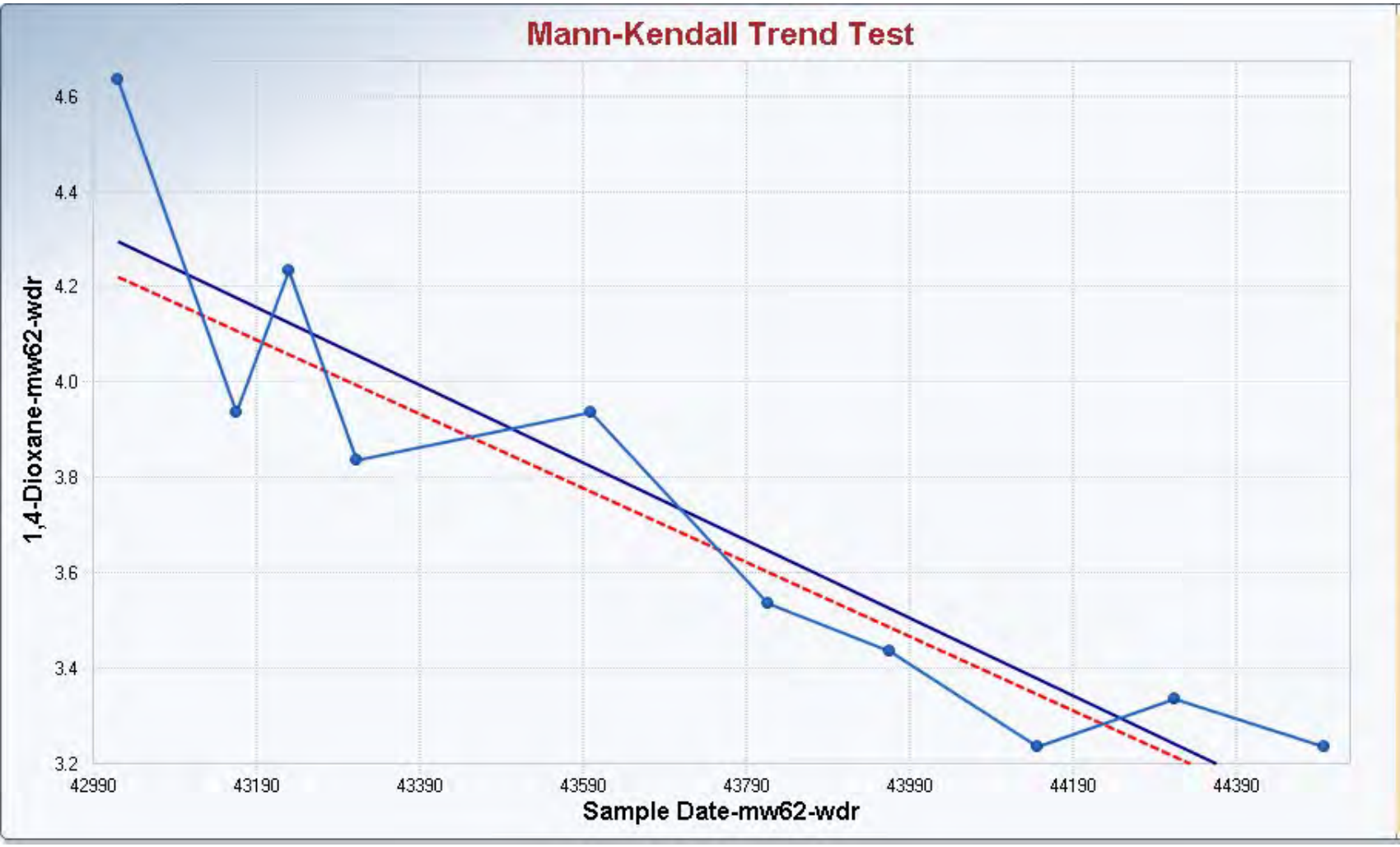
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	3.2
Maximum	4.6
Mean	3.7
Geometric Mean	3.675
Median	3.65
Standard Deviation	0.464
Coefficient of Variation	0.125

Mann-Kendall Test

M-K Test Value (S)	-37
Tabulated p-value	0
Standard Deviation of S	11.09
Standardized Value of S	-3.246
Approximate p-value	5.8517E-4

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.0905
Standardized Value of S	-3.2460
M-K Test Value (S)	-37
Tabulated p-value	0.0000
Approximate p-value	0.0006

OLS Regression Line (Blue)

OLS Regression Slope	-0.0008
OLS Regression Intercept	39.4829

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-0.0008
Theil-Sen Intercept	37.7584

Statistically significant evidence of a decreasing trend at the specified level of significance.

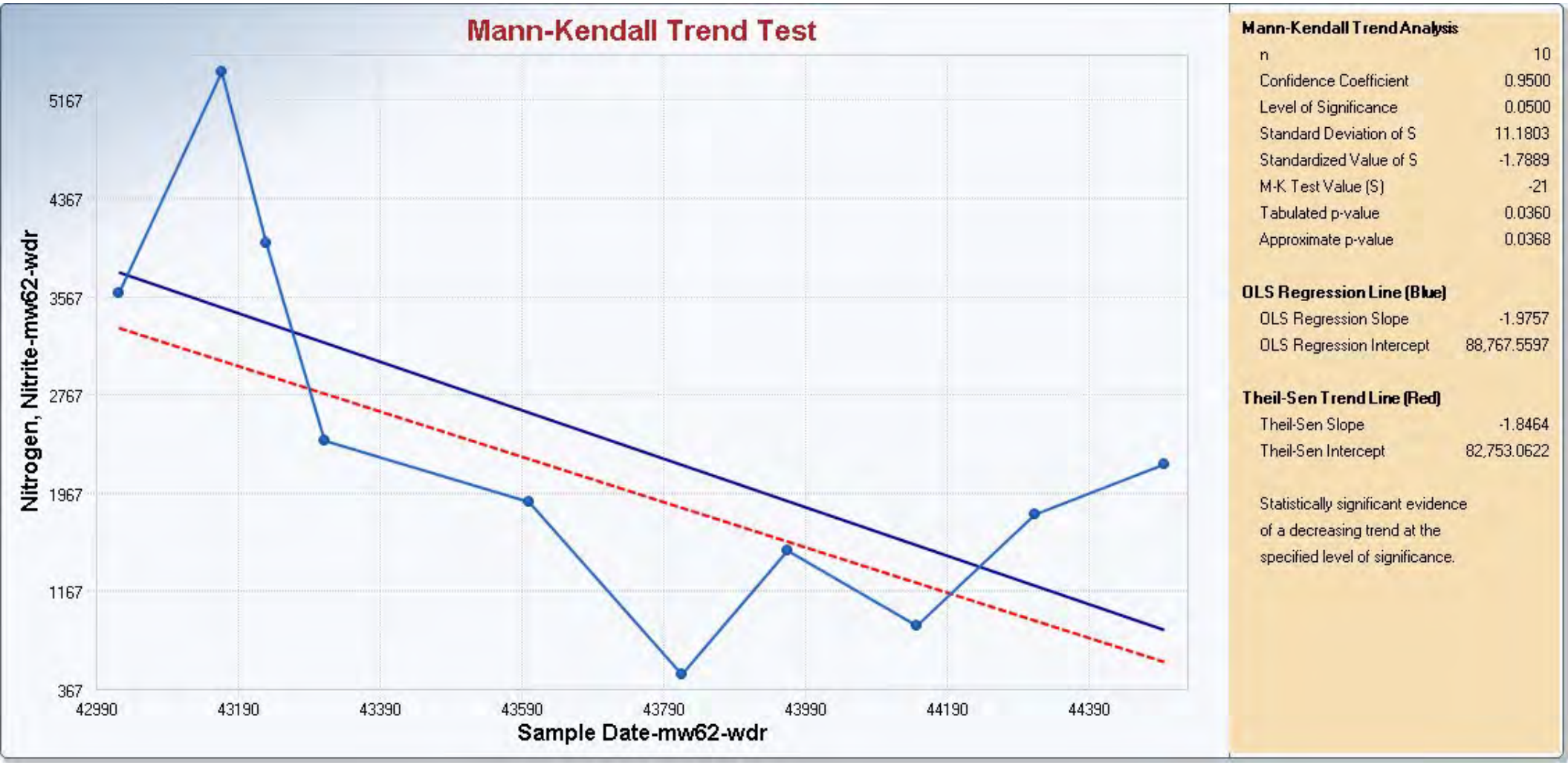
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:29:04 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_c.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrite-mw62-wdr

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	490
Maximum	5400
Mean	2418
Geometric Mean	1978
Median	2050
Standard Deviation	1505
Coefficient of Variation	0.622

Mann-Kendall Test	
M-K Test Value (S)	-21
Tabulated p-value	0.036
Standard Deviation of S	11.18
Standardized Value of S	-1.789
Approximate p-value	0.0368

Statistically significant evidence of a decreasing trend at the specified level of significance.


Mann-Kendall Trend Test
Nitrogen, Nitrite-mw62-wdr
5167
4367
3567
2767
1967
1167
367
42990
43190
43390
43590
43790
43990
44190
44390
Sample Date-mw62-wdr
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1803
Standardized Value of S -1.7889
M-K Test Value (S) -21
Tabulated p-value 0.0360
Approximate p-value 0.0368
OLS Regression Line (Blue)
OLS Regression Slope -1.9757
OLS Regression Intercept 88,767.5597
Theil-Sen Trend Line (Red)
Theil-Sen Slope -1.8464
Theil-Sen Intercept 82,753.0622
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:24:06 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-mw62-wdr

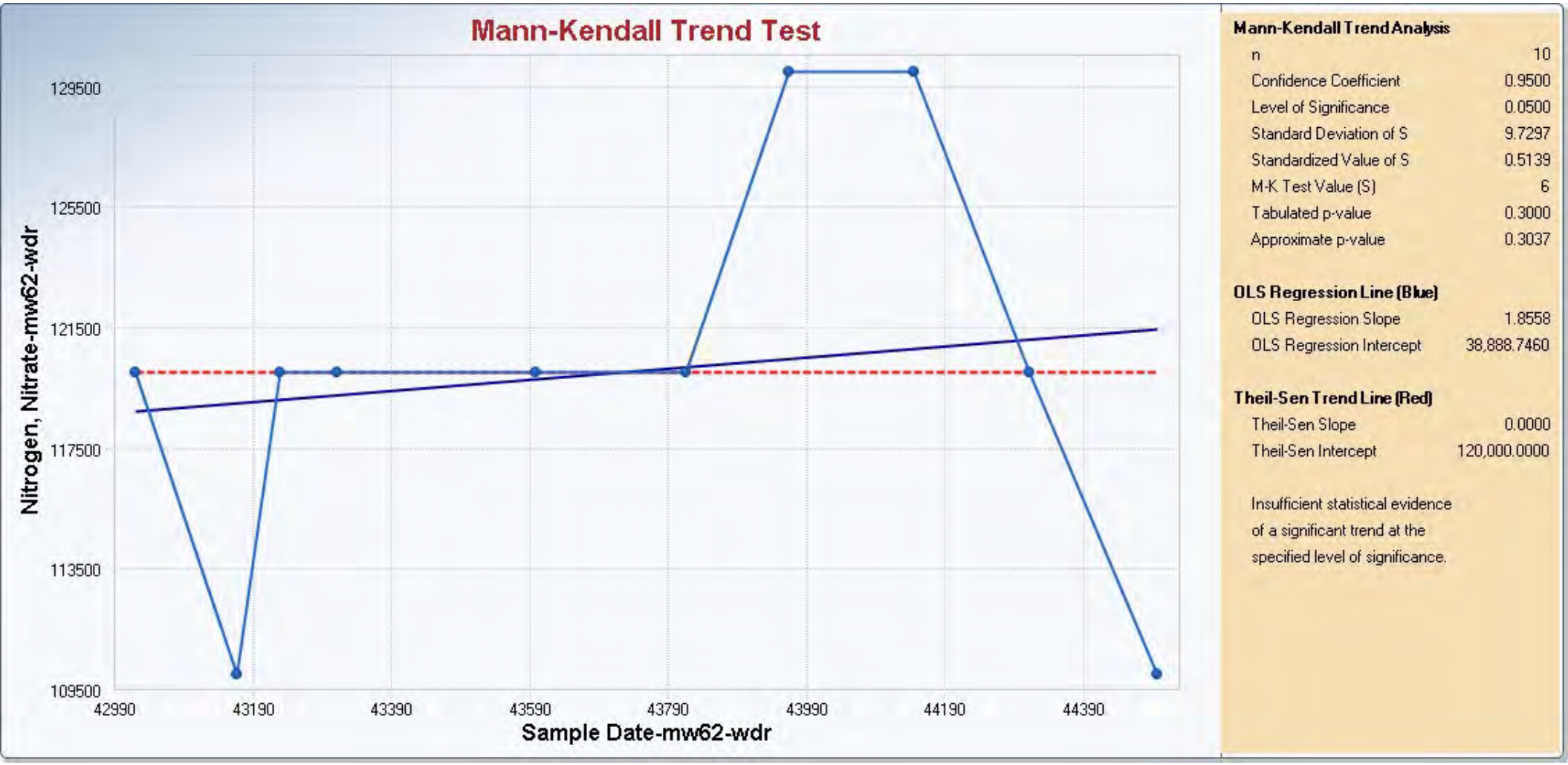
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	110000
Maximum	130000
Mean	120000
Geometric Mean	119833
Median	120000
Standard Deviation	6667
Coefficient of Variation	0.0556

Mann-Kendall Test

M-K Test Value (S)	6
Tabulated p-value	0.3
Standard Deviation of S	9.73
Standardized Value of S	0.514
Approximate p-value	0.304

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Nitrogen, Nitrate-mw62-wdr
129500
125500
121500
117500
113500
109500
42990
43190
43390
43590
43790
43990
44190
44390
Sample Date-mw62-wdr
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.7297
Standardized Value of S 0.5139
M-K Test Value (S) 6
Tabulated p-value 0.3000
Approximate p-value 0.3037
OLS Regression Line (Blue)
OLS Regression Slope 1.8558
OLS Regression Intercept 38,888.7460
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 120,000.0000
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-mw77-wd

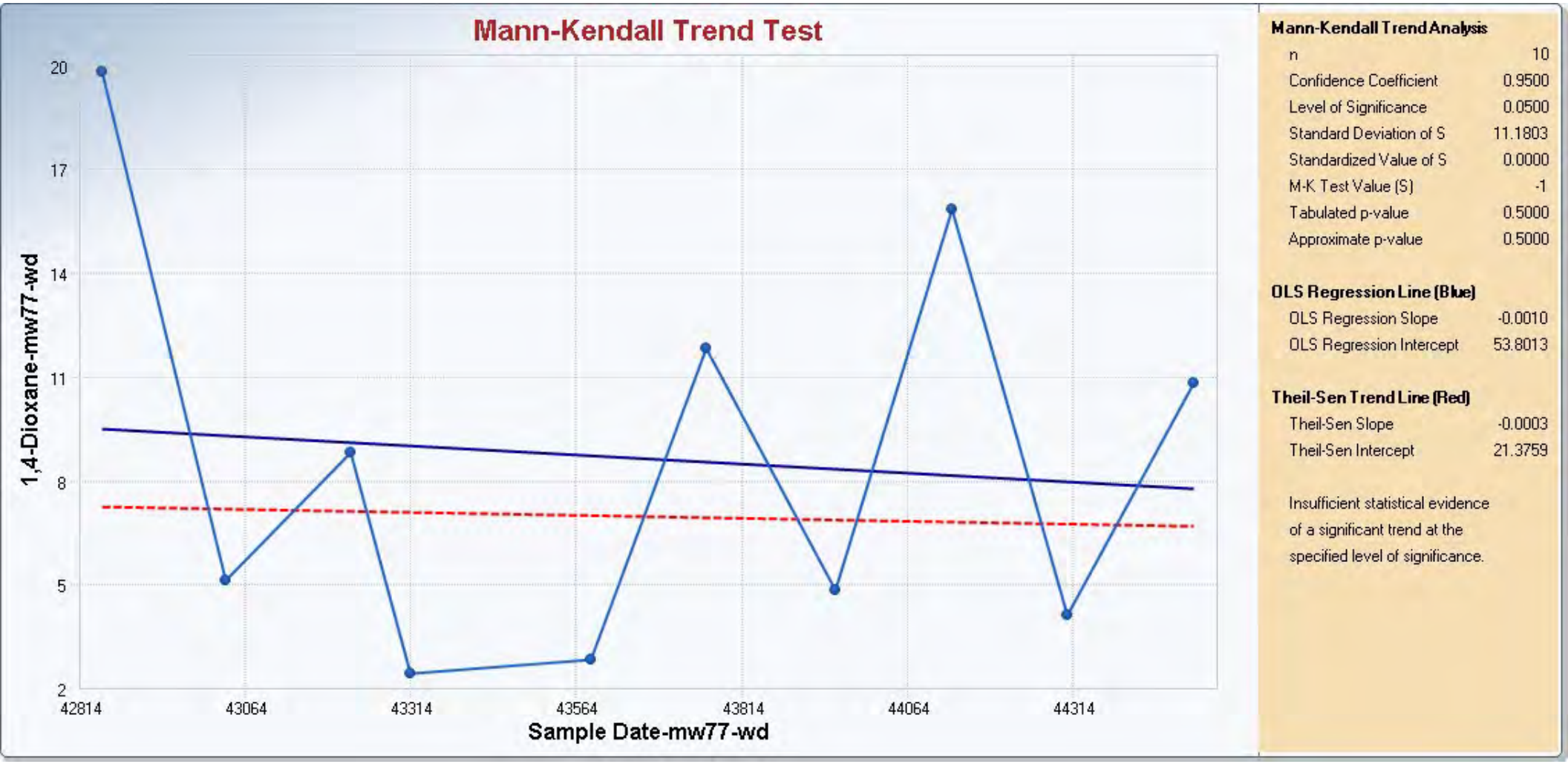
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	2.6
Maximum	20
Mean	8.82
Geometric Mean	7.127
Median	7.15
Standard Deviation	5.882
Coefficient of Variation	0.667

Mann-Kendall Test

M-K Test Value (S)	-1
Tabulated p-value	0.5
Standard Deviation of S	11.18
Standardized Value of S	0
Approximate p-value	0.5

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
1,4-Dioxane-mw77-wd
20
17
14
11
8
5
2
42814
43064
43314
43564
43814
44064
44314
Sample Date-mw77-wd
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1803
Standardized Value of S 0.0000
M-K Test Value (S) -1
Tabulated p-value 0.5000
Approximate p-value 0.5000
OLS Regression Line (Blue)
OLS Regression Slope -0.0010
OLS Regression Intercept 53.8013
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0003
Theil-Sen Intercept 21.3759
Insufficient statistical evidence of a significant trend at the specified level of significance.

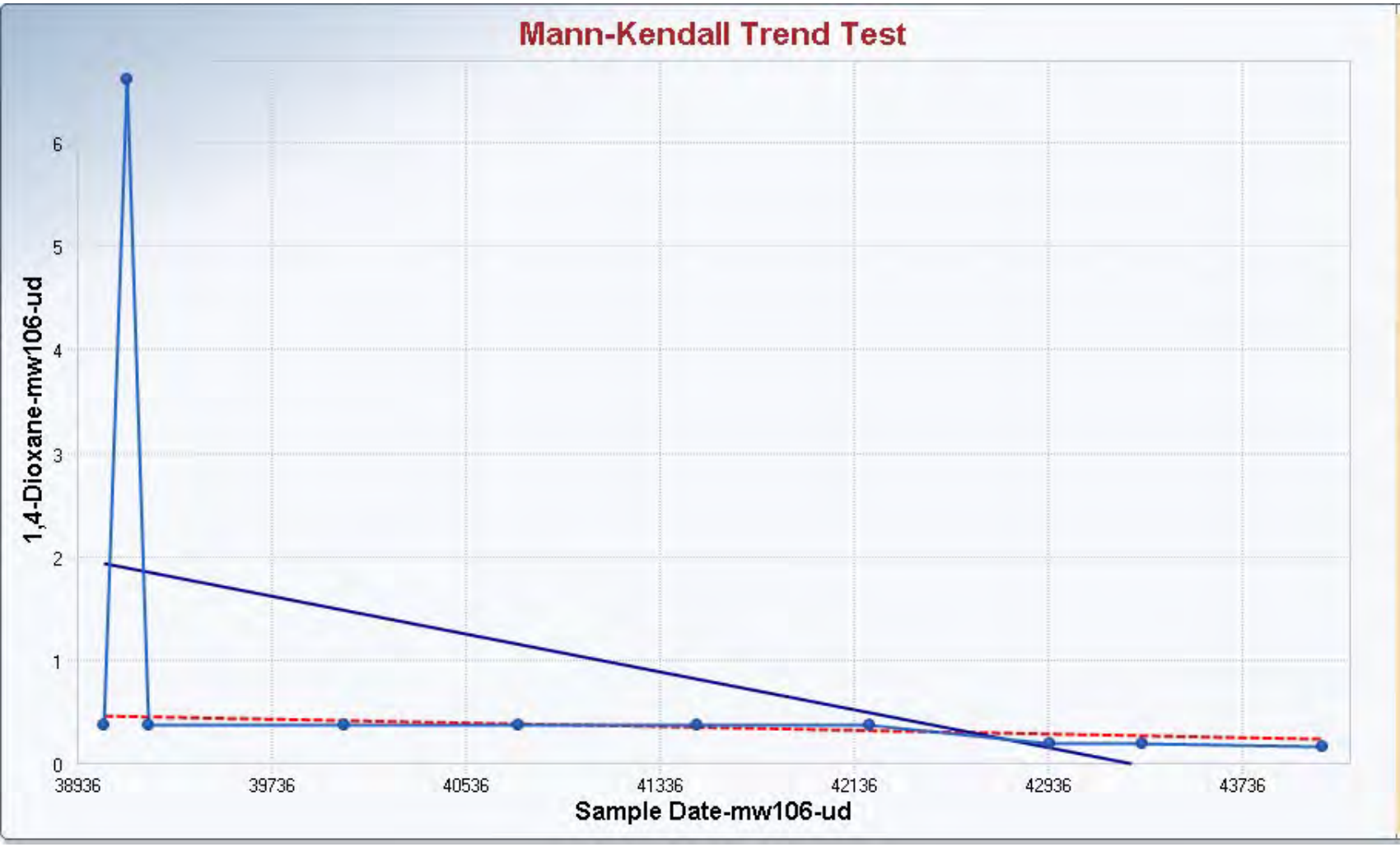
	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:12:37 PM	
From File	COMPLIANCE DATA 2H2021 for MK Trend.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-mw106-ud

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.045
Maximum	6.5
Mean	0.82
Geometric Mean	0.229
Median	0.25
Standard Deviation	1.998
Coefficient of Variation	2.438

Mann-Kendall Test	
M-K Test Value (S)	-27
Tabulated p-value	0.008
Standard Deviation of S	9.781
Standardized Value of S	-2.658
Approximate p-value	0.00393

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.7809
Standardized Value of S	-2.6582
M-K Test Value (S)	-27
Tabulated p-value	0.0080
Approximate p-value	0.0039

OLS Regression Line (Blue)

OLS Regression Slope	-0.0005
OLS Regression Intercept	19.6635

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	2.0076

Statistically significant evidence of a decreasing trend at the specified level of significance.

APPENDIX C-3.3

COMPLIANCE EVALUATION STATISTICAL TESTING

Goodness-of-Fit Testing

	Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 3:43:04 PM	
From File	COMPLIANCE DATA 2H2021.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	

1,4-Dioxane (b-313)

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	2.3
Maximum	21
Mean of Raw Data	14.75
Standard Deviation of Raw Data	5.788
Khat	3.759
Theta hat	3.924
Kstar	2.698
Theta star	5.467
Mean of Log Transformed Data	2.552
Standard Deviation of Log Transformed Data	0.673

Normal GOF Test Results

Correlation Coefficient R	0.923
Shapiro Wilk Test Statistic	0.858
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.063
Lilliefors Test Statistic	0.248
Lilliefors Critical (0.05) Value	0.262

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.834
A-D Test Statistic	1.155
A-D Critical (0.05) Value	0.73
K-S Test Statistic	0.329
K-S Critical(0.05) Value	0.268

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.818
Shapiro Wilk Test Statistic	0.689
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	5.8024E-4
Lilliefors Test Statistic	0.351
Lilliefors Critical (0.05) Value	0.262

Data not Lognormal at (0.05) Significance Level

	Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 3:46:08 PM	
From File	COMPLIANCE DATA 2H2021_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	

Nitrogen, Nitrate (b-313)

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	21000
Maximum	55000
Mean of Raw Data	33600
Standard Deviation of Raw Data	11462
Khat	9.976
Theta hat	3368
Kstar	7.05
Theta star	4766
Mean of Log Transformed Data	10.37
Standard Deviation of Log Transformed Data	0.335

Normal GOF Test Results

Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.45
Lilliefors Test Statistic	0.156
Lilliefors Critical (0.05) Value	0.262

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.985
A-D Test Statistic	0.302
A-D Critical (0.05) Value	0.725
K-S Test Statistic	0.173
K-S Critical(0.05) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.679
Lilliefors Test Statistic	0.167
Lilliefors Critical (0.05) Value	0.262

Data appear Lognormal at (0.05) Significance Level

	Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects	
	User Selected Options	
	Date/Time of Computation	ProUCL 5.11/20/2022 3:43:04 PM
	From File	COMPLIANCE DATA 2H2021.xls
	Full Precision	OFF
	Confidence Coefficient	0.95

1,4-Dioxane (b-326-wd)

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.77
Maximum	17
Mean of Raw Data	7.347
Standard Deviation of Raw Data	5.088
Khat	1.548
Theta hat	4.745
Kstar	1.15
Theta star	6.386
Mean of Log Transformed Data	1.638
Standard Deviation of Log Transformed Data	1.045

Normal GOF Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.571
Lilliefors Test Statistic	0.151
Lilliefors Critical (0.05) Value	0.262

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.949
A-D Test Statistic	0.483
A-D Critical (0.05) Value	0.739
K-S Test Statistic	0.216
K-S Critical(0.05) Value	0.271

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.932
Shapiro Wilk Test Statistic	0.862
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.0895
Lilliefors Test Statistic	0.241
Lilliefors Critical (0.05) Value	0.262

Data appear Lognormal at (0.05) Significance Level

	Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 3:48:40 PM	
From File	COMPLIANCE DATA 2H2021_d.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	

Tetrachloroethene (bm-11x-100n)

Raw Statistics	
Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	4.6
Maximum	7.2
Mean of Raw Data	6.07
Standard Deviation of Raw Data	0.838
Khat	55.54
Theta hat	0.109
Kstar	38.94
Theta star	0.156
Mean of Log Transformed Data	1.794
Standard Deviation of Log Transformed Data	0.144

Normal GOF Test Results	
Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.908
Lilliefors Test Statistic	0.12
Lilliefors Critical (0.05) Value	0.262

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results	
Correlation Coefficient R	0.978
A-D Test Statistic	0.242
A-D Critical (0.05) Value	0.724
K-S Test Statistic	0.134
K-S Critical(0.05) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results	
Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.722
Lilliefors Test Statistic	0.146
Lilliefors Critical (0.05) Value	0.262

Data appear Lognormal at (0.05) Significance Level

	Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects	
	User Selected Options	
	Date/Time of Computation	ProUCL 5.11/20/2022 3:46:08 PM
	From File	COMPLIANCE DATA 2H2021_b.xls
	Full Precision	OFF
	Confidence Coefficient	0.95

Nitrogen, Nitrate (mw62-wdr)

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	3
Minimum	110000
Maximum	130000
Mean of Raw Data	120000
Standard Deviation of Raw Data	6667
Khat	358.9
Theta hat	334.3
Kstar	251.3
Theta star	477.5
Mean of Log Transformed Data	11.69
Standard Deviation of Log Transformed Data	0.0557

Normal GOF Test Results

Correlation Coefficient R	0.903
Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.0222
Lilliefors Test Statistic	0.3
Lilliefors Critical (0.05) Value	0.262

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.904
A-D Test Statistic	1.034
A-D Critical (0.05) Value	0.724
K-S Test Statistic	0.307
K-S Critical(0.05) Value	0.266

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.902
Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.0217
Lilliefors Test Statistic	0.31
Lilliefors Critical (0.05) Value	0.262

Data not Lognormal at (0.05) Significance Level

Non-parametric GOF Test Results

	A	B	C	D	E	F	G	H	I	J	K	L
102	**Data do not follow a discernible distribution at (0.05) Level of Significance**											

	A	B	C	D	E	F	G	H	I	J	K	L
1				Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.11/20/2022 3:43:04 PM								
4			From File	COMPLIANCE DATA 2H2021.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7												
100	1,4-Dioxane (mw77-wd)											
101												
102			Raw Statistics									
103			Number of Valid Observations	10								
104			Number of Distinct Observations	10								
105			Minimum	2.6								
106			Maximum	20								
107			Mean of Raw Data	8.82								
108			Standard Deviation of Raw Data	5.882								
109			Khat	2.499								
110			Theta hat	3.529								
111			Kstar	1.816								
112			Theta star	4.856								
113			Mean of Log Transformed Data	1.964								
114			Standard Deviation of Log Transformed Data	0.705								
115												
116			Normal GOF Test Results									
117												
118			Correlation Coefficient R	0.958								
119			Shapiro Wilk Test Statistic	0.906								
120			Shapiro Wilk Critical (0.05) Value	0.842								
121			Approximate Shapiro Wilk P Value	0.301								
122			Lilliefors Test Statistic	0.225								
123			Lilliefors Critical (0.05) Value	0.262								
124	Data appear Normal at (0.05) Significance Level											
125												
126			Gamma GOF Test Results									
127												
128			Correlation Coefficient R	0.988								
129			A-D Test Statistic	0.29								
130			A-D Critical (0.05) Value	0.734								
131			K-S Test Statistic	0.199								
132			K-S Critical(0.05) Value	0.269								
133	Data appear Gamma Distributed at (0.05) Significance Level											
134												
135			Lognormal GOF Test Results									
136												
137			Correlation Coefficient R	0.984								
138			Shapiro Wilk Test Statistic	0.949								
139			Shapiro Wilk Critical (0.05) Value	0.842								
140			Approximate Shapiro Wilk P Value	0.809								
141			Lilliefors Test Statistic	0.163								
142			Lilliefors Critical (0.05) Value	0.262								
143	Data appear Lognormal at (0.05) Significance Level											

APPENDIX C-3.4

COMPLIANCE EVALUATION STATISTICAL TESTING

Outlier Testing

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM	
From File	COMPLIANCE DATA 2H2021.xls	
Full Precision	OFF	

Dixon's Outlier Test for 1,4-Dioxane (b-313)

Number of Observations = 10

10% critical value: 0.409

5% critical value: 0.477

1% critical value: 0.597

1. Observation Value 21 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.072

For 10% significance level, 21 is not an outlier.

For 5% significance level, 21 is not an outlier.

For 1% significance level, 21 is not an outlier.

2. Observation Value 2.3 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.277

For 10% significance level, 2.3 is not an outlier.

For 5% significance level, 2.3 is not an outlier.

For 1% significance level, 2.3 is not an outlier.

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:11:12 PM							
4				From File	COMPLIANCE DATA 2H2021_b.xls							
5				Full Precision	OFF							
6												
7												
8	**Dixon's Outlier Test for Nitrogen, Nitrate (b-313)**											
9												
10	Number of Observations = 10											
11	10% critical value: 0.409											
12	5% critical value: 0.477											
13	1% critical value: 0.597											
14												
15	**1. Observation Value 55000 is a Potential Outlier (Upper Tail)**											
16												
17	Test Statistic: 0.242											
18												
19	For 10% significance level, 55000 is not an outlier.											
20	For 5% significance level, 55000 is not an outlier.											
21	For 1% significance level, 55000 is not an outlier.											
22												
23	**2. Observation Value 21000 is a Potential Outlier (Lower Tail)**											
24												
25	Test Statistic: 0.038											
26												
27	For 10% significance level, 21000 is not an outlier.											
28	For 5% significance level, 21000 is not an outlier.											
29	For 1% significance level, 21000 is not an outlier.											
30												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
31												
32	**Dixon's Outlier Test for 1,4-Dioxane (b-326-ud)**											
33												
34	Number of Observations = 10											
35	10% critical value: 0.409											
36	5% critical value: 0.477											
37	1% critical value: 0.597											
38												
39	**1. Observation Value 7.7 is a Potential Outlier (Upper Tail)?**											
40												
41	Test Statistic: 0.353											
42												
43	For 10% significance level, 7.7 is not an outlier.											
44	For 5% significance level, 7.7 is not an outlier.											
45	For 1% significance level, 7.7 is not an outlier.											
46												
47	**2. Observation Value 5 is a Potential Outlier (Lower Tail)?**											
48												
49	Test Statistic: 0.476											
50												
51	For 10% significance level, 5 is an outlier.											
52	For 5% significance level, 5 is not an outlier.											
53	For 1% significance level, 5 is not an outlier.											
54												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Variables replacing nondetects with 1/2 the Detection Limit**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 2:58:01 PM							
4				From File	COMPLIANCE DATA 2H2021_b.xls							
5				Full Precision	OFF							
6												
35												
36	**Dixon's Outlier Test for Nitrogen, Nitrate (b-326-ud)**											
37												
38	Total N = 10											
39	Number NDs = 2											
40	Number Detects = 8											
41	Number Data (n) = 10											
42	10% critical value: 0.409											
43	5% critical value: 0.477											
44	1% critical value: 0.597											
45	Note: NDs replaced by DL/2 in Outlier Test											
46												
47	**1. Data Value 66000 is a Potential Outlier (Upper Tail)?**											
48												
49	Test Statistic: 0.258											
50												
51	For 10% significance level, 66000 is not an outlier.											
52	For 5% significance level, 66000 is not an outlier.											
53	For 1% significance level, 66000 is not an outlier.											
54												
55	**2. Data Value 45 is a Potential Outlier (Lower Tail)?**											
56												
57	Test Statistic: 0.000											
58												
59	For 10% significance level, 45 is not an outlier.											
60	For 5% significance level, 45 is not an outlier.											
61	For 1% significance level, 45 is not an outlier.											
62												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
55												
56	**Dixon's Outlier Test for 1,4-Dioxane (b-326-wd)**											
57												
58	Number of Observations = 10											
59	10% critical value: 0.409											
60	5% critical value: 0.477											
61	1% critical value: 0.597											
62												
63	**1. Observation Value 17 is a Potential Outlier (Upper Tail)?**											
64												
65	Test Statistic: 0.375											
66												
67	For 10% significance level, 17 is not an outlier.											
68	For 5% significance level, 17 is not an outlier.											
69	For 1% significance level, 17 is not an outlier.											
70												
71	**2. Observation Value 0.77 is a Potential Outlier (Lower Tail)?**											
72												
73	Test Statistic: 0.022											
74												
75	For 10% significance level, 0.77 is not an outlier.											
76	For 5% significance level, 0.77 is not an outlier.											
77	For 1% significance level, 0.77 is not an outlier.											

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:14:09 PM							
4				From File	COMPLIANCE DATA 2H2021_d.xls							
5				Full Precision	OFF							
6												
7												
8	**Dixon's Outlier Test for Tetrachloroethene (bm-11x-100n)**											
9												
10	Number of Observations = 10											
11	10% critical value: 0.409											
12	5% critical value: 0.477											
13	1% critical value: 0.597											
14												
15	**1. Observation Value 7.2 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.143											
18												
19	For 10% significance level, 7.2 is not an outlier.											
20	For 5% significance level, 7.2 is not an outlier.											
21	For 1% significance level, 7.2 is not an outlier.											
22												
23	**2. Observation Value 4.6 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.217											
26												
27	For 10% significance level, 4.6 is not an outlier.											
28	For 5% significance level, 4.6 is not an outlier.											
29	For 1% significance level, 4.6 is not an outlier.											
30												

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 3:15:57 PM	
From File	COMPLIANCE DATA 2H2021_e.xls	
Full Precision	OFF	

Dixon's Outlier Test for Trichloroethene (bm-11x-100n)

Number of Observations = 10

10% critical value: 0.409

5% critical value: 0.477

1% critical value: 0.597

1. Observation Value 5.7 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.143

For 10% significance level, 5.7 is not an outlier.

For 5% significance level, 5.7 is not an outlier.

For 1% significance level, 5.7 is not an outlier.

2. Observation Value 3.6 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.368

For 10% significance level, 3.6 is not an outlier.

For 5% significance level, 3.6 is not an outlier.

For 1% significance level, 3.6 is not an outlier.

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:11:12 PM							
4				From File	COMPLIANCE DATA 2H2021_b.xls							
5				Full Precision	OFF							
6												
55												
56	**Dixon's Outlier Test for Nitrogen, Nitrate (bm-15n6)**											
57												
58	Number of Observations = 10											
59	10% critical value: 0.409											
60	5% critical value: 0.477											
61	1% critical value: 0.597											
62												
63	**1. Observation Value 49000 is a Potential Outlier (Upper Tail)**											
64												
65	Test Statistic: 0.167											
66												
67	For 10% significance level, 49000 is not an outlier.											
68	For 5% significance level, 49000 is not an outlier.											
69	For 1% significance level, 49000 is not an outlier.											
70												
71	**2. Observation Value 30000 is a Potential Outlier (Lower Tail)**											
72												
73	Test Statistic: 0.063											
74												
75	For 10% significance level, 30000 is not an outlier.											
76	For 5% significance level, 30000 is not an outlier.											
77	For 1% significance level, 30000 is not an outlier.											
78												

	A	B	C	D	E	F	G	H	I	J	K	L
1					Outlier Tests for Selected Variables replacing nondetects with 1/2 the Detection Limit							
2				User Selected Options								
3				Date/Time of Computation	ProUCL 5.11/20/2022 2:52:53 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
119												
120	Dixon's Outlier Test for 1,4-Dioxane (mw23-c-sd)											
121												
122	Total N = 10											
123	Number NDs = 9											
124	Number Detects = 1											
125	Number Data (n) = 10											
126	10% critical value: 0.409											
127	5% critical value: 0.477											
128	1% critical value: 0.597											
129	Note: NDs replaced by DL/2 in Outlier Test											
130												
131	1. Data Value 1.4 is a Potential Outlier (Upper Tail)?											
132												
133	Test Statistic: 0.868											
134												
135	For 10% significance level, 1.4 is an outlier.											
136	For 5% significance level, 1.4 is an outlier.											
137	For 1% significance level, 1.4 is an outlier.											
138												
139	2. Data Value 0.045 is a Potential Outlier (Lower Tail)?											
140												
141	Test Statistic: 0.146											
142												
143	For 10% significance level, 0.045 is not an outlier.											
144	For 5% significance level, 0.045 is not an outlier.											
145	For 1% significance level, 0.045 is not an outlier.											
146												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
127												
128	**Dixon's Outlier Test for 1,4-Dioxane (mw38-830n-230e)**											
129												
130	Number of Observations = 10											
131	10% critical value: 0.409											
132	5% critical value: 0.477											
133	1% critical value: 0.597											
134												
135	**1. Observation Value 13 is a Potential Outlier (Upper Tail)?**											
136												
137	Test Statistic: 0.092											
138												
139	For 10% significance level, 13 is not an outlier.											
140	For 5% significance level, 13 is not an outlier.											
141	For 1% significance level, 13 is not an outlier.											
142												
143	**2. Observation Value 2 is a Potential Outlier (Lower Tail)?**											
144												
145	Test Statistic: 0.010											
146												
147	For 10% significance level, 2 is not an outlier.											
148	For 5% significance level, 2 is not an outlier.											
149	For 1% significance level, 2 is not an outlier.											
150												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:06:31 PM							
4				From File	COMPLIANCE DATA 2H2021_a.xls							
5				Full Precision	OFF							
6												
7												
8	**Dixon's Outlier Test for Chloroform (mw38-830n-230e)**											
9												
10	Number of Observations = 10											
11	10% critical value: 0.409											
12	5% critical value: 0.477											
13	1% critical value: 0.597											
14												
15	**1. Observation Value 6.9 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.104											
18												
19	For 10% significance level, 6.9 is not an outlier.											
20	For 5% significance level, 6.9 is not an outlier.											
21	For 1% significance level, 6.9 is not an outlier.											
22												
23	**2. Observation Value 2.1 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.000											
26												
27	For 10% significance level, 2.1 is not an outlier.											
28	For 5% significance level, 2.1 is not an outlier.											
29	For 1% significance level, 2.1 is not an outlier.											
30												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
151												
152	**Dixon's Outlier Test for 1,4-Dioxane (mw62-wdr)**											
153												
154	Number of Observations = 10											
155	10% critical value: 0.409											
156	5% critical value: 0.477											
157	1% critical value: 0.597											
158												
159	**1. Observation Value 4.6 is a Potential Outlier (Upper Tail)?**											
160												
161	Test Statistic: 0.286											
162												
163	For 10% significance level, 4.6 is not an outlier.											
164	For 5% significance level, 4.6 is not an outlier.											
165	For 1% significance level, 4.6 is not an outlier.											
166												
167	**2. Observation Value 3.2 is a Potential Outlier (Lower Tail)?**											
168												
169	Test Statistic: 0.000											
170												
171	For 10% significance level, 3.2 is not an outlier.											
172	For 5% significance level, 3.2 is not an outlier.											
173	For 1% significance level, 3.2 is not an outlier.											
174												

	Outlier Tests for Selected Variables replacing nondetects with 1/2 the Detection Limit	
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 2:56:07 PM	
From File	COMPLIANCE DATA 2H2021_c.xls	
Full Precision	OFF	

Dixon's Outlier Test for Nitrogen, Nitrite (mw62-wdr)

Total N = 10

Number NDs = 1

Number Detects = 9

Number Data (n) = 10

10% critical value: 0.409

5% critical value: 0.477

1% critical value: 0.597

Note: NDs replaced by DL/2 in Outlier Test

1. Data Value 5400 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.310

For 10% significance level, 5400 is not an outlier.

For 5% significance level, 5400 is not an outlier.

For 1% significance level, 5400 is not an outlier.

2. Data Value 490 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.114

For 10% significance level, 490 is not an outlier.

For 5% significance level, 490 is not an outlier.

For 1% significance level, 490 is not an outlier.

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:11:12 PM							
4				From File	COMPLIANCE DATA 2H2021_b.xls							
5				Full Precision	OFF							
6												
79												
80	**Dixon's Outlier Test for Nitrogen, Nitrate (mw62-wdr)**											
81												
82	Number of Observations = 10											
83	10% critical value: 0.409											
84	5% critical value: 0.477											
85	1% critical value: 0.597											
86												
87	**1. Observation Value 130000 is a Potential Outlier (Upper Tai**											
88												
89	Test Statistic: 0.000											
90												
91	For 10% significance level, 130000 is not an outlier.											
92	For 5% significance level, 130000 is not an outlier.											
93	For 1% significance level, 130000 is not an outlier.											
94												
95	**2. Observation Value 110000 is a Potential Outlier (Lower Tail**											
96												
97	Test Statistic: 0.000											
98												
99	For 10% significance level, 110000 is not an outlier.											
100	For 5% significance level, 110000 is not an outlier.											
101	For 1% significance level, 110000 is not an outlier.											
102												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.11/20/2022 3:03:13 PM							
4				From File	COMPLIANCE DATA 2H2021.xls							
5				Full Precision	OFF							
6												
175												
176	**Dixon's Outlier Test for 1,4-Dioxane (mw77-wd)**											
177												
178	Number of Observations = 10											
179	10% critical value: 0.409											
180	5% critical value: 0.477											
181	1% critical value: 0.597											
182												
183	**1. Observation Value 20 is a Potential Outlier (Upper Tail)?**											
184												
185	Test Statistic: 0.235											
186												
187	For 10% significance level, 20 is not an outlier.											
188	For 5% significance level, 20 is not an outlier.											
189	For 1% significance level, 20 is not an outlier.											
190												
191	**2. Observation Value 2.6 is a Potential Outlier (Lower Tail)?**											
192												
193	Test Statistic: 0.030											
194												
195	For 10% significance level, 2.6 is not an outlier.											
196	For 5% significance level, 2.6 is not an outlier.											
197	For 1% significance level, 2.6 is not an outlier.											
198												

	Outlier Tests for Selected Variables replacing nondetects with 1/2 the Detection Limit	
	User Selected Options	
Date/Time of Computation	ProUCL 5.11/20/2022 2:52:53 PM	
From File	COMPLIANCE DATA 2H2021.xls	
Full Precision	OFF	

Dixon's Outlier Test for 1,4-Dioxane (mw106-ud)

Total N = 10

Number NDs = 9

Number Detects = 1

Number Data (n) = 10

10% critical value: 0.409

5% critical value: 0.477

1% critical value: 0.597

Note: NDs replaced by DL/2 in Outlier Test

1. Data Value 6.5 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.973

For 10% significance level, 6.5 is an outlier.

For 5% significance level, 6.5 is an outlier.

For 1% significance level, 6.5 is an outlier.

2. Data Value 0.045 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.146

For 10% significance level, 0.045 is not an outlier.

For 5% significance level, 0.045 is not an outlier.

For 1% significance level, 0.045 is not an outlier.

APPENDIX C-3.5

COMPLIANCE EVALUATION STATISTICAL TESTING

Linear Regression Analysis

B-326-UD 1,4-DIOXANE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:08:16 AM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	1,4-Dioxane_b-326-ud
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_b-326-ud
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	109.4	22.77	4.802	0.00135
nple Date_b-326	-0.00233	5.1626E-4	-4.514	0.00197

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	3.536	1	3.536	20.37	0.0020
Error	1.388	8	0.174		
Total	4.924	9			

R Square	0.718
Adjusted R Square	0.683
Sqrt(MSE) = Scale	0.417

Regression Table

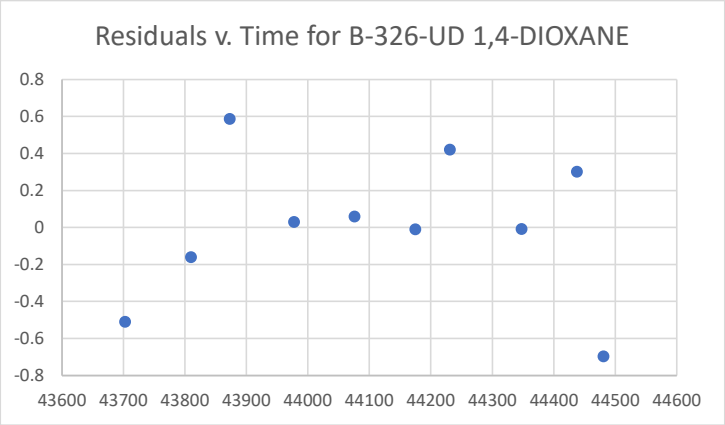
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	7	7.511	-0.511	-1.228
2	7.1	7.262	-0.162	-0.389
3	7.7	7.115	0.585	1.404
4	6.9	6.871	0.0294	0.0705
5	6.7	6.642	0.0577	0.139
6	6.4	6.412	-0.0116	-0.0278
7	6.7	6.281	0.419	1.006
8	6	6.008	-0.00842	-0.0202
9	6.1	5.799	0.301	0.723
10	5	5.698	-0.698	-1.677

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	43703	7	7.511	0.249	0.485	7.049	7.974	6.609	8.414	-0.511
2	43810	7.1	7.262	0.204	0.464	6.883	7.641	6.4	8.125	-0.162
3	43873	7.7	7.115	0.18	0.454	6.78	7.45	6.271	7.959	0.585
4	43978	6.9	6.871	0.149	0.442	6.594	7.147	6.048	7.693	0.0294

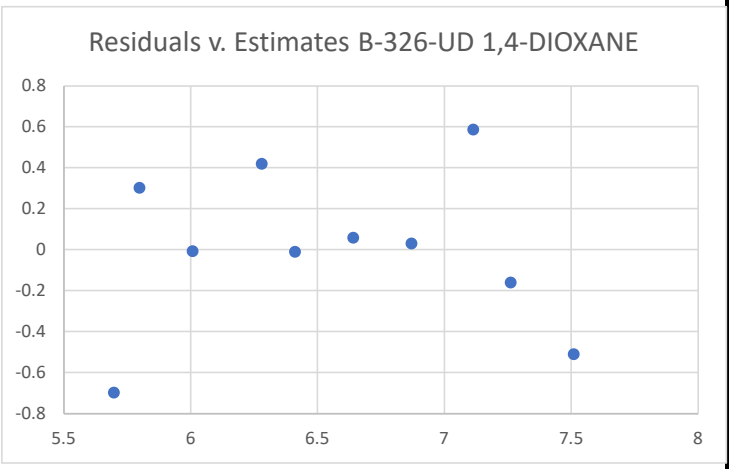
5	44076	6.7	6.642	0.133	0.437	6.395	6.89	5.829	7.455	0.0577
6	44175	6.4	6.412	0.136	0.438	6.159	6.664	5.597	7.226	-0.0116
7	44231	6.7	6.281	0.146	0.441	6.01	6.552	5.461	7.102	0.419
8	44348	6	6.008	0.18	0.454	5.674	6.343	5.165	6.852	-0.00842
9	44438	6.1	5.799	0.214	0.468	5.401	6.197	4.928	6.67	0.301
10	44481	5	5.698	0.232	0.477	5.267	6.13	4.812	6.585	-0.698

	X Vector	Residuals
8/26/2019	43703	-0.511
12/11/2019	43810	-0.162
2/12/2020	43873	0.585
5/27/2020	43978	0.0294
9/2/2020	44076	0.0577
12/10/2020	44175	-0.0116
2/4/2021	44231	0.419
6/1/2021	44348	-0.00842
8/30/2021	44438	0.301
10/12/2021	44481	-0.698



CONSTANT

	Yhat	Residuals
	7.511	-0.511
	7.262	-0.162
	7.115	0.585
	6.871	0.0294
	6.642	0.0577
	6.412	-0.0116
	6.281	0.419
	6.008	-0.00842
	5.799	0.301
	5.698	-0.698



CONSTANT

Shapiro-Wilks Test for Normality

SW= Shapiro-Wilk Statistic

	Residuals	Residuals	Column C-l	Coeffiicien	
1	-0.698	0.585	1.283	0.5739	0.736314
2	-0.511	0.419	0.93	0.3291	0.306063
3	-0.162	0.301	0.463	0.2141	0.099128
4	-0.0116	0.0577	0.0693	0.1224	0.008482
5	-0.00842	0.0294	0.03782	0.0399	0.001509
6	0.0294	-0.00842	-0.03782	b=	1.151496
7	0.0577	-0.0116	-0.0693	StdDev=	0.354832
8	0.301	-0.162	-0.463	SW=	1.170139
9	0.419	-0.511	-0.93	Critical pt =	0.842 5%
10	0.585	-0.698	-1.283		

Assume Normal

B-326-UD NITRATE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:11:55 AM
From File	COMPLIANCE DATA 2H2021_b.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	Nitrogen, Nitrate_b-326-ud
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_b-326-ud
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	801102	533370	1.502	0.172
nple Date_b-326	-17.98	12.26	-1.467	0.18

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	1.135E+9	1	1.135E+9	2.153	0.1805
Error	4.216E+9	8	5.270E+8		
Total	5.351E+9	9			

R Square	0.212
Adjusted R Square	0.114
Sqrt(MSE) = Scale	22957

Regression Table

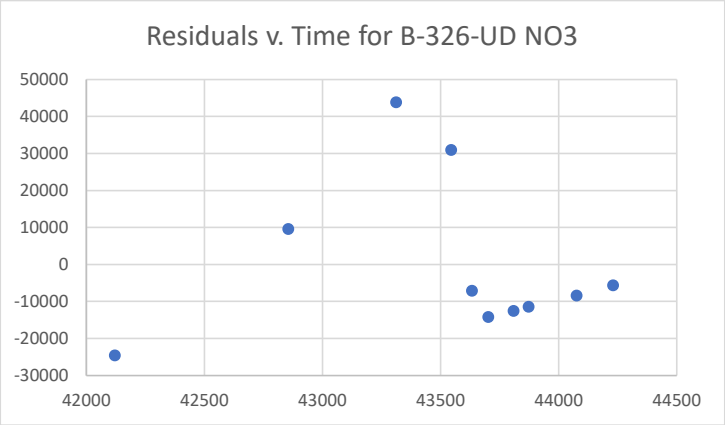
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	19000	43659	-24659	-1.074
2	40000	30460	9540	0.416
3	66000	22260	43740	1.905
4	49000	18070	30930	1.347
5	9300	16488	-7188	-0.313
6	990	15229	-14239	-0.62
7	700	13305	-12605	-0.549
8	730	12172	-11442	-0.498
9	90	8522	-8432	-0.367
10	90	5735	-5645	-0.246

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	42122	19000	43659	18564	29523	9138	78180	-11241	98559	-24659
2	42856	40000	30460	10870	25400	10247	50673	-16772	77692	9540
3	43312	66000	22260	7678	24207	7982	36539	-22753	67274	43740
4	43545	49000	18070	7268	24080	4555	31586	-26707	62848	30930

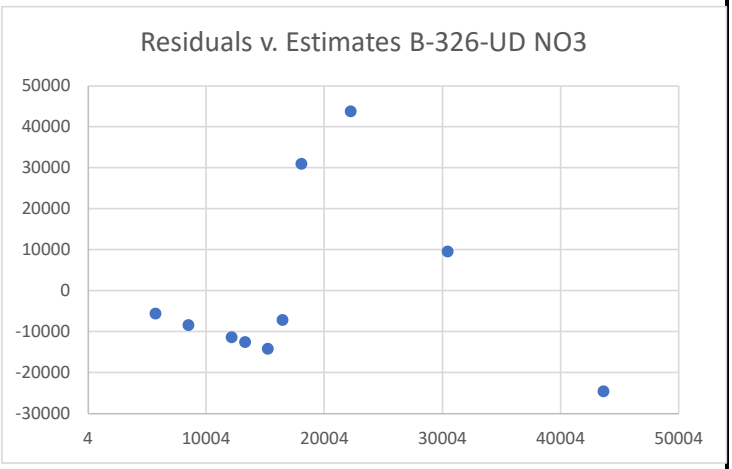
5	43633	9300	16488	7400	24120	2728	30248	-28364	61340	-7188
6	43703	990	15229	7612	24186	1074	29385	-29746	60204	-14239
7	43810	700	13305	8104	24345	-1765	28375	-31966	58576	-12605
8	43873	730	12172	8475	24471	-3588	27933	-33333	57678	-11442
9	44076	90	8522	9989	25036	-10054	27098	-38034	55077	-8432
10	44231	90	5735	11378	25622	-15424	26893	-41910	53380	-5645

	X Vector	Residuals
4/28/2015	42122	-24659
5/1/2017	42856	9540
7/31/2018	43312	43740
3/21/2019	43545	30930
6/17/2019	43633	-7188
8/26/2019	43703	-14239
12/11/2019	43810	-12605
2/12/2020	43873	-11442
9/2/2020	44076	-8432
2/4/2021	44231	-5645



NOT CONSTANT

	Yhat	Residuals
	43659	-24659
	30460	9540
	22260	43740
	18070	30930
	16488	-7188
	15229	-14239
	13305	-12605
	12172	-11442
	8522	-8432
	5735	-5645



NOT CONSTANT

Shapiro-Wilks Test for Normality

	Residuals ascending	Residuals descending	Column C-I	Coeffiicient a		
1	-24659	43740	68399	0.5739	39254.19	
2	-14239	30930	45169	0.3291	14865.12	
3	-12605	9540	22145	0.2141	4741.245	
4	-11442	-5645	5797	0.1224	709.5528	
5	-8432	-7188	1244	0.0399	49.6356	
6	-7188	-8432	-1244	b=	59619.74	
7	-5645	-11442	-5797	StdDev=	16164.59	
8	9540	-12605	-22145	SW=	1.511499	
9	30930	-14239	-45169	Critical pt =	0.842	5%
10	43740	-24659	-68399			

SW= Shapiro-Wilk Statistic

Assume Normal

BM-11X-100N TRICHLOROETHEN

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 11:48:26 AM
From File	COMPLIANCE DATA 2H2021_e.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	Trichloroethene_bm-11x-100n
Number Reported (Y values)	10
Independent Variable (x-data)	Date_bm-11x-100n
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	-28.51	11.51	-2.478	0.0382
Date_bm-11x-100	7.6170E-4	2.6343E-4	2.891	0.0202

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	1.638	1	1.638	8.36	0.0202
Error	1.567	8	0.196		
Total	3.205	9			

R Square	0.511
Adjusted R Square	0.45
Sqrt(MSE) = Scale	0.443

Regression Table

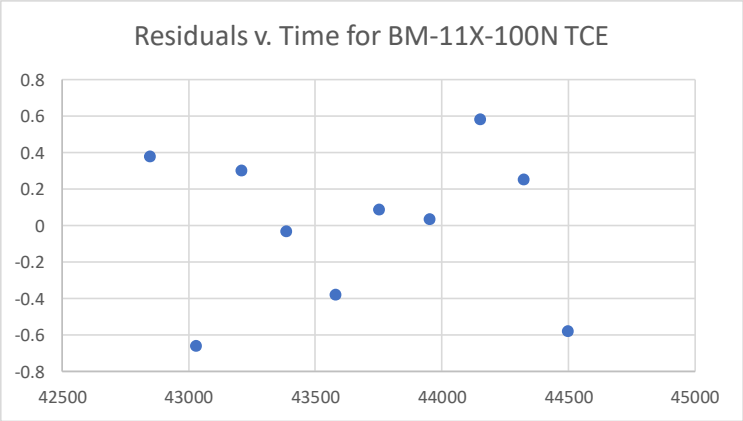
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	4.5	4.12	0.38	0.858
2	3.6	4.26	-0.66	-1.491
3	4.7	4.396	0.304	0.687
4	4.5	4.532	-0.0317	-0.0716
5	4.3	4.679	-0.379	-0.856
6	4.9	4.811	0.0888	0.201
7	5	4.963	0.0372	0.084
8	5.7	5.115	0.585	1.321
9	5.5	5.245	0.255	0.575
10	4.8	5.379	-0.579	-1.307

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	42845	4.5	4.12	0.259	0.513	3.639	4.602	3.167	5.074	0.38
2	43028	3.6	4.26	0.22	0.494	3.851	4.669	3.341	5.179	-0.66
3	43207	4.7	4.396	0.186	0.48	4.05	4.742	3.503	5.289	0.304
4	43385	4.5	4.532	0.159	0.47	4.236	4.827	3.657	5.406	-0.0317

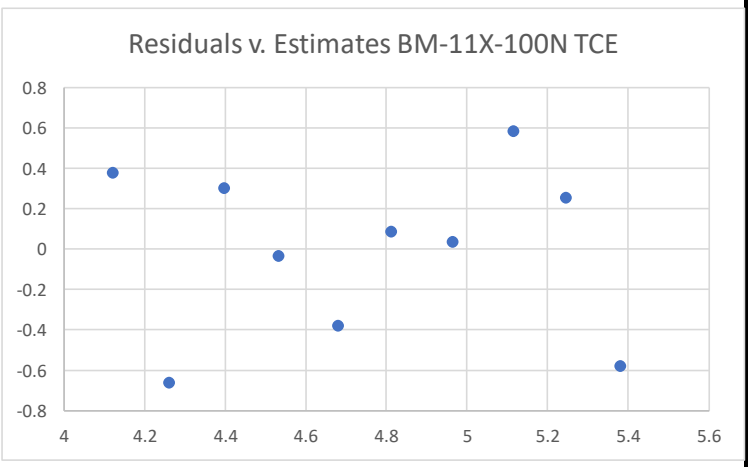
5	43578	4.3	4.679	0.142	0.465	4.414	4.943	3.814	5.543	-0.379
6	43752	4.9	4.811	0.142	0.465	4.548	5.074	3.947	5.675	0.0888
7	43951	5	4.963	0.158	0.47	4.669	5.257	4.089	5.837	0.0372
8	44151	5.7	5.115	0.189	0.481	4.765	5.466	4.221	6.01	0.585
9	44322	5.5	5.245	0.221	0.495	4.834	5.657	4.325	6.166	0.255
10	44497	4.8	5.379	0.259	0.513	4.898	5.86	4.425	6.332	-0.579

	X Vector	Residuals
4/20/2017	42845	0.38
10/20/2017	43028	-0.66
4/17/2018	43207	0.304
10/12/2018	43385	-0.0317
4/23/2019	43578	-0.379
10/14/2019	43752	0.0888
4/30/2020	43951	0.0372
11/16/2020	44151	0.585
5/6/2021	44322	0.255
10/28/2021	44497	-0.579



CONSTANT

	Yhat	Residuals
	4.12	0.38
	4.26	-0.66
	4.396	0.304
	4.532	-0.0317
	4.679	-0.379
	4.811	0.0888
	4.963	0.0372
	5.115	0.585
	5.245	0.255
	5.379	-0.579



CONSTANT

Shapiro-Wilks Test for Normality

	Residuals ascending	Residuals descendin g	Column C-l	Coeffiicien t	
1	-0.66	0.585	1.245	0.5739	0.714506
2	-0.579	0.38	0.959	0.3291	0.315607
3	-0.379	0.304	0.683	0.2141	0.14623
4	-0.0317	0.255	0.2867	0.1224	0.035092
5	0.0372	0.0888	0.0516	0.0399	0.002059
6	0.0888	0.0372	-0.0516	b=	1.213494
7	0.255	-0.0317	-0.2867	StdDev=	0.385456
8	0.304	-0.379	-0.683	SW=	1.101242
9	0.38	-0.579	-0.959	Critical pt =	0.842
10	0.585	-0.66	-1.245		

SW= Shapiro-Wilk Statistic

5%

Assume Normal

BM-15N6 NITRATE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:11:55 AM
From File	COMPLIANCE DATA 2H2021_b.xls
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Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	Nitrogen, Nitrate_bm-15n6
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_bm-15n6
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	481877	95458	5.048	9.9168E-4
nple Date_bm-1!	-10.15	2.185	-4.645	0.00166

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	2.965E+8	1	2.965E+8	21.58	0.0017
Error	1.100E+8	8	13743975		
Total	4.065E+8	9			

R Square	0.73
Adjusted R Square	0.696
Sqrt(MSE) = Scale	3707

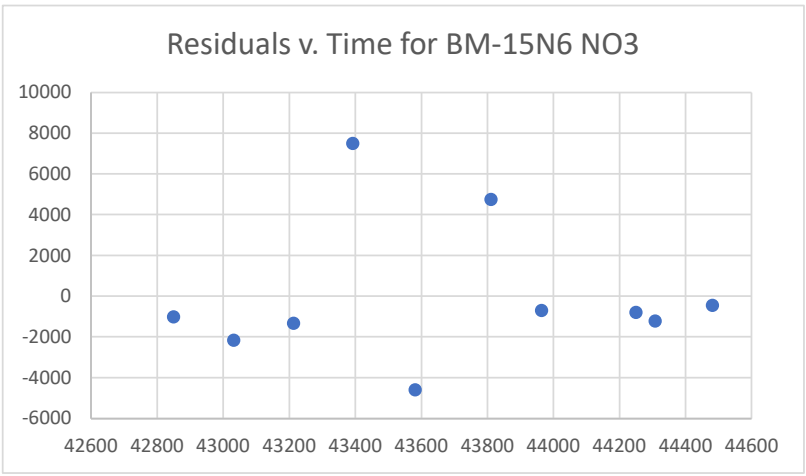
Regression Table

Obs	Y Vector	Yhat	Residuals	Res/Scale
1	46000	47008	-1008	-0.272
2	43000	45161	-2161	-0.583
3	42000	43324	-1324	-0.357
4	49000	41507	7493	2.021
5	35000	39589	-4589	-1.238
6	42000	37255	4745	1.28
7	35000	35702	-702	-0.189
8	32000	32800	-799.5	-0.216
9	31000	32211	-1211	-0.327
10	30000	30445	-445	-0.12

Summary Table for Prediction and Confidence Limits

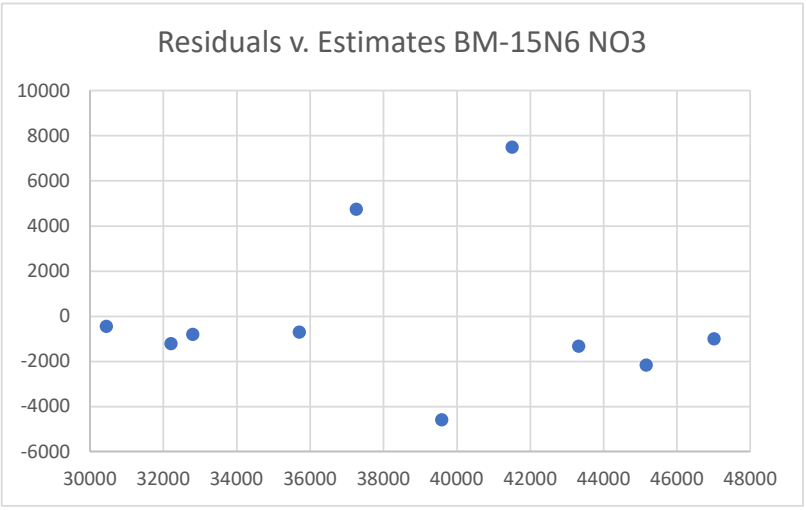
Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	42850	46000	47008	2175	4298	42964	51051	39015	55000	-1008
2	43032	43000	45161	1852	4144	41716	48605	37454	52867	-2161
3	43213	42000	43324	1566	4025	40411	46236	35840	50807	-1324
4	43392	49000	41507	1339	3942	39017	43997	34177	48837	7493
5	43581	35000	39589	1196	3895	37366	41812	32345	46832	-4589
6	43811	42000	37255	1203	3897	35018	39491	30007	44502	4745
7	43964	35000	35702	1318	3935	33251	38153	28385	43019	-702
8	44250	32000	32800	1697	4077	29644	35956	25218	40381	-799.5
9	44308	31000	32211	1791	4117	28881	35541	24555	39867	-1211
10	44482	30000	30445	2093	4257	26553	34337	22528	38362	-445

	X Vector	Residuals
4/25/2017	42850	-1008
10/24/2017	43032	-2161
4/23/2018	43213	-1324
10/19/2018	43392	7493
4/26/2019	43581	-4589
12/12/2019	43811	4745
5/13/2020	43964	-702
2/23/2021	44250	-799.5
4/22/2021	44308	-1211
10/13/2021	44482	-445



NOT CONSTANT

	Yhat	Residuals
	47008	-1008
	45161	-2161
	43324	-1324
	41507	7493
	39589	-4589
	37255	4745
	35702	-702
	32800	-799.5
	32211	-1211
	30445	-445



NOT CONSTANT

Shapiro-Wilks Test for Normality

	Residuals ascending	Residuals descending	Column C-I	Coeffiicient a			
1	-4589	7493	12082	0.5739	6933.86		
2	-2161	4745	6906	0.3291	2272.765		
3	-1324	-445	879	0.2141	188.1939		
4	-1211	-702	509	0.1224	62.3016		
5	-1008	-799.5	208.5	0.0399	8.31915		
6	-799.5	-1008	-208.5	b=	9465.439		
7	-702	-1211	-509	StdDev=	2438.458		
8	-445	-1324	-879	SW=	1.674204		
9	4745	-2161	-6906	Critical pt =	0.842	5%	
10	7493	-4589	-12082				

SW= Shapiro-Wilk Statistic

Assume Normal

MW38-830N-230E 1,4-DIOXANE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:08:16 AM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	1,4-Dioxane_mw38-830n-230e
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_mw38-830n-230e
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	288.7	72.05	4.007	0.00391
Date_mw38-83(	-0.00646	0.00165	-3.912	0.00447

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	113.9	1	113.9	15.3	0.0045
Error	59.52	8	7.44		
Total	173.4	9			

R Square	0.657
Adjusted R Square	0.614
Sqrt(MSE) = Scale	2.728

Regression Table

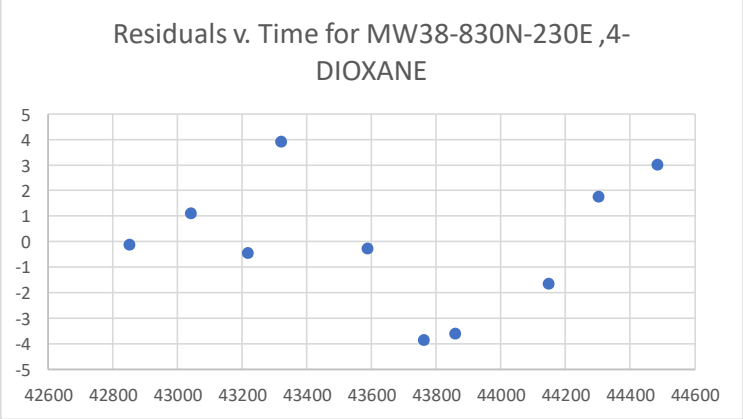
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	12	12.1	-0.0972	-0.0357
2	12	10.88	1.123	0.412
3	9.3	9.741	-0.441	-0.162
4	13	9.076	3.924	1.439
5	7.1	7.353	-0.253	-0.0926
6	2.4	6.229	-3.829	-1.404
7	2	5.597	-3.597	-1.319
8	2.1	3.731	-1.631	-0.598
9	4.5	2.737	1.763	0.646
10	4.6	1.562	3.038	1.114

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	42851	12	12.1	1.584	3.154	9.152	15.04	6.232	17.96	-0.0972
2	43040	12	10.88	1.333	3.036	8.398	13.36	5.231	16.52	1.123
3	43216	9.3	9.741	1.128	2.952	7.644	11.84	4.252	15.23	-0.441
4	43319	13	9.076	1.026	2.914	7.167	10.98	3.657	14.5	3.924
5	43586	7.1	7.353	0.87	2.863	5.734	8.971	2.028	12.68	-0.253

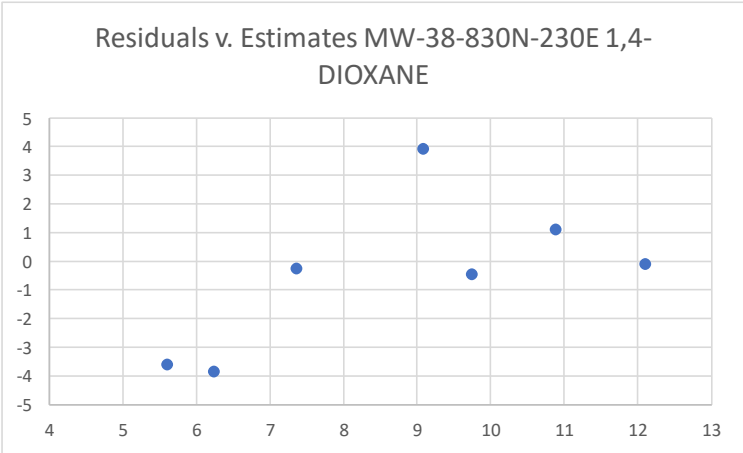
6	43760	2.4	6.229	0.879	2.866	4.594	7.865	0.9	11.56	-3.829
7	43858	2	5.597	0.925	2.88	3.877	7.316	0.241	10.95	-3.597
8	44147	2.1	3.731	1.183	2.973	1.531	5.932	-1.798	9.26	-1.631
9	44301	4.5	2.737	1.37	3.052	0.19	5.284	-2.939	8.413	1.763
10	44483	4.6	1.562	1.614	3.17	-1.44	4.564	-4.332	7.456	3.038

	X Vector	Residuals
4/26/2017	42851	-0.0972
11/1/2017	43040	1.123
4/26/2018	43216	-0.441
8/7/2018	43319	3.924
5/1/2019	43586	-0.253
10/22/2019	43760	-3.829
1/28/2020	43858	-3.597
11/12/2020	44147	-1.631
4/15/2021	44301	1.763
10/14/2021	44483	3.038



NOT CONSTANT

	Yhat	Residuals
	12.1	-0.0972
	10.88	1.123
	9.741	-0.441
	9.076	3.924
	7.353	-0.253
	6.229	-3.829
	5.597	-3.597
	3.731	-1.631
	2.737	1.763
	1.562	3.038



NOT CONSTANT

Shapiro-Wilks Test for Normality

SW= Shapiro-Wilk Statistic

	Residuals ascending	Residuals descendin	Column C-I	Coeffiicient	
1	-3.829	3.924	7.753	0.5739	4.449447
2	-3.597	3.038	6.635	0.3291	2.183579
3	-1.631	1.763	3.394	0.2141	0.726655
4	-0.441	1.123	1.564	0.1224	0.191434
5	-0.253	-0.0972	0.1558	0.0399	0.006216
6	-0.0972	-0.253	-0.1558	b=	7.557331
7	1.123	-0.441	-1.564	StdDev=	2.302592
8	1.763	-1.631	-3.394	SW=	1.196906
9	3.038	-3.597	-6.635	Critical pt =	0.842 5%
10	3.924	-3.829	-7.753		

Assume Normal

MW38-830N-230E CHLOROFORM

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:10:48 AM
From File	COMPLIANCE DATA 2H2021_a.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	Chloroform_mw38-830n-230e
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_mw38-830n-230e
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	111.5	35.11	3.175	0.0131
Date_mw38-83(	-0.00245	8.0408E-4	-3.045	0.0159

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	16.54	1	16.54	9.273	0.0159
Error	14.27	8	1.783		
Total	30.8	9			

R Square	0.537
Adjusted R Square	0.479
Sqrt(MSE) = Scale	1.335

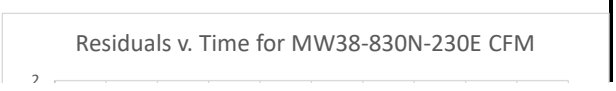
Regression Table

Obs	Y Vector	Yhat	Residuals	Res/Scale
1	6.4	6.536	-0.136	-0.102
2	6.9	6.073	0.827	0.619
3	6.2	5.642	0.558	0.417
4	5.9	5.39	0.51	0.382
5	5.4	4.737	0.663	0.497
6	2.1	4.31	-2.21	-1.655
7	2.1	4.071	-1.971	-1.476
8	2.6	3.363	-0.763	-0.571
9	4.3	2.937	1.363	1.021
10	3.7	2.54	1.16	0.868

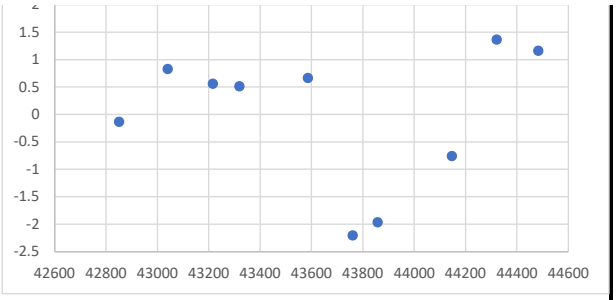
Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	42851	6.4	6.536	0.774	1.544	5.096	7.976	3.666	9.407	-0.136
2	43040	6.9	6.073	0.652	1.486	4.861	7.286	3.31	8.837	0.827
3	43216	6.2	5.642	0.552	1.445	4.616	6.669	2.955	8.33	0.558
4	43319	5.9	5.39	0.503	1.427	4.456	6.325	2.737	8.044	0.51
5	43586	5.4	4.737	0.426	1.402	3.944	5.529	2.13	7.343	0.663
6	43760	2.1	4.31	0.43	1.403	3.511	5.11	1.702	6.919	-2.21
7	43858	2.1	4.071	0.452	1.41	3.23	4.911	1.449	6.692	-1.971
8	44147	2.6	3.363	0.577	1.455	2.29	4.436	0.658	6.068	-0.763
9	44321	4.3	2.937	0.68	1.499	1.672	4.201	0.15	5.724	1.363
10	44483	3.7	2.54	0.786	1.55	1.078	4.002	-0.342	5.422	1.16

	X Vector	Residuals
42851	42851	-0.136



43040	43040	0.827
43216	43216	0.558
43319	43319	0.51
43586	43586	0.663
43760	43760	-2.21
43858	43858	-1.971
44147	44147	-0.763
44321	44321	1.363
44483	44483	1.16



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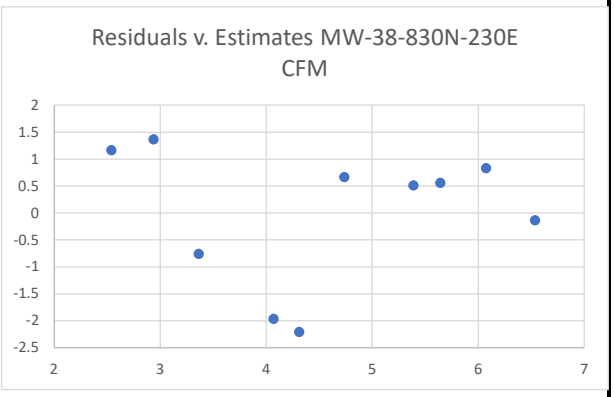
Yhat	Residuals
6.536	-0.136
6.073	0.827
5.642	0.558
5.39	0.51
4.737	0.663
4.31	-2.21
4.071	-1.971
3.363	-0.763
2.937	1.363
2.54	1.16



NOT CONSTANT

Shapiro-Wilks Test for Normality

SW= Shapiro-Wilk Statistic

	Residuals ascending	Residuals descending	Column C- a	Coeffiicient	
1	-2.21	1.363	3.573	0.5739	2.050545
2	-1.971	1.16	3.131	0.3291	1.030412
3	-0.763	0.827	1.59	0.2141	0.340419
4	-0.136	0.663	0.799	0.1224	0.097798
5	0.51	0.558	0.048	0.0399	0.001915
6	0.558	0.51	-0.048	b=	3.521089
7	0.663	-0.136	-0.799	StdDev=	1.235114
8	0.827	-0.763	-1.59	SW=	0.90302
9	1.16	-1.971	-3.131	Critical pt =	0.842 5%
10	1.363	-2.21	-3.573		

Assume Normal

MW62-WDR 1,4-DIOXANE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:08:16 AM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	1,4-Dioxane_mw62-wdr
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_mw62-wdr
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	39.48	5.605	7.044	1.0781E-4
ıple Date_mw62-	-8.187E-4	1.2824E-4	-6.384	2.1266E-4

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	1.622	1	1.622	40.76	0.0002
Error	0.318	8	0.0398		
Total	1.94	9			

R Square	0.836
Adjusted R Square	0.815
Sqrt(MSE) = Scale	0.199

Regression Table

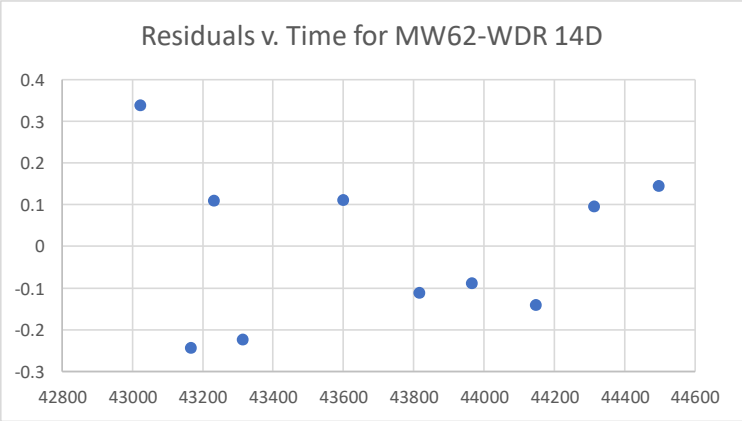
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	4.6	4.261	0.339	1.699
2	3.9	4.142	-0.242	-1.215
3	4.2	4.09	0.11	0.551
4	3.8	4.023	-0.223	-1.117
5	3.9	3.788	0.112	0.562
6	3.5	3.61	-0.11	-0.553
7	3.4	3.488	-0.0883	-0.443
8	3.2	3.34	-0.14	-0.702
9	3.3	3.203	0.0966	0.484
10	3.2	3.054	0.146	0.734

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	43021	4.6	4.261	0.108	0.227	4.06	4.462	3.839	4.683	0.339
2	43166	3.9	4.142	0.0937	0.22	3.968	4.317	3.733	4.552	-0.242
3	43230	4.2	4.09	0.0878	0.218	3.927	4.253	3.685	4.495	0.11
4	43312	3.8	4.023	0.0809	0.215	3.873	4.173	3.623	4.423	-0.223

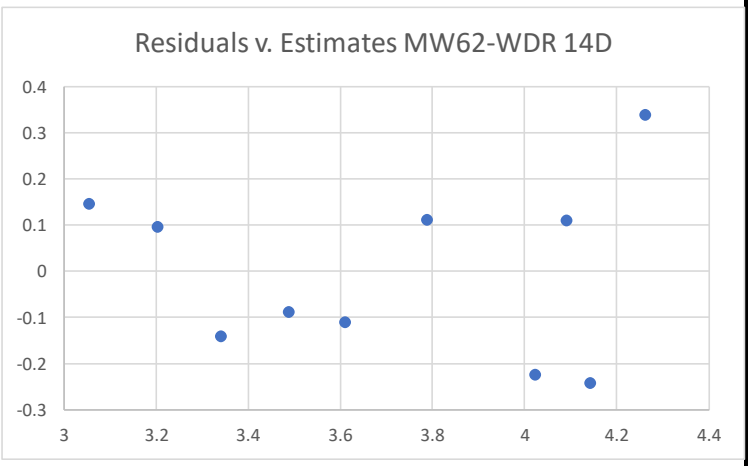
5	43599	3.9	3.788	0.0646	0.21	3.668	3.908	3.398	4.178	0.112
6	43816	3.5	3.61	0.0646	0.21	3.49	3.73	3.22	4	-0.11
7	43965	3.4	3.488	0.0713	0.212	3.356	3.621	3.094	3.882	-0.0883
8	44146	3.2	3.34	0.0846	0.217	3.183	3.497	2.937	3.743	-0.14
9	44313	3.3	3.203	0.1	0.223	3.017	3.39	2.788	3.618	0.0966
10	44496	3.2	3.054	0.119	0.232	2.832	3.275	2.621	3.486	0.146

	X Vector	Residuals
10/13/2017	43021	0.339
3/7/2018	43166	-0.242
5/10/2018	43230	0.11
7/31/2018	43312	-0.223
5/14/2019	43599	0.112
12/17/2019	43816	-0.11
5/14/2020	43965	-0.0883
11/11/2020	44146	-0.14
4/27/2021	44313	0.0966
10/27/2021	44496	0.146



CONSTANT

	Yhat	Residuals
	4.261	0.339
	4.142	-0.242
	4.09	0.11
	4.023	-0.223
	3.788	0.112
	3.61	-0.11
	3.488	-0.0883
	3.34	-0.14
	3.203	0.0966
	3.054	0.146



CONSTANT

Shapiro-Wilks Test for Normality

	Residuals ascending	Residuals descendin	Column C-I	Coeffiicien t	
1	-0.242	0.339	0.581	0.5739	0.333436
2	-0.223	0.146	0.369	0.3291	0.121438
3	-0.14	0.112	0.252	0.2141	0.053953
4	-0.11	0.11	0.22	0.1224	0.026928
5	-0.0883	0.0966	0.1849	0.0399	0.007378
6	0.0966	-0.0883	-0.1849	b=	0.543133
7	0.11	-0.11	-0.22	StdDev=	0.154246
8	0.112	-0.14	-0.252	SW=	1.377655
9	0.146	-0.223	-0.369	Critical pt =	0.842 5%
10	0.339	-0.242	-0.581		

SW= Shapiro-Wilk Statistic

Assume Normal

MW62-WDR NITRITE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:13:02 AM
From File	COMPLIANCE DATA 2H2021_c.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	Nitrogen, Nitrite_mw62-wdr
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_mw62-wdr
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	87846	30588	2.872	0.0208
ıple Date_mw62·	-1.953	0.7	-2.791	0.0235

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	9232651	1	9232651	7.792	0.0235
Error	9478959	8	1184870		
Total	18711610	9			

R Square	0.493
Adjusted R Square	0.43
Sqrt(MSE) = Scale	1089

Regression Table

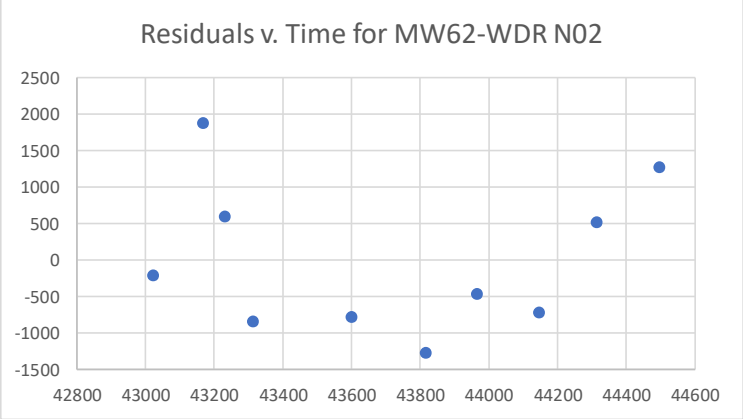
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	3600	3806	-205.9	-0.189
2	5400	3523	1877	1.725
3	4000	3398	602.4	0.553
4	2400	3237	-837.5	-0.769
5	1900	2677	-776.8	-0.714
6	980	2253	-1273	-1.169
7	1500	1962	-461.8	-0.424
8	890	1608	-718.3	-0.66
9	1800	1282	518	0.476
10	2200	924.5	1275	1.172

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	43021	3600	3806	590.4	1238	2708	4904	1503	6109	-205.9
2	43166	5400	3523	511.4	1203	2572	4474	1286	5759	1877
3	43230	4000	3398	479.2	1189	2507	4289	1186	5609	602.4
4	43312	2400	3237	441.2	1175	2417	4058	1053	5422	-837.5

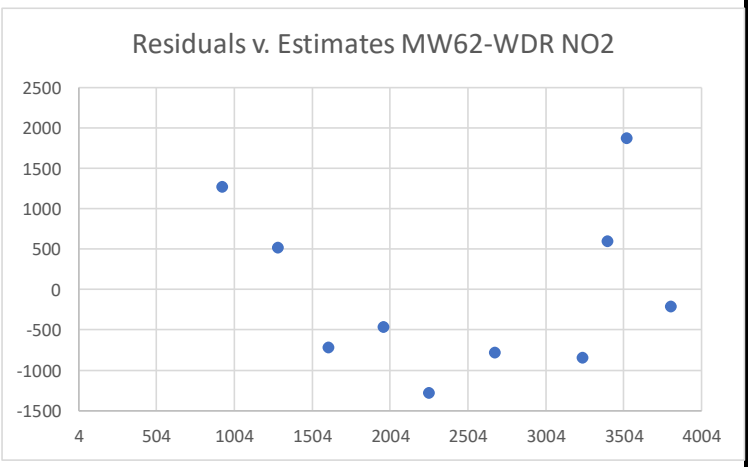
5	43599	1900	2677	352.3	1144	2022	3332	549.3	4804	-776.8
6	43816	980	2253	352.7	1144	1597	2909	125.2	4381	-1273
7	43965	1500	1962	388.9	1156	1239	2685	-187.6	4111	-461.8
8	44146	890	1608	461.7	1182	749.8	2467	-590.4	3807	-718.3
9	44313	1800	1282	546.5	1218	265.7	2298	-982.9	3547	518
10	44496	2200	924.5	651	1268	-286.1	2135	-1434	3283	1275

	X Vector	Residuals
10/13/2017	43021	-205.9
3/7/2018	43166	1877
5/10/2018	43230	602.4
7/31/2018	43312	-837.5
5/14/2019	43599	-776.8
12/17/2019	43816	-1273
5/14/2020	43965	-461.8
11/11/2020	44146	-718.3
4/27/2021	44313	518
10/27/2021	44496	1275



NOT CONSTANT

	Yhat	Residuals
	3806	-205.9
	3523	1877
	3398	602.4
	3237	-837.5
	2677	-776.8
	2253	-1273
	1962	-461.8
	1608	-718.3
	1282	518
	924.5	1275



NOT CONSTANT

Shapiro-Wilks Test for Normality

	Residuals ascending	Residuals descendin	Column C-I	Coeffiicien t		
1	-1273	1877	3150	0.5739	1807.785	
2	-837.5	1275	2112.5	0.3291	695.2238	
3	-776.8	602.4	1379.2	0.2141	295.2867	
4	-718.3	518	1236.3	0.1224	151.3231	
5	-461.8	-205.9	255.9	0.0399	10.21041	
6	-205.9	-461.8	-255.9	b=	2959.829	
7	518	-718.3	-1236.3	StdDev=	833.8137	
8	602.4	-776.8	-1379.2	SW=	1.400079	
9	1275	-837.5	-2112.5	Critical pt =	0.842	5%
10	1877	-1273	-3150			

SW= Shapiro-Wilk Statistic

Assume Normal

MW106-UD 1,4-DIOXANE

Ordinary Least Squares Linear Regression Output Sheet

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 10:08:16 AM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Display Limits	True
Confidence Level for Intervals	0.9
Display Regresion Diagnostics	True
Display Regresion Tables	True
Title For Y vs X Plots	Classical Regression
Confidence Level for Regression Line	0.9
Display Confidence Band	True
Display Prediction Band	True

Dependendant Variable (Y-Data)	1,4-Dioxane_mw106-ud
Number Reported (Y values)	10
Independent Variable (x-data)	Sample Date_mw106-ud
Number Reported (x-values)	10

Regression Estimates and Inference Table

Parameter	Estimates	Std. Error	T-values	p-values
intercept	20.8	13.53	1.538	0.163
ıple Date_mw10	-4.806E-4	3.2788E-4	-1.466	0.181

OLS ANOVA Table

Source of Variation	SS	DOF	MS	F-Value	P-Value
Regression	7.203	1	7.203	2.149	0.1809
Error	26.82	8	3.352		
Total	34.02	9			

R Square	0.212
Adjusted R Square	0.113
Sqrt(MSE) = Scale	1.831

Regression Table

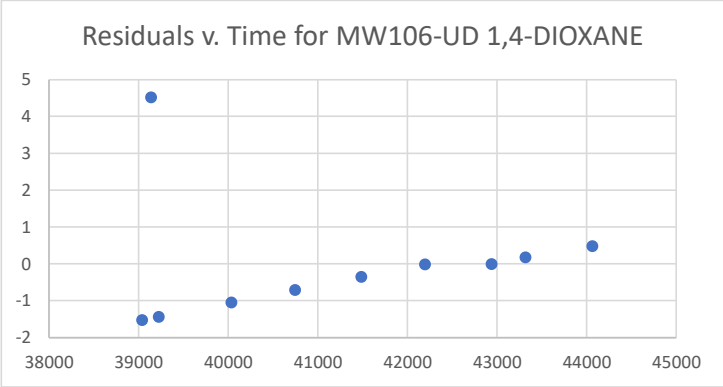
Obs	Y Vector	Yhat	Residuals	Res/Scale
1	0.5	2.036	-1.536	-0.839
2	6.5	1.989	4.511	2.464
3	0.5	1.948	-1.448	-0.791
4	0.5	1.558	-1.058	-0.578
5	0.5	1.216	-0.716	-0.391
6	0.5	0.861	-0.361	-0.197
7	0.5	0.52	-0.0196	-0.0107
8	0.15	0.162	-0.012	-0.00658
9	0.15	-0.0201	0.17	0.0929
10	0.09	-0.38	0.47	0.256

Summary Table for Prediction and Confidence Limits

Obs	X Vector	Y Vector	Yhat	s(Yhat)	s(pred)	LCL	UCL	LPL	UPL	Residuals
1	39042	0.5	2.036	0.92	2.049	0.326	3.747	-1.774	5.847	-1.536
2	39141	6.5	1.989	0.895	2.038	0.325	3.653	-1.801	5.778	4.511
3	39227	0.5	1.948	0.873	2.029	0.323	3.572	-1.825	5.72	-1.448
4	40037	0.5	1.558	0.697	1.959	0.262	2.855	-2.085	5.201	-1.058

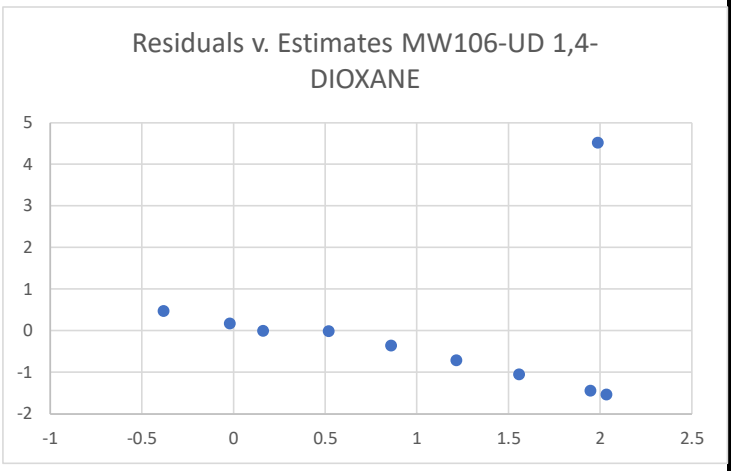
5	40750	0.5	1.216	0.599	1.927	0.101	2.33	-2.367	4.798	-0.716
6	41487	0.5	0.861	0.586	1.922	-0.227	1.95	-2.713	4.436	-0.361
7	42198	0.5	0.52	0.662	1.947	-0.711	1.75	-3.101	4.14	-0.0196
8	42942	0.15	0.162	0.808	2.001	-1.341	1.665	-3.56	3.884	-0.012
9	43321	0.15	-0.0201	0.9	2.04	-1.693	1.653	-3.814	3.773	0.17
10	44069	0.09	-0.38	1.099	2.135	-2.423	1.663	-4.35	3.591	0.47

	X Vector	Residuals
11/21/2006	39042	-1.536
2/28/2007	39141	4.511
5/25/2007	39227	-1.448
8/12/2009	40037	-1.058
7/26/2011	40750	-0.716
8/1/2013	41487	-0.361
7/13/2015	42198	-0.0196
7/26/2017	42942	-0.012
8/9/2018	43321	0.17
8/26/2020	44069	0.47



NOT CONSTANT

	Yhat	Residuals
	2.036	-1.536
	1.989	4.511
	1.948	-1.448
	1.558	-1.058
	1.216	-0.716
	0.861	-0.361
	0.52	-0.0196
	0.162	-0.012
	-0.0201	0.17
	-0.38	0.47



NOT CONSTANT

Shapiro-Wilks Test for Normality

SW= Shapiro-Wilk Statistic

	Residuals ascending	Residuals descending	Column C-	Coefficient	
1	-1.536	4.511	6.047	0.5739	3.470373
2	-1.448	0.47	1.918	0.3291	0.631214
3	-1.058	0.17	1.228	0.2141	0.262915
4	-0.716	-0.012	0.704	0.1224	0.08617
5	-0.361	-0.0196	0.3414	0.0399	0.013622
6	-0.0196	-0.361	-0.3414	b=	4.464293
7	-0.012	-0.716	-0.704	StdDev=	0.725263
8	0.17	-1.058	-1.228	SW=	4.209896
9	0.47	-1.448	-1.918	Critical pt =	0.842 5%
10	4.511	-1.536	-6.047		

Assume Normal

APPENDIX C-3.6

COMPLIANCE EVALUATION STATISTICAL TESTING

Upper Control Limit Analysis for Data Without Trends

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.11/20/2022 4:04:46 PM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Confidence Coefficient	90%

1,4-Dioxane (b-313)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	2.3	Mean	14.75
Maximum	21	Median	16.5
SD	5.788	SD of logged Data	0.673
Coefficient of Variation	0.392	Skewness	-1.37

Normal GOF Test

Shapiro Wilk Test Statistic	0.858	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

90% Normal UCL		90% UCLs (Adjusted for Skewness)	
90% Student's-t UCL	17.28	90% Adjusted-CLT UCL (Chen-1995)	16.53
		90% Modified-t UCL (Johnson-1978)	17.15

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 9:06:46 AM
From File	COMPLIANCE DATA 2H2021_b.xls
Full Precision	OFF
Confidence Coefficient	90%

Nitrogen, Nitrate (b-313)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	21000	Mean	33600
Maximum	55000	Median	31000
SD	11462	SD of logged Data	0.335
Coefficient of Variation	0.341	Skewness	0.671

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

90% Normal UCL		**90% UCLs (Adjusted for Skewness)**	
90% Student's-t UCL	38613	90% Adjusted-CLT UCL (Chen-1995)	38795
		90% Modified-t UCL (Johnson-1978)	38741

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.11/20/2022 4:04:46 PM
From File	COMPLIANCE DATA 2H2021.xls
Full Precision	OFF
Confidence Coefficient	90%

1,4-Dioxane (b-326-wd)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.77	Mean	7.347
Maximum	17	Median	8.15
SD	5.088	SD of logged Data	1.045
Coefficient of Variation	0.692	Skewness	0.37

Normal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

90% Normal UCL		90% UCLs (Adjusted for Skewness)	
90% Student's-t UCL	9.572	90% Adjusted-CLT UCL (Chen-1995)	9.543
		90% Modified-t UCL (Johnson-1978)	9.603

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Normal UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 9:08:24 AM
From File	COMPLIANCE DATA 2H2021_d.xls
Full Precision	OFF
Confidence Coefficient	90%

Tetrachloroethene (bm-11x-100n)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	4.6	Mean	6.07
Maximum	7.2	Median	6.15
SD	0.838	SD of logged Data	0.144
Coefficient of Variation	0.138	Skewness	-0.448

Normal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

90% Normal UCL		**90% UCLs (Adjusted for Skewness)**	
90% Student's-t UCL	6.437	90% Adjusted-CLT UCL (Chen-1995)	6.383
		90% Modified-t UCL (Johnson-1978)	6.43

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.11/24/2022 9:19:38 AM
From File	COMPLIANCE DATA 2H2021_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nitrogen, Nitrate (mw62-wdr)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	110000	Mean	120000
Maximum	130000	Median	120000
SD	6667	Std. Error of Mean	2108
Coefficient of Variation	0.0556	Skewness	0
Mean of logged Data	11.69	SD of logged Data	0.0557

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	123865	95% Adjusted-CLT UCL (Chen-1995)	123468
		95% Modified-t UCL (Johnson-1978)	123865

Nonparametric Distribution Free UCLs

95% CLT UCL	123468	95% Jackknife UCL	123865
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	126325	95% Chebyshev(Mean, Sd) UCL	129189
97.5% Chebyshev(Mean, Sd) UCL	133166	99% Chebyshev(Mean, Sd) UCL	140976

Suggested UCL to Use

95% Student's-t UCL	123865	or 95% Modified-t UCL	123865

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Normal UCL Statistics for Uncensored Full Data Sets		
User Selected Options		
Date/Time of Computation	ProUCL 5.11/20/2022 4:04:46 PM	
From File	COMPLIANCE DATA 2H2021.xls	
Full Precision	OFF	
Confidence Coefficient	90%	

1,4-Dioxane (mw77-wd)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	2.6	Mean	8.82
Maximum	20	Median	7.15
SD	5.882	SD of logged Data	0.705
Coefficient of Variation	0.667	Skewness	0.806

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

90% Normal UCL		**90% UCLs (Adjusted for Skewness)**	
90% Student's-t UCL	11.39	90% Adjusted-CLT UCL (Chen-1995)	11.54
		90% Modified-t UCL (Johnson-1978)	11.47

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

APPENDIX C-4

EFFECTIVENESS ASSESSMENT

APPENDIX C-4.1

EFFECTIVENESS ASSESSMENT

Determination of Hydraulic Gradients

(PM-1I&X through PM-15I&X)

MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-1I	1/16/2020	5772.16	PM-1X	1/16/2020	5772.79		-0.63
PM-1I	4/20/2020	5771.42	PM-1X	4/20/2020	5772.66		-1.24
PM-1I	7/15/2020	5771.40	PM-1X	7/15/2020	5772.50		-1.10
PM-1I	10/8/2020	5771.57	PM-1X	10/8/2020	5772.23		-0.66
PM-1I	1/11/2021	5771.36	PM-1X	1/11/2021	5771.72		-0.36
PM-1I	4/5/2021	5770.76	PM-1X	4/5/2021	5771.07		-0.31
PM-1I	7/14/2021	5771.24	PM-1X	7/14/2021	5774.02		-2.78
PM-1I	10/7/2021	5771.72	PM-1X	10/7/2021	5773.19		-1.47

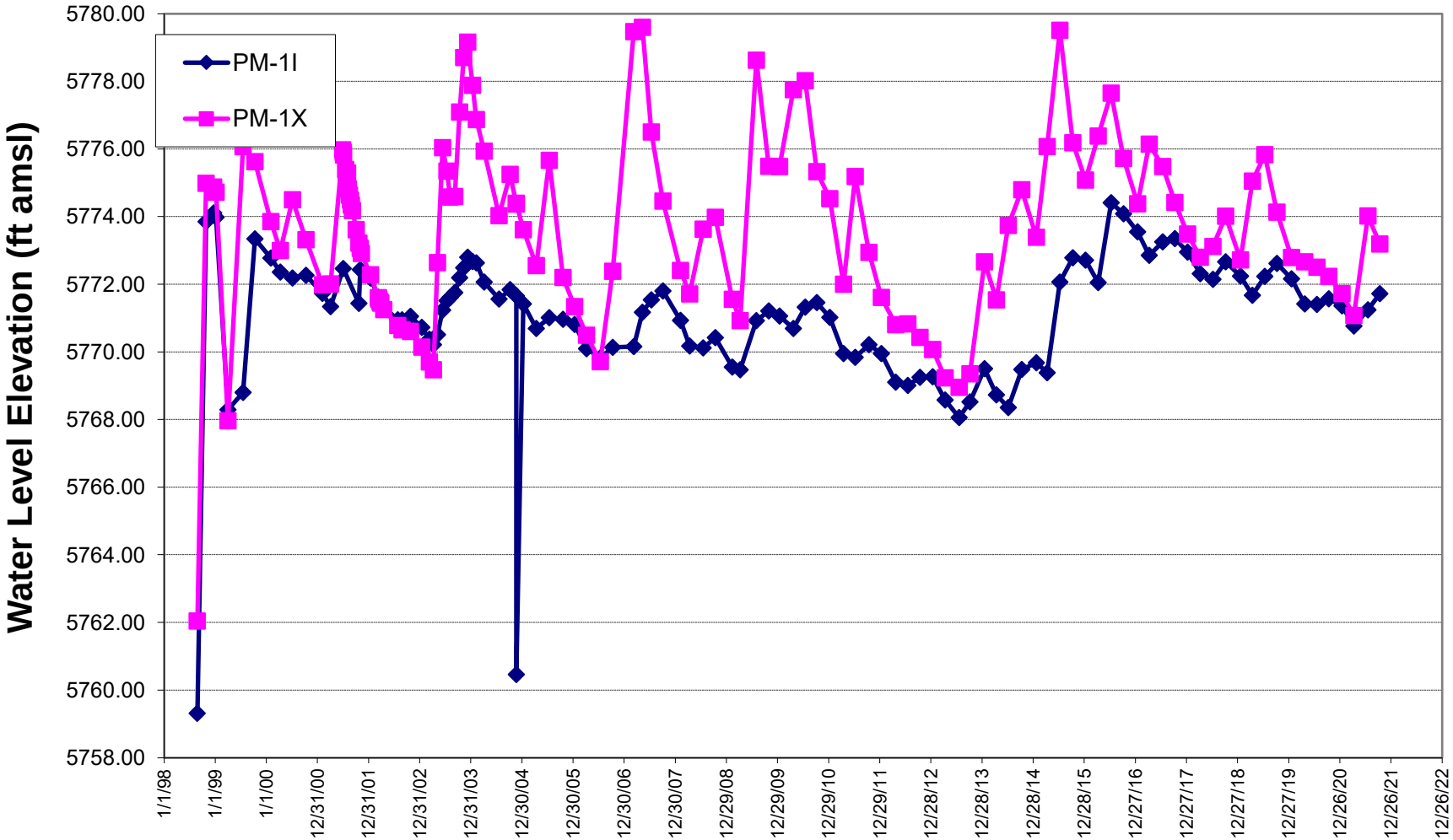
		Minimum	-2.78
		Maximum	-0.31
Mean Interior Water Level	5771.45	Avg. Diff	-1.07
Mean Exterior Water Level	5772.52	Diff of the Means	-1.07
Sum of the Squares of Deviations			
Interior	1.12		
Exterior	5.62		
Standard Deviation (pooled)	0.69		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.31	80% LCL	-1.38
95% Confidence Interval	0.66	95% UCL	-0.41

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-1 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-2I	1/9/2020	5770.45	PM-2X	1/9/2020	5777.48		-7.03
PM-2I	4/14/2020	5770.14	PM-2X	4/14/2020	5777.84		-7.70
PM-2I	7/13/2020	5770.20	PM-2X	7/13/2020	5777.21		-7.01
PM-2I	10/5/2020	5770.11	PM-2X	10/5/2020	5777.09		-6.98
PM-2I	1/6/2021	5770.08	PM-2X	1/6/2021	5777.06		-6.98
PM-2I	4/6/2021	5770.31	PM-2X	4/6/2021	5777.40		-7.09
PM-2I	7/6/2021	5769.95	PM-2X	7/6/2021	5776.96		-7.01
PM-2I	10/1/2021	5769.92	PM-2X	10/1/2021	5776.91		-6.99

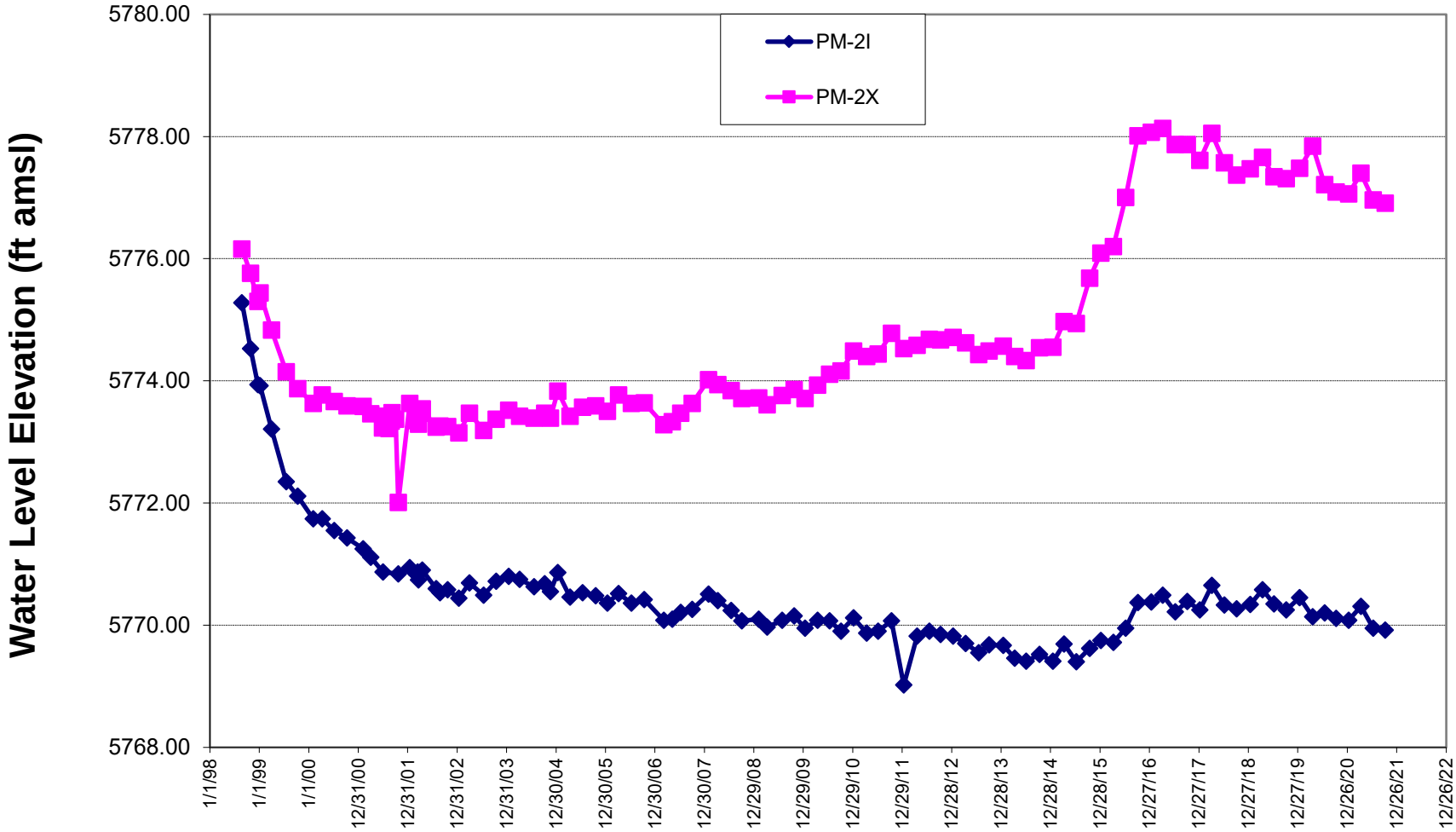
		Minimum	-7.70
		Maximum	-6.98
Mean Interior Water Level	5770.15	Avg. Diff	-7.10
Mean Exterior Water Level	5777.24	Diff of the Means	-7.10
Sum of the Squares of Deviations			
Interior	0.22		
Exterior	0.69		
Standard Deviation (pooled)	0.25		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.11	80% LCL	-7.21
95% Confidence Interval	0.24	95% UCL	-6.86

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-2 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-3I	1/9/2020	5779.59	PM-3X	1/9/2020	5778.81		0.78
PM-3I	4/14/2020	5779.20	PM-3X	4/14/2020	5778.46		0.74
PM-3I	7/13/2020	5779.12	PM-3X	7/13/2020	5778.40		0.72
PM-3I	10/5/2020	5778.96	PM-3X	10/5/2020	5778.24		0.72
PM-3I	1/6/2021	5778.91	PM-3X	1/6/2021	5778.18		0.73
PM-3I	4/6/2021	5779.22	PM-3X	4/6/2021	5778.57		0.65
PM-3I	7/6/2021	5778.64	PM-3X	7/6/2021	5778.07		0.57
PM-3I	10/1/2021	5778.60	PM-3X	10/1/2021	5778.13		0.47

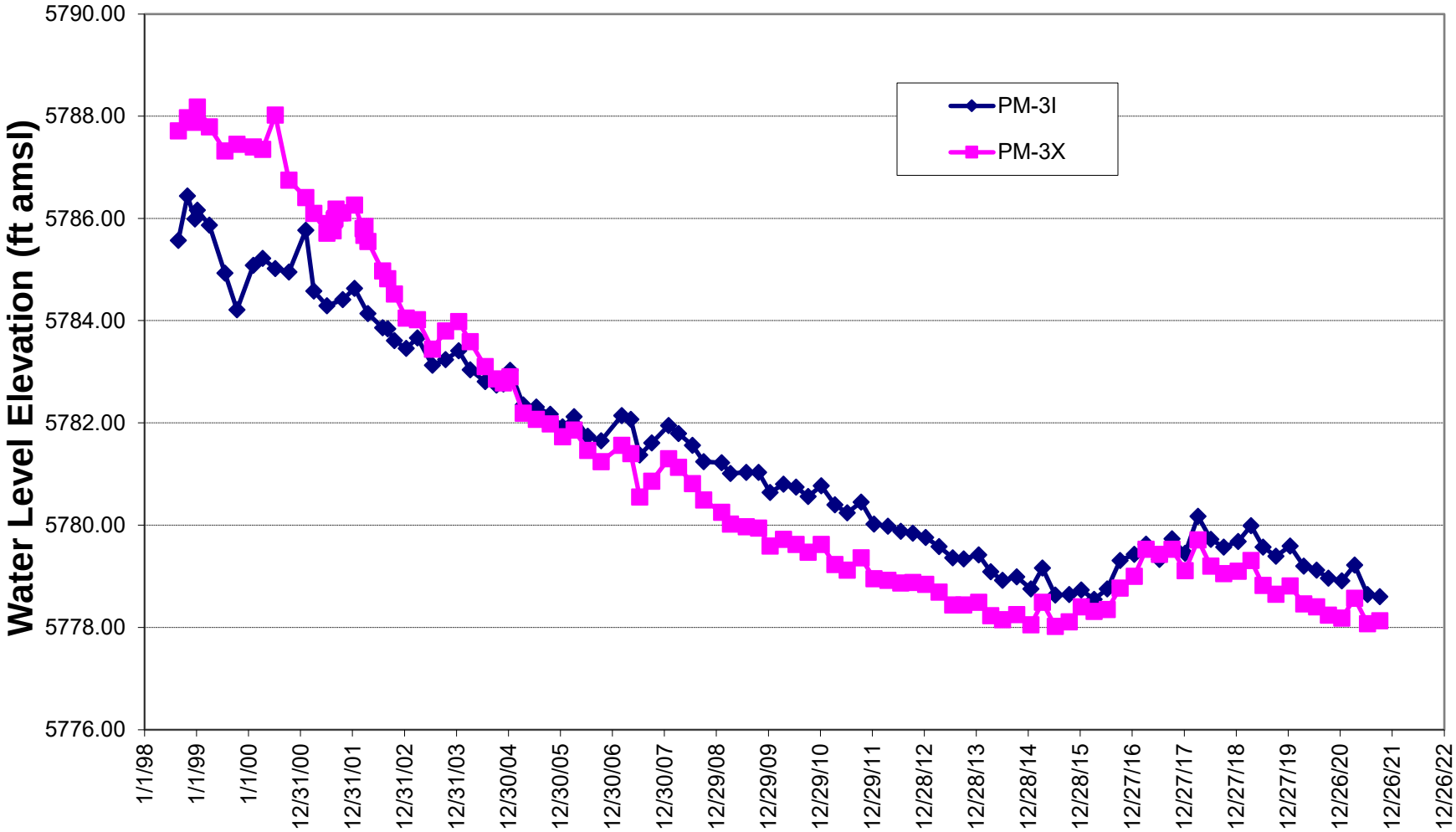
		Minimum	0.47
		Maximum	0.78
Mean Interior Water Level	5779.03	Avg. Diff	0.67
Mean Exterior Water Level	5778.36	Diff of the Means	0.67
Sum of the Squares of Deviations			
Interior	0.74		
Exterior	0.44		
Standard Deviation (pooled)	0.29		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.13	80% LCL	0.54
95% Cpnfidence Interval	0.28	95% UCL	0.95

Effectiveness Decision

Outward Gradient exists

Data Sufficiency

PM-3 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-4I	1/9/2020	5793.97	PM-4X	1/9/2020	5794.18		-0.21
PM-4I	4/15/2020	5793.79	PM-4X	4/15/2020	5794.06		-0.27
PM-4I	7/13/2020	5793.65	PM-4X	7/13/2020	5793.92		-0.27
PM-4I	10/5/2020	5793.41	PM-4X	10/5/2020	5793.70		-0.29
PM-4I	1/6/2021	5793.32	PM-4X	1/6/2021	5793.65		-0.33
PM-4I	4/6/2021	5793.43	PM-4X	4/6/2021	5793.77		-0.34
PM-4I	7/6/2021	5793.2	PM-4X	7/6/2021	5793.59		-0.39
PM-4I	10/1/2021	5793.14	PM-4X	10/1/2021	5793.52		-0.38

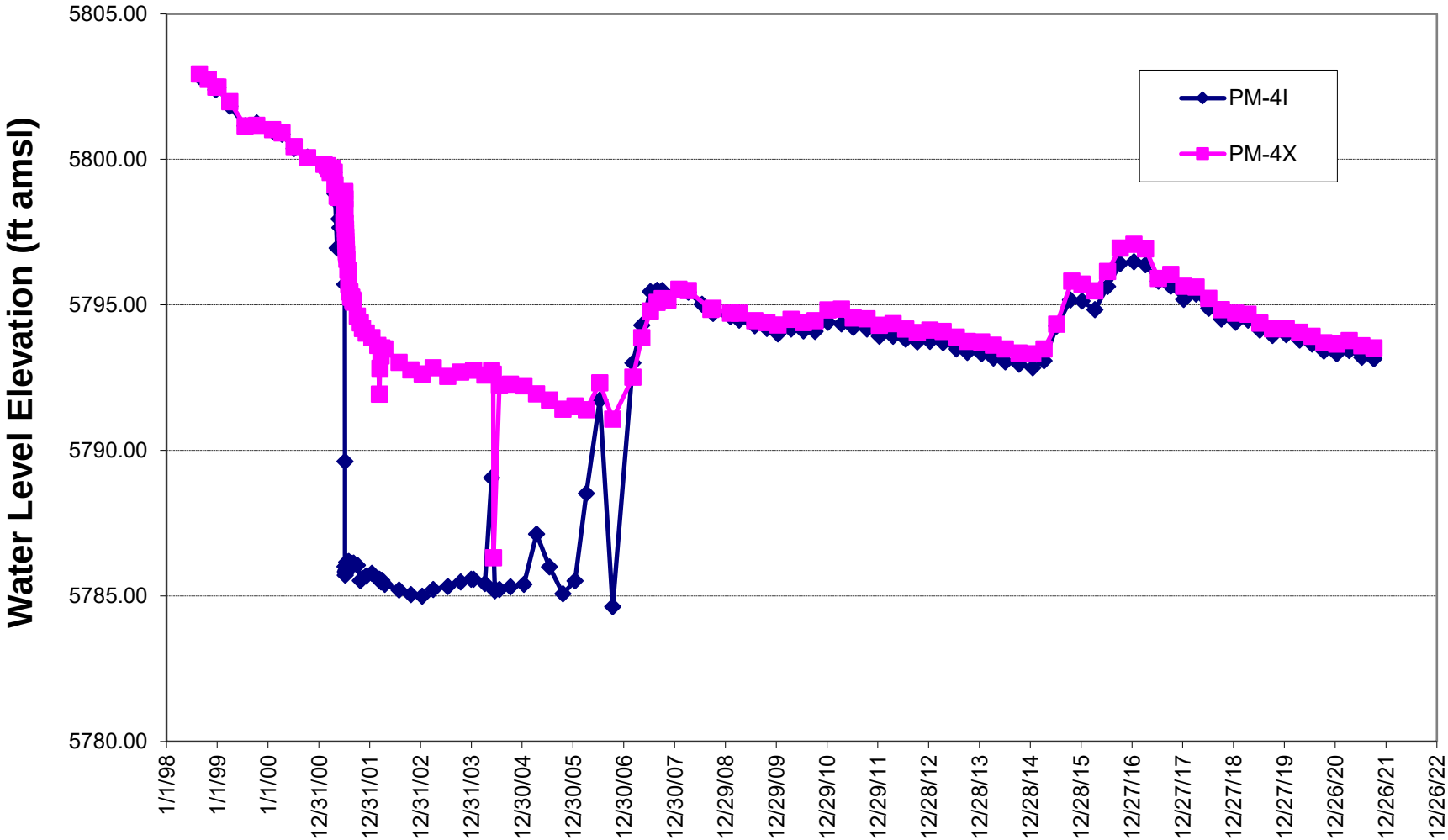
		Minimum	-0.39
		Maximum	-0.21
Mean Interior Water Level	5793.49	Avg. Diff	-0.31
Mean Exterior Water Level	5793.80	Diff of the Means	-0.31
Sum of the Squares of Deviations			
Interior	0.59		
Exterior	0.38		
Standard Deviation (pooled)	0.26		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.1182	80% LCL	-0.43
95% Confidence Interval	0.2498	95% UCL	-0.06

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-4 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-5I	1/9/2020	5798.63	PM-5X	1/9/2020	5799.85		-1.22
PM-5I	4/15/2020	5798.26	PM-5X	4/15/2020	5799.27		-1.01
PM-5I	7/13/2020	5799.19	PM-5X	7/13/2020	5799.54		-0.35
PM-5I	10/5/2020	5798.65	PM-5X	10/5/2020	5799.71		-1.06
PM-5I	1/6/2021	5798.24	PM-5X	1/6/2021	5799.46		-1.22
PM-5I	4/7/2021	5798.07	PM-5X	4/7/2021	5799.17		-1.10
PM-5I	7/6/2021	5799.84	PM-5X	7/6/2021	5799.81		0.03
PM-5I	10/1/2021	5799.04	PM-5X	10/1/2021	5799.93		-0.89

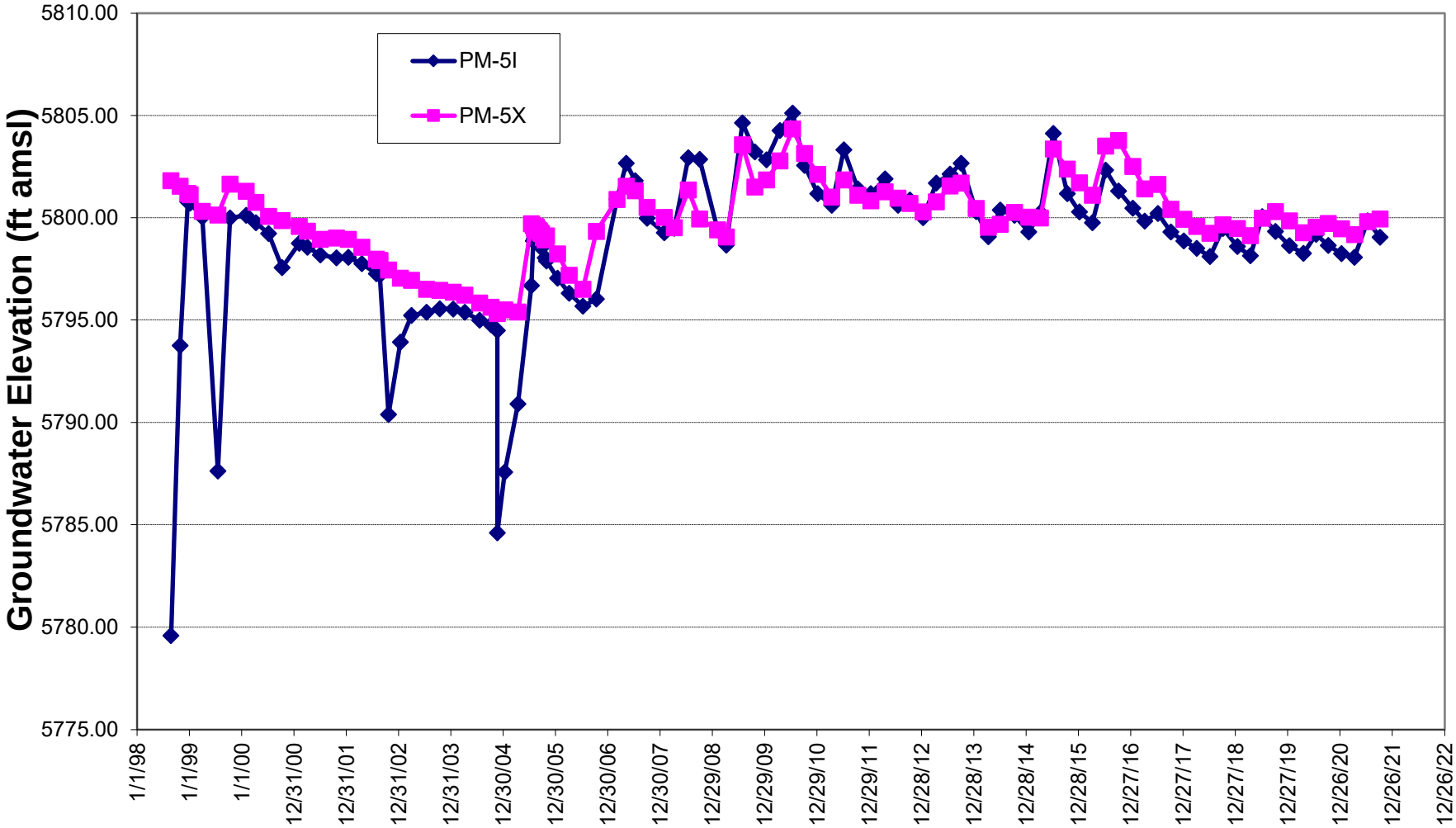
		Minimum	-1.22
		Maximum	0.03
Mean Interior Water Level	5798.74	Avg. Diff	-0.85
Mean Exterior Water Level	5799.59	Diff of the Means	-0.85
Sum of the Squares of Deviations			
Interior	2.45		
Exterior	0.54		
Standard Deviation (pooled)	0.46		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.21	80% LCL	-1.06
95% Confidence Interval	0.44	95% UCL	-0.41

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-5 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-6I	1/9/2020	5797.68	PM-6X	1/9/2020	5793.99		3.69
PM-6I	4/15/2020	5797.63	PM-6X	4/15/2020	5793.79		3.84
PM-6I	7/13/2020	5797.64	PM-6X	7/13/2020	5793.81		3.83
PM-6I	10/5/2020	5797.67	PM-6X	10/5/2020	5793.70		3.97
PM-6I	1/6/2021	5797.62	PM-6X	1/6/2021	5793.53		4.09
PM-6I	4/7/2021	5797.73	PM-6X	4/7/2021	5793.65		4.08
PM-6I	7/8/2021	5797.80	PM-6X	7/8/2021	5793.81		3.99
PM-6I	10/1/2021	5797.76	PM-6X	10/1/2021	5793.76		4

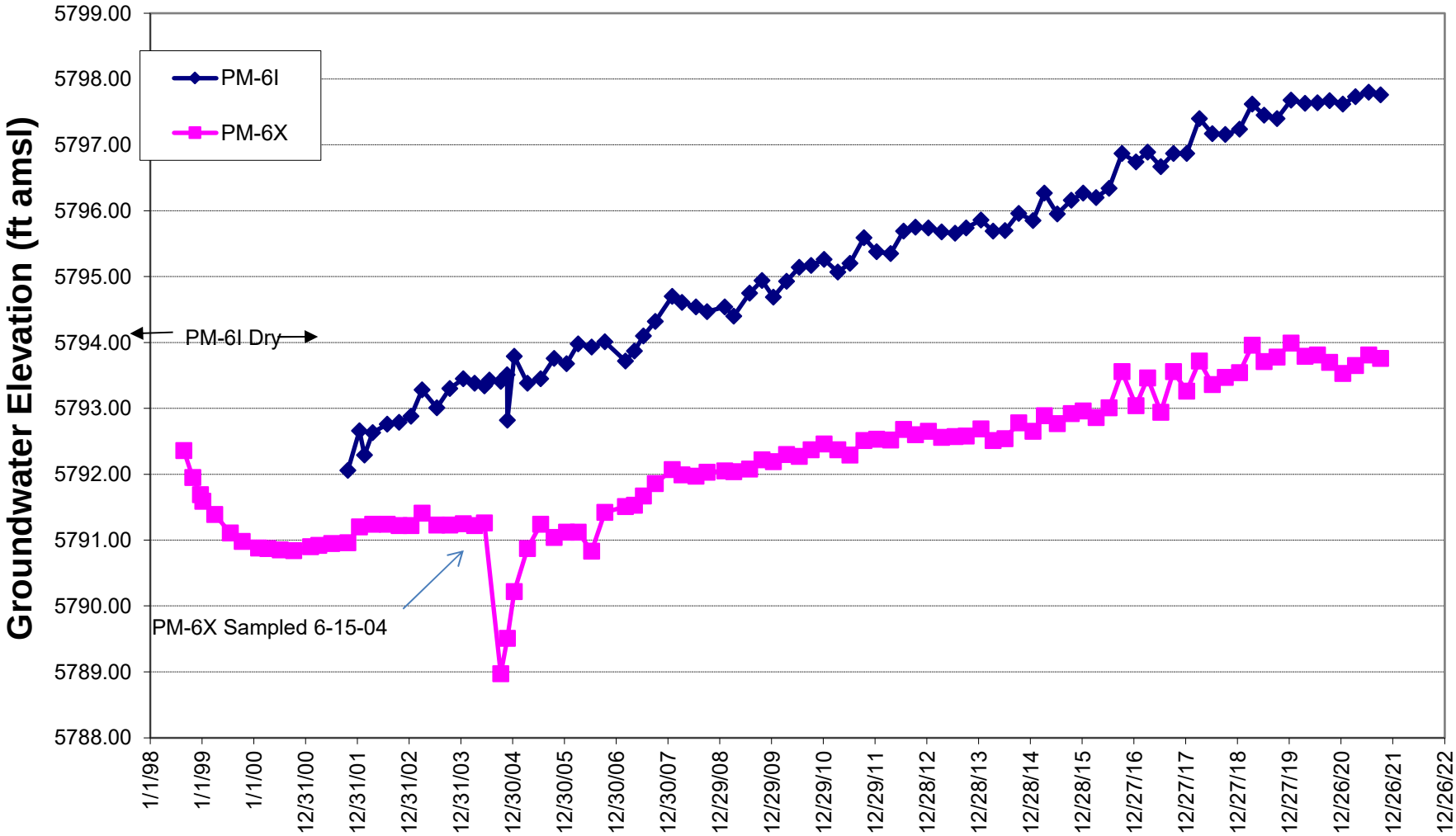
		Minimum	3.69
		Maximum	4.09
Mean Interior Water Level	5797.69	Avg. Diff	3.94
Mean Exterior Water Level	5793.76	Diff of the Means	3.94
Sum of the Squares of Deviations			
Interior	0.03		
Exterior	0.13		
Standard Deviation (pooled)	0.11		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.05	80% LCL	3.89
95% Cpnfidence Interval	0.10	95% UCL	4.04

Effectiveness Decision

Outward Gradient exists

Data Sufficiency

PM-6 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-7I	1/9/2020	5811.43	PM-7X	1/9/2020	5818.64		-7.21
PM-7I	4/15/2020	5811.05	PM-7X	4/15/2020	5817.87		-6.82
PM-7I	7/13/2020	5811.07	PM-7X	7/13/2020	5818.49		-7.42
PM-7I	10/5/2020	5811.04	PM-7X	10/5/2020	5818.22		-7.18
PM-7I	1/6/2021	5810.84	PM-7X	1/6/2021	5817.72		-6.88
PM-7I	4/7/2021	5810.75	PM-7X	4/7/2021	5817.29		-6.54
PM-7I	7/8/2021	5810.82	PM-7X	7/8/2021	5818.26		-7.44
PM-7I	10/1/2021	5810.79	PM-7X	10/1/2021	5818.13		-7.34

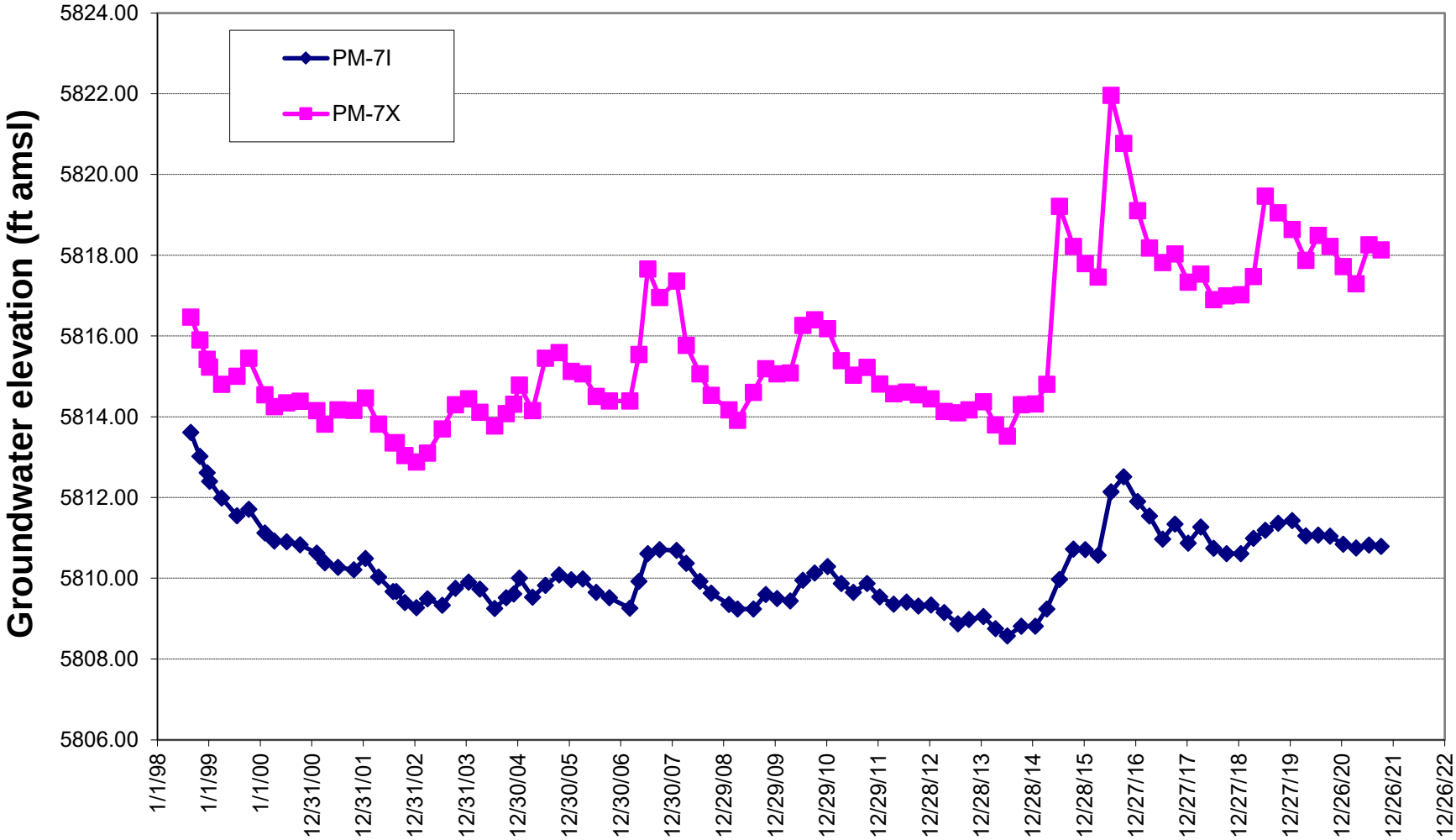
		Minimum	-7.44
		Maximum	-6.54
Mean Interior Water Level	5810.97	Avg. Diff	-7.10
Mean Exterior Water Level	5818.08	Diff of the Means	-7.10
Sum of the Squares of Deviations			
Interior	0.35		
Exterior	1.33		
Standard Deviation (pooled)	0.35		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.16	80% LCL	-7.26
95% Cpnfidence Interval	0.33	95% UCL	-6.77

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-7 well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-8I	1/9/2020	5817.22	PM-8X	1/9/2020	5825.73		-8.51
PM-8I	4/15/2020	5816.91	PM-8X	4/15/2020	5826.35		-9.44
PM-8I	7/13/2020	5817.07	PM-8X	7/13/2020	5826.39		-9.32
PM-8I	10/5/2020	5816.29	PM-8X	10/5/2020	5825.01		-8.72
PM-8I	1/6/2021	5815.59	PM-8X	1/6/2021	5824.34		-8.75
PM-8I	4/7/2021	5815.75	PM-8X	4/7/2021	5825.92		-10.17
PM-8I	7/8/2021	5816.84	PM-8X	7/8/2021	5826.77		-9.93
PM-8I	10/1/2021	5816.29	PM-8X	10/1/2021	5825.60		-9.31

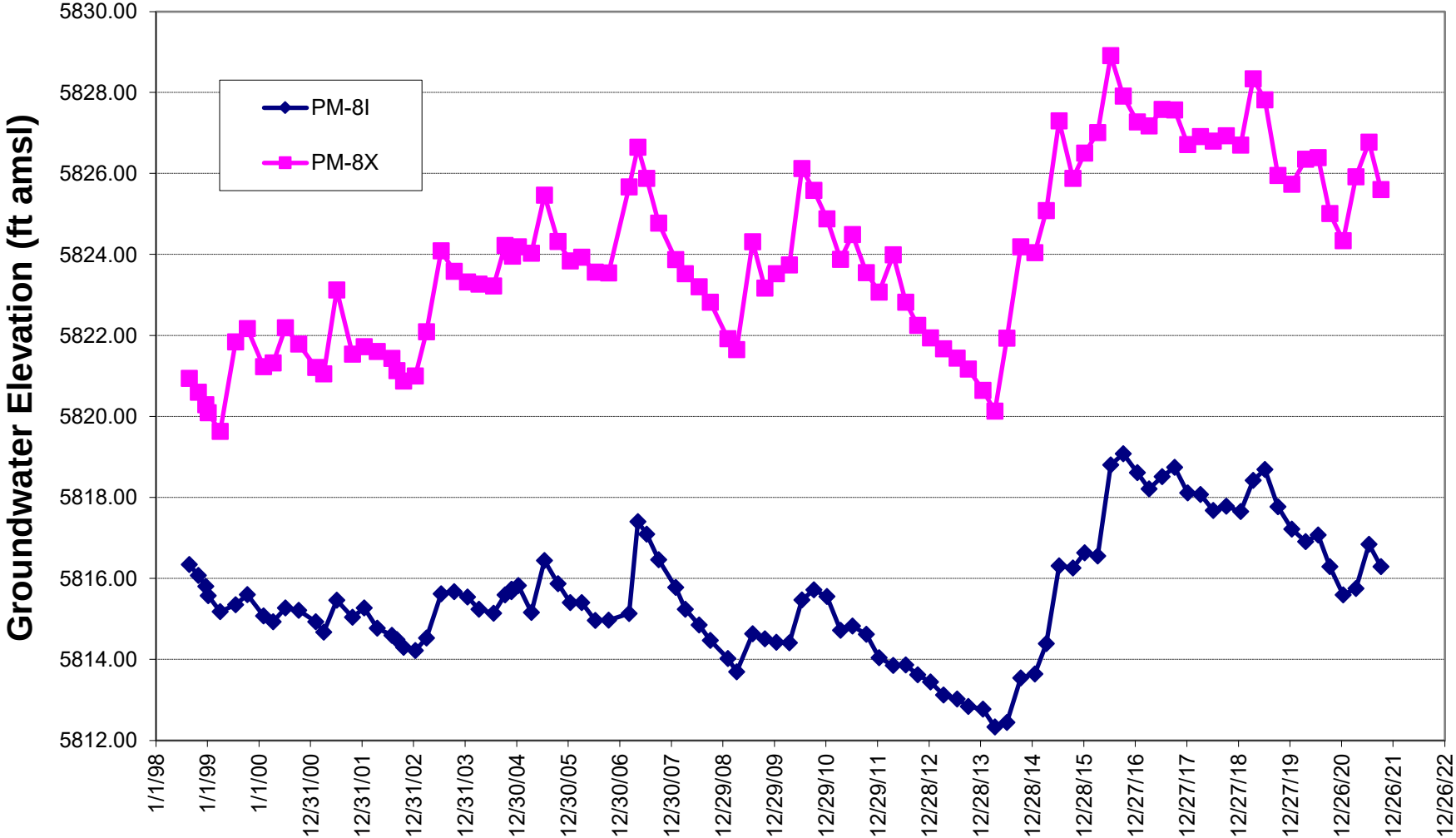
		Minimum	-10.17
		Maximum	-8.51
Mean Interior Water Level	5816.50	Avg. Diff	-9.27
Mean Exterior Water Level	5825.76	Diff of the Means	-9.27
Sum of the Squares of Deviations			
Interior	2.61		
Exterior	4.40		
Standard Deviation (pooled)	0.71		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.32	80% LCL	-9.59
95% Cpnfidence Interval	0.67	95% UCL	-8.60

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-8 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-9I	1/9/2020	5816.57	PM-9X	1/9/2020	5824.91		-8.34
PM-9I	4/15/2020	5816.45	PM-9X	4/15/2020	5826.55		-10.10
PM-9I	7/13/2020	5816.45	PM-9X	7/13/2020	5825.56		-9.11
PM-9I	10/5/2020	5815.96	PM-9X	10/5/2020	5824.30		-8.34
PM-9I	1/6/2021	5815.58	PM-9X	1/6/2021	5823.35		-7.77
PM-9I	4/7/2021	5815.89	PM-9X	4/7/2021	5826.79		-10.90
PM-9I	7/8/2021	5816.62	PM-9X	7/8/2021	5826.89		-10.27
PM-9I	10/1/2021	5816.02	PM-9X	10/1/2021	5824.98		-8.96

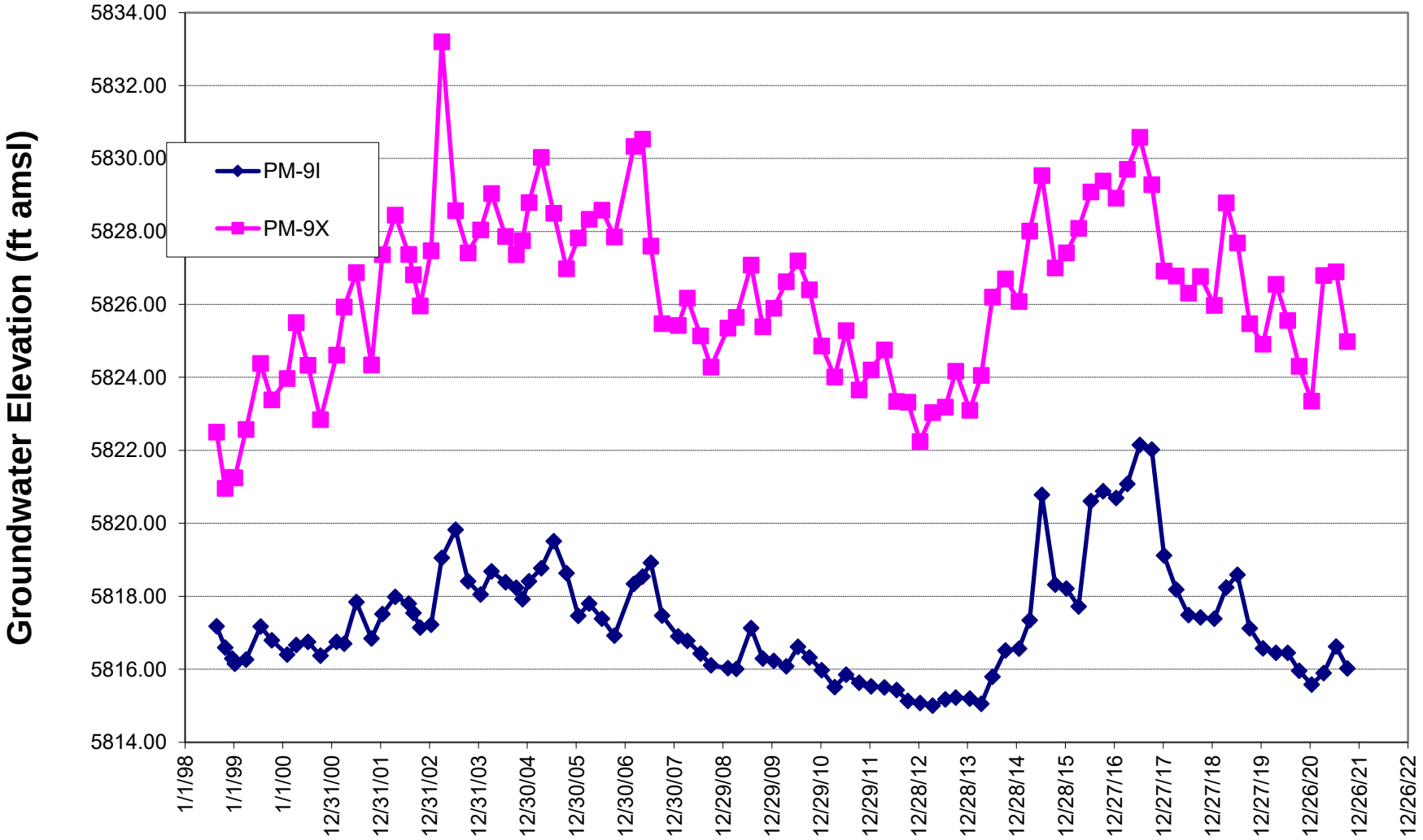
		Minimum	-10.90
		Maximum	-7.77
Mean Interior Water Level	5816.19	Avg. Diff	-9.22
Mean Exterior Water Level	5825.42	Diff of the Means	-9.22
Sum of the Squares of Deviations			
Interior	1.01		
Exterior	11.33		
Standard Deviation (pooled)	0.94		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.42	80% LCL	-9.64
95% Confidence Interval	0.89	95% UCL	-8.33

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-9 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-10I	1/9/2020	5814.89	PM-10X	1/9/2020	5819.52		-4.63
PM-10I	4/15/2020	5814.81	PM-10X	4/15/2020	5820.47		-5.66
PM-10I	7/13/2020	5814.87	PM-10X	7/13/2020	5820.08		-5.21
PM-10I	10/5/2020	5814.27	PM-10X	10/5/2020	5818.66		-4.39
PM-10I	1/6/2021	5813.83	PM-10X	1/6/2021	5817.19		-3.36
PM-10I	4/7/2021	5813.87	PM-10X	4/7/2021	5818.60		-4.73
PM-10I	7/8/2021	5815.01	PM-10X	7/8/2021	5820.68		-5.67
PM-10I	10/1/2021	5814.28	PM-10X	10/1/2021	5818.97		-4.69

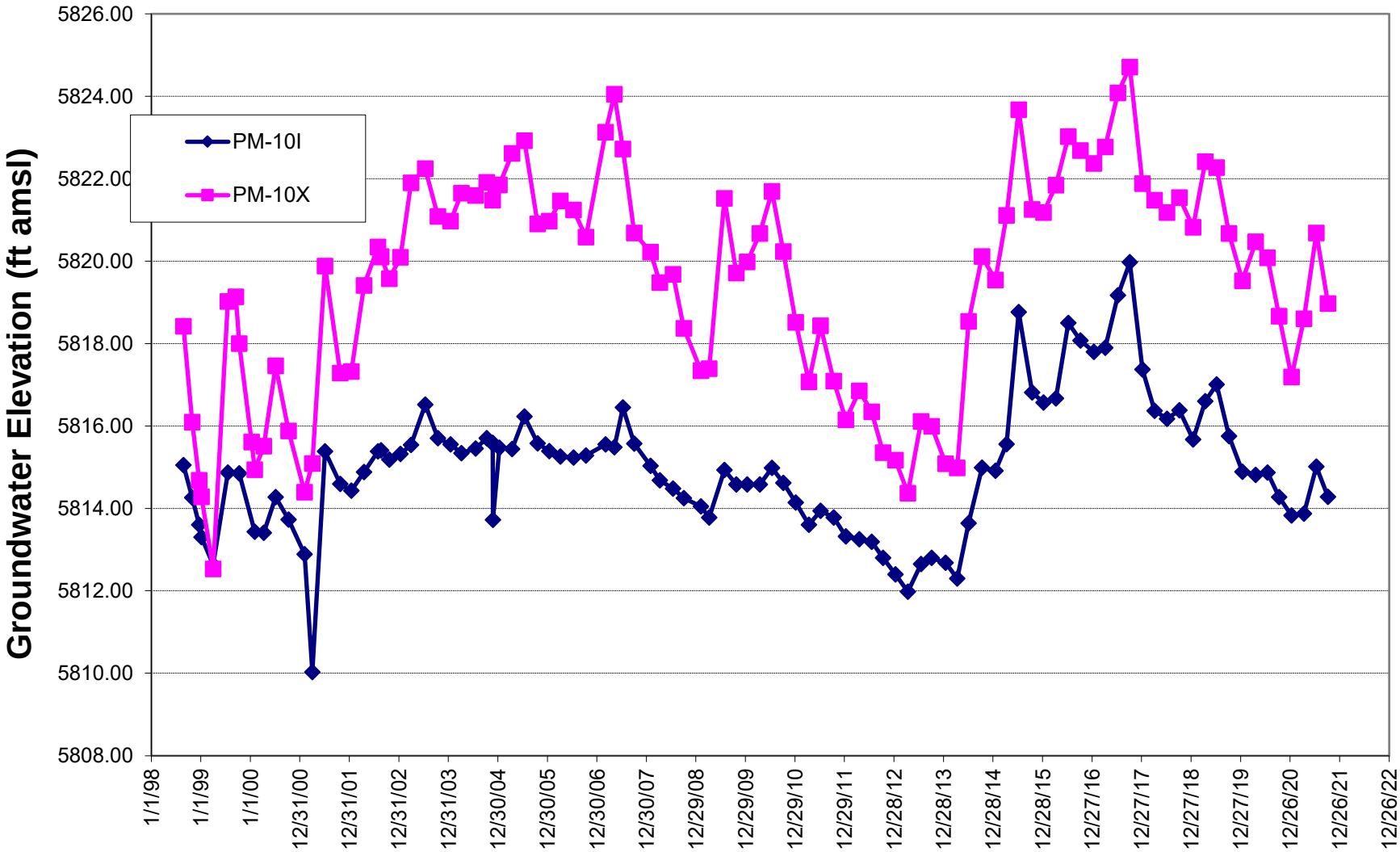
		Minimum	-5.67
		Maximum	-3.36
Mean Interior Water Level	5814.48	Avg. Diff	-4.79
Mean Exterior Water Level	5819.27	Diff of the Means	-4.79
Sum of the Squares of Deviations			
Interior	1.59		
Exterior	9.38		
Standard Deviation (pooled)	0.89		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.40	80% LCL	-5.19
95% Cpnfidence Interval	0.84	95% UCL	-3.95

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-10 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-11I	1/13/2020	5773.71	PM-11X	1/13/2020	5795.74		-22.03
PM-11I	4/16/2020	5773.78	PM-11X	4/16/2020	5795.61		-21.83
PM-11I	7/8/2020	5773.47	PM-11X	7/8/2020	5795.36		-21.89
PM-11I	10/12/2020	5773.37	PM-11X	10/12/2020	5794.84		-21.47
PM-11I	1/6/2021	5773.40	PM-11X	1/7/2021	5794.24		-20.84
PM-11I	4/9/2021	5773.73	PM-11X	4/9/2021	5793.74		-20.01
PM-11I	7/9/2021	5773.53	PM-11X	7/9/2021	5795.56		-22.03
PM-11I	10/5/2021	5773.39	PM-11X	10/5/2021	5794.85		-21.46

		Minimum	-22.03
		Maximum	-20.01
Mean Interior Water Level	5773.55	Avg. Diff	-21.45
Mean Exterior Water Level	5794.99	Diff of the Means	-21.44

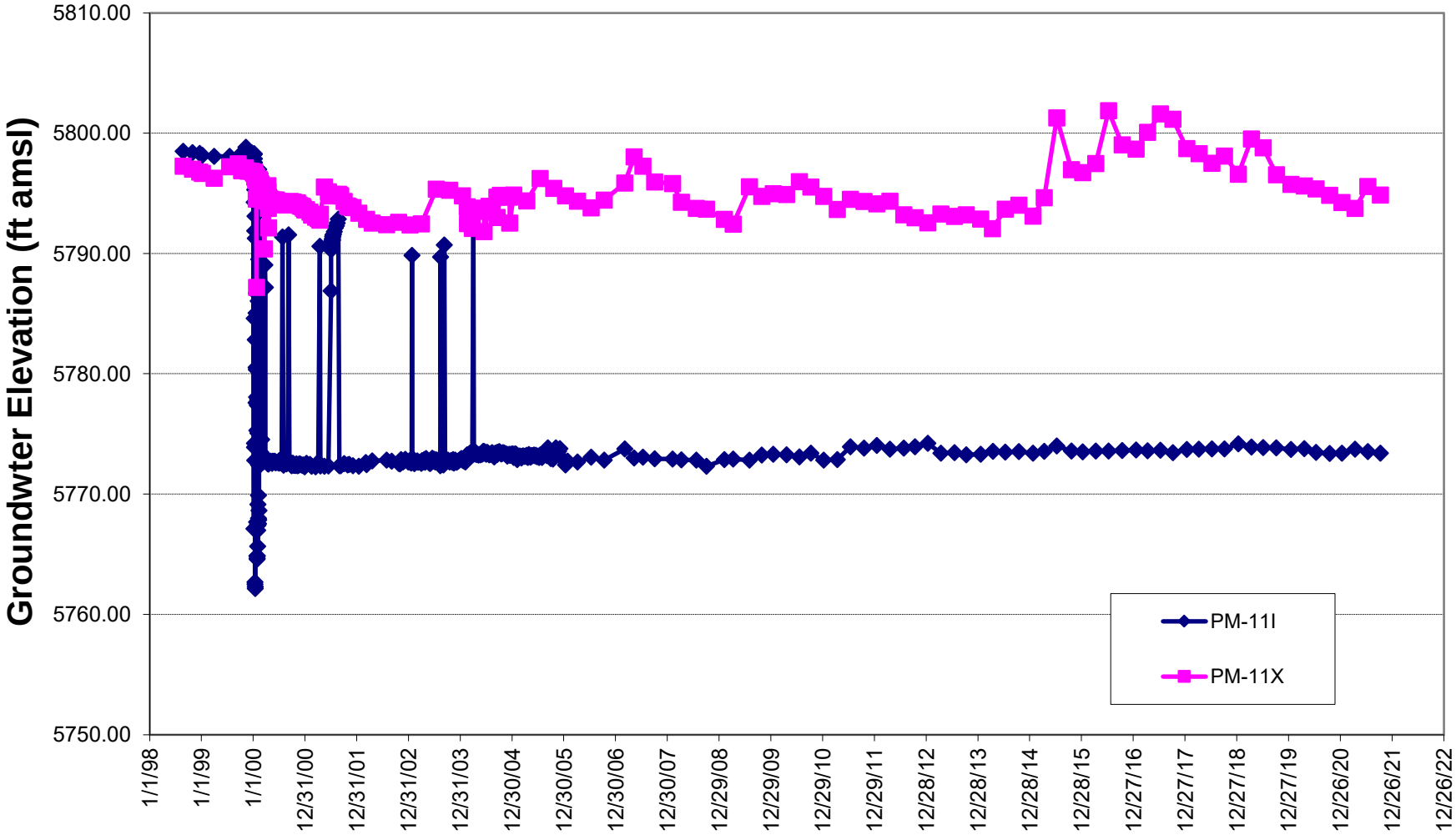
Sum of the Squares of Deviations		
Interior	0.20	
Exterior	3.58	
Standard Deviation (pooled)	0.52	
t-statistics degrees of freedom =	7	
α = 5%	1.89	
α = 20%	0.90	
80% Confidence Interval	0.23	80% LCL -21.68
95% Confidence Interval	0.49	95% UCL -20.95

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-11 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-12I	1/13/2020	5762.93	PM-12X	1/13/2020	5769.18		-6.25
PM-12I	4/16/2020	5763.09	PM-12X	4/16/2020	5768.54		-5.45
PM-12I	7/8/2020	5763.08	PM-12X	7/8/2020	5767.99		-4.91
PM-12I	10/12/2020	5762.96	PM-12X	10/12/2020	5767.89		-4.93
PM-12I	1/7/2021	5762.91	PM-12X	1/7/2021	5768.02		-5.11
PM-12I	4/9/2021	5762.93	PM-12X	4/9/2021	5767.73		-4.80
PM-12I	7/9/2021	5762.86	PM-12X	7/9/2021	5767.15		-4.29
PM-12I	10/5/2021	5762.69	PM-12X	10/5/2021	5767.00		-4.31

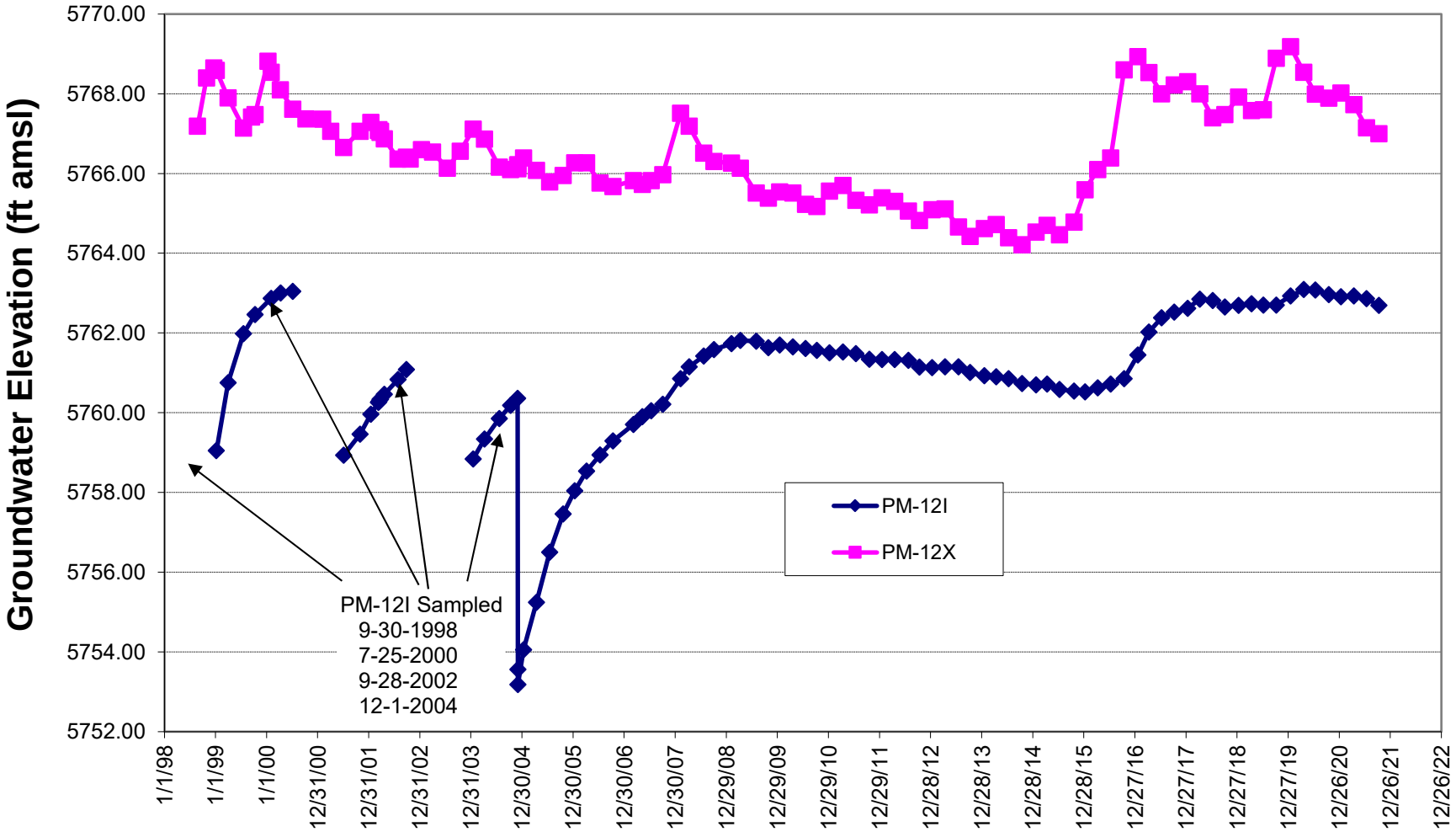
		Minimum	-6.25
		Maximum	-4.29
Mean Interior Water Level	5762.93	Avg. Diff	-5.01
Mean Exterior Water Level	5767.94	Diff of the Means	-5.01
Sum of the Squares of Deviations			
Interior	0.11		
Exterior	3.46		
Standard Deviation (pooled)	0.51		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.23	80% LCL	-5.23
95% Confidence Interval	0.48	95% UCL	-4.53

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-12 Well Pair Hydrographs

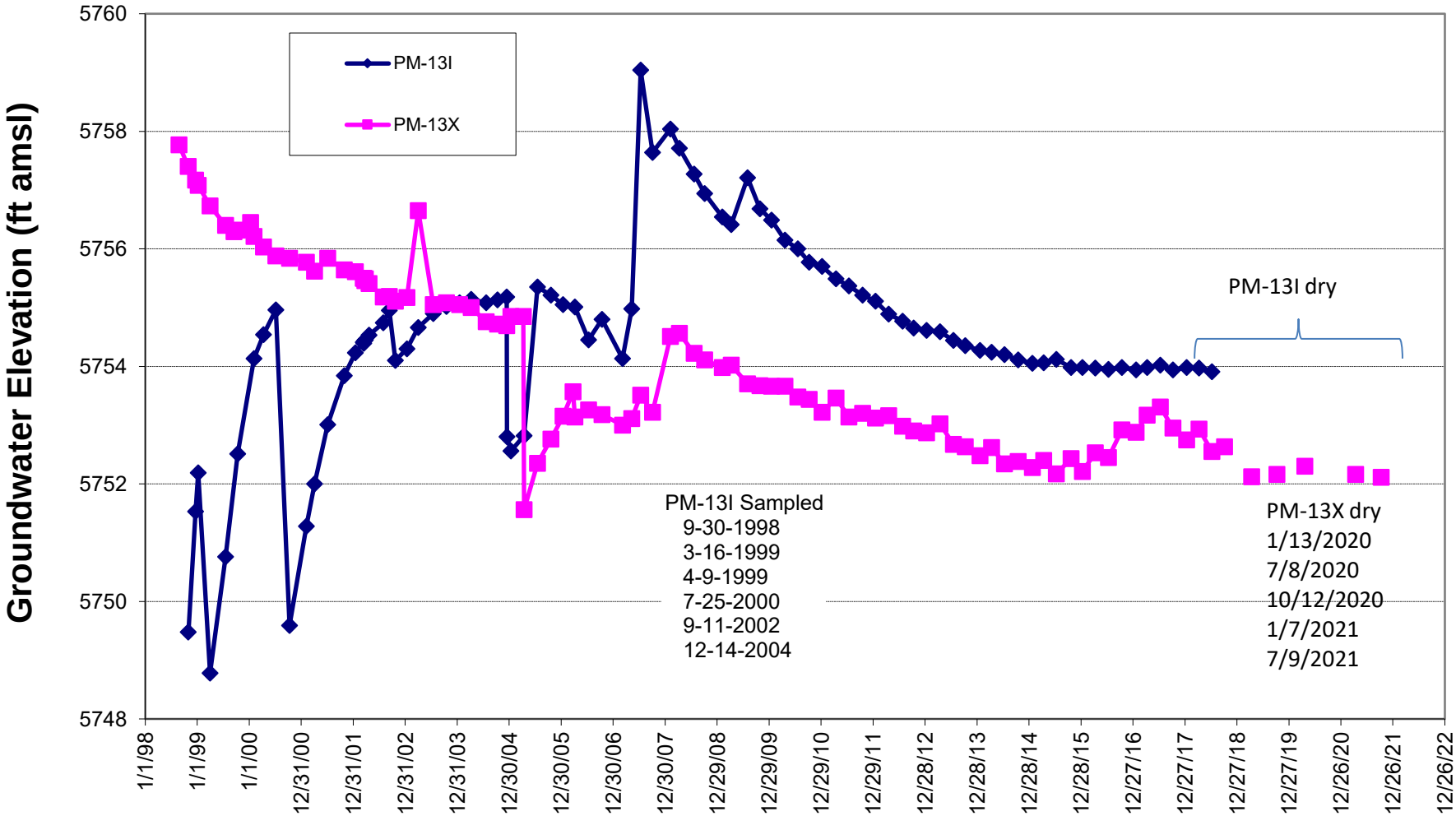


MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-13I	1/13/2020	dry	PM-13X	1/13/2020	dry		#VALUE!
PM-13I	4/16/2020	dry	PM-13X	4/16/2020	5752.30		#VALUE!
PM-13I	7/8/2020	dry	PM-13X	7/8/2020	dry		#VALUE!
PM-13I	10/12/2020	dry	PM-13X	10/12/2020	dry		#VALUE!
PM-13I	1/7/2021	dry	PM-13X	1/7/2021	dry		#VALUE!
PM-13I	4/9/2021	dry	PM-13X	4/9/2021	5752.16		#VALUE!
PM-13I	7/9/2021	dry	PM-13X	7/9/2021	dry		#VALUE!
PM-13I	10/5/2021	dry	PM-13X	10/5/2021	5752.11		#VALUE!

		Minimum	#VALUE!
		Maximum	#VALUE!
Mean Interior Water Level	#DIV/0!	Avg. Diff	#VALUE!
Mean Exterior Water Level	5752.19	Diff of the Means	#DIV/0!
Sum of the Squares of Deviations			
Interior	#VALUE!		
Exterior	#VALUE!		
Standard Deviation (pooled)	#VALUE!		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	#VALUE!	80% LCL	#DIV/0!
95% Confidence Interval	#VALUE!	95% UCL	#DIV/0!

Effectiveness Decision	Data Sufficiency
#VALUE!	#DIV/0!
#VALUE!	#DIV/0!
	Unable to calculate gradient

PM-13 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-14I	1/13/2020	5749.47	PM-14X	1/13/2020	5748.43		1.04
PM-14I	4/16/2020	5749.21	PM-14X	4/16/2020	5748.19		1.02
PM-14I	7/8/2020	5748.94	PM-14X	7/8/2020	5747.78		1.16
PM-14I	10/12/2020	5748.76	PM-14X	10/12/2020	5747.69		1.07
PM-14I	1/7/2021	5748.91	PM-14X	1/7/2021	5747.88		1.03
PM-14I	4/9/2021	5748.96	PM-14X	4/9/2021	5747.91		1.05
PM-14I	7/9/2021	5748.97	PM-14X	7/9/2021	5747.90		1.07
PM-14I	10/5/2021	5749.09	PM-14X	10/5/2021	5748.11		0.98

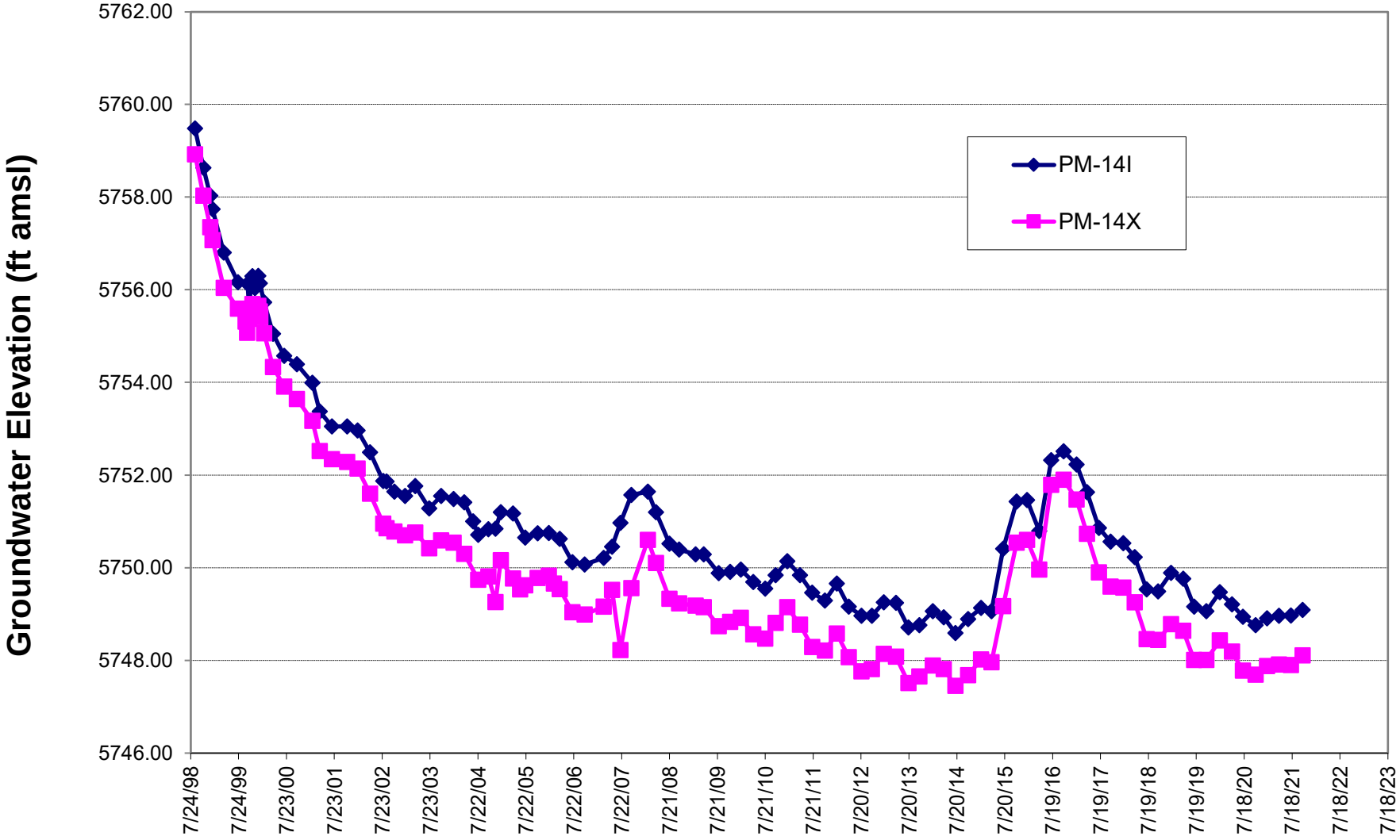
		Minimum	0.98
		Maximum	1.16
Mean Interior Water Level	5749.04	Avg. Diff	1.05
Mean Exterior Water Level	5747.99	Diff of the Means	1.05
Sum of the Squares of Deviations			
Interior	0.33		
Exterior	0.41		
Standard Deviation (pooled)	0.23		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.10	80% LCL	0.95
95% Cpnfidence Interval	0.22	95% UCL	1.27

Effectiveness Decision

Outward Gradient exists

Data Sufficiency

PM-14 Well Pair Hydrographs



MASTER LOC	Date	Water Elev	MASTER LOC	Date	Water Elev		Difference
PM-15I	1/13/2020	5723.57	PM-15X	1/13/2020	5736.52		-12.95
PM-15I	4/17/2020	5723.69	PM-15X	4/17/2020	5735.80		-12.11
PM-15I	7/8/2020	5723.59	PM-15X	7/9/2020	5735.85		-12.26
PM-15I	10/12/2020	5723.62	PM-15X	10/12/2020	5735.83		-12.21
PM-15I	1/6/2021	5723.63	PM-15X	1/7/2021	5735.76		-12.13
PM-15I	4/9/2021	5723.63	PM-15X	4/9/2021	5735.50		-11.87
PM-15I	7/9/2021	5723.61	PM-15X	7/9/2021	5736.91		-13.3
PM-15I	10/5/2021	5723.20	PM-15X	10/5/2021	5737.04		-13.84

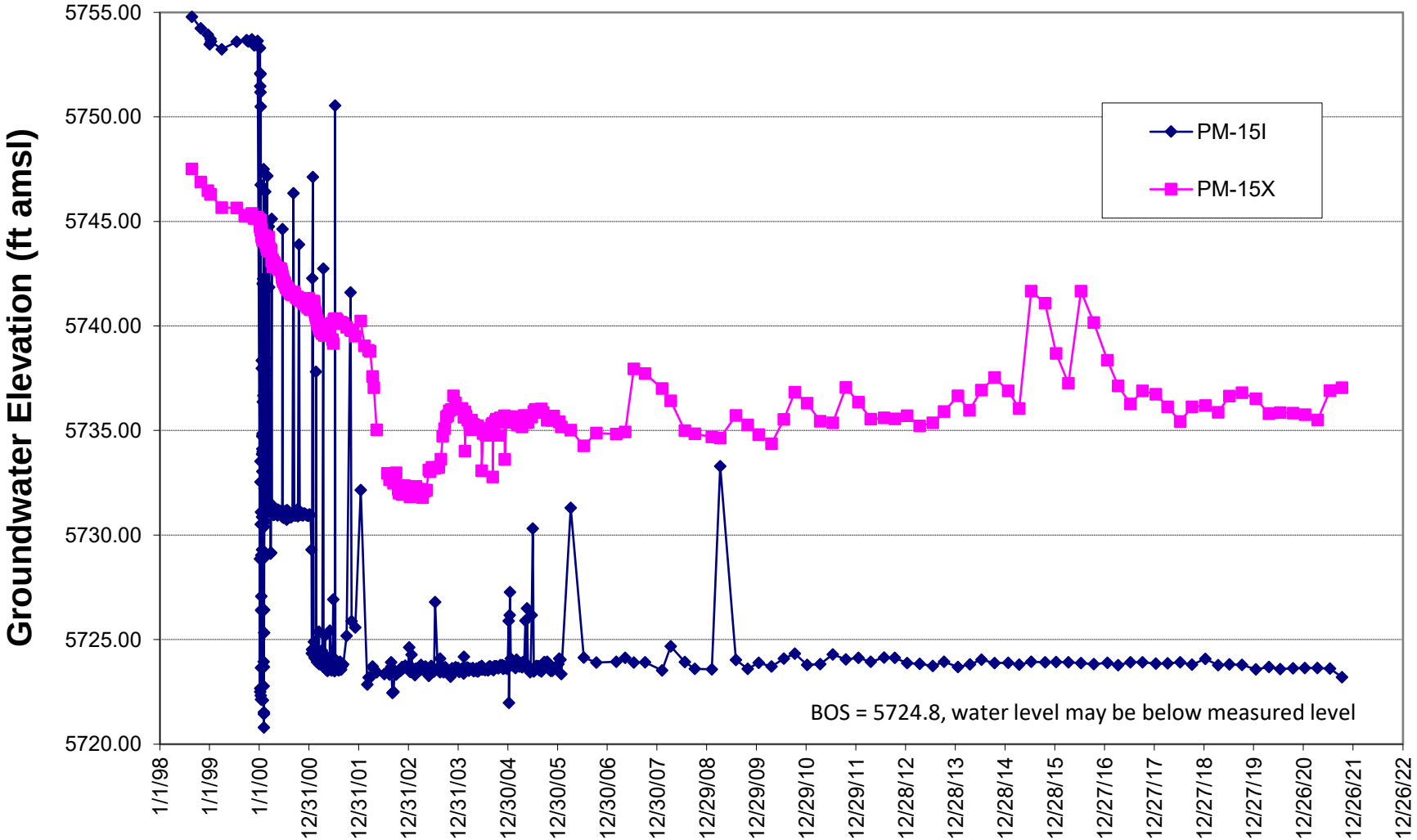
		Minimum	-13.84
		Maximum	-11.87
Mean Interior Water Level	5723.57	Avg. Diff	-12.58
Mean Exterior Water Level	5736.15	Diff of the Means	-12.58
Sum of the Squares of Deviations			
Interior	0.16		
Exterior	2.40		
Standard Deviation (pooled)	0.43		
t-statistics degrees of freedom =	7		
α = 5%	1.89		
α = 20%	0.90		
80% Confidence Interval	0.19	80% LCL	-12.78
95% Confidence Interval	0.41	95% UCL	-12.18

Effectiveness Decision

Data Sufficiency

Inward Gradient exists

PM-15 Well Pair Hydrographs



APPENDIX C-4.2

EFFECTIVENESS ASSESSMENT

Data Summary Table for Wells with Outward Gradients

(PM-3X, PM-6X, PM-13X, and PM-14X)

APPENDIX C-4.2

Table 1

Analytical Data Summary for PM-13X

Dates	1,1,1-trichloroethane (ug/L)	1,1-dichloroethane (ug/L)	1,4-dioxane (ug/L)	Tetrachloroethene (ug/L)	Trichloroethene (ug/L)
9/22/2005	2.20	44		.82	1.30
12/20/2005	2.20	40		.94	1.40
3/23/2006	1.90	41		.90	1.30
6/2/2006	.86	21		.54	.77
7/28/2006	1.50	34		.79	1.20
11/28/2006	1.70	41		1.10	1.40
2/6/2007	2.00	43		1.70	1.90
6/8/2007	.81	35		1.30	1.60
11/5/2007	2.00	43		2.00	2.30
5/16/2008	1.90	46		1.20	1.70
12/8/2008	.59	18		.48	1.10
5/12/2009	1.10	33		1.00	1.40
11/25/2009	1.00	33		.83	1.50
6/11/2010	1.00	39		1.20	1.70
11/19/2010	1.40	41		1.60	1.70
6/7/2011	1.10	39		.93	1.70
12/9/2011	1.10	32		.87	1.40
6/21/2012	.74	32		.70	1.00
12/10/2012	.80	33		.48	.99
6/18/2013	.85	35		1.00	1.40
12/19/2013	.86	37		.82	1.40
6/18/2014	.72	32		1.20	1.50
12/22/2014	.58	28		.62	1.00
6/2/2015	.76	31		1.60	1.70
12/21/2015	.83	33		1.70	1.90
6/21/2016	.69	34		1.00	1.40
12/20/2016	.60	30		1.30	1.60
6/29/2017	.53	27		1.60	1.70
10/17/2017	.47	29	<.15	.59	1.00
6/20/2018	.49	30	<.15	1.00	1.40
10/30/2018	.50	23	<.15	1.60	1.50
6/11/2019	.43	26	<.15	1.60	1.00
12/18/2019	.17	27	<.09	1.30	1.20
6/8/2020	.92	29	.35	1.20	1.50
12/21/2020	<.16	14	<.09	.87	.92
6/9/2021	<.16	24	<.09	.27	.99
11/3/2021	<.16	22	<.09	.30	.66

APPENDIX C-4.2

Table 2

Analytical Data Summary for PM-14X

Dates	1,1,1-trichloroethane (ug/L)	1,1-dichloroethane (ug/L)	1,4-dioxane (ug/L)	Tetrachloroethene (ug/L)	Trichloroethene (ug/L)
6/15/2004	.31	4.6		<.26	<.16
6/8/2005	<.16	3.9	<.19	<.20	<.16
8/26/2005	.23	3.9	<.19	<.20	.17
11/21/2005	.22	3.9	<.19	<.20	<.16
2/21/2006	.17	3.2	<.50	<.20	.21
6/12/2006	<.16	4.2		<.20	<.16
7/26/2006	.17	3.7	<.50	<.20	.17
11/28/2006	<.16	4.3		<.20	.20
2/5/2007	.20	3.7	<.50	<.20	<.16
8/2/2007	<.16	4.1	<.50	<.20	<.16
10/17/2007	<.16	4.5	<.50	<.20	.22
5/5/2008	.19	3.7	<.50	<.20	<.16
10/29/2008	<.16	3.1	<.50	<.20	<.16
4/16/2009	<.16	3.1	<.50	<.20	<.16
11/11/2009	<.16	3.9	<.50	<.20	<.16
4/27/2010	<.16	3.5	<.50	<.20	<.16
11/2/2010	<.16	3.2	<.50	<.20	<.16
5/4/2011	<.16	3.2	<.50	<.20	.19
11/29/2011	<.16	3.8	<.50	<.20	.20
5/21/2012	<.16	3.7	<.50	<.20	<.16
10/25/2012	<.16	3.8	<.50	<.20	<.16
4/23/2013	<.16	4.1	<.50	<.20	<.16
10/15/2013	<.16	3.6	<.50	<.20	<.16
4/23/2014			<.50		
4/24/2014	<.16	3.3		<.20	<.16
10/27/2014	<.16	4.0	<.50	<.20	<.16
4/20/2015	<.16	3.0	<.50	<.20	<.16
11/2/2015	<.16	2.9	<.15	<.20	<.16
4/20/2016	<.16	3.0	<.15	<.20	.17
11/1/2016	<.16	2.6	<.15	<.20	<.16
4/20/2017	<.16	3.0	<.15	<.20	<.16
10/13/2017	<.16	2.8	<.15	<.20	<.16
4/18/2018	<.16	2.6	<.15	<.20	<.16
10/19/2018	<.16	2.5	<.15	<.20	<.16
4/26/2019	<.16	2.5	<.15	<.20	<.16
11/7/2019	<.16	4.0	<.40	<.20	.23
5/13/2020	<.16	3.0	<.09	<.20	<.16
12/15/2020	<.16	3.3	.10	<.20	<.16
5/20/2021	<.16	3.5	<.09	<.20	<.16
10/26/2021	<.16	4.0	<.09	<.20	<.16

APPENDIX C-4.2

Table 3

Analytical Data Summary for PM-3X

Dates	1,1,1-trichloroethane (ug/L)	1,1-dichloroethane (ug/L)	1,4-dioxane (ug/L)	Tetrachloroethene (ug/L)	Trichloroethene (ug/L)
6/13/2006	<.16	.33		1.00	.44
8/1/2006	<.16	.26		1.30	.39
12/12/2006	<.16	.28		1.20	.42
2/8/2007	<.16	.29		1.00	.33
6/8/2007	<.16	<.16		.46	.24
8/10/2007	<.16	.34		.54	.28
10/23/2007	<.16	.30		.48	.33
2/22/2008	<.16	.26		.86	.32
5/9/2008	<.16	.28		.99	.34
12/11/2008	<.16	.35		.60	.32
5/12/2009	<.16	.31		.21	.16
11/25/2009	<.16	.34		.46	.22
5/27/2010	<.16	.38		1.00	.48
11/19/2010	<.16	.48		.65	.24
6/2/2011	<.16	.51		<.20	<.16
12/8/2011	<.16	.40		.57	.22
6/12/2012	<.16	.42		.82	.33
12/5/2012	<.16	.47		.39	.26
5/28/2013	<.16	.49		.65	.63
12/19/2013	<.16	.47		.42	.20
6/18/2014	<.16	.41		.38	.16
12/29/2014	<.16	.32		.39	.17
6/3/2015	<.16	.50		.32	.28
12/21/2015	<.16	.45		.55	.26
6/27/2016	<.16	.50		.63	.27
12/29/2016	<.16	<.22		<.20	<.16
6/29/2017	<.16	.33		.42	.24
10/17/2017	<.16	.40	<.15	.27	.17
6/22/2018	.16	.57	<.15	.77	.37
11/1/2018	<.16	.44	<.15	.77	.30
6/11/2019	<.16	.37	<.15	.33	.17
12/18/2019	<.16	<.22	<.09	.24	<.16
6/8/2020	<.16	.60	<.09	.73	<.16
12/18/2020	<.16	.59	<.09	1.10	.38
6/8/2021	<.16	.73	<.09	.60	.64
11/3/2021	<.16	.37	<.09	<.20	<.16

APPENDIX C-4.2

Table 4

Analytical Data Summary for PM-6X

Dates	1,1,1-trichloroethane (ug/L)	1,1-dichloroethane (ug/L)	1,4-dioxane (ug/L)	Tetrachloroethene (ug/L)	Trichloroethene (ug/L)
6/15/2004	<.16	<.22		<.26	<.16
9/22/2005	<.16	<.16		<.20	<.16
12/20/2005	<.16	<.16		<.20	<.16
3/23/2006	<.16	<.16		<.20	<.16
6/2/2006	<.16	<.16		<.20	<.16
7/28/2006	<.16	<.16		<.20	<.16
11/28/2006	<.16	<.16		<.20	<.16
2/6/2007	<.16	<.16		<.20	<.16
8/10/2007	<.16	<.16		<.20	<.16
10/23/2007	<.16	<.16		<.20	<.16
5/9/2008	<.16	<.16		<.20	<.16
12/8/2008	<.16	<.16		<.20	<.16
5/5/2009	<.16	<.16		<.20	<.16
11/25/2009	<.16	<.16		<.20	<.16
5/27/2010	<.16	<.22		<.20	<.16
11/19/2010	<.16	<.22		<.20	<.16
6/2/2011	<.16	<.22		<.20	<.16
12/7/2011	<.16	<.22		<.20	<.16
6/21/2012	<.16	<.22		<.20	<.16
12/5/2012	<.16	<.22		<.20	<.16
5/28/2013	<.16	<.22		<.20	<.16
12/16/2013	<.16	<.22		<.20	<.16
6/17/2014	<.16	<.22		<.20	<.16
12/22/2014	<.16	<.22		<.20	<.16
6/2/2015	<.16	<.22		<.20	<.16
12/23/2015	<.16	<.22		<.20	<.16
6/21/2016	<.16	<.22		<.20	<.16
12/20/2016	<.16	<.22		<.20	<.16
6/29/2017	<.16	<.22		<.20	<.16
10/17/2017	<.16	<.22	<.15	<.20	<.16
6/21/2018	<.16	<.22	<.15	<.20	<.16
10/16/2018	<.16	<.22	<.15	<.20	<.16
6/12/2019	<.16	<.22	<.15	<.20	<.16
12/18/2019	<.16	<.22	<.09	<.20	<.16
6/8/2020	<.16	<.22	<.09	<.20	<.16
12/18/2020	<.16	<.22	<.09	<.20	<.16
6/8/2021	<.16	<.22	<.09	<.20	<.16
11/3/2021	<.16	<.22	<.09	<.20	<.16

< indicates resultswas not detected above the associated value.

APPENDIX C-4.3

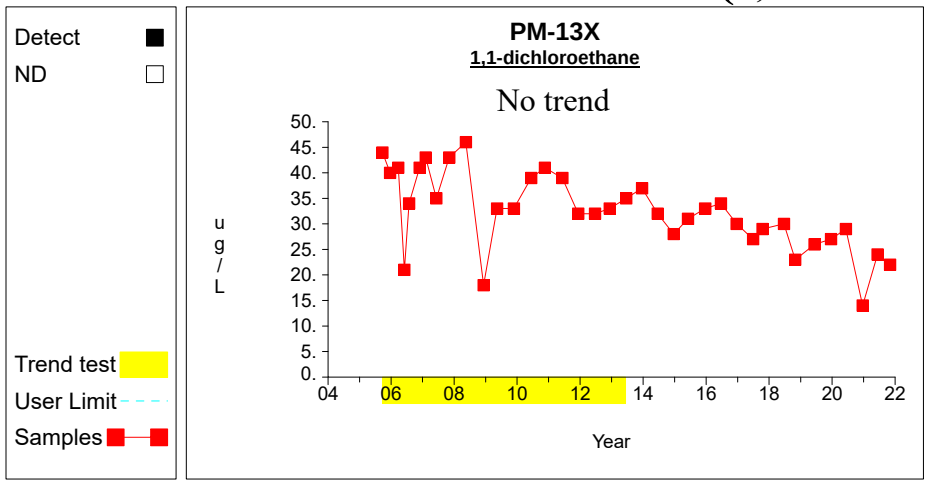
EFFECTIVENESS ASSESSMENT

Trend Analysis for Wells with Outward Gradients

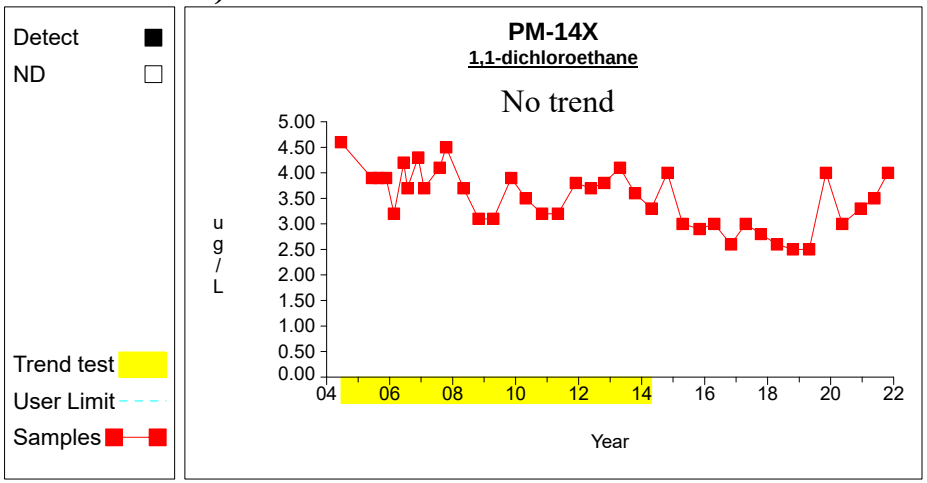
(PM-3X, PM-6X, PM-13X, and PM-14X)

(Baseline Data Set)

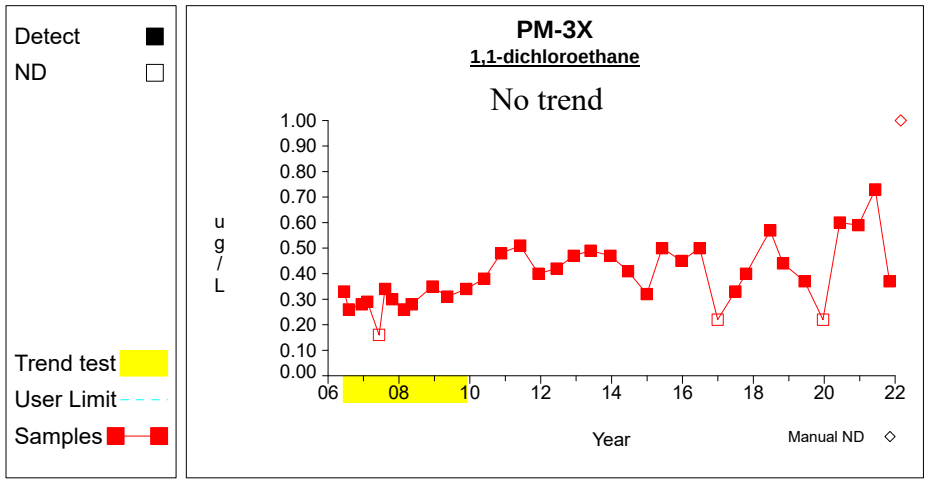
APPENDIX C-4.3
EFFECTIVENESS TREND ANALYSIS
(1,1-DICHLOROETHANE)



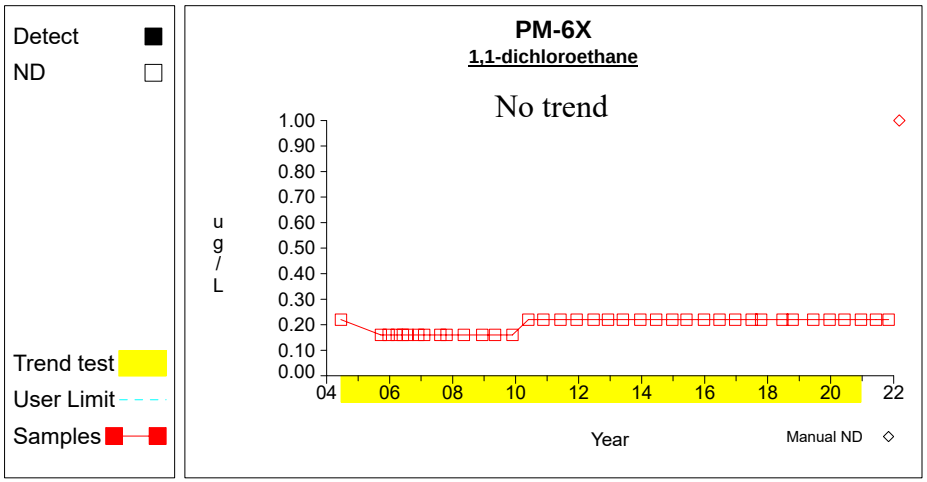
Graph 1



Graph 2



Graph 3

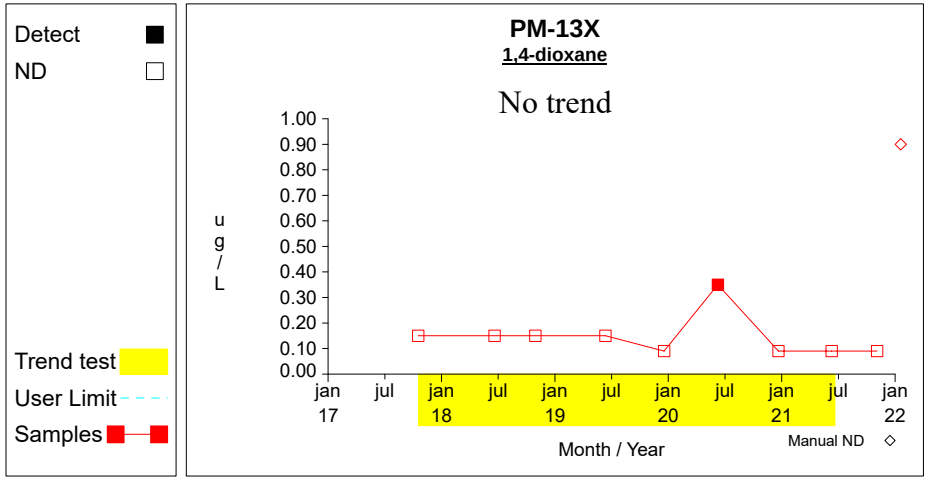


Graph 4

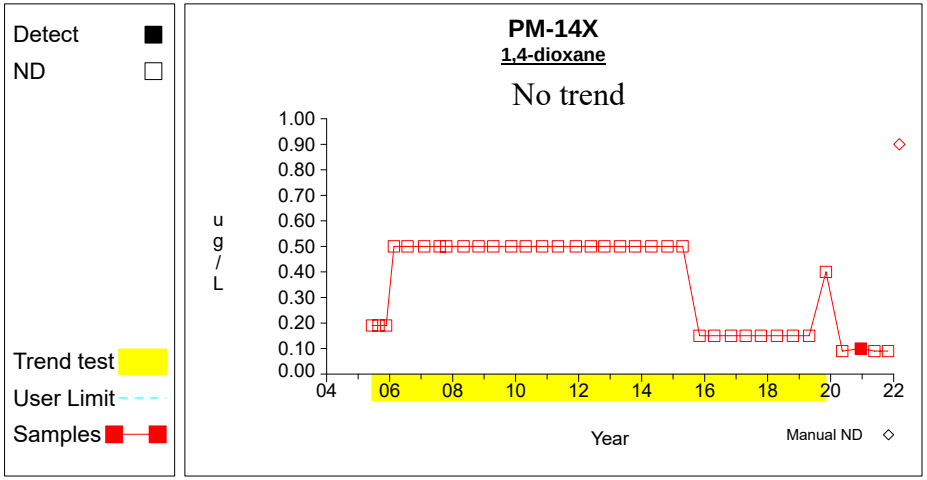
Determined by DUMPSTAT and

Sen's Test for Trend

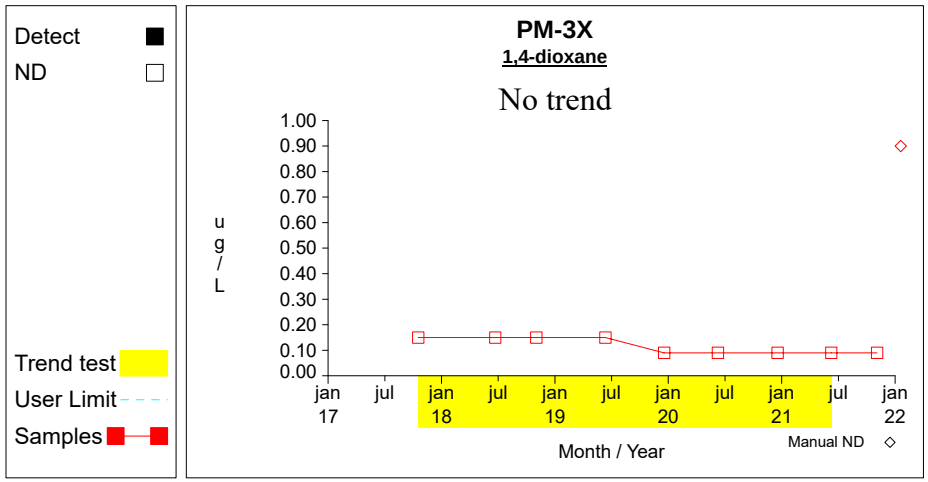
APPENDIX C-4.3
EFFECTIVENESS TREND ANALYSIS
(1,4-DIOXANE)



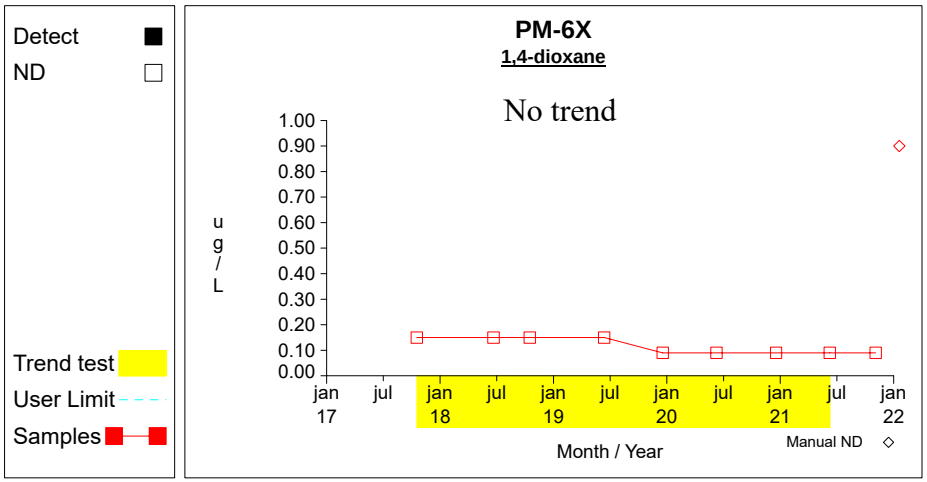
Graph 1



Graph 2



Graph 3

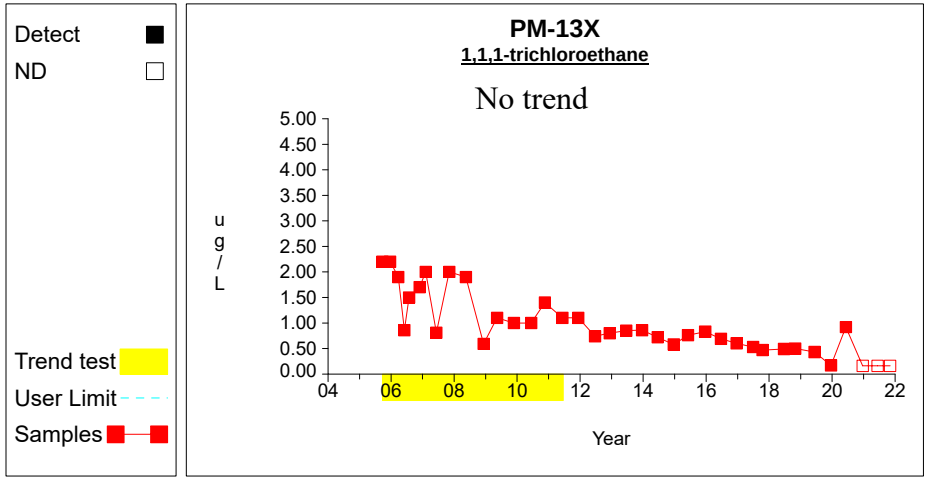


Graph 4

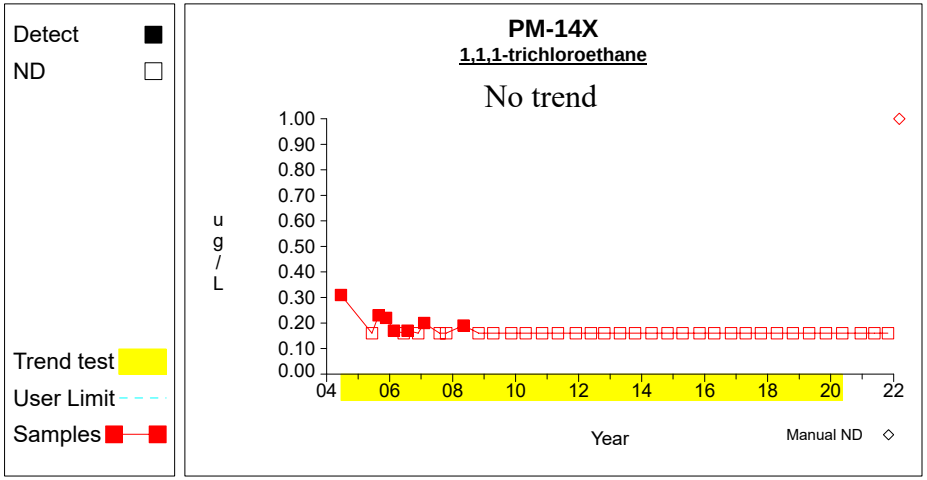
Determined by DUMPSTAT and Sen's

Test for Trend

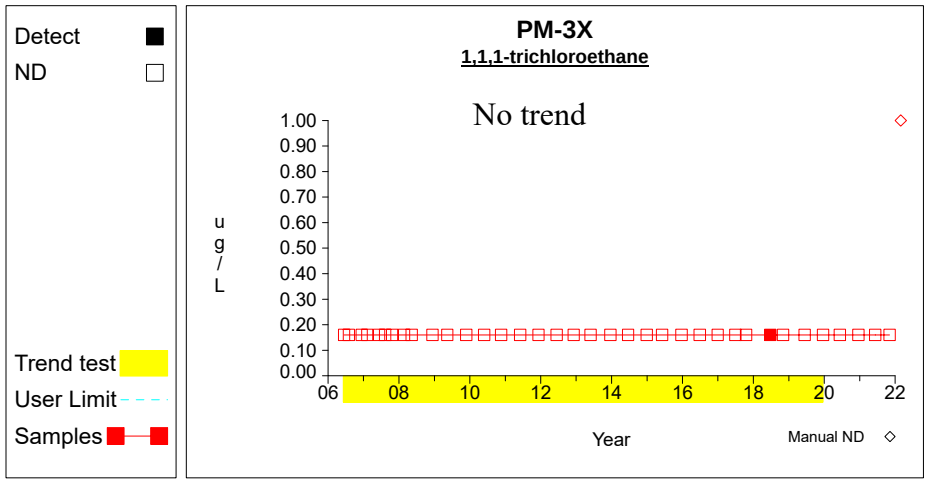
APPENDIX C-4.3
EFFECTIVENESS TREND ANALYSIS
(1,1,1-TRICHLOROETHANE)



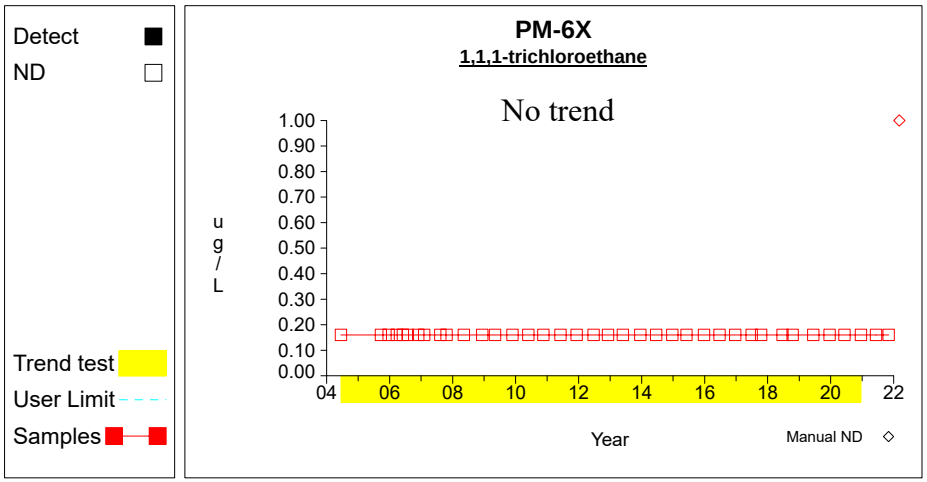
Graph 1



Graph 2



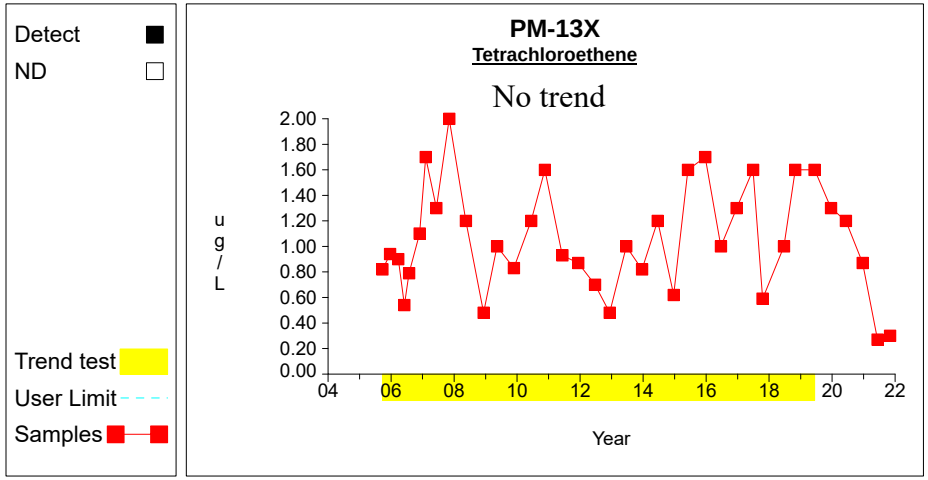
Graph 3



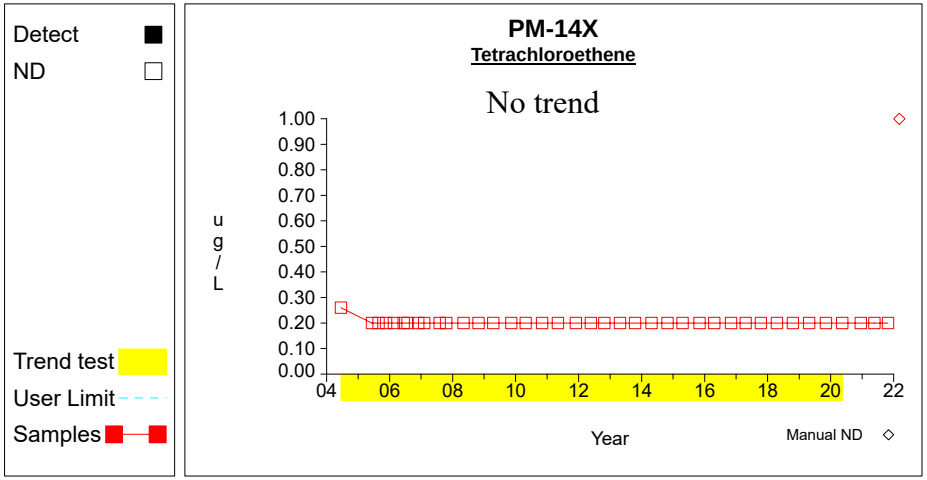
Graph 4

Determined by DUMPSTAT and Sen's
Test for Trend

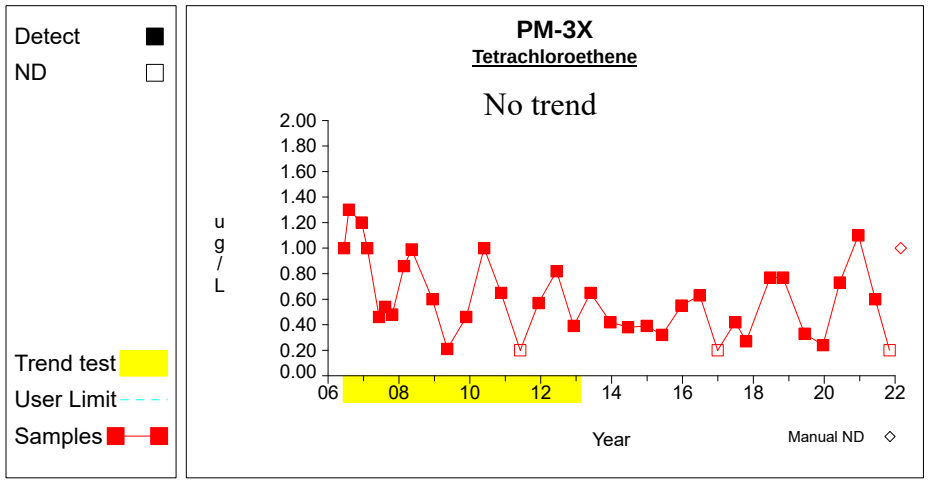
APPENDIX C-4.3
EFFECTIVENESS TREND ANALYSIS
(TETRACHLOROETHENE)



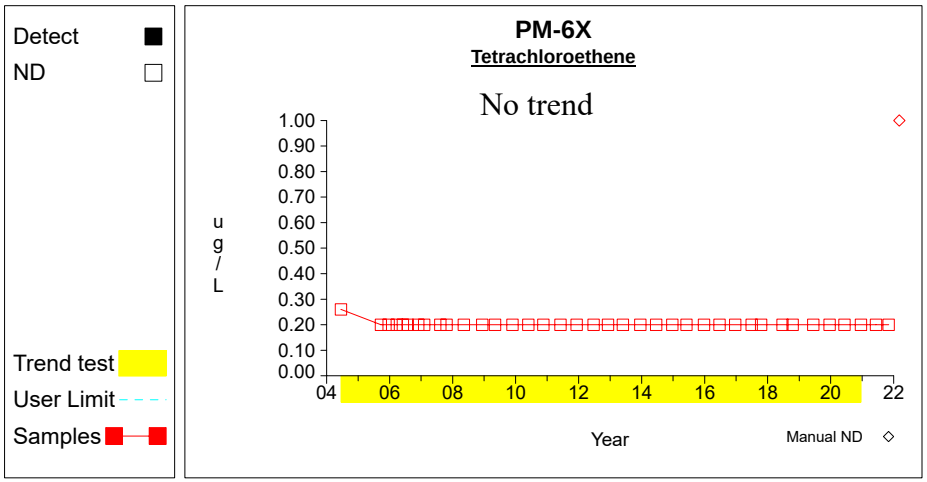
Graph 1



Graph 2



Graph 3

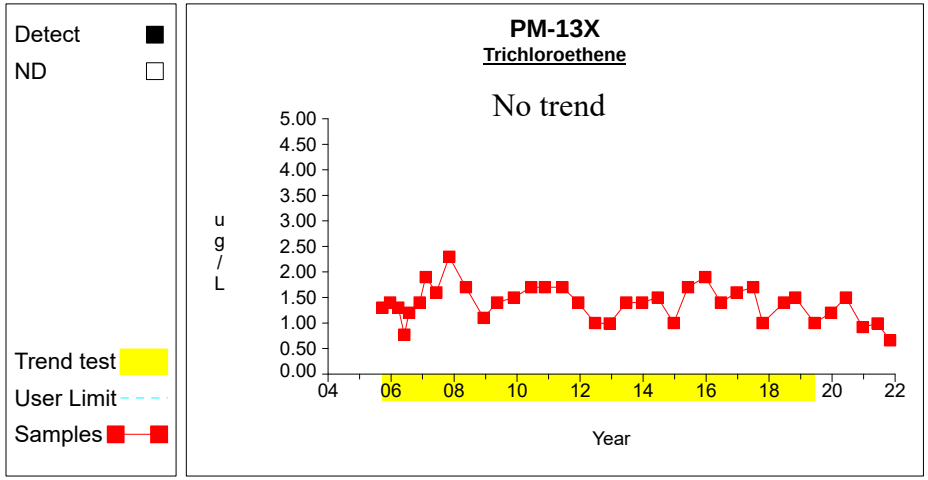


Graph 4

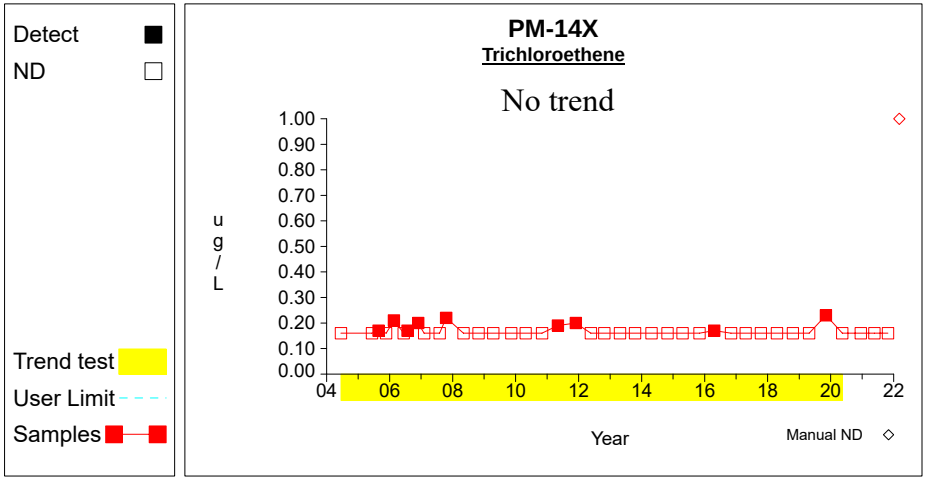
Determined by DUMPSTAT and Sen's

Test for Trend

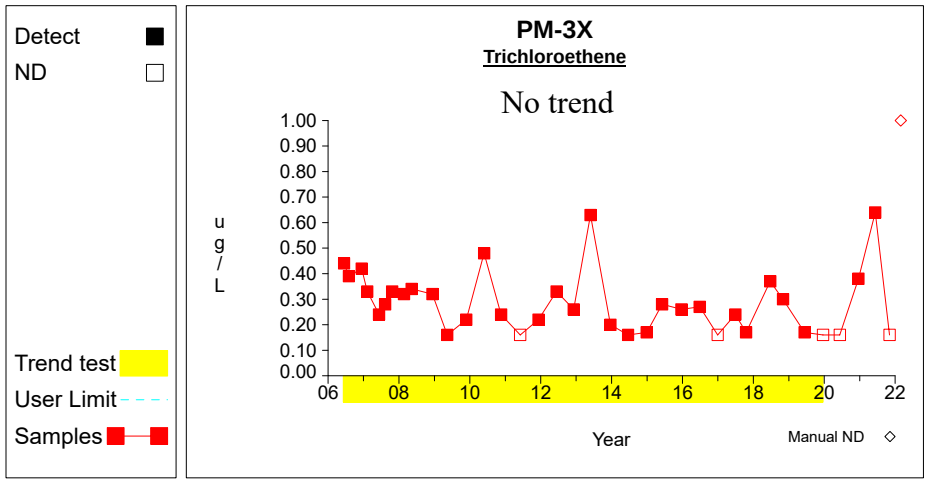
APPENDIX C-4.3
EFFECTIVENESS TREND ANALYSIS
(TRICHLOROETHENE)



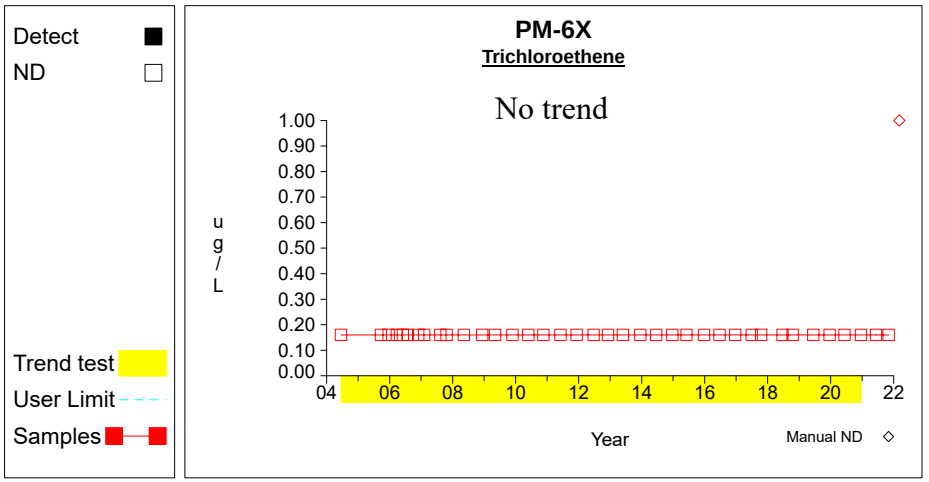
Graph 1



Graph 2



Graph 3



Graph 4

Determined by DUMPSTAT and Sen's

Test for Trend

APPENDIX C-4.4

EFFECTIVENESS ASSESSMENT

Shewhart-CUSUM Test for Wells with Outward Gradients

(PM-3X, PM-6X, PM-13X, and PM-14X)

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS
1,1-DICHLOROETHANE

Summary Statistics and Intermediate Computations for Combined Shewhart-Cusum Control Charts

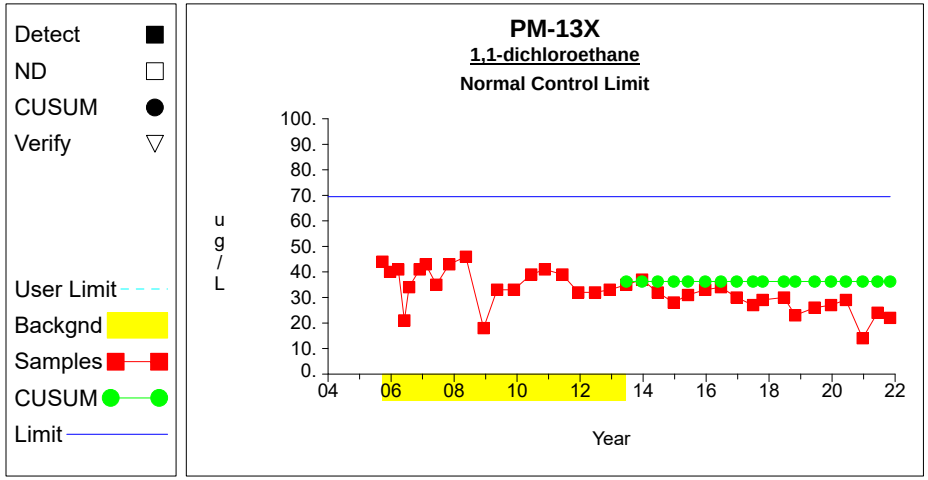
Constituent	Units	Well	N(back)	N(mon)	N(tot)	Mean	SD	R(i-1)	R(i)	S(i-1)	S(i)
1,1-dichloroethane	ug/L	PM-13X	19	18	37	36.2105	7.3905	24.0000	22.0000	36.2105	36.2105
1,1-dichloroethane	ug/L	PM-14X	24	15	39	3.7500	0.4263	3.5000	4.0000	3.7500	3.7500
1,1-dichloroethane	ug/L	PM-3X	12	24	36	0.3617	0.2034	0.7300	0.3700	0.7390	0.5947
1,1-dichloroethane	ug/L	PM-6X	36	2	38			0.2200	0.2200		

N(back) and N(mon) = Non-outlier measurements in the background and monitoring periods.
N(tot) = All independent measurements for that constituent and well.
For transformed data, mean and SD in transformed units and control limit in original units.
Conf = confidence level for passing initial test or one verification resample (nonparametric test only).
* - Insufficient Data.
** - Detection Frequency < 25%.
*** - Zero Variance.

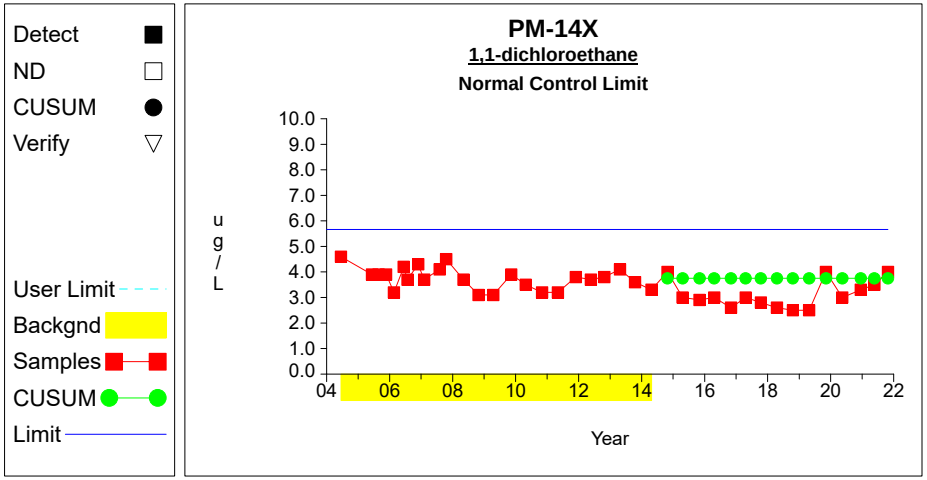
Analysis performed using DUMPSTAT

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - 1,1-DICHLOROETHANE

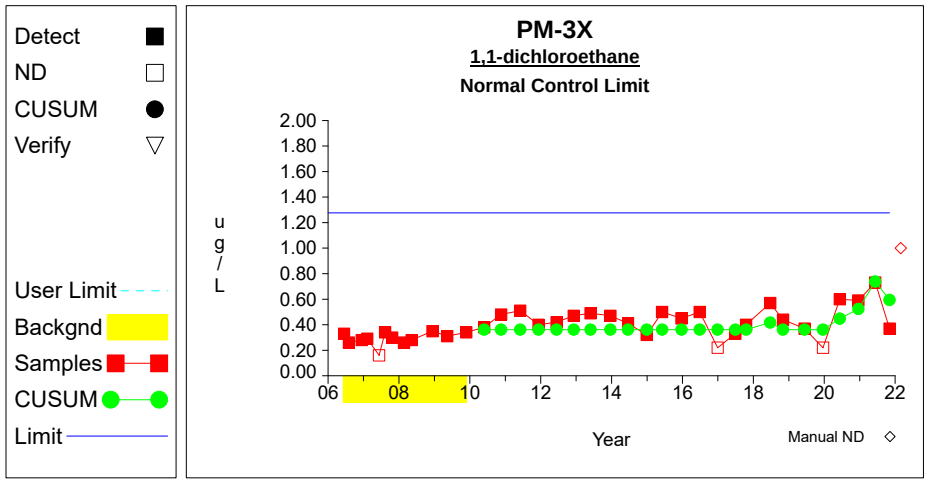
Intra-Well Control Charts / Prediction Limits



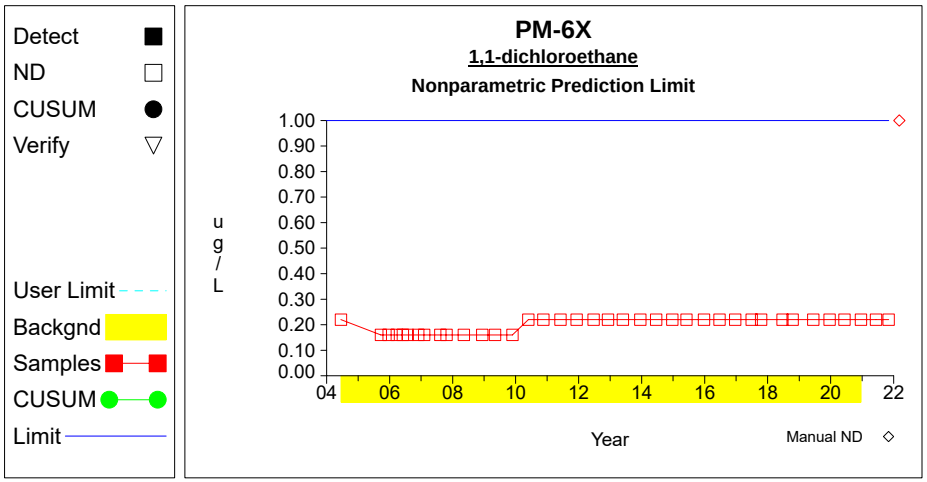
Graph 1



Graph 2



Graph 3



Graph 4

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS
1,4-DIOXANE

Summary Statistics and Intermediate Computations for Combined Shewhart-Cusum Control Charts

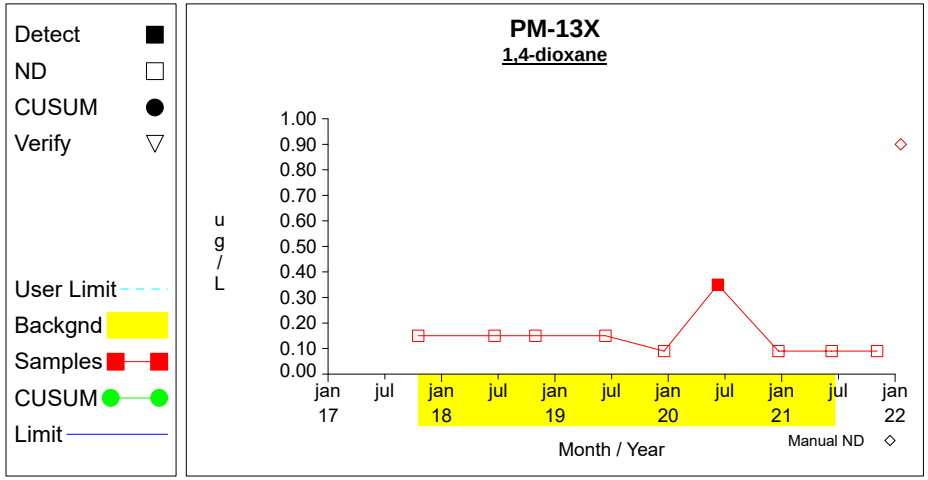
Constituent	Units	Well	N(back)	N(mon)	N(tot)	Mean	SD	R(i-1)	R(i)	S(i-1)	S(i)	Limit	Type	Conf
1,4-dioxane	ug/L	PM-13X	8	1	9								nonpar *	
1,4-dioxane	ug/L	PM-14X	32	4	36			0.0900	0.0900			0.9000	nonpar	.99
1,4-dioxane	ug/L	PM-3X	8	1	9								nonpar *	
1,4-dioxane	ug/L	PM-6X	8	1	9								nonpar *	

N(back) and N(mon) = Non-outlier measurements in the background and monitoring periods.
N(tot) = All independent measurements for that constituent and well.
For transformed data, mean and SD in transformed units and control limit in original units.
Conf = confidence level for passing initial test or one verification resample (nonparametric test only).
* - Insufficient Data.
** - Detection Frequency < 25%.
*** - Zero Variance.

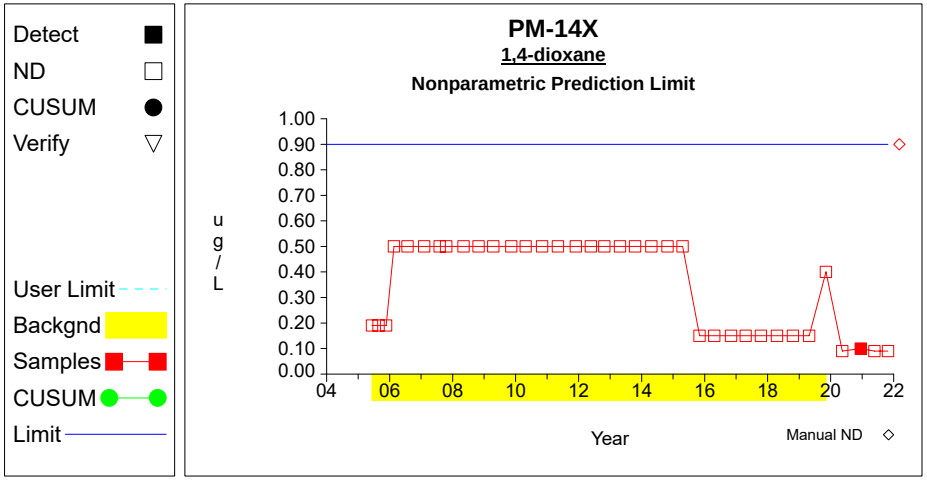
Analysis performed using DUMPSTAT

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - 1,4-DIOXANE

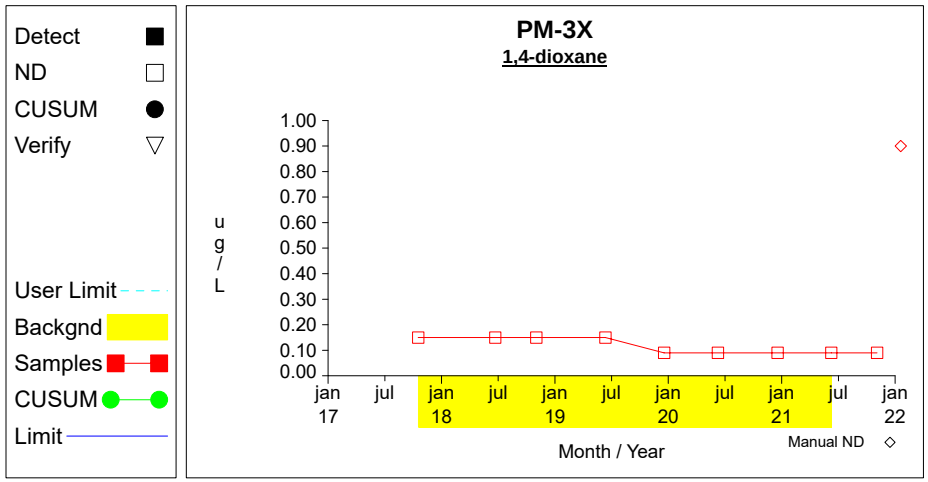
Intra-Well Control Charts / Prediction Limits



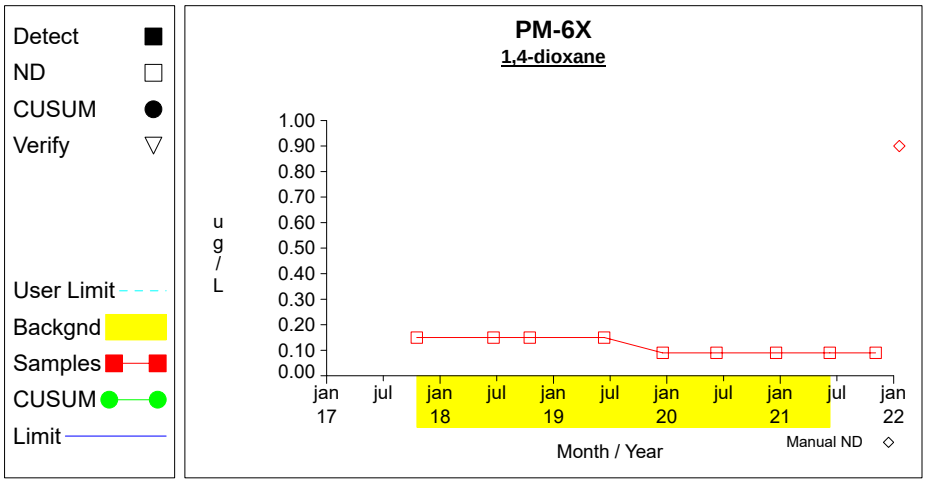
Graph 1



Graph 2



Graph 3



Graph 4

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS
1,1,1-TRICHLOROETHANE

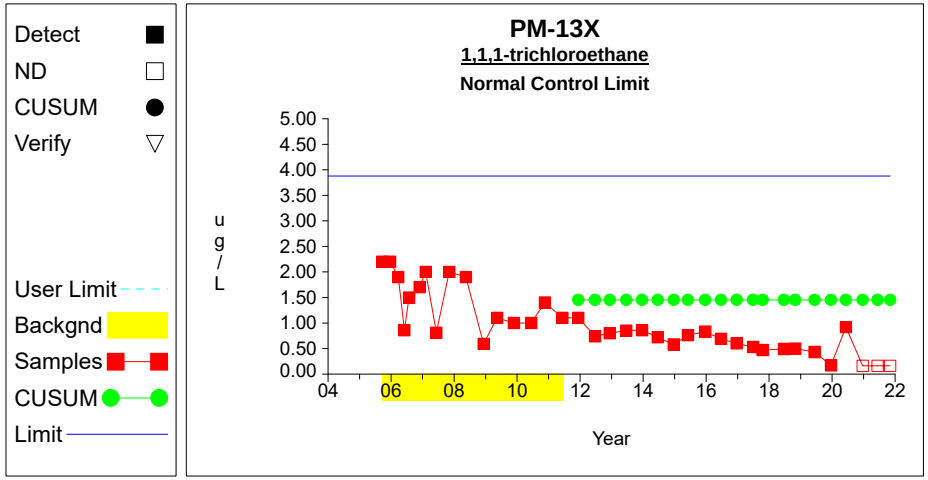
Summary Statistics and Intermediate Computations for Combined Shewhart-Cusum Control Charts

Constituent	Units	Well	N(back)	N(mon)	N(tot)	Mean	SD	R(i-1)	R(i)	S(i-1)	S(i)	Limit
1,1,1-trichloroethane	ug/L	PM-13X	16	21	37	1.4538	0.5385	0.1600	0.1600	1.4538	1.4538	3.8770
1,1,1-trichloroethane	ug/L	PM-14X	36	3	39			0.1600	0.1600			1.0000
1,1,1-trichloroethane	ug/L	PM-3X	32	4	36			0.1600	0.1600			1.0000
1,1,1-trichloroethane	ug/L	PM-6X	36	2	38			0.1600	0.1600			1.0000

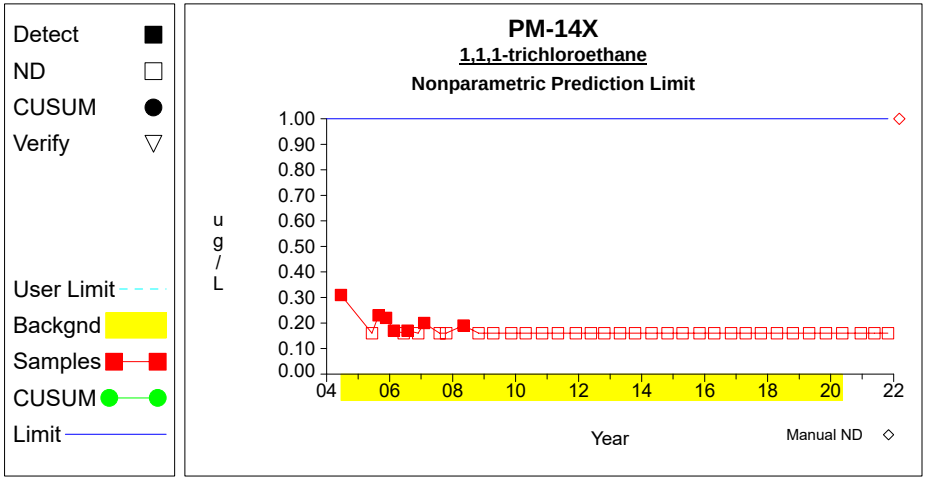
N(back) and N(mon) = Non-outlier measurements in the background and monitoring periods.
N(tot) = All independent measurements for that constituent and well.
For transformed data, mean and SD in transformed units and control limit in original units.
Conf = confidence level for passing initial test or one verification resample (nonparametric test only).
* - Insufficient Data.
** - Detection Frequency < 25%.
*** - Zero Variance.

Analysis performed using DUMPSTAT

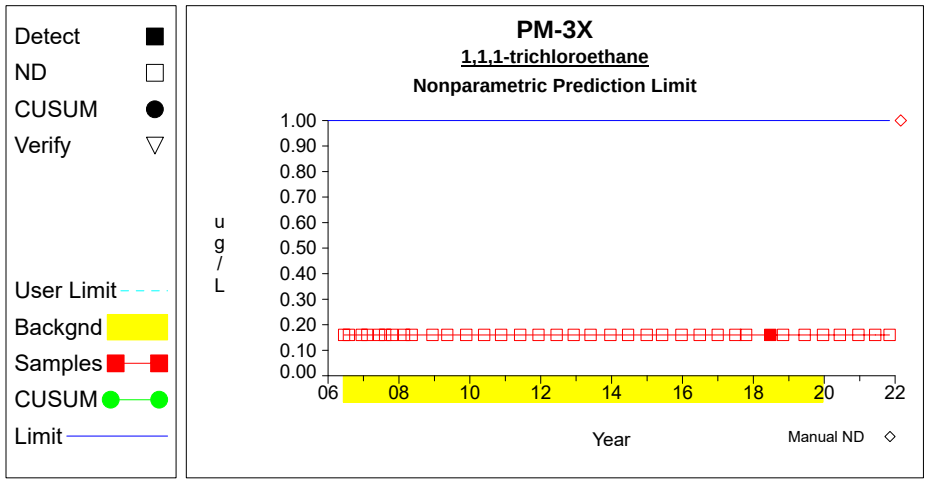
APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - 1,1,1-TRICHLOROETHANE
Intra-Well Control Charts / Prediction Limits



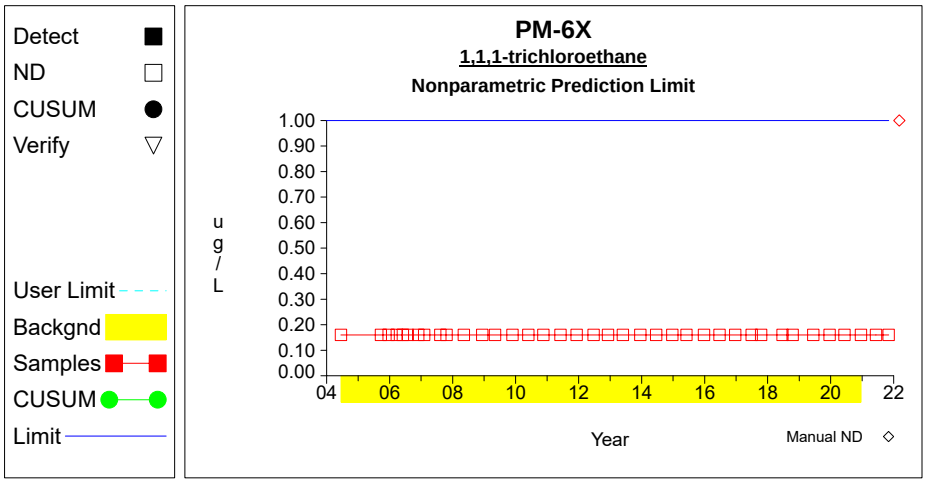
Graph 1



Graph 2



Graph 3



Graph 4

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS
TETRACHLOROETHENE

Summary Statistics and Intermediate Computations for Combined Shewhart-Cusum Control Charts

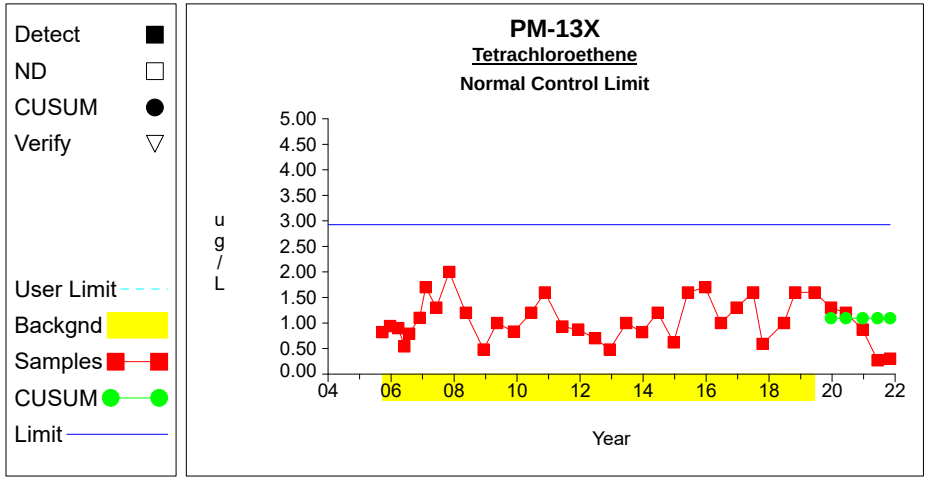
Constituent	Units	Well	N(back)	N(mon)	N(tot)	Mean	SD	R(i-1)	R(i)	S(i-1)	S(i)	Limit
Tetrachloroethene	ug/L	PM-13X	32	5	37	1.0941	0.4070	0.2700	0.3000	1.0941	1.0941	2.9255
Tetrachloroethene	ug/L	PM-14X	36	3	39			0.2000	0.2000			1.0000
Tetrachloroethene	ug/L	PM-3X	18	18	36	0.7517	0.3069	0.6000	0.2000	0.7517	0.7517	2.1326
Tetrachloroethene	ug/L	PM-6X	36	2	38			0.2000	0.2000			1.0000

N(back) and N(mon) = Non-outlier measurements in the background and monitoring periods.
N(tot) = All independent measurements for that constituent and well.
For transformed data, mean and SD in transformed units and control limit in original units.
Conf = confidence level for passing initial test or one verification resample (nonparametric test only).
* - Insufficient Data.
** - Detection Frequency < 25%.
*** - Zero Variance.

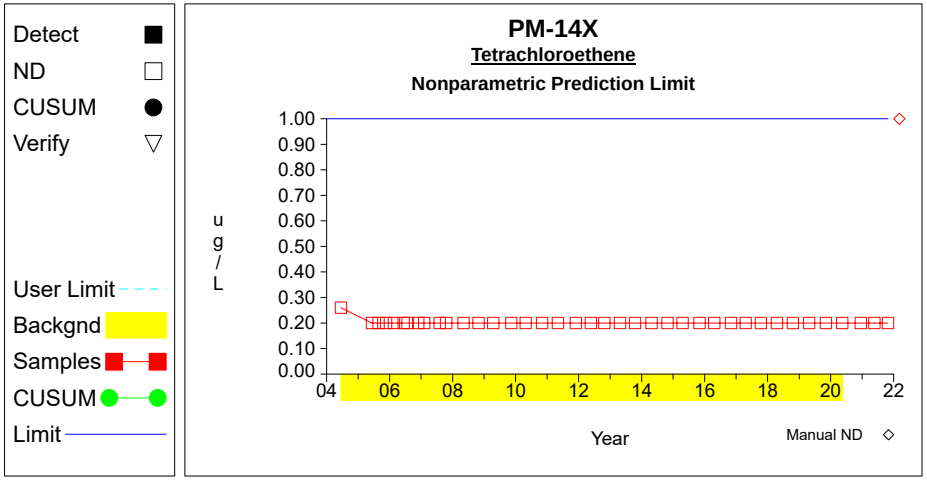
Analysis performed using DUMPSTAT

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - TETRACHLOROETHENE

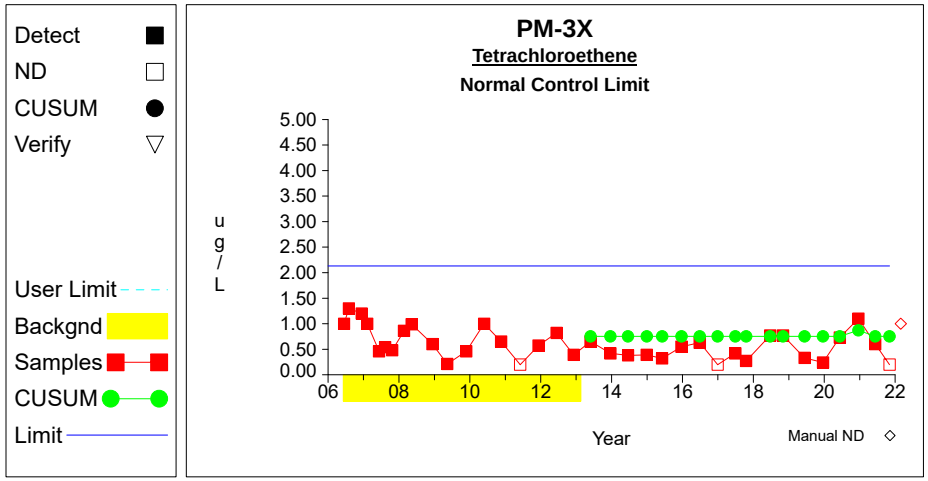
Intra-Well Control Charts / Prediction Limits



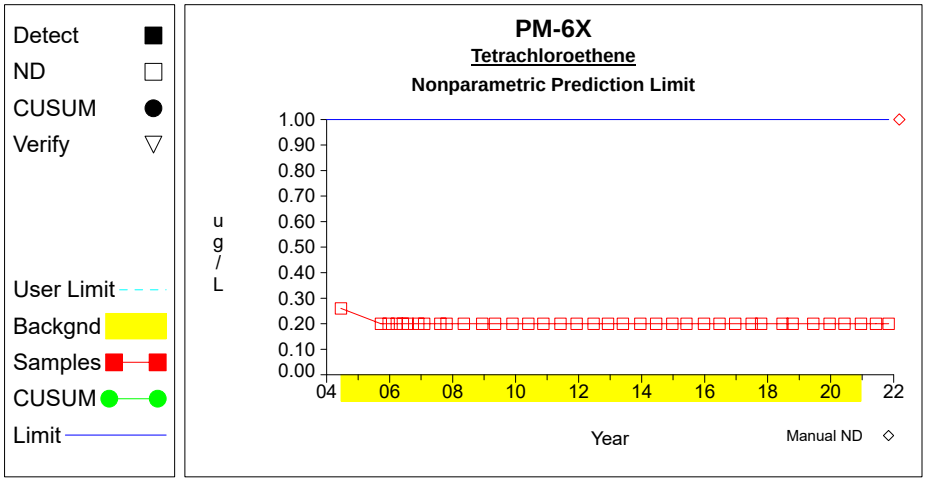
Graph 1



Graph 2



Graph 3



Graph 4

APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - TRICHLOROETHENE

Summary Statistics and Intermediate Computations for Combined Shewhart-Cusum Control Charts

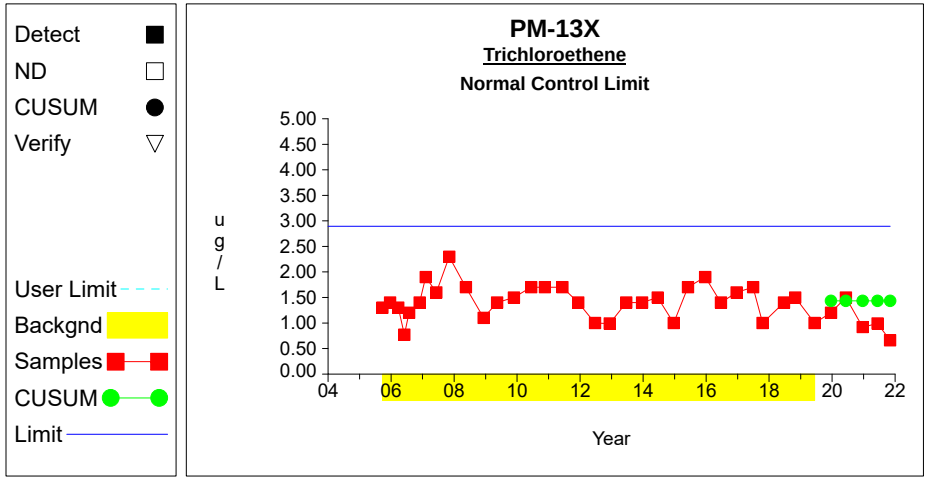
Constituent	Units	Well	N(back)	N(mon)	N(tot)	Mean	SD	R(i-1)	R(i)	S(i-1)	S(i)	Limit
Trichloroethene	ug/L	PM-13X	8	1	37	1.1888	0.2454	0.9900	0.6600		1.1888	2.2930
Trichloroethene	ug/L	PM-14X	34	4	39	0.7871	0.3604	0.1600	0.1600	0.7871	0.7871	2.4089
Trichloroethene	ug/L	PM-3X	8	1	36	0.5037	0.3399	0.6400	0.1600		0.5037	2.0332
Trichloroethene	ug/L	PM-6X	8	1	38							

N(back) and N(mon) = Non-outlier measurements in the background and monitoring periods.
N(tot) = All independent measurements for that constituent and well.
For transformed data, mean and SD in transformed units and control limit in original units.
Conf = confidence level for passing initial test or one verification resample (nonparametric test only).
* - Insufficient Data.
** - Detection Frequency < 25%.
*** - Zero Variance.

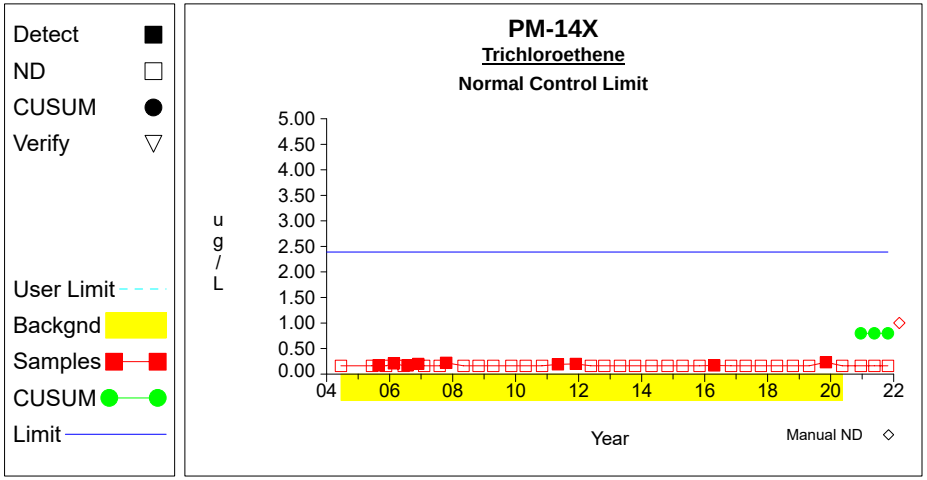
Analysis performed using DUMPSTAT

Prepared by: Parsons

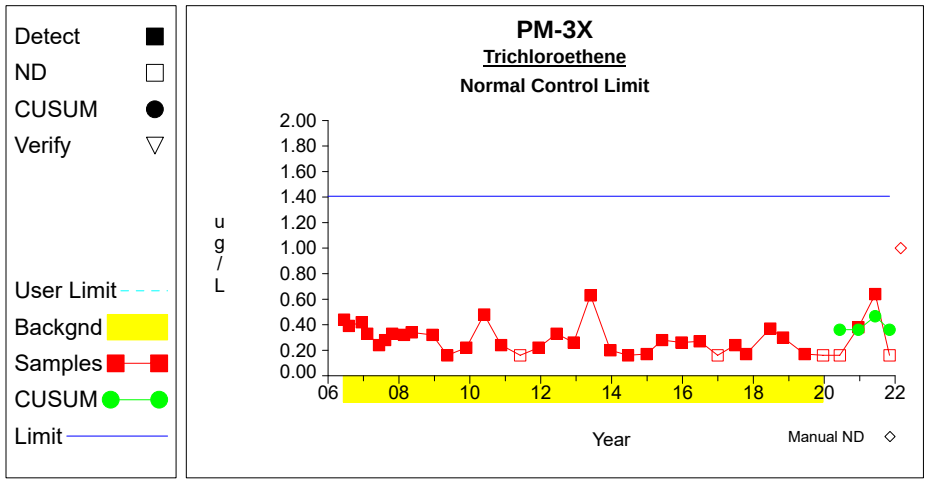
APPENDIX C-4.4
SHEWHART-CUSUM CONTROL CHARTS - TRICHLOROETHENE
Intra-Well Control Charts / Prediction Limits



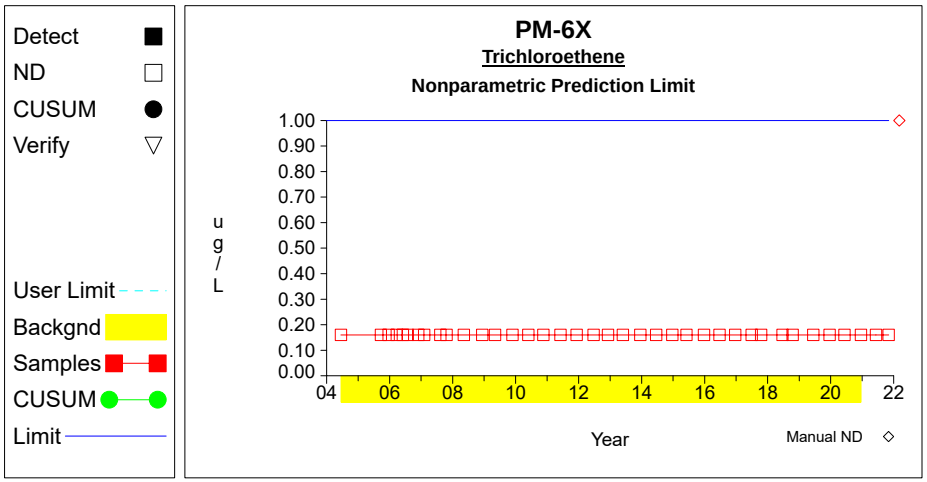
Graph 1



Graph 2



Graph 3



Graph 4

APPENDIX C-5

VERTICAL MIGRATION ASSESSMENT

APPENDIX C-5.1

VERTICAL MIGRATION ASSESSMENT

Vertical Migration Well Data

TABLE C-5.1
VERTICAL MIGRATION WELL DATA
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS
REPORT LOWRY LANDFILL SUPERFUND SITE

Group-ID	Sample Date	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroetha	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloropropane	1,4-Dioxane	Acetone	Arsenic	Benzene	Bromodichloromethan	Bromoform	Cadmium	Carbon Tetrachloride	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Dibromochloromethan	Ethylbenzene	Methylene Chloride	Naphthalene	Nitrogen, Nitrate	Nitrogen, Nitrite	Tetrachloroethene	Toluene	Trans-1,2-Dichloroeth	Trichloroethene	Vinyl Chloride
B-504A	9/9/2002										10 U				5 U															
B-504A	5/11/2005										10 U				5 U									500 U	500 U					
B-504A	9/13/2005	1 U	1 U	1 U	5.6	0.26 J	1 U	1 U	0.5 U	6.9 J		1 U	1 U	1 U		1 U	1 U	1 U	0.24 J	1 U	1 U	1 U	1 U	500 U	500 U	1 U	0.31 J	0.5 U	1 U	2 U
B-504A	12/12/2005	1 U	1 U	1 U	4.5	0.2 J	1 U	1 U	0.5 U	2.4 J		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	90 J	500 U	1 U	0.23 J	0.5 U	1 U	2 U
B-504A	3/6/2006	1 U	1 U	1 U	4.8	0.19 J	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	0.4 J	1 U			1 U	0.21 J	0.5 U	1 U	2 U
B-504A	6/16/2006	1 U	1 U	1 U	3.1	0.15 J	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.33 J	500 U	500 U	1 U	0.18 J	0.5 U	1 U	2 U
B-504A	7/26/2006	1 U	1 U	1 U	4.9	0.24 J	1 U	1 U	5 U	2.4 J	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.17 J	1 U	1 U	1 U	1 U	500 U	500 U	1 U	0.22 J	0.5 U	1 U	2 U
B-504A	12/1/2006	1 U	1 U	1 U	11	0.47 J	1 U	1 U	5 U	3.6 J	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.37 J	1 U	1 U	1 U	1 U	500 U	500 U	1 U	0.53 J	0.5 U	1 U	0.39 J
B-504A	3/14/2007	1 U	1 U	1 U	3.9	0.17 J	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.17 J	1 U	1 U	0.42 J	1 U	500 U	500 U	1 U	0.19 J	0.5 U	1 U	2 U
B-504A	8/19/2010	1 U	1 U	1 U	5.6	0.29 J	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	0.32 J	0.5 U	1 U	2 U
B-504A	7/30/2015	1 U	1 U	1 U	11	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.19 J	1 U	1 U	1 U	1 U	500 U	500 U	1 U	0.77 J	0.5 U	1 U	0.28 J
B-504A	8/15/2018	1 U	1 U	1 U	1.5	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	7/24/2006	1 U	1 U	1 U	1 U	1 U	0.56 J	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	3/1/2007	1 U	1 U	1 U	1 U	1 U	0.47 J	1 U	0.95 J	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	110 J	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	5/29/2007	1 U	1 U	1 U	1 U	1 U	0.2 J	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	8/17/2009	1 U	1 U	1 U	1 U	1 U	0.63 J	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	7/21/2011	1 U	1 U	1 U	1 U	1 U	0.53 J	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	8/8/2013	1 U	1 U	1 U	1 U	1 U	0.71 J	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	7/27/2015	1 U	1 U	1 U	1 U	1 U	0.62 J	1 U	0.9 U	10 U	7.6 J	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	42 J	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	7/28/2017	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	8/21/2018	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	54 J	500 U	1 U	1 U	0.5 U	1 U	2 U
B-712-LD	9/2/2020	1 U	1 U	1 U	1 U	1 U	0.48 J	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.56 J	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	9/12/2002	1 U	1 U	1 U	1 U	1 U	1 U	1 U			10 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U				1 U	1 U	0.5 U	1 U	2 U
C-702P3	5/12/2005	1 U	1 U	1 U	1 U	1 U	1 U	1 U		10 U	10 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	9/14/2005								0.5 U															40 J	500 U					
C-702P3	12/5/2005								0.5 U															500 U	500 U					
C-702P3	3/8/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	0.38 J	1 U			1 U	1 U	0.5 U	1 U	2 U
C-702P3	5/24/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U		10 U		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	0.5 U	1 U	2 U
C-702P3	6/15/2006								5 U		15 U				5 U									500 U	500 U					
C-702P3	7/26/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U

TABLE C-5.1
VERTICAL MIGRATION WELL DATA
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS
REPORT LOWRY LANDFILL SUPERFUND SITE

Group-ID	Sample Date	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroetha	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,2-Dichloropropane	1,4-Dioxane	Acetone	Arsenic	Benzene	Bromodichloromethan	Bromoform	Cadmium	Carbon Tetrachloride	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Dibromochloromethan	Ethylbenzene	Methylene Chloride	Naphthalene	Nitrogen, Nitrate	Nitrogen, Nitrite	Tetrachloroethene	Toluene	Trans-1,2-Dichloroethe	Trichloroethene	Vinyl Chloride
C-702P3	11/27/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	2/28/2007	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	8/19/2010	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	7/14/2015	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	87 J	500 U	1 U	1 U	0.5 U	1 U	2 U
C-702P3	8/15/2018	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	59 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	9/12/2002										10 U				5 U															
GW-113	5/24/2005										10 U				5 U									500 UJ	500 UJ					
GW-113	9/13/2005	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	10 U	10 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	47 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	12/13/2005	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	10 U		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	140 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	3/14/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U		1 U	1 U	1 U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U			1 U	1 U	0.5 U	1 U	2 U
GW-113	6/19/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	270 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	7/26/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	42 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	11/27/2006	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	43 J	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	3/1/2007	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	2.1 J	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	8/23/2010	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	50 J	1 U	1 U	0.5 U	1 U	2 U
GW-113	7/27/2015	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	500 U	500 U	1 U	1 U	0.5 U	1 U	2 U
GW-113	8/16/2018	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 U	10 U	15 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	57 J	500 U	1 U	1 U	0.5 U	1 U	2 U

Units= µg/L

Highlighted cell indicates a detected compound

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.
The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ= The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the sample.

UJ-= Same as UJ qualification but with an indication of negative bias in the sample concentration.

UJ+= Same as UJ qualification but with an indication of positive bias in the sample concentration.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

J-= Same as J qualification but with an indication of negative bias in the sample concentration.

J+= Same as J qualification but with an indication of positive bias in the sample concentration.

APPENDIX C-5.2

VERTICAL MIGRATION ASSESSMENT

Trend Analysis

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:33:53 AM	
From File	VERT MIG DATA.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,1-Dichloroethane-b-504a

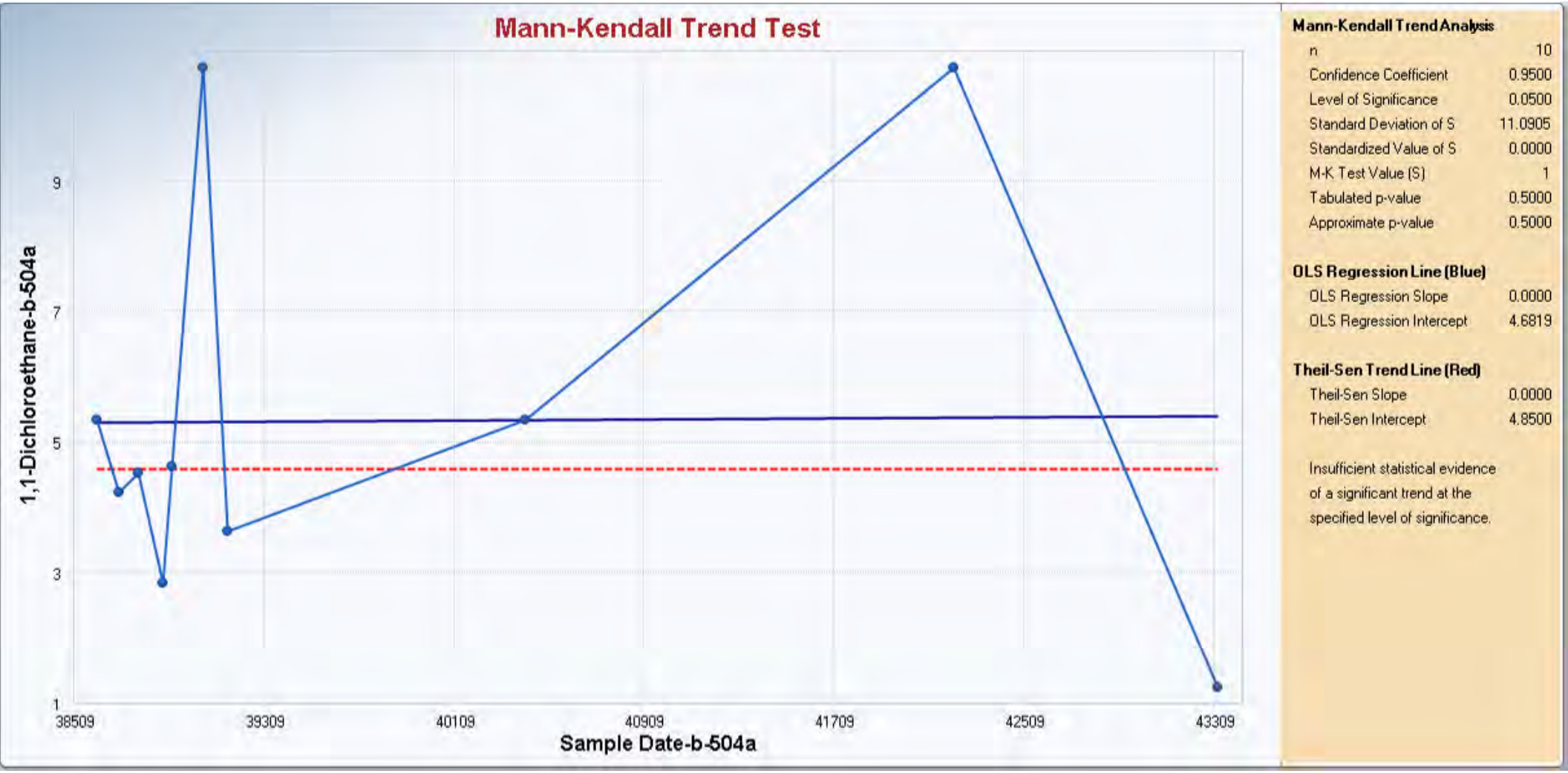
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	1.5
Maximum	11
Mean	5.59
Geometric Mean	4.855
Median	4.85
Standard Deviation	3.102
Coefficient of Variation	0.555

Mann-Kendall Test

M-K Test Value (S)	1
Tabulated p-value	0.5
Standard Deviation of S	11.09
Standardized Value of S	0
Approximate p-value	0.5

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
1,1-Dichloroethane-b-504a
9
7
5
3
1
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.0905
Standardized Value of S 0.0000
M-K Test Value (S) 1
Tabulated p-value 0.5000
Approximate p-value 0.5000
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 4.6819
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 4.8500
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:30:09 AM	
From File	VERT MIG DATA_a.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,1-Dichloroethene-b-504a

General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.115
Maximum	0.47
Mean	0.22
Geometric Mean	0.201
Median	0.195
Standard Deviation	0.105
Coefficient of Variation	0.479

Mann-Kendall Test

M-K Test Value (S)	-14
Tabulated p-value	0.108
Standard Deviation of S	11.14
Standardized Value of S	-1.167
Approximate p-value	0.122

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
1,1-Dichloroethene-b-504a
0.456
0.406
0.356
0.306
0.256
0.206
0.156
0.106
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1355
Standardized Value of S -1.1674
M-K Test Value (S) -14
Tabulated p-value 0.1080
Approximate p-value 0.1215
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 1.3145
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 1.0468
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:28:31 AM	
From File	VERT MIG DATA_d.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acetone-b-504a

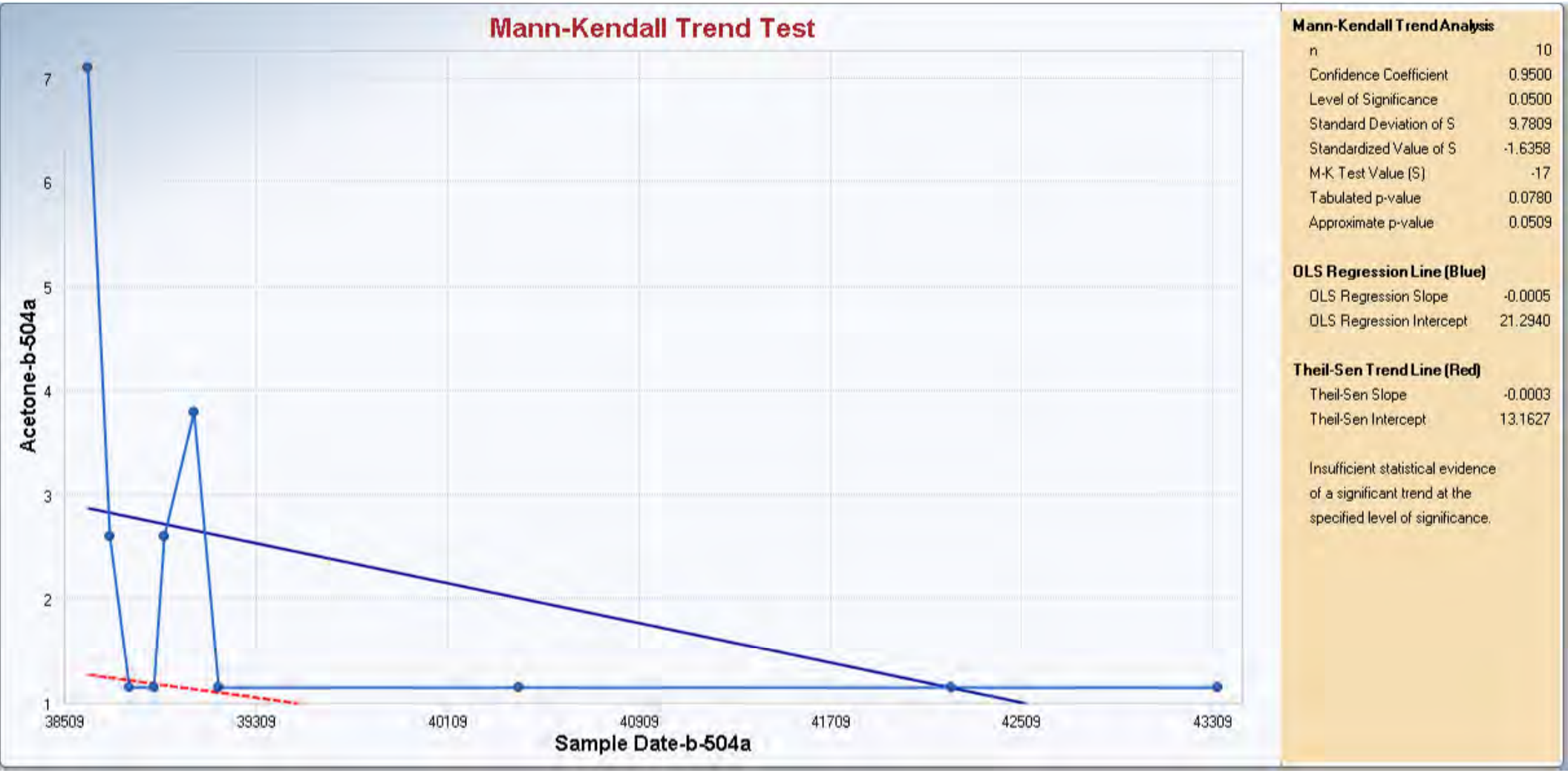
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.95
Maximum	6.9
Mean	2.1
Geometric Mean	1.593
Median	0.95
Standard Deviation	1.927
Coefficient of Variation	0.917

Mann-Kendall Test

M-K Test Value (S)	-17
Tabulated p-value	0.078
Standard Deviation of S	9.781
Standardized Value of S	-1.636
Approximate p-value	0.0509

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Acetone-b-504a
7
6
5
4
3
2
1
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.7809
Standardized Value of S -1.6358
M-K Test Value (S) -17
Tabulated p-value 0.0780
Approximate p-value 0.0509
OLS Regression Line (Blue)
OLS Regression Slope -0.0005
OLS Regression Intercept 21.2940
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0003
Theil-Sen Intercept 13.1627
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:27:07 AM	
From File	VERT MIG DATA_f.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

cis-1,2-Dichloroethene-b-504a

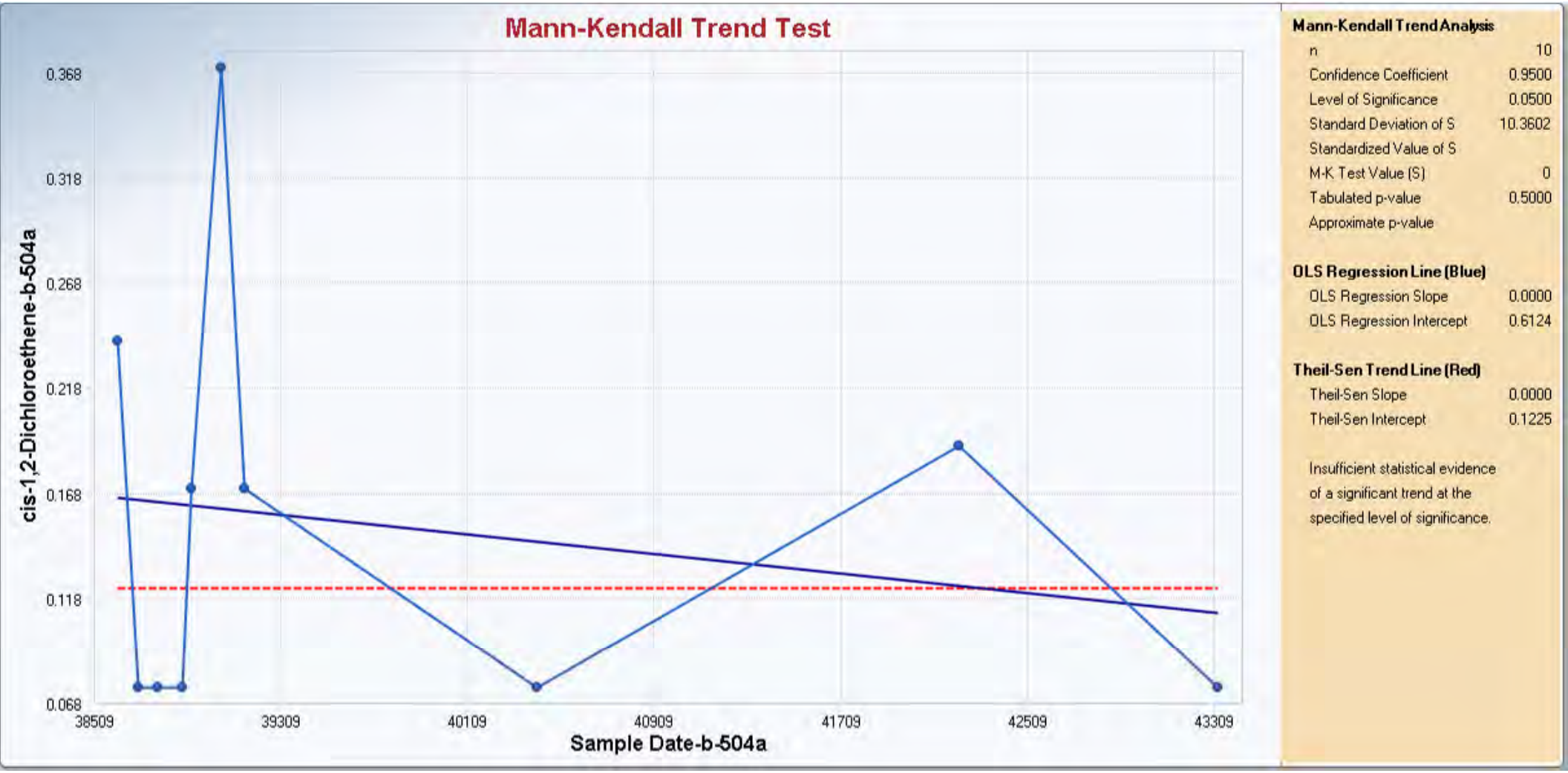
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.075
Maximum	0.37
Mean	0.152
Geometric Mean	0.128
Median	0.123
Standard Deviation	0.0983
Coefficient of Variation	0.649

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	10.36
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
cis-1,2-Dichloroethene-b-504a
0.368
0.318
0.268
0.218
0.168
0.118
0.068
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 10.3602
Standardized Value of S
M-K Test Value (S) 0
Tabulated p-value 0.5000
Approximate p-value
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 0.6124
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.1225
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:26:14 AM	
From File	VERT MIG DATA_g.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Methylene Chloride-b-504a

General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.16
Maximum	0.42
Mean	0.21
Geometric Mean	0.193
Median	0.16
Standard Deviation	0.106
Coefficient of Variation	0.502

Mann-Kendall Test

M-K Test Value (S)	-1
Tabulated p-value	0.5
Standard Deviation of S	7.724
Standardized Value of S	0
Approximate p-value	0.5

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Methylene Chloride-b-504a
0.403
0.353
0.303
0.253
0.203
0.153
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 7.7244
Standardized Value of S 0.0000
M-K Test Value (S) -1
Tabulated p-value 0.5000
Approximate p-value 0.5000
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 0.8731
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.1600
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:25:41 AM	
From File	VERT MIG DATA_h.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene-b-504a

General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.11
Maximum	0.33
Mean	0.132
Geometric Mean	0.123
Median	0.11
Standard Deviation	0.0696
Coefficient of Variation	0.527

Mann-Kendall Test

M-K Test Value (S)	-3
Tabulated p-value	0.431
Standard Deviation of S	5.745
Standardized Value of S	-0.348
Approximate p-value	0.364

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Naphthalene-b-504a
0.324
0.304
0.284
0.264
0.244
0.224
0.204
0.184
0.164
0.144
0.124
0.104
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 5.7446
Standardized Value of S -0.3482
M-K Test Value (S) -3
Tabulated p-value 0.4310
Approximate p-value 0.3639
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 0.4561
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.1100
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:24:11 AM	
From File	VERT MIG DATA_i.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-b-504a

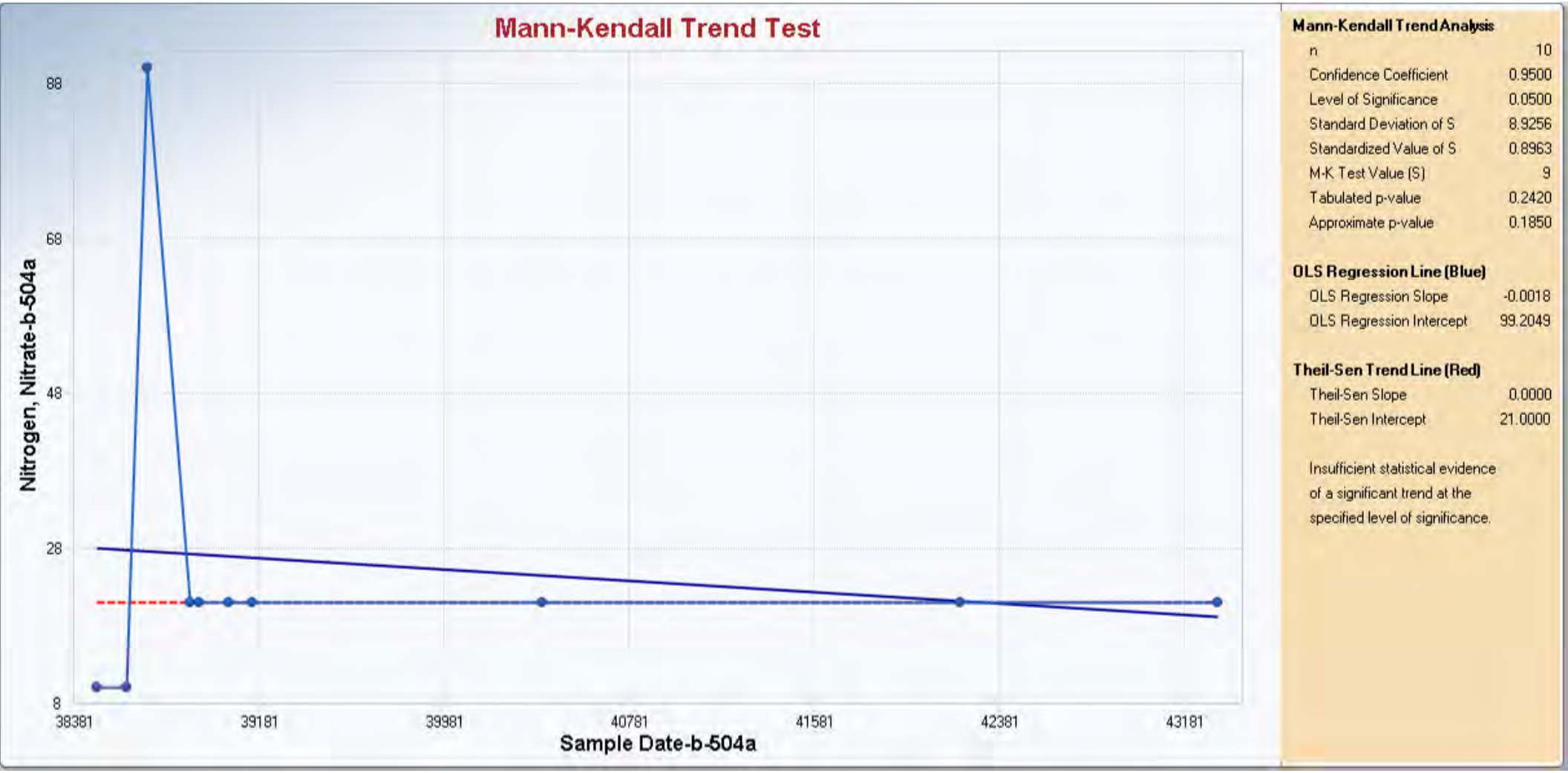
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	10
Maximum	90
Mean	25.7
Geometric Mean	20.94
Median	21
Standard Deviation	23.05
Coefficient of Variation	0.897

Mann-Kendall Test

M-K Test Value (S)	9
Tabulated p-value	0.242
Standard Deviation of S	8.926
Standardized Value of S	0.896
Approximate p-value	0.185

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Nitrogen, Nitrate-b-504a
88
68
48
28
8
38381
39181
39981
40781
41581
42381
43181
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 8.9256
Standardized Value of S 0.8963
M-K Test Value (S) 9
Tabulated p-value 0.2420
Approximate p-value 0.1850
OLS Regression Line (Blue)
OLS Regression Slope -0.0018
OLS Regression Intercept 99.2049
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 21.0000
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:22:52 AM	
From File	VERT MIG DATA_k.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Toluene-b-504a

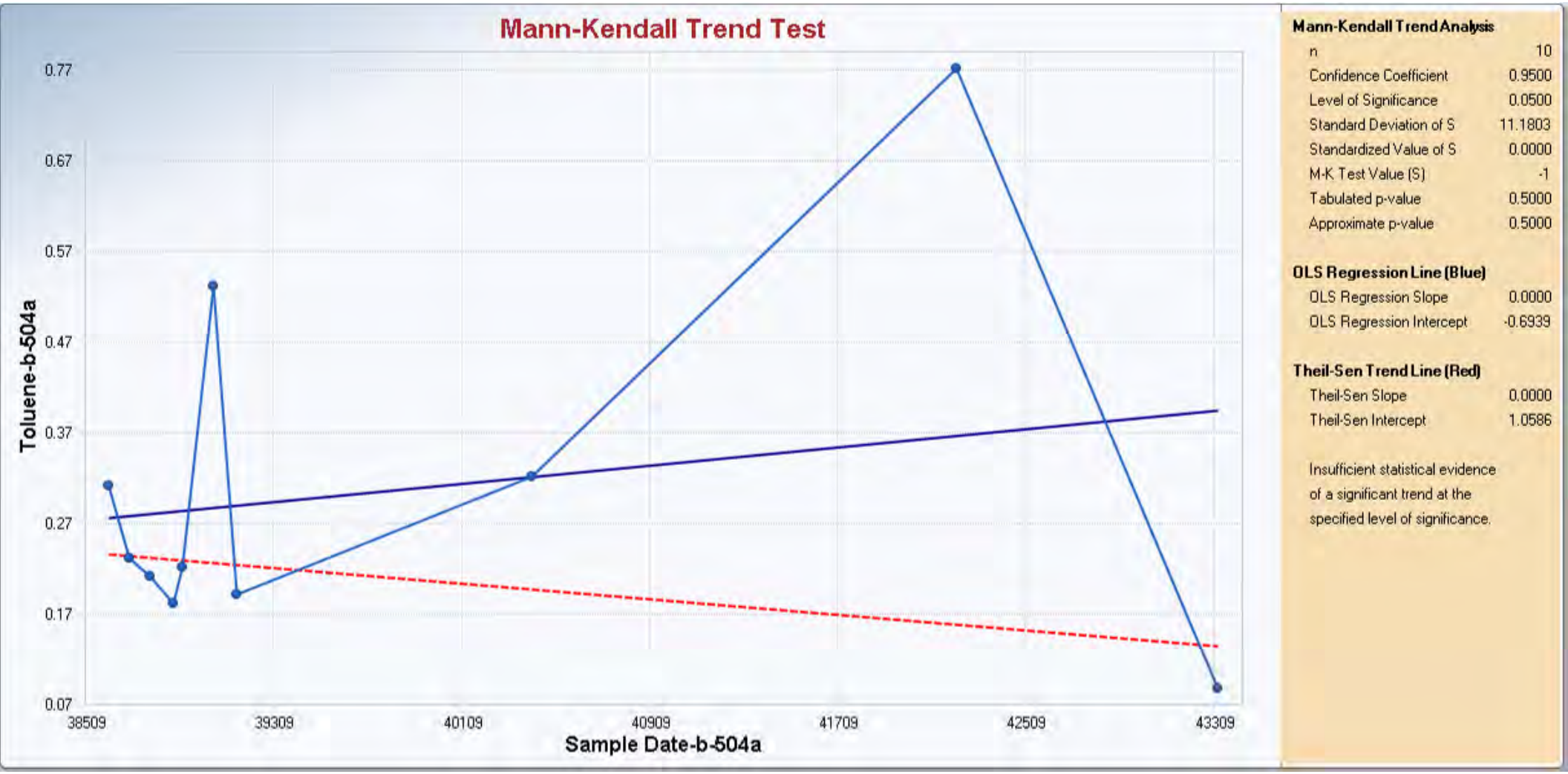
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.085
Maximum	0.77
Mean	0.305
Geometric Mean	0.257
Median	0.225
Standard Deviation	0.202
Coefficient of Variation	0.662

Mann-Kendall Test

M-K Test Value (S)	-1
Tabulated p-value	0.5
Standard Deviation of S	11.18
Standardized Value of S	0
Approximate p-value	0.5

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Toluene-b-504a
0.77
0.67
0.57
0.47
0.37
0.27
0.17
0.07
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1803
Standardized Value of S 0.0000
M-K Test Value (S) -1
Tabulated p-value 0.5000
Approximate p-value 0.5000
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept -0.6939
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 1.0586
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:21:39 AM	
From File	VERT MIG DATA_I.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Vinyl Chloride-b-504a

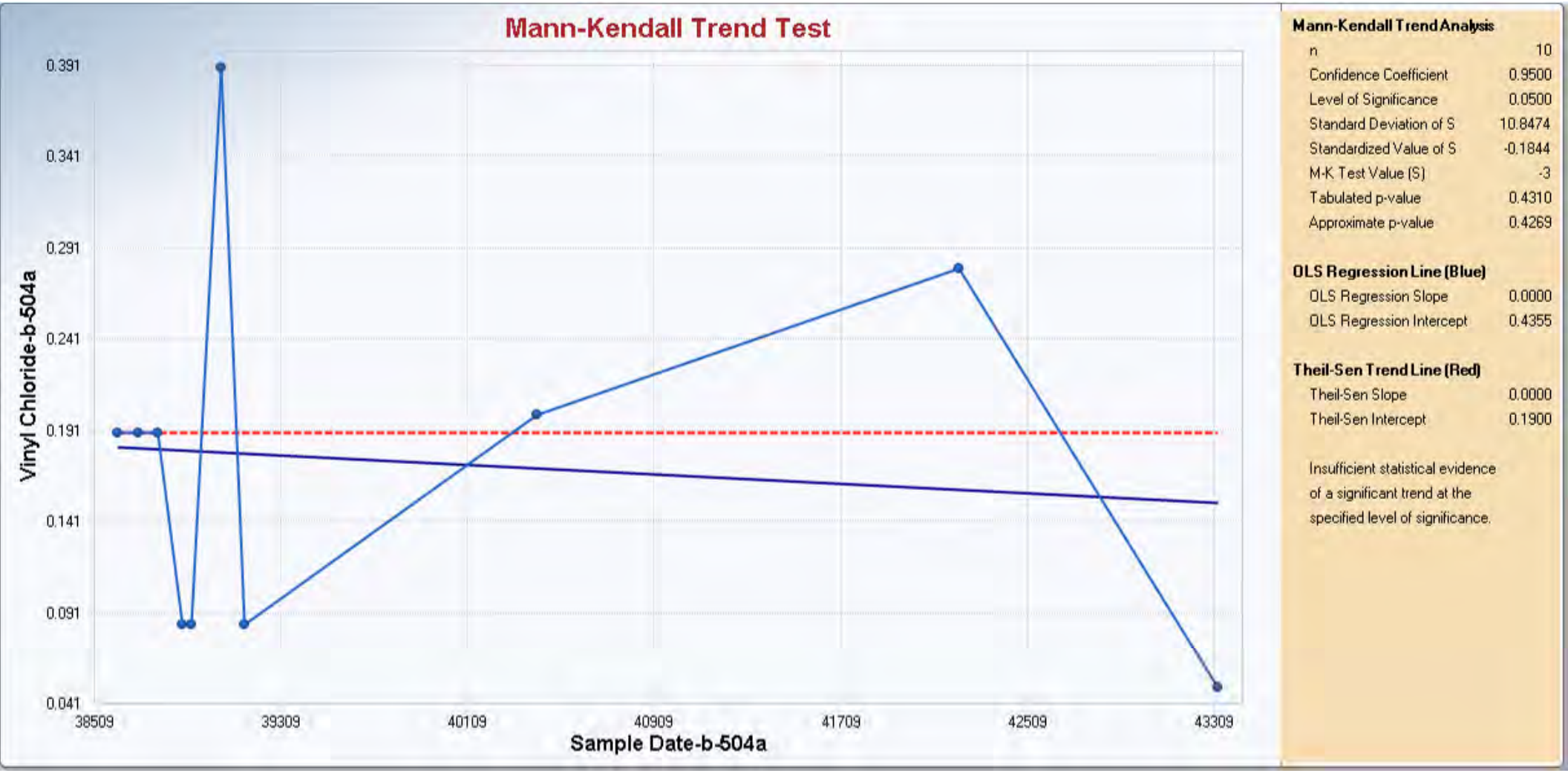
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.05
Maximum	0.39
Mean	0.175
Geometric Mean	0.147
Median	0.19
Standard Deviation	0.105
Coefficient of Variation	0.599

Mann-Kendall Test

M-K Test Value (S)	-3
Tabulated p-value	0.431
Standard Deviation of S	10.85
Standardized Value of S	-0.184
Approximate p-value	0.427

Insufficient evidence to identify a significant trend at the specified level of significance.


Mann-Kendall Trend Test
Vinyl Chloride-b-504a
0.391
0.341
0.291
0.241
0.191
0.141
0.091
0.041
38509
39309
40109
40909
41709
42509
43309
Sample Date-b-504a
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 10.8474
Standardized Value of S -0.1844
M-K Test Value (S) -3
Tabulated p-value 0.4310
Approximate p-value 0.4269
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept 0.4355
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.1900
Insufficient statistical evidence of a significant trend at the specified level of significance.

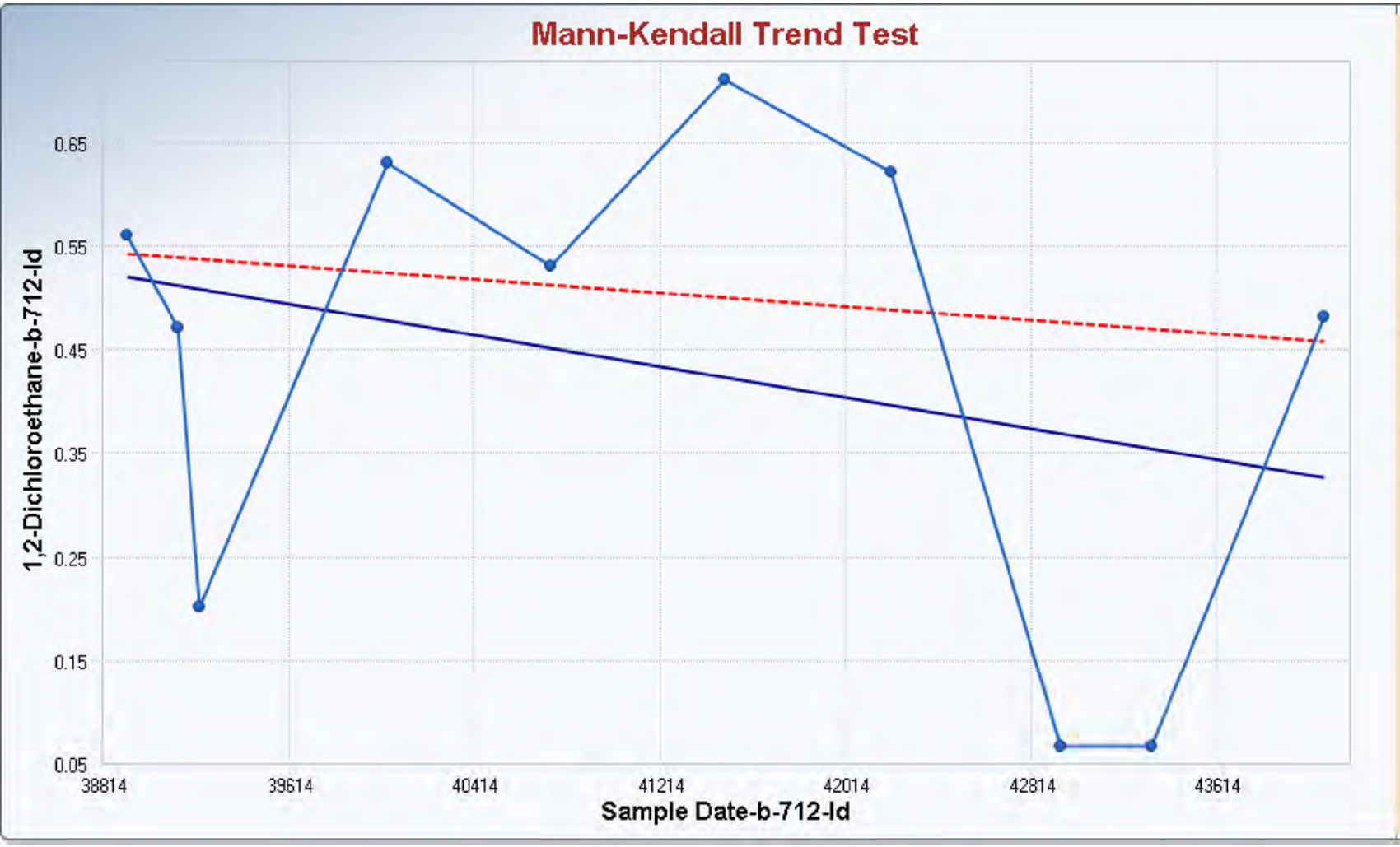
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.12/19/2021 10:41:55 AM	
From File	VERT MIG DATA - B-712-LD ONLY.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,2-Dichloroethane-b-712-ld

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.065
Maximum	0.71
Mean	0.433
Geometric Mean	0.331
Median	0.505
Standard Deviation	0.237
Coefficient of Variation	0.547

Mann-Kendall Test	
M-K Test Value (S)	-8
Tabulated p-value	0.242
Standard Deviation of S	11.14
Standardized Value of S	-0.629
Approximate p-value	0.265

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1355
Standardized Value of S	-0.6286
M-K Test Value (S)	-8
Tabulated p-value	0.2420
Approximate p-value	0.2648

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	1.9870

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	1.1817

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.12/19/2021 10:46:19 AM	
From File	VERT MIG DATA - B-712-LD ONLY_b.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Arsenic-b-712-ld

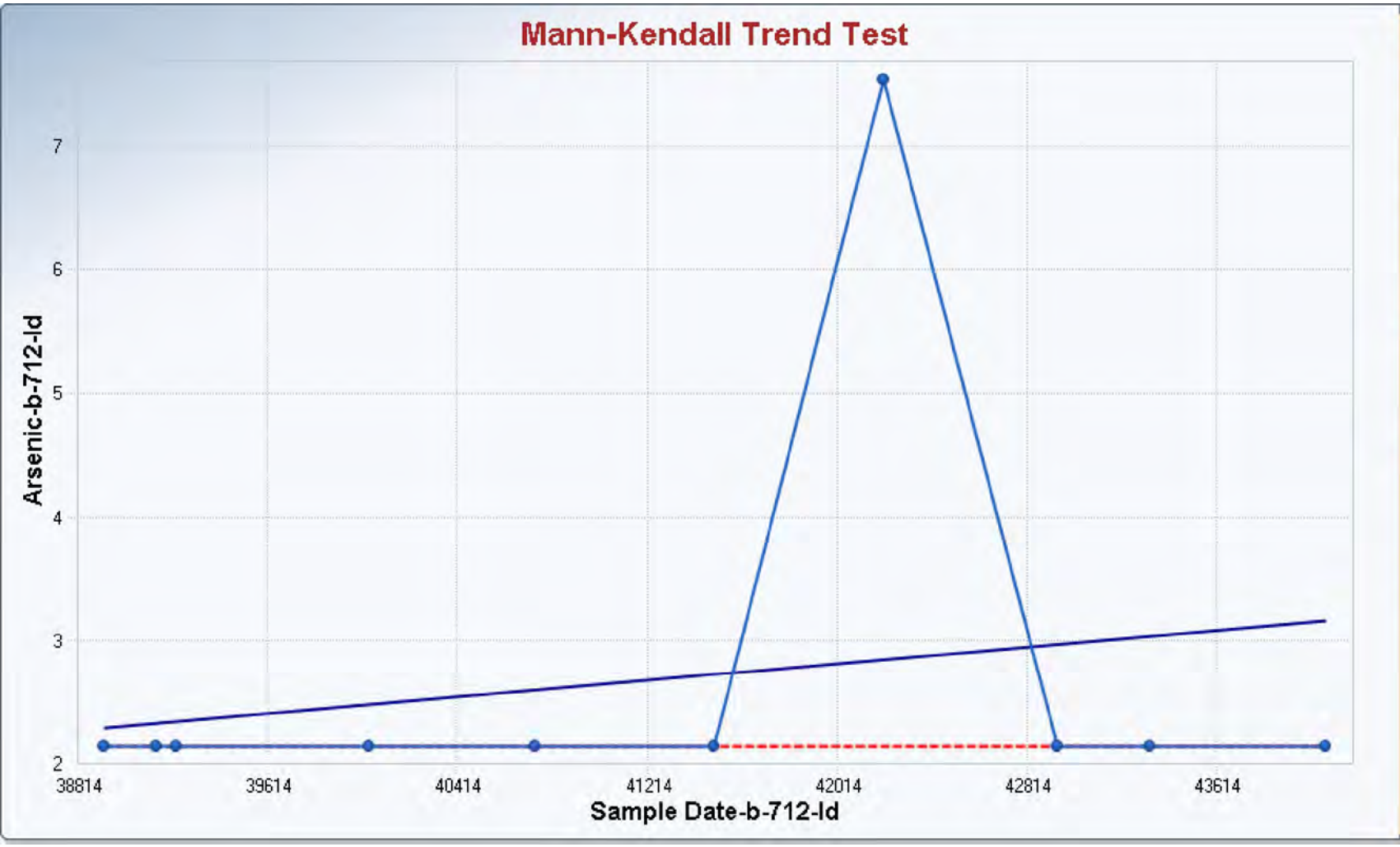
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	2.2
Maximum	7.6
Mean	2.74
Geometric Mean	2.49
Median	2.2
Standard Deviation	1.708
Coefficient of Variation	0.623

Mann-Kendall Test

M-K Test Value (S)	3
Tabulated p-value	0.431
Standard Deviation of S	5.745
Standardized Value of S	0.348
Approximate p-value	0.364

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	5.7446
Standardized Value of S	0.3482
M-K Test Value (S)	3
Tabulated p-value	0.4310
Approximate p-value	0.3639

OLS Regression Line (Blue)

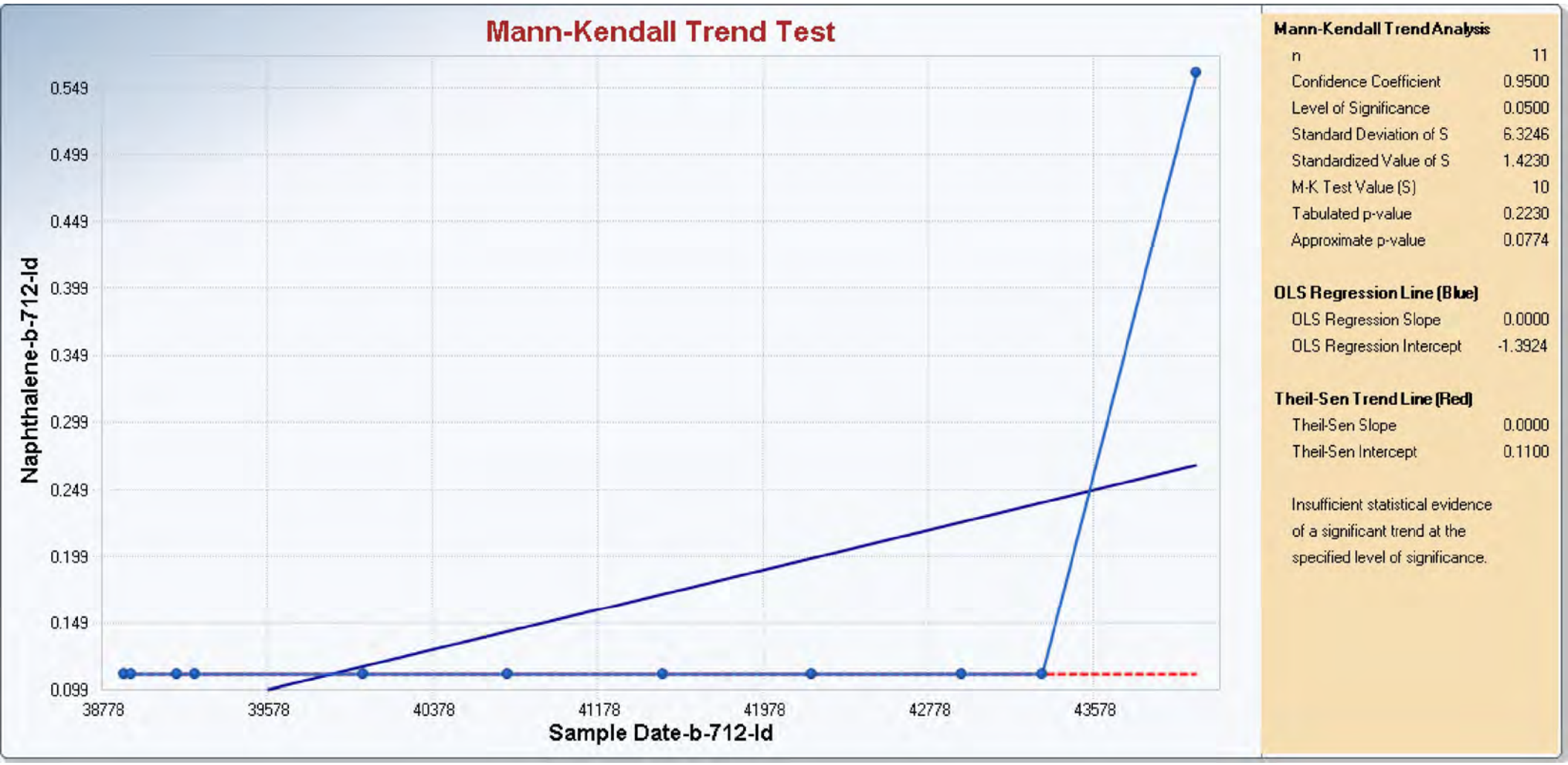
OLS Regression Slope	0.0002
OLS Regression Intercept	-4.2394

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	2.2000

Insufficient statistical evidence of a significant trend at the specified level of significance.

	A	B	C	D	E	F	G	H	I	J	K	L
1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.12/19/2021 10:51:27 AM								
4			From File	VERT MIG DATA - B-712-LD ONLY_d.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9	**Naphthalene-b-712-ld**											
10												
11	**General Statistics**											
12			Number of Events Reported (m)		11							
13			Number of Missing Events		0							
14			Number or Reported Events Used		11							
15			Number Values Reported (n)		11							
16			Minimum		0.11							
17			Maximum		0.56							
18			Mean		0.151							
19			Geometric Mean		0.128							
20			Median		0.11							
21			Standard Deviation		0.136							
22			Coefficient of Variation		0.899							
23												
24	**Mann-Kendall Test**											
25			M-K Test Value (S)		10							
26			Tabulated p-value		0.223							
27			Standard Deviation of S		6.325							
28			Standardized Value of S		1.423							
29			Approximate p-value		0.0774							
30												
31	**Insufficient evidence to identify a significant**											
32	**trend at the specified level of significance.**											


Mann-Kendall Trend Test
Naphthalene-b-712-Id
0.549
0.499
0.449
0.399
0.349
0.299
0.249
0.199
0.149
0.099
38778
39578
40378
41178
41978
42778
43578
Sample Date-b-712-Id
Mann-Kendall Trend Analysis
n 11
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 6.3246
Standardized Value of S 1.4230
M-K Test Value (S) 10
Tabulated p-value 0.2230
Approximate p-value 0.0774
OLS Regression Line (Blue)
OLS Regression Slope 0.0000
OLS Regression Intercept -1.3924
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.1100
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.12/19/2021 10:49:35 AM	
From File	VERT MIG DATA - B-712-LD ONLY_c.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-b-712-ld

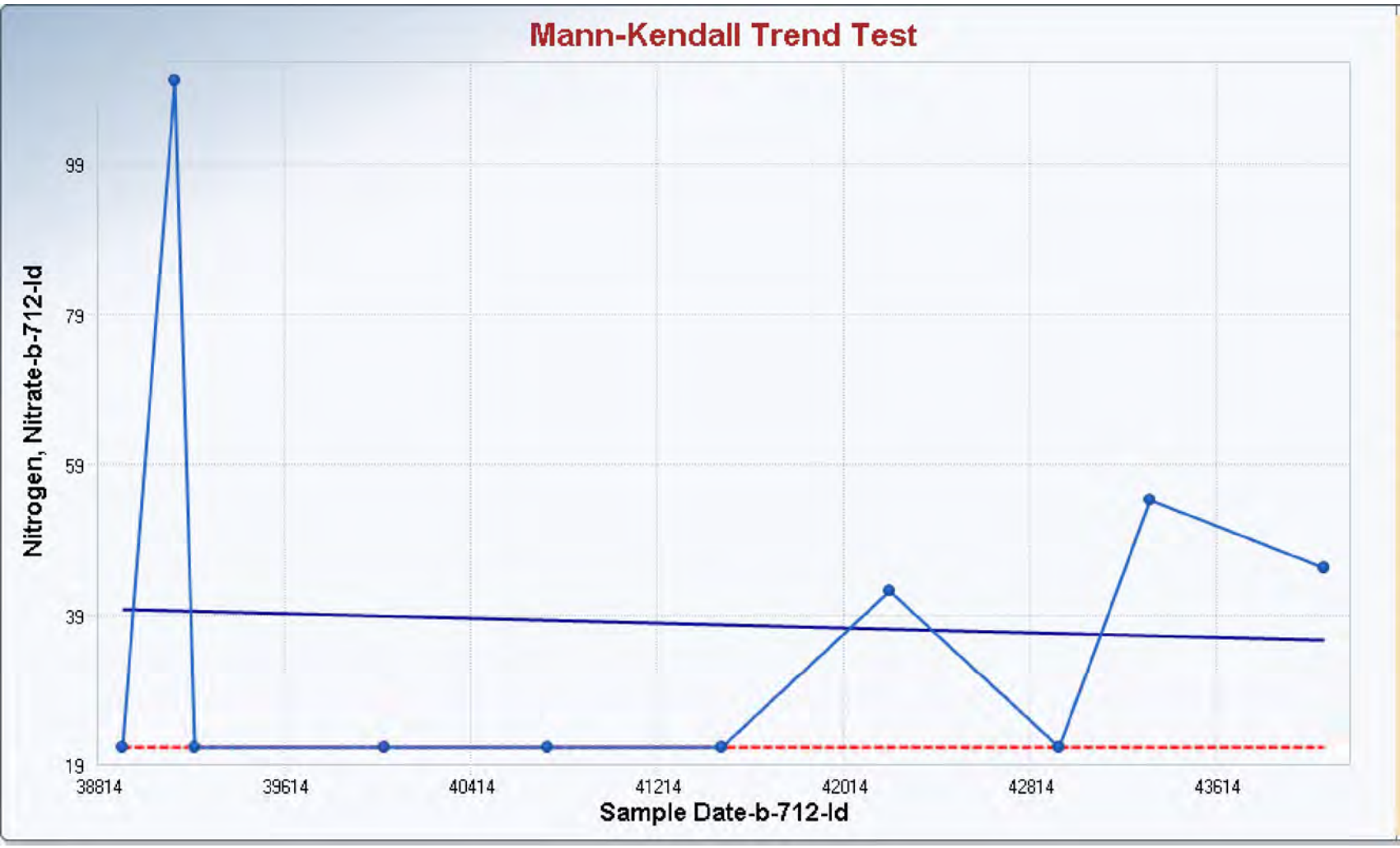
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	21
Maximum	110
Mean	37.7
Geometric Mean	31.5
Median	21
Standard Deviation	28.36
Coefficient of Variation	0.752

Mann-Kendall Test

M-K Test Value (S)	10
Tabulated p-value	0.19
Standard Deviation of S	9.832
Standardized Value of S	0.915
Approximate p-value	0.18

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.8319
Standardized Value of S	0.9154
M-K Test Value (S)	10
Tabulated p-value	0.1900
Approximate p-value	0.1800

OLS Regression Line (Blue)

OLS Regression Slope	-0.0008
OLS Regression Intercept	69.8878

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	21.0000

Insufficient statistical evidence of a significant trend at the specified level of significance.

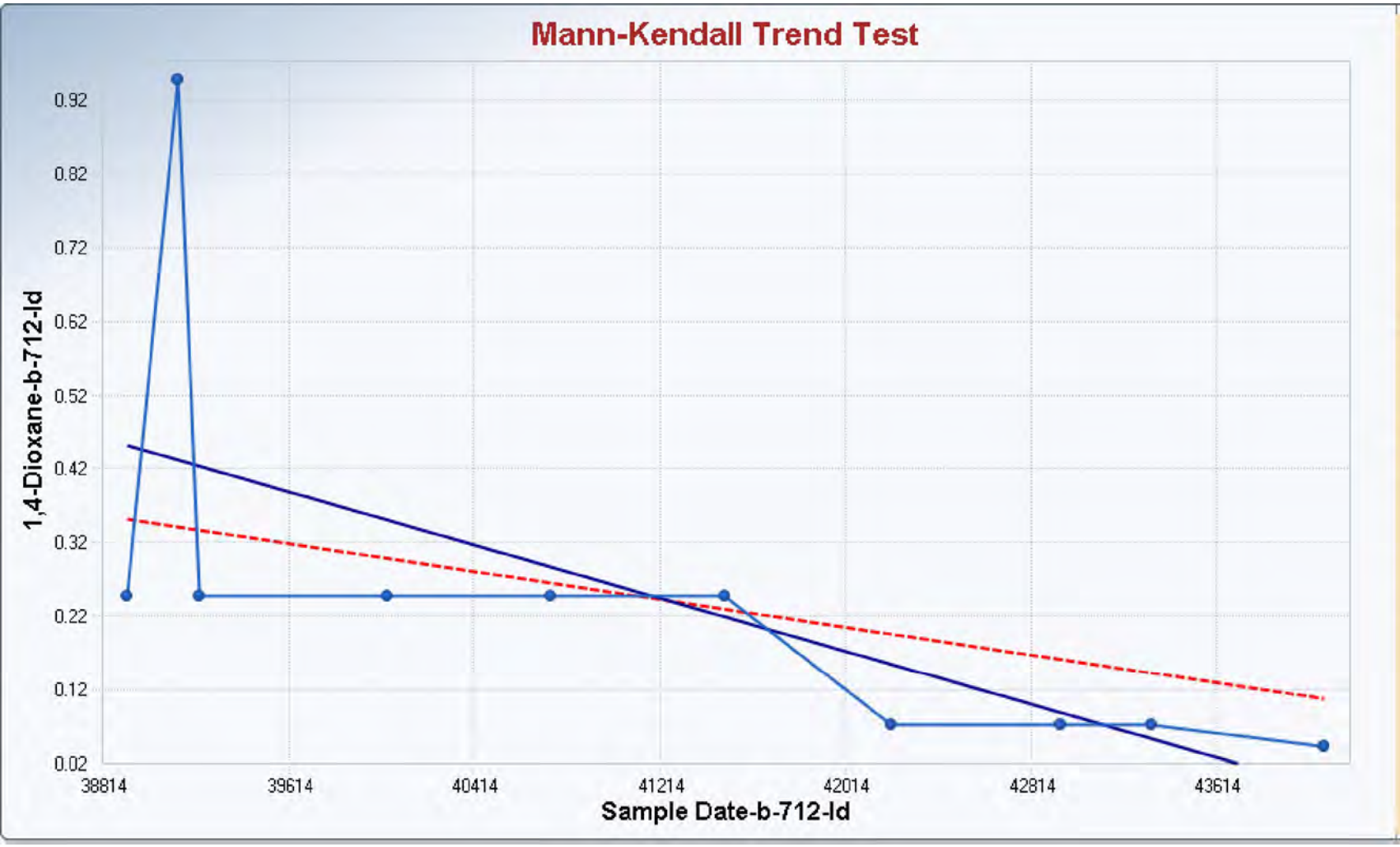
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.12/15/2021 12:25:59 PM	
From File	COMPLIANCE DATA For TREND- 1H2020.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

1,4-Dioxane-b-712-ld

General Statistics	
Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.045
Maximum	0.95
Mean	0.247
Geometric Mean	0.168
Median	0.25
Standard Deviation	0.263
Coefficient of Variation	1.066

Mann-Kendall Test	
M-K Test Value (S)	-30
Tabulated p-value	0.002
Standard Deviation of S	10.23
Standardized Value of S	-2.835
Approximate p-value	0.00229

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	10.2307
Standardized Value of S	-2.8346
M-K Test Value (S)	-30
Tabulated p-value	0.0020
Approximate p-value	0.0023

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	3.9841

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	2.1880

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:26:14 AM	
From File	VERT MIG DATA_g.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Methylene Chloride-c-702p3

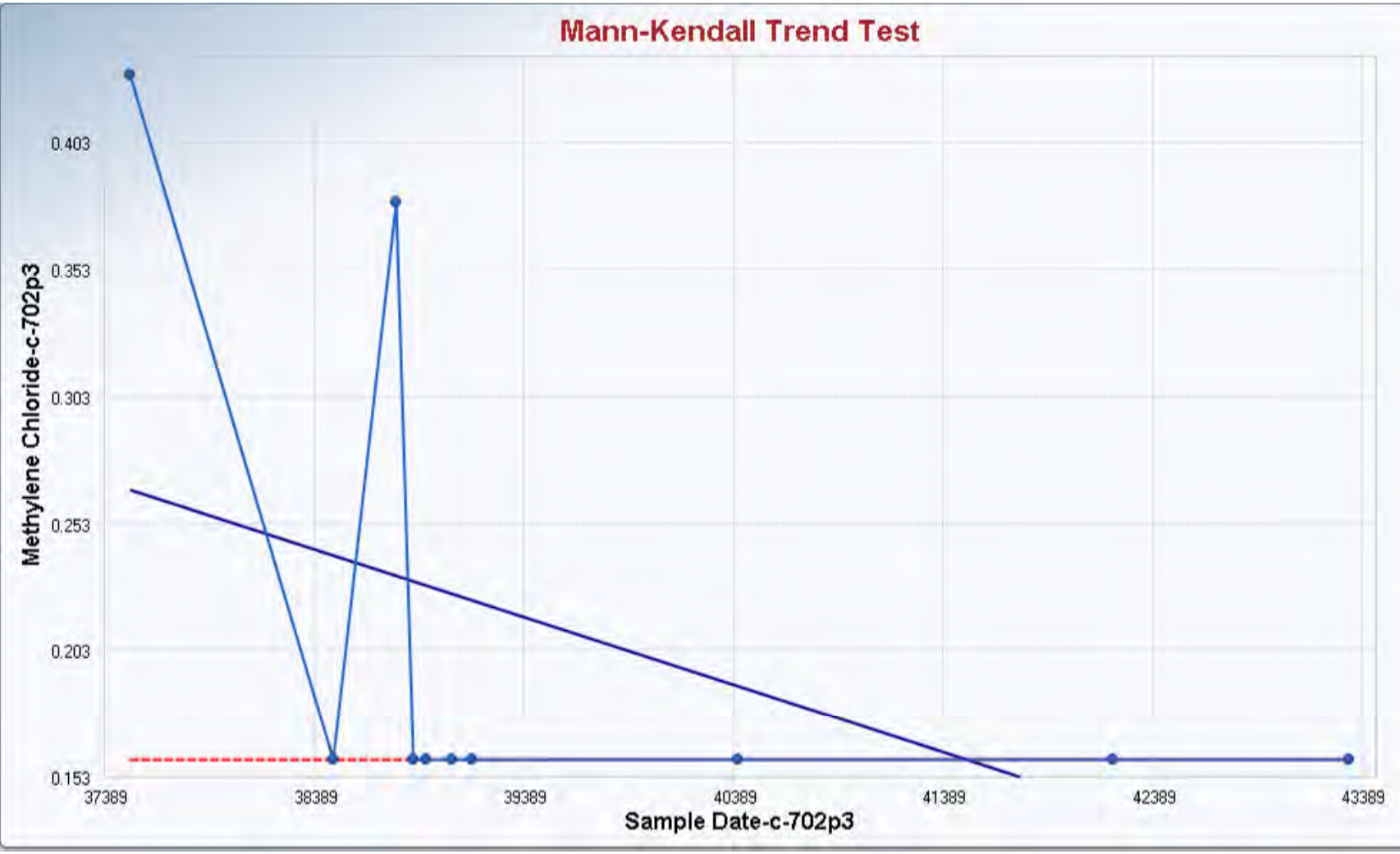
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.16
Maximum	0.43
Mean	0.209
Geometric Mean	0.193
Median	0.16
Standard Deviation	0.104
Coefficient of Variation	0.497

Mann-Kendall Test

M-K Test Value (S)	-15
Tabulated p-value	0.108
Standard Deviation of S	7.724
Standardized Value of S	-1.812
Approximate p-value	0.035

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	7.7244
Standardized Value of S	-1.8124
M-K Test Value (S)	-15
Tabulated p-value	0.1080
Approximate p-value	0.0350

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	1.2705

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.1600

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:24:11 AM	
From File	VERT MIG DATA_i.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-c-702p3

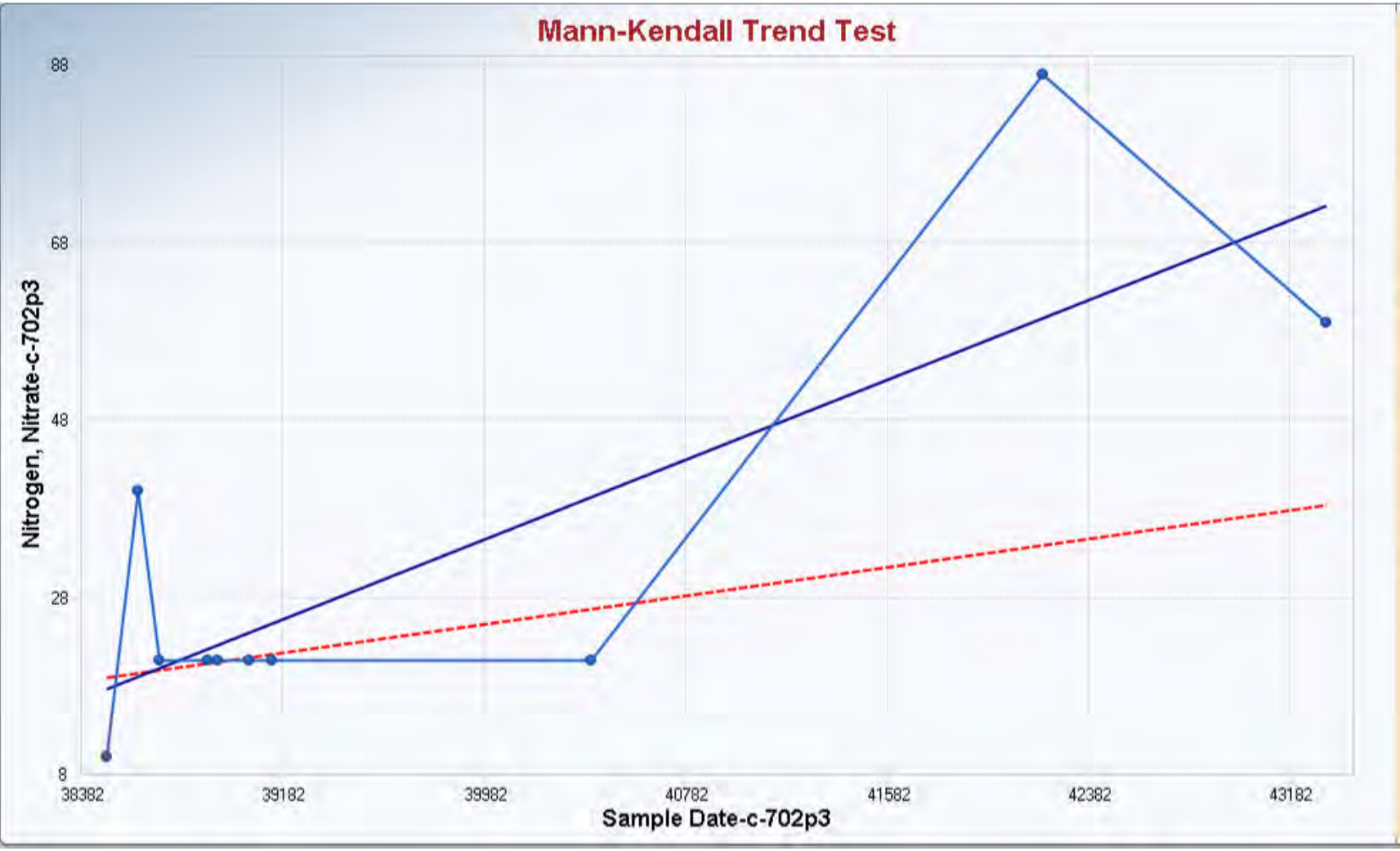
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	10
Maximum	87
Mean	32.2
Geometric Mean	26.58
Median	21
Standard Deviation	23.64
Coefficient of Variation	0.734

Mann-Kendall Test

M-K Test Value (S)	16
Tabulated p-value	0.078
Standard Deviation of S	9.832
Standardized Value of S	1.526
Approximate p-value	0.0635

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.8319
Standardized Value of S	1.5256
M-K Test Value (S)	16
Tabulated p-value	0.0780
Approximate p-value	0.0635

OLS Regression Line (Blue)

OLS Regression Slope	0.0113
OLS Regression Intercept	-415.2403

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0040
Theil-Sen Intercept	-136.0017

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:28:31 AM	
From File	VERT MIG DATA_d.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acetone-gw-113

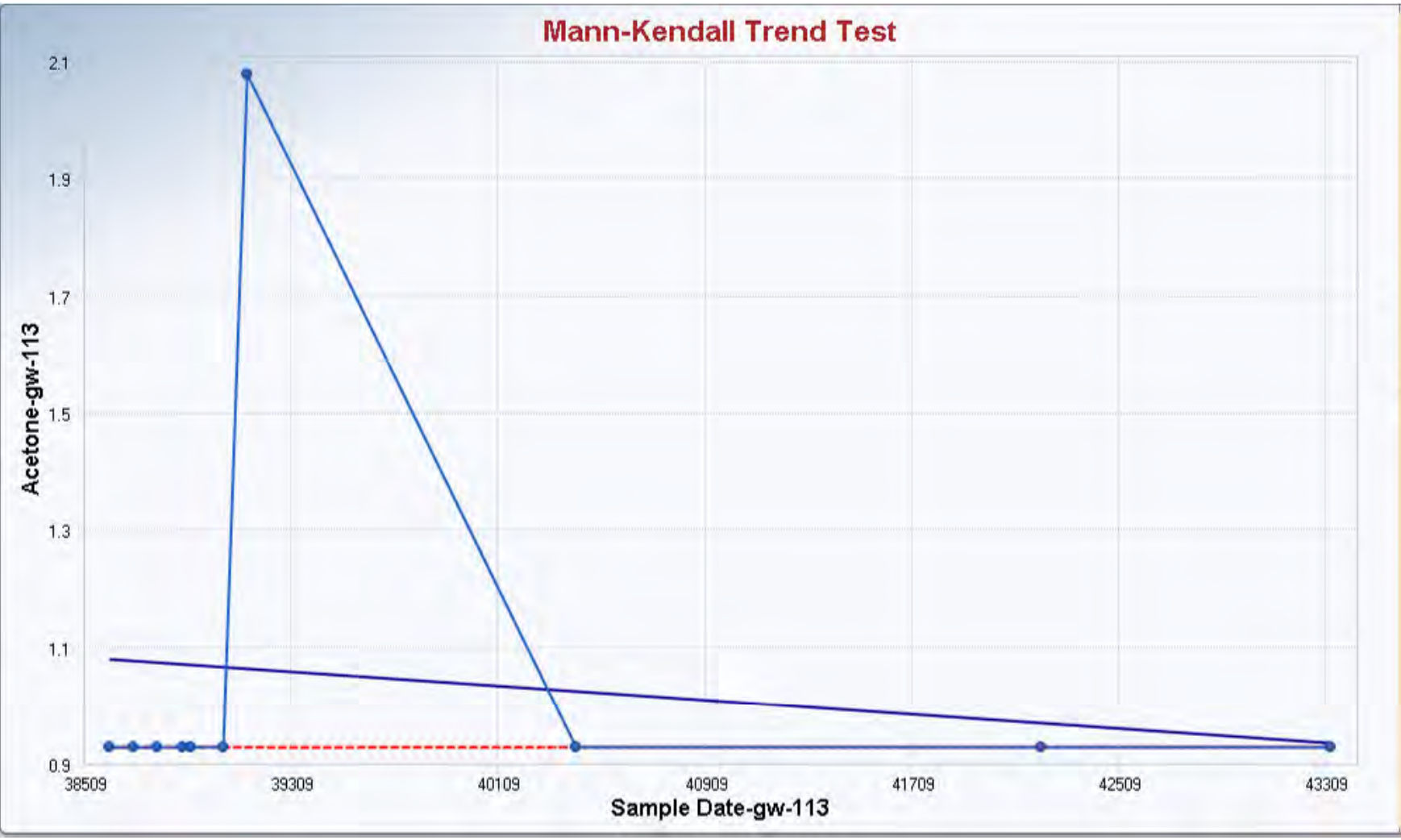
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	0.95
Maximum	2.1
Mean	1.065
Geometric Mean	1.028
Median	0.95
Standard Deviation	0.364
Coefficient of Variation	0.341

Mann-Kendall Test

M-K Test Value (S)	3
Tabulated p-value	0.431
Standard Deviation of S	5.745
Standardized Value of S	0.348
Approximate p-value	0.364

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	5.7446
Standardized Value of S	0.3482
M-K Test Value (S)	3
Tabulated p-value	0.4310
Approximate p-value	0.3639

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	2.2844

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.9500

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:23:27 AM	
From File	VERT MIG DATA_j.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrite-gw-113

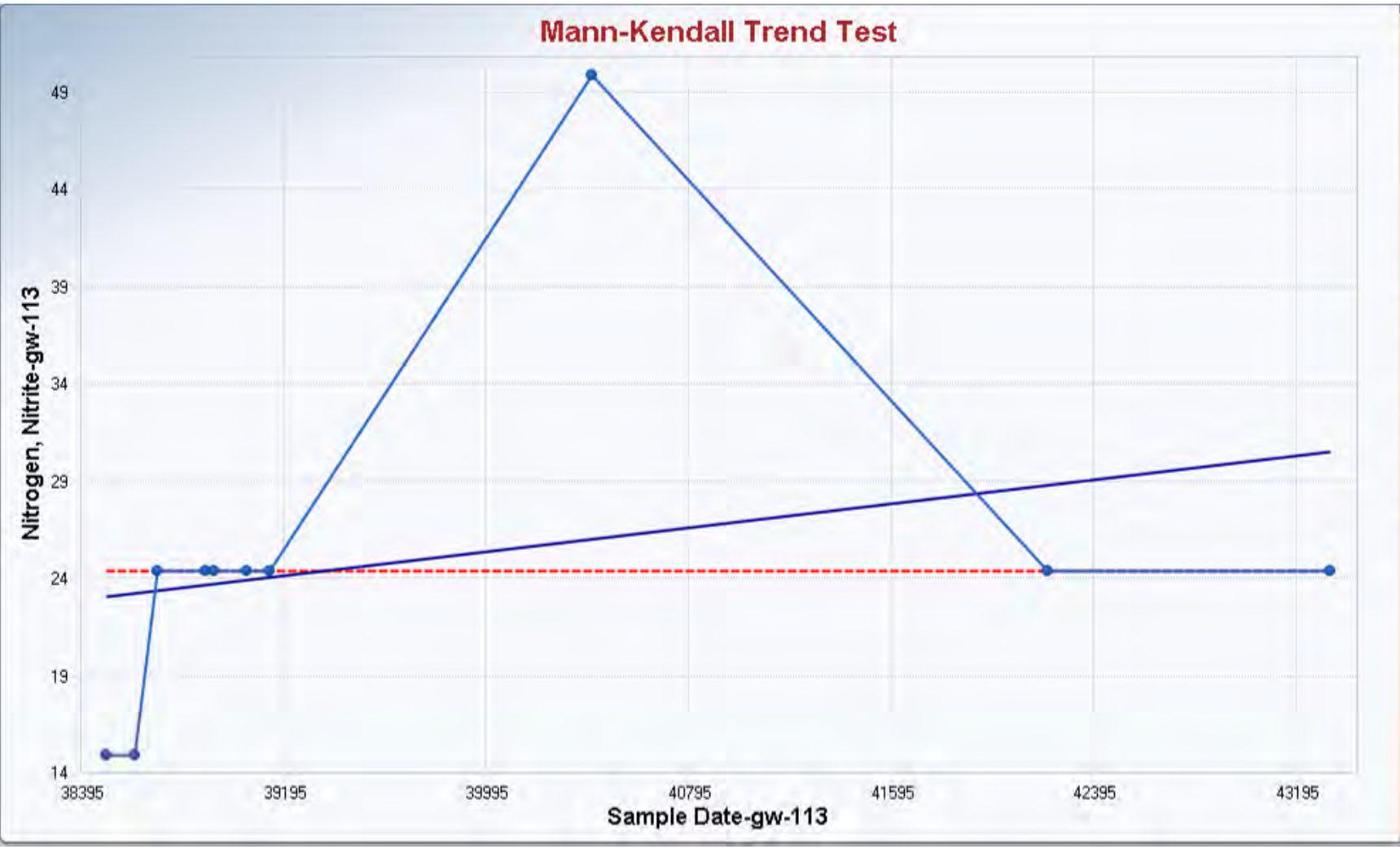
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	15
Maximum	50
Mean	25.15
Geometric Mean	23.85
Median	24.5
Standard Deviation	9.583
Coefficient of Variation	0.381

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.054
Standard Deviation of S	8.926
Standardized Value of S	2.017
Approximate p-value	0.0219

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	8.9256
Standardized Value of S	2.0167
M-K Test Value (S)	19
Tabulated p-value	0.0540
Approximate p-value	0.0219

OLS Regression Line (Blue)

OLS Regression Slope	0.0015
OLS Regression Intercept	-36.3034

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	24.5000

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.13/4/2019 9:24:11 AM	
From File	VERT MIG DATA_i.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Nitrogen, Nitrate-gw-113

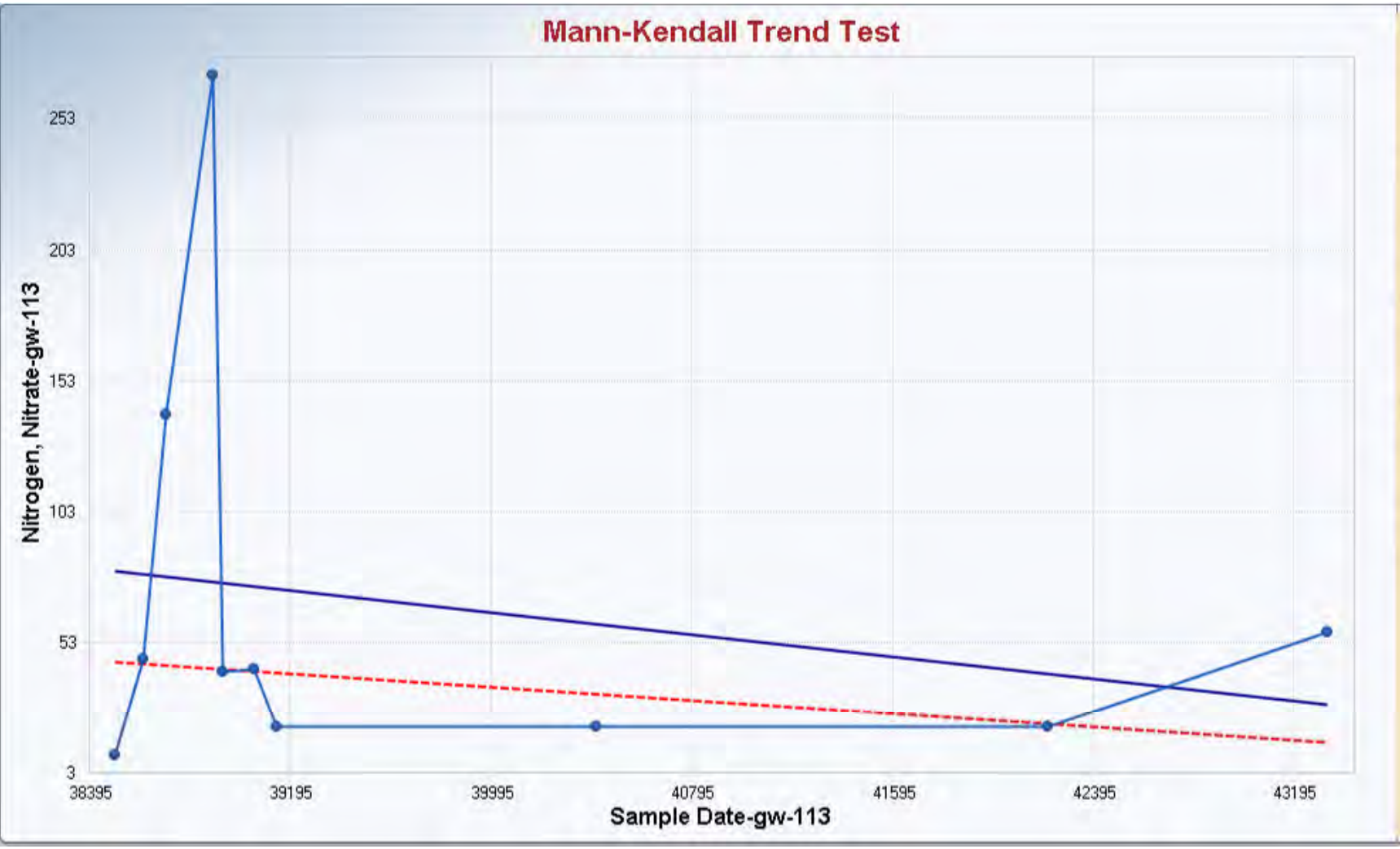
General Statistics

Number of Events Reported (m)	10
Number of Missing Events	0
Number or Reported Events Used	10
Number Values Reported (n)	10
Minimum	10
Maximum	270
Mean	67.2
Geometric Mean	41.96
Median	42.5
Standard Deviation	80.16
Coefficient of Variation	1.193

Mann-Kendall Test

M-K Test Value (S)	-4
Tabulated p-value	0.364
Standard Deviation of S	11.02
Standardized Value of S	-0.272
Approximate p-value	0.393

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.0151
Standardized Value of S	-0.2724
M-K Test Value (S)	-4
Tabulated p-value	0.3640
Approximate p-value	0.3927

OLS Regression Line (Blue)

OLS Regression Slope	-0.0106
OLS Regression Intercept	489.9055

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-0.0064
Theil-Sen Intercept	291.4982

Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX C-5.3

VERTICAL MIGRATION ASSESSMENT

Dixon's Test for Outliers

	Outlier Tests for Selected Variables replacing nondetects with 1/2 the Detection Limit	
User Selected Options		
Date/Time of Computation	ProUCL 5.12/19/2021 11:06:07 AM	
From File	VERT MIG DATA - B-712-LD ONLY FOR DIXON'S.xls	
Full Precision	OFF	

Dixon's Outlier Test for 1,4-Dioxane (b-712-ld)

Total N = 10

Number NDs = 9

Number Detects = 1

Number Data (n) = 10

10% critical value: 0.409

5% critical value: 0.477

1% critical value: 0.597

Note: NDs replaced by DL/2 in Outlier Test

1. Data Value 0.95 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.800

For 10% significance level, 0.95 is an outlier.

For 5% significance level, 0.95 is an outlier.

For 1% significance level, 0.95 is an outlier.

2. Data Value 0.045 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.146

For 10% significance level, 0.045 is not an outlier.

For 5% significance level, 0.045 is not an outlier.

For 1% significance level, 0.045 is not an outlier.

APPENDIX C-6

NORTH END MONITORING AND RESPONSE ACTIONS

APPENDIX C-6.1

NORTH END – ALL ORGANICS AND NITRATE DATA

APPENDIX C-6.1
NORTH END - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (µg/L)[a/]	Qualifier[b/]
31	B-313	Nitrogen, Nitrate	8/12/2021	55000	J
31	B-313	1,4-Dioxane	11/16/2021	17	
31	B-314	Nitrogen, Nitrate	10/27/2021	160	J
31	B-314	Nitrogen, Nitrite	10/27/2021	500	U
31	B-314	1,4-Dioxane	10/27/2021	0.9	U
31	B-314	1,1,1-Trichloroethane	10/27/2021	1	U
31	B-314	1,1,2,2-Tetrachloroethane	10/27/2021	1	U
31	B-314	1,1,2-Trichloroethane	10/27/2021	1	U
31	B-314	1,1-Dichloroethane	10/27/2021	1.5	
31	B-314	1,1-Dichloroethene	10/27/2021	1	U
31	B-314	1,2-Dichloroethane	10/27/2021	1	U
31	B-314	1,2-Dichloropropane	10/27/2021	1	U
31	B-314	1,4-Dioxane	10/27/2021	200	U
31	B-314	Acetone	10/27/2021	10	U
31	B-314	Benzene	10/27/2021	1	U
31	B-314	Bromodichloromethane	10/27/2021	1	U
31	B-314	Bromoform	10/27/2021	1	U
31	B-314	Carbon Tetrachloride	10/27/2021	1	U
31	B-314	Chlorobenzene	10/27/2021	1	U
31	B-314	Chloroform	10/27/2021	1	U
31	B-314	cis-1,2-Dichloroethene	10/27/2021	1	U
31	B-314	Dibromochloromethane	10/27/2021	1	U
31	B-314	Ethylbenzene	10/27/2021	1	U
31	B-314	Methylene Chloride	10/27/2021	1	U
31	B-314	Naphthalene	10/27/2021	1	U
31	B-314	Tetrachloroethene	10/27/2021	1	U
31	B-314	Toluene	10/27/2021	1	U
31	B-314	Trans-1,2-Dichloroethene	10/27/2021	0.5	U
31	B-314	Trichloroethene	10/27/2021	1	U
31	B-314	Vinyl Chloride	10/27/2021	2	U
31	B-321	Nitrogen, Nitrate	8/11/2021	43000	
31	B-321	1,4-Dioxane	8/30/2021	9.7	
31	B-326-UD	1,4-Dioxane	8/30/2021	6.1	
31	B-326-UD	1,4-Dioxane	10/12/2021	5	
31	B-326-WD	Nitrogen, Nitrate	10/12/2021	9900	
31	B-326-WD	Nitrogen, Nitrite	10/12/2021	150	J-
31	B-326-WD	1,4-Dioxane	8/30/2021	0.77	J
31	B-326-WD	1,4-Dioxane	9/27/2021	0.69	J
31	B-326-WD	1,4-Dioxane	10/12/2021	1	
31	B-326-WD	1,1,1-Trichloroethane	10/12/2021	1	U
31	B-326-WD	1,1,2,2-Tetrachloroethane	10/12/2021	1	U
31	B-326-WD	1,1,2-Trichloroethane	10/12/2021	1	U
31	B-326-WD	1,1-Dichloroethane	10/12/2021	1	U
31	B-326-WD	1,1-Dichloroethene	10/12/2021	1	U
31	B-326-WD	1,2-Dichloroethane	10/12/2021	1	U
31	B-326-WD	1,2-Dichloropropane	10/12/2021	1	U
31	B-326-WD	1,4-Dioxane	10/12/2021	200	U
31	B-326-WD	Acetone	10/12/2021	10	U
31	B-326-WD	Benzene	10/12/2021	1	U
31	B-326-WD	Bromodichloromethane	10/12/2021	1	U
31	B-326-WD	Bromoform	10/12/2021	1	U
31	B-326-WD	Carbon Tetrachloride	10/12/2021	1	U
31	B-326-WD	Chlorobenzene	10/12/2021	1	U
31	B-326-WD	Chloroform	10/12/2021	1	U
31	B-326-WD	cis-1,2-Dichloroethene	10/12/2021	1	U

APPENDIX C-6.1
NORTH END - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (µg/L)[a/]	Qualifier[b/]
31	B-326-WD	Dibromochloromethane	10/12/2021	1	U
31	B-326-WD	Ethylbenzene	10/12/2021	1	U
31	B-326-WD	Methylene Chloride	10/12/2021	1	U
31	B-326-WD	Naphthalene	10/12/2021	1	U
31	B-326-WD	Tetrachloroethene	10/12/2021	1	U
31	B-326-WD	Toluene	10/12/2021	1	U
31	B-326-WD	Trans-1,2-Dichloroethene	10/12/2021	0.5	U
31	B-326-WD	Trichloroethene	10/12/2021	1	U
31	B-326-WD	Vinyl Chloride	10/12/2021	2	U
31	MW05-WD	1,4-Dioxane	8/18/2021	4.4	
31	MW113-EW-1	Nitrogen, Nitrate	7/29/2021	1100	
31	MW113-EW-1	Nitrogen, Nitrate	10/19/2021	2000	
31	MW113-EW-1	1,4-Dioxane	7/29/2021	92	
31	MW113-EW-1	1,4-Dioxane	10/19/2021	120	
31	MW113-UD	1,4-Dioxane	7/29/2021	120	
31	MW113-UD	1,4-Dioxane	10/19/2021	94	
31	MW114-WD	1,4-Dioxane	8/5/2021	0.93	
31	MW114-WD	1,4-Dioxane	11/17/2021	0.96	
31	MW117-WD	1,4-Dioxane	8/5/2021	1.8	
31	MW117-WD	1,4-Dioxane	11/17/2021	1.5	
31	MW118-WD	1,4-Dioxane	8/9/2021	0.28	J
31	MW118-WD	1,4-Dioxane	11/17/2021	0.26	J
31	MW121-WDR	1,4-Dioxane	8/18/2021	2	
31	MW122-WDR	1,4-Dioxane	8/18/2021	2	
31	MW123-WD	1,4-Dioxane	8/18/2021	1.5	
31	MW124-WD	1,4-Dioxane	8/18/2021	0.49	J
31	MW125-WD	1,4-Dioxane	8/30/2021	0.41	J
31	MW129-WD	1,4-Dioxane	9/7/2021	5.3	
31	MW132-WD	1,4-Dioxane	7/21/2021	11	
31	MW132-WD	1,4-Dioxane	11/2/2021	14	
30	MW135-WD	1,4-Dioxane	7/28/2021	4.5	
30	MW141-WD	1,4-Dioxane	7/28/2021	2.3	
19	MW142-WD	1,4-Dioxane	7/28/2021	1.7	
24	MW144-WD	1,4-Dioxane	8/4/2021	0.9	U
31	MW151-WD	1,4-Dioxane	7/19/2021	1.7	
31	MW151-WD	1,4-Dioxane	11/11/2021	5.1	
31	MW153-EW-1	1,4-Dioxane	7/21/2021	1.5	
31	MW153-EW-1	1,4-Dioxane	11/8/2021	2	
31	MW154-EW-1	1,4-Dioxane	7/21/2021	1.2	
31	MW154-EW-1	1,4-Dioxane	11/11/2021	0.63	J
31	MW155-EW-1	1,4-Dioxane	7/21/2021	1.1	
31	MW155-EW-1	1,4-Dioxane	11/22/2021	0.27	J
31	MW156-EW-1	1,4-Dioxane	7/21/2021	1.1	
31	MW156-EW-1	1,4-Dioxane	11/22/2021	0.48	J
31	MW156-WD	1,4-Dioxane	7/19/2021	0.88	J
31	MW156-WD	1,4-Dioxane	11/11/2021	0.25	J
31	MW157-WD	1,4-Dioxane	7/19/2021	0.19	J
31	MW157-WD	1,4-Dioxane	11/11/2021	0.1	J
31	MW160-WD	1,4-Dioxane	7/19/2021	2.3	
31	MW160-WD	1,4-Dioxane	11/8/2021	3.3	
13	MW176-DEN	1,4-Dioxane	8/4/2021	0.49	J
31	MW179-UDEN	1,4-Dioxane	9/8/2021	0.9	U
31	NBBW-IW-3	1,4-Dioxane	8/5/2021	140	
31	PTP-12	1,4-Dioxane	11/4/2021	9.1	
31	PTP-13	1,4-Dioxane	8/25/2021	4.8	

APPENDIX C-6.1
NORTH END - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (µg/L)[a/]	Qualifier[b/]
31	PTP-13	1,4-Dioxane	11/10/2021	6.9	

a/ µg/L = micrograms per liter

b/ Final Q definitions:

Qualifiers: U= The analyte was analyzed for and is not present above the level of the associated value.

UJ-= Same as UJ qualification but with an indication of negative bias in the sample concentration.

UJ+= Same as UJ qualification but with an indication of positive bias in the sample concentration.

UJ= The analyte analyzed for was not present above the level of the associated value. The associated

J= The analyte was analyzed for, and was positively identified, but the associated numerical value

The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

J-= Same as J qualification but with an indication of negative bias in the sample concentration.

J+= Same as J qualification but with an indication of positive bias in the sample concentration.

APPENDIX C-6.2

MW77 AREA – ALL ORGANICS AND NITRATE DATA

TABLE C-6.2
MW77 AREA - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (ug/L)[a/]	Qualifier[b/]
31	MW102-WD	1,4-Dioxane	8/31/2021	1.7	
31	MW102-WD	1,4-Dioxane	11/18/2021	1.1	
31	MW103-WD	1,4-Dioxane	8/5/2021	0.45	J
31	MW103-WD	1,4-Dioxane	11/2/2021	0.41	J
31	MW170-EW-1	1,1,1-Trichloroethane	8/9/2021	1.8	
31	MW170-EW-1	1,1,1-Trichloroethane	10/27/2021	2	
31	MW170-EW-1	1,1,2,2-Tetrachloroethane	8/9/2021	1	U
31	MW170-EW-1	1,1,2,2-Tetrachloroethane	10/27/2021	1	U
31	MW170-EW-1	1,1,2-Trichloroethane	8/9/2021	1	U
31	MW170-EW-1	1,1,2-Trichloroethane	10/27/2021	1	U
31	MW170-EW-1	1,1-Dichloroethane	8/9/2021	4	
31	MW170-EW-1	1,1-Dichloroethane	10/27/2021	4.6	
31	MW170-EW-1	1,1-Dichloroethene	8/9/2021	2.8	
31	MW170-EW-1	1,1-Dichloroethene	10/27/2021	3.4	
31	MW170-EW-1	1,2-Dichloroethane	8/9/2021	1	U
31	MW170-EW-1	1,2-Dichloroethane	10/27/2021	1	U
31	MW170-EW-1	1,2-Dichloropropane	8/9/2021	1	U
31	MW170-EW-1	1,2-Dichloropropane	10/27/2021	1	U
31	MW170-EW-1	1,4-Dioxane	8/9/2021	14	
31	MW170-EW-1	1,4-Dioxane	8/9/2021	200	U
31	MW170-EW-1	1,4-Dioxane	10/27/2021	12	
31	MW170-EW-1	1,4-Dioxane	10/27/2021	200	U
31	MW170-EW-1	Acetone	8/9/2021	10	U
31	MW170-EW-1	Acetone	10/27/2021	10	U
31	MW170-EW-1	Benzene	8/9/2021	1	U
31	MW170-EW-1	Benzene	10/27/2021	1	U
31	MW170-EW-1	Bromodichloromethane	8/9/2021	1	U
31	MW170-EW-1	Bromodichloromethane	10/27/2021	1	U
31	MW170-EW-1	Bromoform	8/9/2021	1	U
31	MW170-EW-1	Bromoform	10/27/2021	1	U
31	MW170-EW-1	Carbon Tetrachloride	8/9/2021	1	U
31	MW170-EW-1	Carbon Tetrachloride	10/27/2021	1	U
31	MW170-EW-1	Chlorobenzene	8/9/2021	1	U
31	MW170-EW-1	Chlorobenzene	10/27/2021	1	U
31	MW170-EW-1	Chloroform	8/9/2021	1	U
31	MW170-EW-1	Chloroform	10/27/2021	1	U
31	MW170-EW-1	cis-1,2-Dichloroethene	8/9/2021	9.5	
31	MW170-EW-1	cis-1,2-Dichloroethene	10/27/2021	11	
31	MW170-EW-1	Dibromochloromethane	8/9/2021	1	U
31	MW170-EW-1	Dibromochloromethane	10/27/2021	1	U
31	MW170-EW-1	Ethylbenzene	8/9/2021	1	U
31	MW170-EW-1	Ethylbenzene	10/27/2021	1	U
31	MW170-EW-1	Methylene Chloride	8/9/2021	1	U
31	MW170-EW-1	Methylene Chloride	10/27/2021	1	U
31	MW170-EW-1	Naphthalene	8/9/2021	1	U
31	MW170-EW-1	Naphthalene	10/27/2021	1	U
31	MW170-EW-1	Nitrogen, Nitrate	8/9/2021	9800	
31	MW170-EW-1	Nitrogen, Nitrate	10/27/2021	9900	
31	MW170-EW-1	Tetrachloroethene	8/9/2021	1	
31	MW170-EW-1	Tetrachloroethene	10/27/2021	0.93	J
31	MW170-EW-1	Toluene	8/9/2021	1	U

TABLE C-6.2
MW77 AREA - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (ug/L)[a/]	Qualifier[b/]
31	MW170-EW-1	Toluene	10/27/2021	1	U
31	MW170-EW-1	Trans-1,2-Dichloroethene	8/9/2021	0.5	U
31	MW170-EW-1	Trans-1,2-Dichloroethene	10/27/2021	0.5	U
31	MW170-EW-1	Trichloroethene	8/9/2021	0.45	J
31	MW170-EW-1	Trichloroethene	10/27/2021	0.33	J
31	MW170-EW-1	Vinyl Chloride	8/9/2021	2	U
31	MW170-EW-1	Vinyl Chloride	10/27/2021	2	U
31	MW23-UPPER-C	1,1,1-Trichloroethane	10/18/2021	1	U
31	MW23-UPPER-C	1,1,2,2-Tetrachloroethane	10/18/2021	1	U
31	MW23-UPPER-C	1,1,2-Trichloroethane	10/18/2021	1	U
31	MW23-UPPER-C	1,1-Dichloroethane	10/18/2021	1	U
31	MW23-UPPER-C	1,1-Dichloroethene	10/18/2021	1	U
31	MW23-UPPER-C	1,2-Dichloroethane	10/18/2021	1	U
31	MW23-UPPER-C	1,2-Dichloropropane	10/18/2021	1	U
31	MW23-UPPER-C	1,4-Dioxane	10/18/2021	0.9	U
31	MW23-UPPER-C	1,4-Dioxane	10/18/2021	200	U
31	MW23-UPPER-C	Acetone	10/18/2021	10	U
31	MW23-UPPER-C	Benzene	10/18/2021	1	U
31	MW23-UPPER-C	Bromodichloromethane	10/18/2021	1	U
31	MW23-UPPER-C	Bromoform	10/18/2021	1	U
31	MW23-UPPER-C	Carbon Tetrachloride	10/18/2021	1	U
31	MW23-UPPER-C	Chlorobenzene	10/18/2021	1	U
31	MW23-UPPER-C	Chloroform	10/18/2021	1	U
31	MW23-UPPER-C	cis-1,2-Dichloroethene	10/18/2021	1	U
31	MW23-UPPER-C	Dibromochloromethane	10/18/2021	1	U
31	MW23-UPPER-C	Ethylbenzene	10/18/2021	1	U
31	MW23-UPPER-C	Methylene Chloride	10/18/2021	1	U
31	MW23-UPPER-C	Naphthalene	10/18/2021	1	U
31	MW23-UPPER-C	Nitrogen, Nitrate	10/18/2021	100	J
31	MW23-UPPER-C	Nitrogen, Nitrite	10/18/2021	500	U
31	MW23-UPPER-C	Tetrachloroethene	10/18/2021	1	U
31	MW23-UPPER-C	Toluene	10/18/2021	1	U
31	MW23-UPPER-C	Trans-1,2-Dichloroethene	10/18/2021	0.5	U
31	MW23-UPPER-C	Trichloroethene	10/18/2021	1	U
31	MW23-UPPER-C	Vinyl Chloride	10/18/2021	2	U
31	MW77-EW-1	1,4-Dioxane	8/31/2021	3.7	
31	MW77-EW-1	1,4-Dioxane	11/18/2021	3	
31	MW77-EW-2	1,4-Dioxane	9/1/2021	0.12	R
31	MW77-EW-2	1,4-Dioxane	9/14/2021	0.13	J
31	MW77-EW-2	1,4-Dioxane	11/18/2021	0.12	J
31	MW77-WD	1,1,1-Trichloroethane	10/27/2021	1	U
31	MW77-WD	1,1,2,2-Tetrachloroethane	10/27/2021	1	U
31	MW77-WD	1,1,2-Trichloroethane	10/27/2021	1	U
31	MW77-WD	1,1-Dichloroethane	10/27/2021	0.99	J
31	MW77-WD	1,1-Dichloroethene	10/27/2021	1.7	
31	MW77-WD	1,2-Dichloroethane	10/27/2021	1	U
31	MW77-WD	1,2-Dichloropropane	10/27/2021	1	U
31	MW77-WD	1,4-Dioxane	10/27/2021	11	
31	MW77-WD	1,4-Dioxane	10/27/2021	200	U
31	MW77-WD	Acetone	10/27/2021	10	U
31	MW77-WD	Benzene	10/27/2021	1	U

TABLE C-6.2
MW77 AREA - ALL ORGANICS AND NITRATE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Section	Well ID	Parameter Name	Date Sampled	Result (ug/L)[a/]	Qualifier[b/]
31	MW77-WD	Bromodichloromethane	10/27/2021	1	U
31	MW77-WD	Bromoform	10/27/2021	1	U
31	MW77-WD	Carbon Tetrachloride	10/27/2021	1	U
31	MW77-WD	Chlorobenzene	10/27/2021	1	U
31	MW77-WD	Chloroform	10/27/2021	1	U
31	MW77-WD	cis-1,2-Dichloroethene	10/27/2021	1	U
31	MW77-WD	Dibromochloromethane	10/27/2021	1	U
31	MW77-WD	Ethylbenzene	10/27/2021	1	U
31	MW77-WD	Methylene Chloride	10/27/2021	1	U
31	MW77-WD	Naphthalene	10/27/2021	1	U
31	MW77-WD	Nitrogen, Nitrate	10/27/2021	12000	
31	MW77-WD	Nitrogen, Nitrite	10/27/2021	500	U
31	MW77-WD	Tetrachloroethene	10/27/2021	1.1	
31	MW77-WD	Toluene	10/27/2021	1	U
31	MW77-WD	Trans-1,2-Dichloroethene	10/27/2021	0.5	U
31	MW77-WD	Trichloroethene	10/27/2021	1	U
31	MW77-WD	Vinyl Chloride	10/27/2021	2	U
31	MW98-WD	1,4-Dioxane	8/31/2021	11	
31	MW98-WD	1,4-Dioxane	11/18/2021	11	

a/ ug/L = micrograms per liter

b/ Qualifiers:

U= The analyte was analyzed for and is not present above the level of the associated value. The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ= The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the sample.

UJ-= Same as UJ qualification but with an indication of negative bias in the sample concentration.

UJ+= Same as UJ qualification but with an indication of positive bias in the sample concentration.

J-= Same as J qualification but with an indication of negative bias in the sample concentration.

J+= Same as J qualification but with an indication of positive bias in the sample concentration.

J= The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

APPENDIX D

LANDFILL GAS

APPENDIX D-1

LFG QUALITY AND EXTRACTION WELL PRESSURES

APPENDIX D-1
LANDFILL GAS EXTRACTION WELL MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWEW30A	7/20/21 9:44	42.1	29.2	0.5	28.2	82.1	-0.12	-0.1	0.086	6.5	24.43	No Adj. Made
LOWEW30A	8/31/21 7:51	47.4	33	0.2	19.4	78.9	-0.34	-0.34	0.132	8.2	24.04	No Adj. Made
LOWEW30A	9/14/21 9:36	49.7	33.9	0.1	16.3	78.5	-0.26	-0.26	0.157	9	24.3	No Adj. Made
LOWEW30A	10/31/21 10:05	56.7	34	0	9.3	74.3	-0.37	-0.37	0.036	4.4	24.39	No Adj. Made
LOWEW30A	11/18/21 9:16	59.2	36.4	0.3	4.1	77.1	-0.07	-0.11	0.034	4.3	24.44	Inc. Flow/Vac.
LOWEW30A	12/20/21 10:36	41.5	32.7	0.4	25.4	77.1	-0.45	-0.45	0.15	8.7	24.3	No Adj. Made
LOWEW34A	7/20/21 10:06	35.8	25.2	1.3	37.7	79.7	-5.99	-5.95	0.368	8	24.42	No Adj. Made
LOWEW34A	8/31/21 8:10	33.4	28	0.2	38.4	71.6	-7.66	-7.66	0.413	8.5	24.17	No Adj. Made
LOWEW34A	9/14/21 9:55	34.4	28.4	0.2	37	70	-7.49	-7.5	0.439	8.9	24.3	No Adj. Made
LOWEW34A	10/31/21 10:34	38.4	29	0.1	32.5	64.9	-4.11	-4.06	0.399	8.6	24.39	No Adj. Made
LOWEW34A	11/18/21 9:57	38.5	29.9	0.9	30.7	68.1	-5.85	-4.66	0.505	9.6	24.43	Dec. Flow/Vac.
LOWEW34A	12/21/21 9:13	38	28.5	0.5	33	60	-2.28	-2.3	0.068	3.6	24.2	No Adj. Made
LOWEW40A	7/19/21 10:31	43.9	33.4	0.8	21.9	84.2	-1.07	-1.06	2.972	5.5	24.53	No Adj. Made
LOWEW40A	8/30/21 9:49	41.5	34.4	0	24.1	82.4	-1.64	-0.13	0.756	2.7	24.26	No Adj. Made
LOWEW40A	9/13/21 10:06	43.3	36.6	0	20.1	73.6	-1.39	-1.38	1.968	4.5	24.33	No Adj. Made
LOWEW40A	10/31/21 9:01	48	37	0.2	14.8	54.7	-1.29	-1.29	0.957	3.2	24.4	No Adj. Made
LOWEW40A	11/17/21 9:57	47.3	40	0	12.7	48.4	-2.33	-2.32	1.305	3.7	24.41	No Adj. Made
LOWEW40A	12/20/21 9:43	46.9	37.1	0.2	15.8	55.2	-1.04	-1.03	0.743	2.8	24.31	No Adj. Made
LOWREW01	7/20/21 11:17	12.7	24.5	0.4	62.4	94.9	-0.01	-0.01	0.655	1.6	24.44	No Adj. Made
LOWREW01	8/31/21 9:14	12.3	25.3	0	62.4	82	-0.19	-0.18	0.728	1.7	24.2	No Adj. Made
LOWREW01	9/14/21 10:59	13.1	26.3	0	60.6	77.9	-0.09	-0.08	0.843	1.8	24.33	No Adj. Made
LOWREW01	10/31/21 12:01	15.4	27.8	0	56.8	54.8	-0.05	-0.05	0.446	1.3	24.41	No Adj. Made
LOWREW01	11/19/21 10:20	17.1	29.3	0.4	53.2	68.1	-0.1	-0.09	1.318	2.3	24.24	No Adj. Made
LOWREW01	12/21/21 10:07	13.4	28	0.3	58.3	61.9	-0.33	-0.33	0.875	1.9	24.22	No Adj. Made
LOWREW02	7/20/21 11:15	6.2	22.9	0.5	70.4	92	-0.12	-0.11	1.129	2.1	24.44	No Adj. Made
LOWREW02	8/31/21 9:11	5.5	23.8	0.5	70.2	82.9	-0.08	-0.09	1.439	2.3	24.2	No Adj. Made
LOWREW02	9/14/21 10:56	7.3	24.3	0.2	68.2	77.7	-0.07	-0.07	1.322	2.2	24.33	No Adj. Made
LOWREW02	10/31/21 11:58	8	25.3	0.1	66.6	60.7	-0.07	-0.06	0.4	1.3	24.41	No Adj. Made
LOWREW02	11/19/21 10:13	8.1	26.6	0.5	64.8	73.7	-0.06	-0.03	0.902	1.9	24.23	No Adj. Made
LOWREW02	12/21/21 10:05	5.1	24.4	0.7	69.8	64.8	-0.22	-0.22	0.436	1.3	24.22	No Adj. Made
LOWREW03	7/20/21 11:12	21.1	28.1	0.4	50.4	94.5	-0.07	-0.07	0.211	0.9	24.44	No Adj. Made
LOWREW03	8/31/21 9:09	21.8	28.5	0	49.7	82.3	-0.2	-0.17	0.397	1.3	24.2	No Adj. Made
LOWREW03	9/14/21 10:54	21.6	28.8	0.1	49.5	77.9	-0.12	-0.11	0.301	1.1	24.32	No Adj. Made
LOWREW03	10/31/21 11:54	24.3	31.1	0	44.6	57.6	-0.03	-0.01	0.365	1.2	24.39	No Adj. Made
LOWREW03	11/19/21 10:05	26.5	33	0	40.5	65.4	-0.02	-0.01	2.128	2.9	24.23	No Adj. Made
LOWREW03	12/21/21 10:02	20	29	0.5	50.5	61.2	-3	-0.24	0.655	1.6	24.22	No Adj. Made
LOWREW04	7/20/21 11:10	16.5	27.5	0.4	55.6	93.4	-0.02	-0.01	0.567	1.5	24.43	No Adj. Made

APPENDIX D-1
LANDFILL GAS EXTRACTION WELL MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW04	8/31/21 9:06	15	25.7	0	59.3	82.3	-0.14	-0.14	0.823	1.8	24.2	No Adj. Made
LOWREW04	9/14/21 10:52	15.6	27	0	57.4	78.2	-0.04	-0.03	0.809	1.8	24.31	No Adj. Made
LOWREW04	10/31/21 11:49	14	26.8	0.1	59.1	54.5	-0.04	-0.04	0.549	1.5	24.4	No Adj. Made
LOWREW04	11/19/21 9:55	16.3	29.9	0.4	53.4	75.9	-0.02	-0.01	0.538	1.4	24.24	No Adj. Made
LOWREW04	12/21/21 10:00	12.7	27.4	0.3	59.6	54.7	-0.36	-0.35	0.444	1.3	24.22	No Adj. Made
LOWREW05	7/20/21 11:04	21.3	25.6	0.5	52.6	93.5	-0.1	-0.1	0.448	1.3	24.44	No Adj. Made
LOWREW05	8/31/21 9:01	25.8	29.7	0	44.5	81.2	-0.15	-0.15	0.696	1.7	24.19	No Adj. Made
LOWREW05	9/14/21 10:47	23.3	28.9	0	47.8	77.1	-0.07	-0.07	0.684	1.7	24.32	No Adj. Made
LOWREW05	10/31/21 11:43	22	28.2	0	49.8	57.1	-0.02	-0.02	0.429	1.3	24.39	No Adj. Made
LOWREW05	11/19/21 9:44	27.3	32.1	0	40.6	71.5	-0.04	-0.02	0.113	0.7	24.24	Inc. Flow/Vac.
LOWREW05	12/21/21 9:56	21.3	29.3	0.3	49.1	58.6	-0.44	-0.44	1.432	2.4	24.22	No Adj. Made
LOWREW06	7/20/21 11:02	9.4	21.7	0.5	68.4	91.5	-0.06	-0.05	0.977	1.9	24.43	No Adj. Made
LOWREW06	8/31/21 8:57	9.7	24.2	0	66.1	80.4	-0.17	-0.16	1.279	2.2	24.22	No Adj. Made
LOWREW06	9/14/21 10:44	11.7	25	0	63.3	78.2	-0.02	-0.02	1.276	2.2	24.31	No Adj. Made
LOWREW06	10/31/21 11:38	10.4	24.6	0	65	54.7	-0.02	-0.01	0.535	1.5	24.39	No Adj. Made
LOWREW06	11/19/21 9:28	12.3	26.8	0.7	60.2	71.1	-0.04	-0.04	0.861	1.8	24.24	No Adj. Made
LOWREW06	12/21/21 9:54	9.2	25.9	0.4	64.5	57.1	-0.4	-0.4	0.57	1.5	24.21	No Adj. Made
LOWREW07	7/20/21 10:59	31.1	29.1	0.4	39.4	87.3	-0.19	-0.18	4.067	4.1	24.43	No Adj. Made
LOWREW07	8/31/21 8:54	26.9	29.6	0	43.5	73.6	-0.76	-0.77	0.615	1.4	24.19	No Adj. Made
LOWREW07	9/14/21 10:42	39.1	35.3	0	25.6	79.5	-0.18	-0.17	0.021	0.3	24.32	No Adj. Made
LOWREW07	10/31/21 11:35	41.3	34.5	0	24.2	53.2	-0.04	-0.02	0.215	1	24.39	No Adj. Made
LOWREW07	11/19/21 9:22	43.6	36.5	0.3	19.6	67.4	-0.08	-0.1	3.822	4	24.23	No Adj. Made
LOWREW07	12/21/21 9:51	33.3	33.3	0.2	33.2	54.7	-0.41	-0.42	2.295	3.1	24.22	No Adj. Made
LOWREW08	7/20/21 10:16	14.7	23.1	0.5	61.7	96.3	-0.04	-0.04	0.36	1.2	24.43	No Adj. Made
LOWREW08	8/31/21 8:16	15.2	26.5	0	58.3	77.3	-0.14	-0.14	0.522	1.4	24.17	No Adj. Made
LOWREW08	9/14/21 10:03	15.4	26.9	0.1	57.6	72.4	-0.01	-0.03	0.516	1.4	24.3	No Adj. Made
LOWREW08	10/31/21 10:42	19.5	29.5	0	51	54.1	-0.1	-0.09	0.535	1.5	24.38	No Adj. Made
LOWREW08	11/18/21 10:09	21.3	31.6	0	47.1	61.4	-0.05	-0.04	0.782	1.8	24.43	No Adj. Made
LOWREW08	12/21/21 9:18	16.8	28.6	0.2	54.4	52	-0.09	-0.08	0.859	1.8	24.19	No Adj. Made
LOWREW09	7/20/21 10:10	0.3	19.2	3.1	77.4	91	-0.14	-0.14	1.143	3.2	24.42	Fully Closed
LOWREW09	8/31/21 8:13	2.4	23.6	0.2	73.8	77.5	-0.28	0	3.39	5.6	24.17	Fully Closed
LOWREW09	9/14/21 9:59	1	25.2	0	73.8	75.4	-0.34	0	4.803	6.6	24.3	Fully Closed
LOWREW09	10/31/21 10:39	0.6	20.2	4	75.2	54.4	-0.03	-0.04	1.244	3.5	24.39	Fully Closed
LOWREW09	11/18/21 10:01	0.8	21.8	3.8	73.6	63.2	-0.11	-0.07	1.196	3.4	24.43	Fully Closed
LOWREW09	12/21/21 9:16	2	24.4	0.3	73.3	48.7	-0.15	-0.13	0.142	1.2	24.18	Fully Closed
LOWREW10	7/20/21 9:22	6	19.7	0.5	73.8	88.1	-0.28	-0.21	3.621	5.9	24.41	Fully Closed
LOWREW10	8/30/21 10:18	6.1	21.5	0.4	72	93.8	-0.02	-0.06	1.598	3.8	24.25	Fully Closed

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LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW10	9/13/21 10:32	6.3	20.5	0.9	72.3	82.7	-0.51	-0.37	4.959	6.8	24.31	Fully Closed
LOWREW10	10/31/21 9:34	28.8	25.1	3	43.1	51.7	-0.19	-0.21	2.422	5.1	24.39	Fully Closed
LOWREW10	11/18/21 8:43	9.3	27.4	0.6	62.7	64.7	-0.11	-0.06	0.573	2.4	24.46	Fully Closed
LOWREW10	12/20/21 10:10	4.2	19.3	5.6	70.9	68.5	-0.18	-0.03	0.815	2.8	24.29	Fully Closed
LOWREW11	7/20/21 9:19	12.1	24.5	0.2	63.2	83.8	-0.18	-0.16	0.785	1.7	24.42	No Adj. Made
LOWREW11	8/30/21 10:14	15.4	25	0	59.6	89.9	-0.32	-0.31	0.35	1.1	24.25	No Adj. Made
LOWREW11	9/13/21 10:27	11.7	26.5	0.1	61.7	78.4	-0.46	-0.45	1.062	2	24.31	No Adj. Made
LOWREW11	10/31/21 9:26	11.7	26.7	0	61.6	53.3	-0.29	-0.29	0.591	1.5	24.38	No Adj. Made
LOWREW11	11/17/21 10:51	11.6	28.6	0	59.8	60.3	-0.52	-0.5	0.996	2	24.39	No Adj. Made
LOWREW11	12/20/21 10:06	11.3	26.5	0.6	61.6	64.4	-0.12	-0.12	0.517	1.4	24.28	No Adj. Made
LOWREW12	7/20/21 9:13	11.5	22.3	0.4	65.8	84.7	-1.66	-1.66	0.691	1.6	24.41	No Adj. Made
LOWREW12	8/30/21 10:10	12.7	24.3	0	63	89.8	-0.65	-0.65	0.259	1	24.29	No Adj. Made
LOWREW12	9/13/21 10:24	13	25.5	0.1	61.4	75.9	-2.04	-2.03	0.847	1.8	24.31	No Adj. Made
LOWREW12	10/31/21 9:23	12.8	26.6	0	60.6	48.1	-1.34	-1.34	0.492	1.4	24.38	No Adj. Made
LOWREW12	11/17/21 10:47	12.4	28.1	0	59.5	49.5	-1.97	-1.98	1.098	2.1	24.38	No Adj. Made
LOWREW12	12/20/21 10:01	11.8	25.6	0.4	62.2	56.1	-1.11	-1.11	0.336	1.2	24.29	No Adj. Made
LOWREW13	7/20/21 9:08	14.4	19.9	0.5	65.2	79.8	-0.43	-0.42	0.172	3	24.53	No Adj. Made
LOWREW13	8/30/21 10:08	15.7	26.4	0	57.9	84.2	-0.03	-0.03	0.142	2.3	24.29	No Adj. Made
LOWREW13	9/13/21 10:21	17.3	26.1	0.1	56.5	74.8	-0.87	-0.86	0.609	5.6	24.31	No Adj. Made
LOWREW13	10/31/21 9:20	17.7	28.1	0.1	54.1	56.6	-0.67	-0.62	0.43	4.7	24.39	No Adj. Made
LOWREW13	11/17/21 10:43	16.9	29	0	54.1	62.1	-0.93	-0.91	1.095	7.5	24.38	No Adj. Made
LOWREW13	12/20/21 9:58	16.5	27.4	0.3	55.8	63.6	-0.29	-0.29	0.867	6.7	24.29	No Adj. Made
LOWREW14	7/19/21 10:15	20.8	26	0.5	52.7	84.8	-0.05	-0.04	2.064	2.9	24.51	No Adj. Made
LOWREW14	8/30/21 9:33	22	26.6	0	51.4	82.4	-0.13	-0.14	0.857	1.9	24.24	No Adj. Made
LOWREW14	9/13/21 9:52	22.7	27.3	0.1	49.9	74.4	-0.69	-0.69	2.434	3.1	24.3	No Adj. Made
LOWREW14	10/31/21 8:44	23	28.3	0	48.7	53.1	-0.46	-0.46	1.104	2.1	24.39	No Adj. Made
LOWREW14	11/17/21 9:34	23.4	31.5	0	45.1	51.5	-0.99	-0.99	1.912	2.8	24.39	No Adj. Made
LOWREW14	12/20/21 9:27	22.9	28.7	0.3	48.1	58.4	-0.33	-0.33	1.095	2.1	24.29	No Adj. Made
LOWREW15	7/19/21 10:12	20.8	24.4	0.4	54.4	83.7	-0.15	-0.13	0.107	2.3	24.5	No Adj. Made
LOWREW15	8/30/21 9:31	21.6	25.1	0	53.3	81.1	-0.13	-0.13	0.047	1.6	24.24	No Adj. Made
LOWREW15	9/13/21 9:50	21.5	26.4	0	52.1	73.7	-0.73	-0.72	0.152	2.8	24.3	No Adj. Made
LOWREW15	10/31/21 8:42	21.8	27.5	0.1	50.6	54.1	-0.58	-0.56	0.031	1.3	24.39	No Adj. Made
LOWREW15	11/17/21 9:30	20.7	29.5	0	49.8	53.8	-1.1	-1	0.289	3.9	24.39	No Adj. Made
LOWREW15	12/20/21 9:25	20.1	27.1	0.3	52.5	57.3	-0.39	-0.39	0.04	1.5	24.29	No Adj. Made
LOWREW16	7/19/21 10:06	16.9	25.9	0.4	56.8	88.4	-0.05	-0.05	0.403	1.3	24.51	No Adj. Made
LOWREW16	8/30/21 9:26	18.5	27.3	0	54.2	82.5	-0.16	-0.16	0.143	0.7	24.25	No Adj. Made
LOWREW16	9/13/21 9:45	18.5	28.2	0.1	53.2	75.1	-0.48	-0.49	0.584	1.5	24.3	No Adj. Made

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ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW16	10/31/21 8:35	20.5	29.1	0	50.4	50.5	-0.46	-0.45	0.769	1.8	24.39	No Adj. Made
LOWREW16	11/17/21 9:21	20.1	31	0	48.9	48.9	-0.97	-0.97	1.426	2.4	24.4	No Adj. Made
LOWREW16	12/20/21 9:18	20.2	29	0.3	50.5	55.6	-0.37	-0.37	0.821	1.8	24.29	No Adj. Made
LOWREW17	7/19/21 10:01	7.1	20.3	0.5	72.1	87.6	-0.02	-0.02	0.05	1.6	24.52	No Adj. Made
LOWREW17	8/30/21 9:20	9.9	23.9	0	66.2	80.4	-0.11	-0.12	0.02	1	24.25	No Adj. Made
LOWREW17	9/13/21 9:40	9.1	24.2	0	66.7	69.5	-0.81	-0.8	0.023	1.1	24.34	No Adj. Made
LOWREW17	10/31/21 8:29	5.8	22.7	0.1	71.4	57.5	-0.42	-0.41	0.349	4.2	24.4	No Adj. Made
LOWREW17	11/17/21 9:14	5.3	24.2	0	70.5	55.8	-0.46	-0.38	0.738	6.1	24.26	Dec. Flow/Vac.
LOWREW17	12/20/21 9:11	7.4	22.9	0.5	69.2	56	-0.23	-0.23	0.068	1.9	24.18	No Adj. Made
LOWREW18	7/19/21 9:54	6.8	21.4	0.4	71.4	84.6	-0.21	-0.2	1.66	2.5	24.53	No Adj. Made
LOWREW18	8/30/21 9:15	8	23.7	0	68.3	78.9	-0.01	-0.01	0.74	1.7	24.26	No Adj. Made
LOWREW18	9/13/21 9:33	8.3	24.2	0.1	67.4	73	-0.38	-0.37	2.128	2.9	24.32	No Adj. Made
LOWREW18	10/31/21 8:22	7.2	24	0	68.8	51.5	-0.27	-0.26	0.857	1.8	24.4	No Adj. Made
LOWREW18	11/17/21 9:01	6.1	24.6	0	69.3	46.1	-0.39	-0.39	1.272	2.3	24.43	No Adj. Made
LOWREW18	12/20/21 9:06	7.9	23.4	0.6	68.1	51.9	-0.14	-0.15	0.723	1.7	24.32	No Adj. Made
LOWREW19	7/19/21 9:52	16.1	26	0.2	57.7	85.8	-0.02	-0.01	0.527	1.4	24.53	No Adj. Made
LOWREW19	8/30/21 9:11	18.4	27.4	0	54.2	79.7	-0.12	-0.12	0.273	1	24.26	No Adj. Made
LOWREW19	9/13/21 9:30	12.8	26	0.1	61.1	75.1	-0.48	-0.45	0.488	1.4	24.32	No Adj. Made
LOWREW19	10/31/21 8:19	17	27.3	0.1	55.6	51	-0.16	-0.16	0.443	1.4	24.41	No Adj. Made
LOWREW19	11/17/21 8:52	15.2	28.9	0	55.9	42.6	-0.3	-0.3	0.784	1.8	24.43	No Adj. Made
LOWREW19	12/20/21 9:03	16.4	28.1	0.2	55.3	51.9	-0.12	-0.12	0.416	1.3	24.32	No Adj. Made
LOWREW20	7/19/21 9:49	22.7	22.5	0.7	54.1	81.8	-0.09	-0.08	1.025	2	24.53	No Adj. Made
LOWREW20	8/30/21 9:08	27.9	25	0.4	46.7	76	-0.04	-0.04	0.507	1.5	24.34	No Adj. Made
LOWREW20	9/13/21 9:27	14.9	24.9	0.9	59.3	73.2	-0.33	-0.31	1.209	2.2	24.38	No Adj. Made
LOWREW20	10/31/21 8:16	19.4	26.7	0.9	53	55.6	-0.16	-0.16	0.623	1.6	24.42	
LOWREW20	11/17/21 8:48	15.5	28.3	0.4	55.8	52.4	-0.23	-0.21	1.222	2.2	24.44	No Adj. Made
LOWREW20	12/20/21 9:00	18.9	27	0.8	53.3	54.2	-0.06	-0.06	0.685	1.7	24.38	No Adj. Made
LOWREW21	7/20/21 10:35	21.1	28.6	0.5	49.8	94	-0.09	-0.1	0.395	1.2	24.42	No Adj. Made
LOWREW21	8/31/21 8:36	20	29.5	0	50.5	79.1	-0.15	-0.16	0.481	1.3	24.18	No Adj. Made
LOWREW21	9/14/21 10:26	20.5	29.7	0	49.8	74.8	-0.07	-0.04	0.504	1.4	24.3	No Adj. Made
LOWREW21	10/31/21 11:13	19.5	28.7	0	51.8	55.9	-0.06	-0.04	0.646	1.6	24.39	No Adj. Made
LOWREW21	11/18/21 11:07	23.1	32.2	0.3	44.4	70.5	-0.13	-0.08	2.484	3.1	24.41	No Adj. Made
LOWREW21	12/21/21 9:38	18.8	29.4	0.5	51.3	57	-0.44	-0.44	1.425	2.4	24.2	No Adj. Made
LOWREW22	7/20/21 10:38	21.5	28.1	0.5	49.9	90.1	-0.01	-0.01	0.122	2.5	24.43	No Adj. Made
LOWREW22	8/31/21 8:39	14.6	28.6	0	56.8	77.7	-0.33	-0.33	0.182	3	24.18	No Adj. Made
LOWREW22	9/14/21 10:30	18.1	31	0	50.9	73.5	-0.05	-0.05	0.235	3.4	24.31	No Adj. Made
LOWREW22	10/31/21 11:17	14.6	27.5	0.5	57.4	59.2	-0.09	-0.1	0.214	3.3	24.39	No Adj. Made

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ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW22	11/18/21 11:20	23.9	32.9	0.3	42.9	70	-0.06	-0.06	0.319	4	24.41	No Adj. Made
LOWREW22	12/21/21 9:40	17	30	0.2	52.8	57.4	-0.55	-0.53	0.141	2.7	24.22	No Adj. Made
LOWREW23	7/20/21 10:42	8.6	23.3	0.5	67.6	95.5	-0.06	-0.01	0.637	5.5	24.43	Fully Closed
LOWREW23	8/31/21 8:42	8.2	25.3	0.3	66.2	92.6	-0.32	-0.14	0.786	6.1	24.19	Fully Closed
LOWREW23	9/14/21 10:34	1.6	20.1	6.5	71.8	101.4	-1.33	-1.33	5.129	6.3	24.34	Fully Closed
LOWREW23	10/31/21 11:24	8.1	16.9	3.3	71.7	63.3	-0.04	-0.04	0.039	1.4	24.4	Fully Closed
LOWREW23	11/19/21 9:08	14.9	30	2.4	52.7	94.6	-0.34	-0.05	1.621	8.8	24.22	Fully Closed
LOWREW23	12/21/21 9:43	4.1	25	3.3	67.6	91.4	-0.41	-0.36	0.939	6.6	24.21	Fully Closed
LOWREW24	7/20/21 10:51	17.2	26.9	0.5	55.4	87.9	-0.01	-0.02	0.162	2.8	24.43	No Adj. Made
LOWREW24	8/31/21 8:44	15.3	27.1	0	57.6	78	-0.33	-0.32	0.228	3.4	24.19	No Adj. Made
LOWREW24	9/14/21 10:37	14.9	26.6	0	58.5	76.6	-0.16	-0.12	0.078	2	24.35	No Adj. Made
LOWREW24	10/31/21 11:26	9.5	26.2	0.2	64.1	56.1	-0.03	-0.03	0.091	2.2	24.38	No Adj. Made
LOWREW24	11/19/21 9:11	16.8	29.6	0.1	53.5	71.5	-0.12	-0.12	0.057	1.7	24.21	No Adj. Made
LOWREW24	12/21/21 9:47	12	27	0.2	60.8	56.7	-0.49	-0.47	0.02	1	24.21	No Adj. Made
LOWREW25	7/20/21 10:57	5.4	20.7	0.4	73.5	92.7	-0.06	-0.04	0.4	1.2	24.43	No Adj. Made
LOWREW25	8/31/21 8:49	5.8	24.3	0	69.9	80.4	-0.42	-0.24	-0.066	0	24.22	No Adj. Made
LOWREW25	9/14/21 10:39	6.7	24.9	0	68.4	77.5	-0.03	-0.04	0.594	1.5	24.31	No Adj. Made
LOWREW25	10/31/21 11:31	8.1	26.4	0	65.5	56	-0.03	-0.02	0.123	0.7	24.39	No Adj. Made
LOWREW25	11/19/21 9:18	9.5	28.1	0.3	62.1	69.3	-0.08	-0.04	0.221	0.9	24.22	Inc. Flow/Vac.
LOWREW25	12/21/21 9:49	6.9	25.9	0.2	67	52.3	-0.41	-0.41	0.587	1.5	24.21	No Adj. Made
LOWREW26	7/20/21 10:33	24.7	27.3	0.5	47.5	88.7	-0.14	-0.09	0.14	2.7	24.42	No Adj. Made
LOWREW26	8/31/21 8:33	27.8	30.7	0	41.5	74.6	-0.39	-0.38	0.126	2.6	24.17	No Adj. Made
LOWREW26	9/14/21 10:23	28	32.2	0	39.8	73	-0.12	-0.12	0.04	1.4	24.29	No Adj. Made
LOWREW26	10/31/21 11:10	30.1	30.9	0.8	38.2	59.4	-0.22	-0.19	0.028	1.2	24.38	No Adj. Made
LOWREW26	11/18/21 10:59	28.3	33.2	0	38.5	68.5	-0.04	-0.02	0.151	2.8	24.41	No Adj. Made
LOWREW26	12/21/21 9:35	25.7	31.5	0.3	42.5	60.2	-0.45	-0.25	0.061	1.8	24.19	No Adj. Made
LOWREW27	7/20/21 10:28	13.2	24.4	0.5	61.9	87.7	-8.88	-0.02	0.064	1.8	24.43	No Adj. Made
LOWREW27	8/31/21 8:27	15.5	27.8	0	56.7	74.9	-0.37	-0.38	0.13	2.5	24.17	No Adj. Made
LOWREW27	9/14/21 10:17	14.8	27.9	0	57.3	72.4	-0.18	-0.17	0.15	2.7	24.3	No Adj. Made
LOWREW27	10/31/21 11:01	15.1	28.1	0	56.8	58.4	-0.29	-0.28	0.031	1.3	24.38	No Adj. Made
LOWREW27	11/18/21 10:50	14.7	28.9	0	56.4	66.8	-0.09	-0.09	0.187	3.1	24.42	No Adj. Made
LOWREW27	12/21/21 9:30	13.4	27.2	0.5	58.9	59.1	-0.32	-0.33	0.148	2.8	24.19	No Adj. Made
LOWREW28	7/20/21 10:23	21.1	25.1	0.4	53.4	87.7	-0.1	-0.1	0.1	2.2	24.43	No Adj. Made
LOWREW28	8/31/21 8:23	15.6	26	0	58.4	75.5	-0.49	-0.48	0.092	2	24.16	No Adj. Made
LOWREW28	9/14/21 10:11	18.4	28.6	0	53	72.7	-0.22	-0.21	0.105	2.3	24.3	No Adj. Made
LOWREW28	10/31/21 10:55	5.6	25.5	0	68.9	58.5	-0.4	-0.38	0.012	0.8	24.38	No Adj. Made
LOWREW28	11/18/21 10:38	20.7	29.7	0.1	49.5	66.8	-0.26	-0.2	0.072	1.9	24.42	No Adj. Made

APPENDIX D-1
LANDFILL GAS EXTRACTION WELL MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW28	12/21/21 9:26	15.6	27.4	0.3	56.7	56.2	-0.31	-0.31	0.068	1.9	24.18	No Adj. Made
LOWREW29	7/20/21 10:18	30.6	26.1	0.5	42.8	88.7	-0.06	-0.06	1.098	2.1	24.43	No Adj. Made
LOWREW29	8/31/21 8:18	30.9	30	0	39.1	74.4	-0.43	-0.42	1.43	2.4	24.17	No Adj. Made
LOWREW29	9/14/21 10:05	25.2	28.6	0	46.2	72	-0.15	-0.14	1.396	2.4	24.3	No Adj. Made
LOWREW29	10/31/21 10:48	18.2	28.2	0	53.6	56.3	-0.36	-0.35	0.722	1.7	24.38	No Adj. Made
LOWREW29	11/18/21 10:15	35.2	32.8	0	32	63.7	-0.51	-0.33	1.853	3.2	24.42	No Adj. Made
LOWREW29	12/21/21 9:21	22.4	28.2	0.3	49.1	55.9	-0.19	-0.19	1.141	2.2	24.19	No Adj. Made
LOWREW30	7/20/21 9:42	24.8	26.1	0.5	48.6	83.7	-0.05	-0.04	0.117	2.5	24.43	No Adj. Made
LOWREW30	8/31/21 7:49	26.7	28	0.2	45.1	76.6	-0.3	-0.29	0.236	3.5	24.26	No Adj. Made
LOWREW30	9/14/21 9:34	26.5	30.3	0.1	43.1	75.3	-0.18	-0.17	0.257	3.6	24.31	No Adj. Made
LOWREW30	10/31/21 10:02	26.6	30	0	43.4	60.7	-9.33	-0.29	0.033	1.3	24.39	No Adj. Made
LOWREW30	11/18/21 9:11	29.2	32	0.3	38.5	66.5	-0.07	-0.06	0.176	3.1	24.45	No Adj. Made
LOWREW30	12/20/21 10:34	22.4	27.8	0.8	49	66.1	-0.2	-0.21	0.04	1.4	24.31	No Adj. Made
LOWREW31	7/20/21 9:48	24.5	27.9	0.3	47.3	84.9	-0.01	-0.02	0.19	3.1	24.43	No Adj. Made
LOWREW31	8/31/21 7:54	21.3	29	0	49.7	78.8	-0.33	-0.32	0.245	3.4	24.16	No Adj. Made
LOWREW31	9/14/21 9:38	23.1	28	0.2	48.7	77	-0.22	-0.21	0.234	3.5	24.3	No Adj. Made
LOWREW31	10/31/21 10:10	20.9	28.6	0	50.5	62.6	-0.33	-0.34	0.035	1.4	24.39	No Adj. Made
LOWREW31	11/18/21 9:20	22.3	31.8	0	45.9	71.8	-0.17	-0.13	0.131	2.6	24.44	No Adj. Made
LOWREW31	12/20/21 10:39	17.9	27.5	0.5	54.1	69.5	-0.38	-0.37	0.132	2.6	24.3	No Adj. Made
LOWREW32	7/20/21 9:54	20.7	26.5	0.3	52.5	91.6	-0.1	-0.05	0.183	1.3	24.43	No Adj. Made
LOWREW32	8/31/21 7:59	22.1	29	0	48.9	77.3	-0.31	-0.31	0.205	1.4	24.16	No Adj. Made
LOWREW32	9/14/21 9:43	21.1	28.4	0.1	50.4	74.6	-0.23	-0.22	0.265	1.6	24.3	No Adj. Made
LOWREW32	10/31/21 10:17	21	29	0	50	58.8	-0.47	-0.45	0.047	0.7	24.39	No Adj. Made
LOWREW32	11/18/21 9:29	23.1	32	0	44.9	73.6	-0.04	-0.03	0.944	3	24.44	No Adj. Made
LOWREW32	12/21/21 9:01	24.1	28.5	0.4	47	63.7	-0.17	-0.19	1.101	3.3	24.2	No Adj. Made
LOWREW33	7/20/21 10:00	27	25.5	0.4	47.1	90	-0.04	-0.06	0.216	1.5	24.42	No Adj. Made
LOWREW33	8/31/21 8:03	29	29.2	0.1	41.7	75.7	-0.35	-0.33	0.311	1.8	24.16	No Adj. Made
LOWREW33	9/14/21 9:48	28.3	29.5	0.1	42.1	72.8	-0.21	-0.2	0.442	2.1	24.29	No Adj. Made
LOWREW33	10/31/21 10:23	23.3	28.2	0	48.5	57.3	-0.55	-0.51	0.211	1.4	24.39	No Adj. Made
LOWREW33	11/18/21 9:41	31.4	32.7	0	35.9	71.4	-0.02	-0.02	0.418	2.1	24.43	No Adj. Made
LOWREW33	12/21/21 9:06	26.3	27.3	0.4	46	67.2	-0.32	-0.32	4.936	7.1	24.2	No Adj. Made
LOWREW34	7/20/21 10:04	9.2	22.9	0.1	67.8	88.3	-0.14	-0.13	0.352	1.8	24.42	No Adj. Made
LOWREW34	8/31/21 8:08	10.9	25	0	64.1	75.7	-0.07	-0.06	0.438	2.1	24.16	No Adj. Made
LOWREW34	9/14/21 9:53	10.5	25.1	0	64.4	72.7	-0.09	-0.08	0.441	2.1	24.29	No Adj. Made
LOWREW34	10/31/21 10:31	10.9	25.8	0	63.3	59.3	-0.03	-0.02	0.724	2.7	24.39	No Adj. Made
LOWREW34	11/18/21 9:53	10	26.4	0.6	63	66.9	-0.01	-0.01	1.215	3.4	24.43	No Adj. Made
LOWREW34	12/21/21 9:11	10.5	24.9	0.3	64.3	58.7	-0.02	-0.03	0.277	1.7	23.98	No Adj. Made

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ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW35	7/20/21 9:25	13.7	24.7	0.4	61.2	82.8	-0.08	-0.08	0.082	2	24.42	No Adj. Made
LOWREW35	8/30/21 10:20	17.1	26.2	0	56.7	85.4	-0.31	-0.31	0.076	2	24.28	No Adj. Made
LOWREW35	9/13/21 10:35	12.1	26.3	0	61.6	75.8	-0.67	-0.68	0.132	2.6	24.32	No Adj. Made
LOWREW35	10/31/21 9:37	12.5	26.9	0	60.6	57.2	-0.54	-0.54	0.019	1	24.39	No Adj. Made
LOWREW35	11/18/21 8:48	15.5	29.6	0.1	54.8	61.4	-0.13	-0.12	0.067	1.9	24.45	No Adj. Made
LOWREW35	12/20/21 10:17	9.9	23.9	0.6	65.6	62.2	-0.5	-0.48	0.049	1.6	24.29	No Adj. Made
LOWREW36	7/20/21 9:39	32.4	31	0.3	36.3	81.4	-0.07	-0.08	1.258	3.6	24.43	No Adj. Made
LOWREW36	8/30/21 10:32	35.1	30.1	0	34.8	81.8	-0.14	-0.11	0.019	0.4	24.3	No Adj. Made
LOWREW36	9/13/21 10:46	31.3	32	0	36.7	76.7	-0.91	-0.82	2.057	4.5	24.32	No Adj. Made
LOWREW36	10/31/21 9:58	31.6	30.5	0.1	37.8	63.1	-0.46	-0.45	0.765	2.8	24.4	No Adj. Made
LOWREW36	11/18/21 9:05	36.5	35.6	0	27.9	67.3	-0.24	-0.23	1.798	4.3	24.45	No Adj. Made
LOWREW36	12/20/21 10:32	29.7	31.2	0.5	38.6	67.8	-0.35	-0.36	0.963	3.1	24.31	No Adj. Made
LOWREW37	7/20/21 9:33	35.4	30.1	0.3	34.2	82.5	-0.01	-0.01	3.489	3.8	24.42	No Adj. Made
LOWREW37	8/30/21 10:28	37	29.9	0	33.1	86.3	-0.3	-0.31	1.424	2.4	24.26	No Adj. Made
LOWREW37	9/13/21 10:41	34.7	31.7	0	33.6	75.7	-0.76	-0.76	4.089	4.1	24.32	No Adj. Made
LOWREW37	10/31/21 9:49	36.2	33.4	0	30.4	58.2	-0.45	-0.45	1.662	2.6	24.4	No Adj. Made
LOWREW37	11/18/21 8:58	37.4	36.2	0	26.4	64.7	-0.12	-0.12	3.421	3.8	24.46	No Adj. Made
LOWREW37	12/20/21 10:26	33.7	32.8	0.1	33.4	65.3	-0.42	-0.42	1.766	2.7	24.3	No Adj. Made
LOWREW38	7/20/21 9:28	42.6	30.8	0.2	26.4	82.4	-0.05	-0.05	5.517	4.8	24.42	No Adj. Made
LOWREW38	8/30/21 10:23	51	32.5	0	16.5	86.1	-0.36	-0.37	2.149	3.1	24.25	No Adj. Made
LOWREW38	9/13/21 10:37	26	28.5	0.2	45.3	78	-0.61	-0.63	5.606	4.7	24.32	No Adj. Made
LOWREW38	10/31/21 9:41	27.7	30	0	42.3	59.8	-0.5	-0.51	2.297	3.1	24.39	No Adj. Made
LOWREW38	11/18/21 8:51	41.1	34.3	0	24.6	66	-0.04	-0.04	4.924	4.6	24.45	No Adj. Made
LOWREW38	12/20/21 10:20	25.7	28.8	0.6	44.9	69	-0.41	-0.42	1.931	2.8	24.29	No Adj. Made
LOWREW39	7/20/21 9:16	40	32.3	0.2	27.5	80.2	-0.26	-0.25	3.725	6.2	24.41	No Adj. Made
LOWREW39	8/30/21 10:12	37.4	31.1	0	31.5	84.9	-0.27	-0.27	1.496	3.9	24.25	No Adj. Made
LOWREW39	9/13/21 10:29	34.3	31.9	0.1	33.7	75.3	-0.85	-0.86	3.979	6.2	24.31	No Adj. Made
LOWREW39	10/31/21 9:29	38.8	32.7	0.4	28.1	60.1	-0.56	-0.56	1.543	4	24.38	No Adj. Made
LOWREW39	11/17/21 11:04	39.1	35.1	0	25.8	65.7	-0.91	-0.91	3.168	5.7	24.39	No Adj. Made
LOWREW39	12/20/21 10:03	38.5	32.7	0.3	28.5	65.2	-0.46	-0.45	1.541	4	24.29	No Adj. Made
LOWREW40	7/19/21 10:29	14.7	24	0.7	60.6	91.1	-0.02	-0.03	0.464	1.3	24.53	No Adj. Made
LOWREW40	8/30/21 9:48	22.1	29.3	0	48.6	82.5	-0.3	-0.29	0.205	0.9	24.26	No Adj. Made
LOWREW40	9/13/21 10:05	21.4	29.8	0.2	48.6	74.4	-0.5	-0.49	0.509	1.4	24.32	No Adj. Made
LOWREW40	10/31/21 9:00	17.9	28.6	0.3	53.2	50.6	-0.33	-0.34	0.346	1.2	24.41	No Adj. Made
LOWREW40	11/17/21 9:54	19.4	33.2	0	47.4	43.2	-0.65	-0.65	0.541	1.5	24.41	No Adj. Made
LOWREW40	12/20/21 9:40	18.9	30.3	0.1	50.7	55.9	-0.2	-0.21	0.376	1.2	24.3	No Adj. Made
LOWREW41	7/19/21 10:36	14.5	23.4	0.7	61.4	87.4	-0.16	-0.16	1.132	2.1	24.53	No Adj. Made

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LOWREW41	8/30/21 9:54	23.9	28.2	0	47.9	79.5	-0.27	-0.28	0.562	1.5	24.26	No Adj. Made
LOWREW41	9/13/21 10:11	19.7	28.5	0	51.8	73.3	-0.73	-0.73	1.37	2.3	24.32	No Adj. Made
LOWREW41	10/31/21 9:07	16.7	28.2	0.4	54.7	53.6	-0.68	-0.68	0.551	1.5	24.4	No Adj. Made
LOWREW41	11/17/21 10:09	16	30.7	0	53.3	54.7	-1.44	-1.44	0.78	1.8	24.39	No Adj. Made
LOWREW41	12/20/21 9:48	17.6	29	0.1	53.3	59.9	-0.56	-0.55	0.459	1.4	24.31	No Adj. Made
LOWREW42	7/19/21 10:40	14.2	22.6	0.7	62.5	92.8	-0.08	-0.07	0.024	1.1	24.52	No Adj. Made
LOWREW42	8/30/21 9:59	24	27.1	0	48.9	85.5	-0.29	-0.32	0.195	2.6	24.27	No Adj. Made
LOWREW42	9/13/21 10:16	21.4	27.3	0.1	51.2	81.4	-0.66	-0.66	0.259	3.6	24.32	No Adj. Made
LOWREW42	10/31/21 9:13	12.9	26.3	0.2	60.6	67.1	-0.67	-0.66	0.037	1.4	24.39	No Adj. Made
LOWREW42	11/17/21 10:21	12.4	29.3	0	58.3	54.1	-1.08	-1.08	0.126	2.5	24.39	No Adj. Made
LOWREW42	12/20/21 9:53	15.1	27	0.3	57.6	71.5	-0.32	-0.33	0.237	3.5	24.3	No Adj. Made
LOWREW43	7/19/21 10:43	20.4	24.1	0.6	54.9	87.1	-0.04	-0.03	0.219	3.3	24.52	No Adj. Made
LOWREW43	8/30/21 10:04	48.6	31.8	0	19.6	79.1	-0.34	-0.33	0.103	2.4	24.26	No Adj. Made
LOWREW43	9/13/21 10:19	35.6	31	0.1	33.3	74.5	-0.63	-0.64	0.338	4.3	24.32	No Adj. Made
LOWREW43	10/31/21 9:17	15.9	26.4	0	57.7	59.7	-0.56	-0.56	0.223	3.4	24.39	No Adj. Made
LOWREW43	11/17/21 10:33	19.5	30.1	0	50.4	47.7	-0.99	-0.94	0.024	1.1	24.38	No Adj. Made
LOWREW43	12/20/21 9:56	22.1	26.8	0.4	50.7	62.3	-0.36	-0.36	0.035	1.4	24.3	No Adj. Made
LOWREW44	7/19/21 10:18	34.1	32.3	0.4	33.2	91.5	-0.04	-0.03	0.353	1.2	24.5	No Adj. Made
LOWREW44	8/30/21 9:36	33.9	31.9	0	34.2	84.8	-0.2	-0.22	0.147	0.8	24.24	No Adj. Made
LOWREW44	9/13/21 9:54	34.4	32.4	0.1	33.1	75	-0.58	-0.59	0.547	1.5	24.3	No Adj. Made
LOWREW44	10/31/21 8:48	37.8	34.6	0.1	27.5	48.8	-0.58	-0.58	0.287	1.1	24.39	No Adj. Made
LOWREW44	11/17/21 9:37	36.9	37.2	0	25.9	52.6	-1.32	-1.31	2.1	3	24.39	No Adj. Made
LOWREW44	12/20/21 9:30	33.8	32.4	0.4	33.4	57.4	-0.42	-0.45	0.888	1.9	24.28	No Adj. Made
LOWREW45	7/19/21 10:26	21.5	25.6	0.7	52.2	87.2	-0.02	-0.03	0.062	1.8	24.52	No Adj. Made
LOWREW45	8/30/21 9:46	26.2	30.1	0	43.7	79.9	-0.26	-0.27	0.023	1.1	24.25	No Adj. Made
LOWREW45	9/13/21 10:02	20.8	28.7	0	50.5	73.2	-0.49	-0.48	0.122	2.5	24.32	No Adj. Made
LOWREW45	10/31/21 8:56	21.1	28.9	0	50	54.5	-0.36	-0.36	0.023	1.1	24.4	No Adj. Made
LOWREW45	11/17/21 9:49	20.5	32.5	0	47	53.8	-0.65	-0.65	0.042	1.5	24.41	No Adj. Made
LOWREW45	12/20/21 9:38	22.1	30	0.2	47.7	60	-0.28	-0.25	0.054	1.7	24.3	No Adj. Made
LOWREW46	7/19/21 10:24	28.1	28.3	0.6	43	88.7	-0.07	-0.07	0.547	2.3	24.51	No Adj. Made
LOWREW46	8/30/21 9:43	34.5	33.1	0	32.4	81.3	-0.24	-0.25	0.159	1.3	24.24	No Adj. Made
LOWREW46	9/13/21 10:00	27.2	29.9	0.1	42.8	74.3	-0.62	-0.61	0.395	1.9	24.31	No Adj. Made
LOWREW46	10/31/21 8:53	28	30.7	0	41.3	53.4	-0.42	-0.42	0.463	2.2	24.39	No Adj. Made
LOWREW46	11/17/21 9:45	25.8	33.4	0	40.8	53.5	-0.85	-0.86	0.636	2.5	24.4	No Adj. Made
LOWREW46	12/20/21 9:35	29.7	32	0.5	37.8	61.4	-0.27	-0.27	0.411	2.1	24.29	No Adj. Made
LOWREW47	7/19/21 10:22	19.9	28	0.5	51.6	93.2	-0.03	-0.04	0.04	0.6	24.51	No Adj. Made
LOWREW47	8/30/21 9:38	22.2	29.4	0	48.4	83.7	-0.23	-0.24	0.066	0.8	24.24	No Adj. Made

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ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW47	9/13/21 9:58	22.2	28.9	0.8	48.1	73.9	-0.7	-0.67	0.383	1.9	24.3	No Adj. Made
LOWREW47	10/31/21 8:51	20.6	28.6	0	50.8	46.6	-0.61	-0.59	0.316	1.8	24.39	No Adj. Made
LOWREW47	11/17/21 9:42	19.3	31.8	0.2	48.7	35	-0.97	-0.96	0.326	1.8	24.39	No Adj. Made
LOWREW47	12/20/21 9:32	20.1	29.4	0.2	50.3	53.8	-0.32	-0.32	0.14	1.2	24.29	No Adj. Made
LOWREW48	7/19/21 9:58	9.8	23.6	0.4	66.2	88.2	-0.01	-0.01	0.613	1.5	24.53	No Adj. Made
LOWREW48	8/30/21 9:18	28	31.4	0	40.6	79.7	-0.18	-0.18	0.367	1.2	24.25	No Adj. Made
LOWREW48	9/13/21 9:36	25.4	31.5	0	43.1	74	-0.44	-0.44	0.012	0.2	24.31	No Adj. Made
LOWREW48	10/31/21 8:26	9.6	27	0	63.4	56.6	-0.31	-0.3	0.776	1.8	24.4	No Adj. Made
LOWREW48	11/17/21 9:05	10.4	29.8	0	59.8	57.9	-0.57	-0.56	1.468	2.4	24.42	No Adj. Made
LOWREW48	12/20/21 9:08	12	27	0.4	60.6	57.9	-0.24	-0.23	0.961	2	24.31	No Adj. Made
LOWREW49	7/19/21 10:04	17.3	26.3	0.3	56.1	83.4	-0.08	-0.07	0.088	2.1	24.52	No Adj. Made
LOWREW49	8/30/21 9:23	24.8	29.8	0	45.4	80.1	-0.14	-0.14	0.037	1.4	24.25	No Adj. Made
LOWREW49	9/13/21 9:43	16.7	27.8	0	55.5	74.1	-0.6	-0.59	0.171	2.9	24.33	No Adj. Made
LOWREW49	10/31/21 8:32	14.3	26.8	0.1	58.8	55.4	-0.47	-0.46	0.025	1.1	24.39	No Adj. Made
LOWREW49	11/17/21 9:17	14.1	29.8	0	56.1	53.9	-0.83	-0.84	0.084	2.1	24.4	No Adj. Made
LOWREW49	12/20/21 9:14	14.6	27.3	0.3	57.8	57.8	-0.33	-0.34	0.062	1.8	24.31	No Adj. Made
LOWREW50	7/19/21 10:09	27.8	26.9	0.4	44.9	84	-0.3	-0.29	0.137	2.6	24.5	No Adj. Made
LOWREW50	8/30/21 9:28	33	30.2	0	36.8	79	-0.01	-0.01	0.076	2	24.25	No Adj. Made
LOWREW50	9/13/21 9:48	25.2	29	0	45.8	74.4	-0.82	-0.82	0.212	3.3	24.3	No Adj. Made
LOWREW50	10/31/21 8:38	20.3	26.8	0.4	52.5	56.3	-0.71	-0.69	0.302	4	24.39	No Adj. Made
LOWREW50	11/17/21 9:25	15	29	0.2	55.8	57.8	-1.14	-1.14	0.109	2.4	24.39	No Adj. Made
LOWREW50	12/20/21 9:22	22	29	0.6	48.4	63.7	-0.57	-0.6	0.113	2.4	24.29	No Adj. Made
LOWREW55	7/19/21 10:33	42.7	32	1	24.3	83.1	-1.56	-1.55	0.169	9.2	24.53	No Adj. Made
LOWREW55	8/30/21 9:52	45.6	34.6	0	19.8	79.4	-0.49	-0.48	0.094	6.9	24.26	No Adj. Made
LOWREW55	9/13/21 10:09	46.6	36.9	0	16.5	73.9	-2.12	-2.13	0.213	10.4	24.32	No Adj. Made
LOWREW55	10/31/21 9:04	49.6	36.6	0	13.8	66.2	-1.73	-1.73	0.032	4.1	24.41	No Adj. Made
LOWREW55	11/17/21 10:01	48.9	38.7	0	12.4	67.5	-3.32	-3.32	0.194	10	24.4	No Adj. Made
LOWREW55	12/20/21 9:45	46.1	35.7	0.5	17.7	68.7	-1.57	-1.57	0.017	3	24.31	No Adj. Made
LOWREW56	7/19/21 10:38	32.1	28	0.8	39.1	85.2	-0.26	-0.26	0.175	3	24.53	No Adj. Made
LOWREW56	8/30/21 9:56	40.1	32.6	0	27.3	82.5	-0.25	-0.26	0.069	1.9	24.26	No Adj. Made
LOWREW56	9/13/21 10:14	36.2	32.1	0.1	31.6	77.5	-0.88	-0.87	0.295	4	24.32	No Adj. Made, scheduled repairs
LOWREW56	10/31/21 9:10	28.1	29.4	0.1	42.4	63.2	-0.88	-0.88	0.045	1.5	24.28	No Adj. Made
LOWREW56	11/17/21 10:13	27.2	32.3	0	40.5	65.5	-1.76	-1.76	0.289	3.9	24.39	No Adj. Made
LOWREW56	12/20/21 9:50	26.7	28.7	0.6	44	65.5	-0.68	-0.67	0.079	2	24.3	No Adj. Made
LOWREW57	7/20/21 9:36	42.1	31.8	0.4	25.7	83.3	-0.94	-0.94	0.482	5.1	24.43	No Adj. Made
LOWREW57	8/30/21 10:30	42.9	31.5	0	25.6	84.8	-0.26	-0.23	0.284	3.9	24.28	No Adj. Made

APPENDIX D-1
LANDFILL GAS EXTRACTION WELL MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW57	9/13/21 10:44	43.7	33.8	0	22.5	81.7	-1.71	-1.65	0.571	5.5	24.32	No Adj. Made
LOWREW57	10/31/21 9:54	48.2	34	0.1	17.7	70.8	-1.21	-1.21	0.269	3.9	24.4	No Adj. Made
LOWREW57	11/18/21 9:02	50.2	37.8	0	12	73.6	-1.04	-1.04	0.545	5.5	24.46	No Adj. Made
LOWREW57	12/20/21 10:28	42.9	32.1	0.7	24.3	74.2	-1.14	-1.15	0.341	4.3	24.31	No Adj. Made
LOWREW58	7/20/21 9:31	30.3	26.5	0.3	42.9	84	-0.13	-0.11	0.223	3.4	24.42	No Adj. Made
LOWREW58	8/30/21 10:26	33.6	27.9	0	38.5	86.5	-0.35	-0.38	0.114	2.5	24.26	No Adj. Made
LOWREW58	9/13/21 10:39	30.7	28.3	0.1	40.9	77.1	-0.64	-0.65	0.317	4	24.32	No Adj. Made
LOWREW58	10/31/21 9:45	30	27.9	0.6	41.5	60.4	-0.52	-0.49	0.143	2.8	24.4	No Adj. Made
LOWREW58	11/18/21 8:54	32	31	0.1	36.9	67.2	-0.07	-0.07	0.355	4.4	24.45	No Adj. Made
LOWREW58	12/20/21 10:23	26.8	27.6	0.2	45.4	68.4	-0.43	-0.42	0.114	2.5	24.3	No Adj. Made
LOWREW59	7/20/21 9:57	35.6	28.2	0.4	35.8	85.1	-0.06	-0.05	0.297	4	24.42	No Adj. Made
LOWREW59	8/31/21 8:01	38.7	31.4	0	29.9	74.2	-0.3	-0.3	0.414	4.7	24.16	No Adj. Made
LOWREW59	9/14/21 9:46	38.5	30.2	0.1	31.2	71.7	-0.24	-0.24	0.421	4.8	24.3	No Adj. Made
LOWREW59	10/31/21 10:20	42.9	31	0	26.1	63.4	-0.38	-0.38	0.165	3.1	24.3	No Adj. Made
LOWREW59	11/18/21 9:33	43.6	33.8	0	22.6	69.1	-0.08	-0.07	0.475	5.1	24.43	No Adj. Made
LOWREW59	12/21/21 9:03	35.4	29.3	0.4	34.9	62.8	-0.31	-0.31	0.257	3.8	24.2	
LOWREW5A	7/20/21 11:06	25	27	0.4	47.6	92.2	-0.03	-0.02	0.453	1.3	24.43	No Adj. Made
LOWREW5A	8/31/21 9:03	27.3	30.4	0	42.3	81.8	-0.44	-0.43	0.716	1.7	24.2	No Adj. Made
LOWREW5A	9/14/21 10:49	26.7	29.6	0	43.7	78.1	-0.24	-0.2	0.755	1.7	24.31	No Adj. Made
LOWREW5A	10/31/21 11:46	28.9	31.1	0	40	51.2	-0.06	-0.06	0.446	1.4	24.39	No Adj. Made
LOWREW5A	11/19/21 9:49	30.9	33.1	0.1	35.9	67.5	-0.06	-0.11	0.629	1.6	24.24	No Adj. Made
LOWREW5A	12/21/21 9:58	25.5	28.2	0.3	46	53.6	-0.52	-0.51	0.472	1.4	24.23	No Adj. Made
LOWREW60	7/20/21 9:51	44.6	32.6	0.2	22.6	83.9	-0.02	-0.03	0.123	2.6	24.43	No Adj. Made
LOWREW60	8/31/21 7:56	45.1	33.2	0	21.7	74.6	-0.35	-0.32	0.355	4.4	24.16	No Adj. Made
LOWREW60	9/14/21 9:41	44	32.5	0.2	23.3	73	-0.23	-0.23	0.348	4.4	24.3	No Adj. Made
LOWREW60	10/31/21 10:13	45.9	33.2	0	20.9	61.5	-0.43	-0.43	0.077	2.1	24.39	No Adj. Made
LOWREW60	11/18/21 9:24	47.4	36.3	0	16.3	70.8	-0.06	-0.04	0.436	4.9	24.44	No Adj. Made
LOWREW60	12/21/21 8:58	47.6	33	0.3	19.1	62.4	-0.29	-0.28	0.313	4.2	24.3	No Adj. Made
LOWREW61	7/20/21 10:21	36.5	28.5	0.3	34.7	85.3	-0.04	-0.04	0.283	3.9	24.43	No Adj. Made
LOWREW61	8/31/21 8:20	38.7	30.7	0	30.6	76	-0.42	-0.42	0.348	4.3	24.17	No Adj. Made
LOWREW61	9/14/21 10:08	36.8	30.3	0.1	32.8	72.7	-0.1	-0.11	0.375	4.5	24.3	No Adj. Made
LOWREW61	10/31/21 10:51	39.3	31.5	0	29.2	61.5	-0.25	-0.26	0.155	2.9	24.38	No Adj. Made
LOWREW61	11/18/21 10:24	43.3	34	0	22.7	69.5	-0.06	-0.04	0.486	5.2	24.42	No Adj. Made
LOWREW61	12/21/21 9:23	39.3	31.3	0.4	29	63.1	-0.2	-0.21	0.406	4.7	24.19	No Adj. Made
LOWREW62	7/20/21 10:02	35.5	27.1	0.4	37	87.5	-0.41	-0.4	0.293	4	24.42	No Adj. Made
LOWREW62	8/31/21 8:06	36.6	29.4	0.1	33.9	77.4	-0.87	-0.85	0.436	4.8	24.16	No Adj. Made
LOWREW62	9/14/21 9:51	37.8	30.3	0	31.9	74.3	-0.62	-0.64	0.5	5.2	24.3	No Adj. Made

APPENDIX D-1
LANDFILL GAS EXTRACTION WELL MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

ID	Date/Time	Methane (%)[a/]	Carbon Dioxide (%)	Oxygen (%)	Balance (%)	Initial Temperature (°F)[b/]	Initial Static Pressure ("H_2O)[c/]	Adjusted Static Pressure ("H_2O)	Header Pressure ("H_2O)	Initial Flow (scfm)[d/]	Barometric Pressure ("Hg)[e/]	Comments
LOWREW62	10/31/21 10:27	40.6	30.2	0	29.2	64	-0.69	-0.68	0.185	3.2	24.38	No Adj. Made
LOWREW62	11/18/21 9:46	41.7	32.8	0	25.5	69.7	-0.29	-0.29	0.319	4.2	24.43	No Adj. Made
LOWREW62	12/21/21 9:09	37.5	29.3	0.2	33	61.7	-0.45	-0.47	0.145	2.8	24.2	No Adj. Made
LOWREW63	7/20/21 10:30	33.1	31.9	0.4	34.6	84.4	-0.24	-0.24	0.166	2.9	24.42	No Adj. Made
LOWREW63	8/31/21 8:30	34.3	34.6	0	31.1	73	-0.72	-0.72	0.17	3	24.17	No Adj. Made
LOWREW63	9/14/21 10:20	33.3	34.1	0	32.6	71	-0.4	-0.22	0.189	3.2	24.3	No Adj. Made
LOWREW63	10/31/21 11:06	34.4	33.8	0	31.8	56.7	-0.57	-0.56	0.043	1.5	24.38	No Adj. Made
LOWREW63	11/18/21 10:55	43.7	39.6	0	16.7	66.5	-0.07	-0.02	0.422	4.8	24.41	No Adj. Made
LOWREW63	12/21/21 9:32	33.7	34.9	0.3	31.1	57.3	-0.68	-0.7	0.198	3.3	24.19	No Adj. Made
LOWREW64	7/20/21 10:26	37.2	35.1	0.6	27.1	85.5	-1.58	-1.57	0.176	3	24.42	No Adj. Made
LOWREW64	8/31/21 8:25	36.7	35	0	28.3	75.4	-2.38	-2.37	0.209	3.3	24.16	No Adj. Made
LOWREW64	9/14/21 10:14	36.6	35.4	0	28	71.7	-2.1	-2.11	0.246	3.6	24.29	No Adj. Made
LOWREW64	10/31/21 10:57	40	35.6	0.6	23.8	57.5	-1.54	-1.53	0.123	2.6	24.38	No Adj. Made
LOWREW64	11/18/21 10:42	43.3	39.3	0	17.4	65.7	-1.13	-1.13	0.21	3.4	24.42	No Adj. Made
LOWREW64	12/21/21 9:28	35.5	34.9	0.3	29.3	54.8	-1.48	-1.46	0.044	1.5	24.19	No Adj. Made

a/ % = Percent
b/ Deg F = Degrees Fahrenheit
c/ " H2O = Inches of water
d/ scfm = Standard cubic feet per minute
e/ " Hg = Inches of mercury

APPENDIX D-2

FLARE/GAS-TO-ENERGY PLANT STATION MONITORING

APPENDIX D-2.1

FLARE STATION MONITORING

LOWRY INLET

APPENDIX D-2.1
FLARE STATION MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

Lowry Inlet

Sample Point	Date and Time	% Methane	% Carbon Dioxide	% Oxygen	% Balance Gas	Static Pressure ("H_2O)[a/]	Temp (°F)[b/]	Flow (scfm)[c/]	Current * Power (BTU/h)[d/]	Comments
LOWRINLT	7/2/2021 14:25	30.9	28.1	2.1	38.9	-35.17	59	197	3696.21	
LOWRINLT	7/8/2021 14:55	28.1	25.8	2.2	43.9	-33.06	60	191	3258.9	
LOWRINLT	7/15/2021 14:54	28.8	27.6	2	41.6	-34.92	60.1	199	3479.98	
LOWRINLT	7/16/2021 13:43	27.5	26.4	2.1	44	-35.48	60.3	202	3373	
LOWRINLT	7/23/2021 13:08	27	26.4	2.2	44.4	-36.52	61.1	195	3196.91	
LOWRINLT	7/29/2021 14:27	26.8	27.5	2.2	43.5	-34.38	62	193	3140.68	
LOWRINLT	7/30/2021 10:07	23.9	26.6	2.5	47	-33.79	62	189	2742.78	
LOWRINLT	8/5/2021 14:14	28.9	27.8	2.1	41.2	-32.85	63.4	196	3439.42	
LOWRINLT	8/5/2021 14:22	39.4	32.2	0.8	27.6	8.37	143	498	11913.99	
LOWRINLT	8/6/2021 14:55	30.6	26.3	2.2	40.9	-32.34	63	194	3604.58	
LOWRINLT	8/13/2021 12:19	24.3	25.8	2.5	47.4	-31.59	63.8	185	2729.67	
LOWRINLT	8/19/2021 13:37	27.8	26.6	2.1	43.5	-34.52	64	209	3527.95	
LOWRINLT	8/20/2021 16:46	26.4	25.7	2.6	45.3	-35.7	64.5	205	3286.17	
LOWRINLT	8/27/2021 13:19	30.3	25.9	2.2	41.6	-34.72	64	204	3753.22	
LOWRINLT	9/1/2021 13:35	28.1	26.8	2	43.1	-35.21	65	205	3497.78	
LOWRINLT	9/2/2021 14:39	27.1	26.4	2.1	44.4	-36.41	65	204	3356.84	
LOWRINLT	9/10/2021 14:38	28.5	28.4	2.2	40.9	-35.3	65	204	3530.26	
LOWRINLT	9/15/2021 14:58	29.7	28.3	1.9	40.1	-34.7	65	206	3714.97	
LOWRINLT	9/17/2021 15:41	25.2	28	1.7	45.1	-34.1	65	205	3136.8	
LOWRINLT	9/24/2021 15:10	26	28.1	2.1	43.8	-30.65	65	198	3125.87	
LOWRINLT	9/30/2021 15:05	25	27.2	1.9	45.9	-29.31	64	196	2975.28	
LOWRINLT	10/1/2021 14:25	28.2	28.8	1.8	41.2	-28.27	64	192	3287.62	
LOWRINLT	10/13/2021 15:15	25.4	27.6	2.4	44.6	-34.63	209	63	971.64	
LOWRINLT	10/14/2021 14:22	26.1	25.6	2.3	46	-34.35	63	210	3328.06	
LOWRINLT	10/22/2021 13:12	28.7	28.1	1.9	41.3	-32.56	61	186	3241.36	
LOWRINLT	10/28/2021 16:38	24.2	26.8	2.5	46.5	-34.55	60	192	2821.29	
LOWRINLT	10/29/2021 14:04	29.5	28.4	1.7	40.4	-37.62	60	208	3725.78	
LOWRINLT	11/5/2021 14:00	24.9	27.3	1.9	45.9	-33.81	59	218	3296	
LOWRINLT	11/11/2021 14:06	27.9	29.3	2	40.8	-32.27	58	217	3676.17	
LOWRINLT	11/12/2021 13:42	25.6	25.3	2.4	46.7	-31.85	58	216	3357.57	
LOWRINLT	11/18/2021 14:48	29.4	29.8	1.6	39.2	-29.15	57	213	3802.41	
LOWRINLT	11/19/2021 13:06	32.5	29.7	1.5	36.3	-29.43	57	213	4203.34	
LOWRINLT	11/24/2021 13:13	26.3	27.3	3.1	43.3	-28.98	56	211	3366.9	
LOWRINLT	11/26/2021 10:20	32.7	28.2	2.9	36.2	-28.47	56	213	4229.3	

APPENDIX D-2.1
FLARE STATION MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

Lowry Inlet

Sample Point	Date and Time	% Methane	% Carbon Dioxide	% Oxygen	% Balance Gas	Static Pressure ("H_2O)[a/]	Temp (°F)[b/]	Flow (scfm)[c/]	Current * Power (BTU/h)[d/]	Comments
LOWRINLT	12/2/2021 14:47	35.2	27.8	3.5	33.5	-27.55	55	200	4272.6	
LOWRINLT	12/3/2021 13:22	33.4	28.1	3	35.5	-25.59	55	201	4072.8	
LOWRINLT	12/7/2021 12:50	33	29.9	2.2	34.9	-24.77	55	188	3767.5	
LOWRINLT	12/16/2021 14:27	27.8	28	1.9	42.3	-17.51	53	191	3224.11	
LOWRINLT	12/17/2021 14:36	25.1	27.8	3.1	44	-17.36	53	186	2834.77	
LOWRINLT	12/29/2021 15:11	26.4	27.6	3.2	42.8	-13.83	51	193	3093.81	
LOWRINLT	12/30/2021 14:44	31.3	29.4	1.8	37.5	-11.28	51	126	2394.68	

***** Note: The BTU calculation is based upon a methane value of **1009.7** BTU/scf at standard conditions. This data is taken from the petroleum industry book "Gas Processors Association Engineering Data Book", Ninth Edition, Tulsa OK, 1972.

a/ "H_2O=inches of water

b/ °F= Degrees Fahrenheit

c/ scfm= standard cubic feet per minute

d/ BTU/h= British Thermal Unit per hour

APPENDIX D-2.2

FLARE STATION MONITORING

DADS BLOWER FLARE

APPENDIX D-2.2
GAS-TO-ENERGY PLANT MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

DADS Blower Flare

Location	Sample Point	Date and Time	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Balance Gas (%)	Initial Static Pressure (" H2O)[a/]	Initial Temperature (° F)[b/]	Initial Flow (scfm)[c/]	Initial Power (BTU/h)[d/]	Comments
DADS Blower Flare	DASPFLR1	7/2/2021 14:32	41.1	33	0.6	25.3	7.76	135	497	12403.09	
DADS Blower Flare	DASPFLR1	7/8/2021 15:02	38.3	32.2	0.6	28.9	8.3	143	500	11627.88	
DADS Blower Flare	DASPFLR1	7/16/2021 13:51	37.3	32	0.6	30.1	8.25	143	500	11324.28	
DADS Blower Flare	DASPFLR1	7/23/2021 13:15	36.8	32	0.7	30.5	7.21	146	503	11239.51	
DADS Blower Flare	DASPFLR1	7/29/2021 14:37	35.3	32.7	0.7	31.3	8.32	146	499	10695.65	
DADS Blower Flare	DASPFLR1	8/6/2021 15:02	41.4	31.3	0.6	26.7	8.33	141	506	12719.87	
DADS Blower Flare	DASPFLR1	8/13/2021 12:29	32.6	31.4	0.8	35.2	8.37	140	502	9936.95	
DADS Blower Flare	DASPFLR1	8/20/2021 16:52	35.9	32.4	0.7	31	8.3	144	500	10899.24	
DADS Blower Flare	DASPFLR1	8/27/2021 13:28	43.3	32.9	0.4	23.4	8.36	151	496	13040.71	
DADS Blower Flare	DASPFLR1	9/1/2021 13:46	39.9	31.9	0.5	27.7	8.17	148	500	12113.64	
DADS Blower Flare	DASPFLR1	9/2/2021 14:51	36.5	31.9	0.6	31	8.13	147	496	10992.75	
DADS Blower Flare	DASPFLR1	9/10/2021 14:46	40.1	33.8	0.6	25.5	8.05	129	497	12101.31	
DADS Blower Flare	DASPFLR1	9/15/2021 15:07	42.1	34.2	0.6	23.1	8.12	128	501	12807.12	
DADS Blower Flare	DASPFLR1	9/24/2021 15:17	36.6	33.1	0.6	29.7	8.41	143	497	11045.09	
DADS Blower Flare	DASPFLR1	10/1/2021 14:32	39.2	33	0.5	27.3	8.28	137	504	11996.33	
DADS Blower Flare	DASPFLR1	10/13/2021 15:26	36.2	32.9	0.8	30.1	7.98	126	502	11034.28	
DADS Blower Flare	DASPFLR1	10/22/2021 13:22	41.7	34.7	0.4	23.2	7.56	120	503	12736.08	
DADS Blower Flare	DASPFLR1	10/28/2021 16:46	33.5	30.4	1.2	34.9	7.61	117	508	10333.33	
DADS Blower Flare	DASPFLR1	11/5/2021 14:08	35.7	32.2	0.6	31.5	8.19	118	497	10773.49	
DADS Blower Flare	DASPFLR1	11/11/2021 14:16	40.2	34.9	0.6	24.3	7.73	111	499	12180.31	
DADS Blower Flare	DASPFLR1	11/12/2021 13:53	36.9	30.5	0.7	31.9	7.62	112	498	11158.03	
DADS Blower Flare	DASPFLR1	11/19/2021 13:19	42.5	34.5	0.4	22.6	7.99	109	500	12903	
DADS Blower Flare	DASPFLR1	11/24/2021 13:21	36	33.4	1.2	29.4	7.53	102	503	10994.8	
DADS Blower Flare	DASPFLR1	11/26/2021 10:29	45.2	35	0.7	19.1	7.87	110	505	13869.6	
DADS Blower Flare	DASPFLR1	12/2/2021 15:00	47.6	35.1	0.8	16.5	7.61	99	507	14657	
DADS Blower Flare	DASPFLR1	12/3/2021 13:33	48.4	35.4	0.6	15.6	7.76	105	499	14670.4	
DADS Blower Flare	DASPFLR1	12/7/2021 12:58	44.5	35.9	0.7	18.9	7.63	99	501	13550.7	
DADS Blower Flare	DASPFLR1	12/17/2021 14:42	35.1	33.4	1	30.5	7.02	85	501	10677.67	
DADS Blower Flare	DASPFLR1	12/29/2021 15:18	37.3	34.9	0.7	27.1	7.13	79	500	11324.28	

***** Note: The BTU calculation is based upon a methane value of **1009.7** BTU/scf at standard conditions. This data is taken from the petroleum industry book "Gas Processors Association Engineering Data Book", Ninth Edition, Tulsa OK, 1972.

a/ "H_2O= inches water

b/ ° F= Degrees Fahrenheit

c/ scfm= standard cubic feet per minute

d/ BTU/h= British Thermal Unit per hour

APPENDIX D-2.3

FLARE STATION MONITORING

FLARE STATION 3

APPENDIX D-2.3
GAS-TO-ENERGY PLANT MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

Flare Station 3 - Candlestick Flare

Location	Sample Point	Date Time	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Balance Gas (%)	Initial Static Pressure (" H2O)[a/]	Initial Temperature (° F)[b/]	Initial Flow (scfm)[c/]	Initial Power (BTU/h)[d/]	Comments
Flare Station 3	DASPFLR3	7/2/2021 14:41	49.4	36.7	0.7	13.2	5.42	102	1095	32845.27	
Flare Station 3	DASPFLR3	7/8/2021 15:10	47.8	35.9	0.9	15.4	8.73	109	1327	38515.06	
Flare Station 3	DASPFLR3	7/16/2021 14:01	49.3	37.6	0.4	12.7	8.77	110	1343	40202.65	
Flare Station 3	DASPFLR3	7/23/2021 13:26	48	36.7	0.3	15	4.31	109	911	26551.64	
Flare Station 3	DASPFLR3	7/29/2021 14:49	49.2	37.9	0.4	12.5	5.34	108	1015	30322.35	
Flare Station 3	DASPFLR3	8/5/2021 14:34	50.7	36.7	0.6	12	4.68	109	1016	31277.6	
Flare Station 3	DASPFLR3	8/6/2021 15:11	50	36.3	0.3	13.4	5.25	106	1117	33912.12	
Flare Station 3	DASPFLR3	8/13/2021 12:45	47.4	36.9	0.5	15.2	3.08	106	917	26392.43	
Flare Station 3	DASPFLR3	8/20/2021 16:59	46.2	36.3	0.4	17.1	2.72	102	857	24041.11	
Flare Station 3	DASPFLR3	8/27/2021 13:37	52.3	36.2	0.2	11.3	5.65	111	1053	33439.66	
Flare Station 3	DASPFLR3	9/1/2021 14:01	52.3	36.1	0.4	11.2	6.4	110	1118	35503.83	
Flare Station 3	DASPFLR3	9/2/2021 15:02	50.5	37.2	0.3	12	6.1	108	1068	32748.72	
Flare Station 3	DASPFLR3	9/10/2021 15:02	51.3	37.8	0.4	10.5	10.61	117	1472	45851.86	
Flare Station 3	DASPFLR3	9/15/2021 15:16	51.3	38.1	0.4	10.2	10.68	117	1416	44107.49	
Flare Station 3	DASPFLR3	9/24/2021 15:26	49.5	38.5	0.3	11.7	9.02	109	1391	41808.45	
Flare Station 3	DASPFLR3	10/1/2021 14:41	49	37.6	0.3	13.1	8.37	107	1297	38589.38	
Flare Station 3	DASPFLR3	10/13/2021 15:37	48.2	38	0.4	13.4	11.32	110	1558	45598.05	
Flare Station 3	DASPFLR3	10/22/2021 13:38	50.9	38.4	0.1	10.6	6.15	105	1199	37056.87	
Flare Station 3	DASPFLR3	10/28/2021 17:00	46.7	37.3	0.6	15.4	10.16	103	1547	43867.1	
Flare Station 3	DASPFLR3	11/5/2021 14:21	47.7	36.5	0.3	15.5	7.48	104	1222	35393.32	
Flare Station 3	DASPFLR3	11/11/2021 14:26	49	38.4	0.4	12.2	6.88	95	1168	34751.27	
Flare Station 3	DASPFLR3	11/12/2021 14:04	47.3	34.1	0.4	18.2	5.84	95	1124	32281.91	
Flare Station 3	DASPFLR3	11/19/2021 13:34	50	38.7	0.5	10.8	6.3	100	1160	35217.6	
Flare Station 3	DASPFLR3	11/24/2021 13:34	48.9	39.5	0.8	10.8	4.45	84	1002	29765.4	
Flare Station 3	DASPFLR3	11/26/2021 10:40	55.3	38.7	0.5	5.5	5.64	96	1105	34140.8	
Flare Station 3	DASPFLR3	12/2/2021 15:15	53.6	38.9	0.6	6.9	6.37	99	1171	34140.8	
Flare Station 3	DASPFLR3	12/3/2021 13:46	55.7	39.2	0.5	4.6	5.92	82	1197	34140.8	
Flare Station 3	DASPFLR3	12/7/2021 13:13	53.3	39.1	0.7	6.9	3.55	91	910	29468.7	
Flare Station 3	DASPFLR3	12/17/2021 14:54	45.7	38.3	0.7	15.3	4.78	84	1088	30190.96	
Flare Station 3	DASPFLR3	12/29/2021 15:31	47.4	38.7	0.5	13.4	4.52	79	1036	29817.41	

***** Note: The BTU calculation is based upon a methane value of **1009.7** BTU/scf at standard conditions. This data is taken from the petroleum industry book "Gas Processors Association Engineering Data Book", Ninth Edition, Tulsa OK, 1972

a/ "H_2O= inches water

b/ ° F= Degrees Fahrenheit

c/ scfm= standard cubic feet per minute

d/ BTU/h= British Thermal Unit per hour

APPENDIX D-2.4

FLARE STATION MONITORING

COMBINED SOURCES AT GAS-TO-ENERGY PLANT

APPENDIX D-2.4
GAS-TO-ENERGY PLANT MONITORING
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE REPORT
LOWRY LANDFILL SUPERFUND SITE

Gas-to-Energy Plant

Location	Sample Point	Date and Time	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Balance Gas (%)	Initial Static Pressure (" H_2O)[a/]	Initial Temperature (° F)[b/]	Initial Flow (scfm)[c/]	Initial Power (BTU/h)[d/]	Comments
Gas Plant	DASPGAP1	7/2/2021 14:47	52.2	38.9	0.7	8.2	66.08	86	1020.2	32336.1	
Gas Plant	DASPGAP1	7/8/2021 15:16	50.9	38.2	0.9	10	68.89	96	736.5	22762.62	
Gas Plant	DASPGAP1	7/16/2021 14:17	52.9	39.2	0.3	7.6	72.47	89	716.1	23001.76	
Gas Plant	DASPGAP1	7/23/2021 13:42	52.3	39.1	0.2	8.4	65.87	93	990.3	31448.52	
Gas Plant	DASPGAP1	7/29/2021 15:02	53	40	0.3	6.7	67.07	91	980.7	31560.5	
Gas Plant	DASPGAP1	8/5/2021 14:44	54.1	39.3	0.4	6.2	67.54	91	955.8	31397.57	
Gas Plant	DASPGAP1	8/6/2021 15:16	54.9	39.1	0.2	5.8	65.98	89	973.6	32455.23	
Gas Plant	DASPGAP1	8/13/2021 13:04	53.7	39.8	0.4	6.1	66.68	82	990.4	32293.62	
Gas Plant	DASPGAP1	8/20/2021 17:09	54.2	39.8	0.3	5.7	66.81	78	950.3	31274.6	
Gas Plant	DASPGAP1	8/27/2021 14:34	56.9	39.6	0.2	3.3	78.8	93	675.9	23352.13	
Gas Plant	DASPGAP1	9/1/2021 14:09	56	40	0.2	3.8	81.39	88	491.5	16712.57	
Gas Plant	DASPGAP1	9/2/2021 15:13	55.4	39.7	0.2	4.7	81	79	492	16550.33	
Gas Plant	DASPGAP1	9/10/2021 15:10	54.8	39.7	0.3	5.2	68.55	96	924.4	30759	
Gas Plant	DASPGAP1	9/15/2021 15:25	54.3	39.4	0.3	6	67.29	89	968.2	31922.48	
Gas Plant	DASPGAP1	9/24/2021 15:33	52.3	40.3	0.3	7.1	68.99	76	993.3	31543.79	
Gas Plant	DASPGAP1	10/1/2021 14:46	52.5	39.3	0.2	8	64.36	85	992.6	31642.1	
Gas Plant	DASPGAP1	10/13/2021 15:49	51.6	39.9	0.2	8.3	68.71	83	775.8	24306.99	
Gas Plant	DASPGAP1	10/22/2021 13:45	51.7	38.8	0.1	9.4	69.89	75	1010.3	31715.58	
Gas Plant	DASPGAP1	10/28/2021 17:08	51.4	38.8	0.3	9.5	80.11	77	605.4	18894.58	
Gas Plant	DASPGAP1	11/5/2021 14:28	52.1	38.6	0.2	9.1	69.98	74	1073	33944.48	
Gas Plant	DASPGAP1	11/11/2021 14:36	53.5	40	0.3	6.2	68.06	78	1065.6	34616.23	
Gas Plant	DASPGAP1	11/12/2021 14:14	52.8	35.8	0.4	11	69.27	80	1089.2	34919.93	
Gas Plant	DASPGAP1	11/19/2021 13:42	53.5	39	0.4	7.1	69.87	80	1083.1	35184.72	
Gas Plant	DASPGAP1	11/24/2021 13:42	53.1	40.4	0.8	5.7	69.02	81	1145.5	34140.8	
Gas Plant	DASPGAP1	11/26/2021 10:52	54.6	39.7	0.6	5.1	69.04	70	1108.5	34140.8	
Gas Plant	DASPGAP1	12/2/2021 15:22	56.7	39.7	0.5	3.1	69.5	71	1036.5	34140.8	
Gas Plant	DASPGAP1	12/3/2021 13:53	57.4	40	0.5	2.1	68.87	70	1031.1	34140.8	
Gas Plant	DASPGAP1	12/7/2021 13:22	55.1	40.3	0.6	4	68.7	79	1053.3	34140.8	
Gas Plant	DASPGAP1	12/17/2021 15:00	50.8	39.2	0.7	9.3	68.9	62	808.8	24948.05	
Gas Plant	DASPGAP1	12/29/2021 15:38	50.9	39.4	0.5	9.2	69.72	63	790.8	24440.84	

* Note: The BTU calculation is based upon a methane value of 1009.7 BTU/scf at standard conditions. This data is taken from the petroleum industry book "Gas Processors Association Engineering Data Book", Ninth Edition, Tulsa OK, 1972.

a/ "H_2O= inches water

b/ ° F= Degrees Fahrenheit

c/ scfm= standard cubic feet per minute

d/ BTU/h= British Thermal Unit per hour

APPENDIX D-2.5

FLARE STATION MONITORING

DAILY FIELD NOTES

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				07/08/21	
Lowry Header - Monitoring					
Time (hh:mm)				1451	
Technician (initials)				CL	
Control Panel - Digital Recorder					
Flow Rate (SCFM)				191	
Gas Temperature (F)				60.0	
Flare 2 - Monitoring					
Time (hh:mm)				1457	
Technician (initials)				CL	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	☐
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	☐
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	☐
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				39.8	
*Flare DP (inWC)				5.5	
*Flare Flame Temperature (F)				1274	
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				79	
*Gas Handling Skid Inlet Temperature (F)				64	
*Recirculation Valve Position (%Closed)				70	
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				500	
*Total Flow (MMSCF)				934.05	
*Flow Pressure (inWC)				7.0	
*Flow Temperature (F)				143	
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				340.39	
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				35406	
*Blower 301 Vibration (in/Sec)				0.24	
*Blower 301 Speed (%Max)				91	
*Blower 301 Inlet Bearing Temp (F)				112	
*Blower 301 Outlet Bearing Temp (F)				142	
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				14.1	
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.3	
*Demister Outlet Pressure (inWC)				-43.0	
*Demister DP (inWC)				+2.7	
*Flame Arrester Inlet Pressure (inWC)				+8.1	
*Flame Arrester Outlet Pressure (inWC)				+5.0	
*Flame Arrester DP (inWC)				+3.1	
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	
*Spiralator Position (%Open)				50	
*Manual Louver 1 Position (%Open)				50	
*Manual Louver 2 Position (%Open)				50	
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	☐ ☐
Flare 3 - Monitoring					
Time (hh:mm)				1504	
Technician (initials)				CL	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	☐
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	☐
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	☐

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.0	
*Gas Handling Skid Inlet Temperature (F)				69	
*Panel Temperature (F)				125	
*Recirculation Valve Position (%Closed)				100	
*Flare Flame Temperature (F)				1312	
*Flame Arrestor Temperature (F)				109	
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				30(1413	
*Blower Speed (Blower | Speed (%Max))				72	
*Blower Vibration (Blower | Vibration (in/Sec))				0.05	
*Blower Current (Blower | Current (Amps))				37.5	
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1327	
*Total Flow (MMSCF)				60.94	
*Flow Pressure (inWC)				7.4	
*Flow Temperature (F)				109	
*Flow DP (inWC)				4.46	
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				60.94	
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	✓	☐
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-39.7	
*Demister Outlet Pressure (inWC)				-41.2	
*Demister DP (inWC)				+1.5	
*Flame Arrester Inlet Pressure (inWC)				+8.4	
*Flame Arrester Outlet Pressure (inWC)				+7.7	
*Flame Arrester DP (inWC)				+0.7	
*Fail-Close Valve Air Pressure (psi)				105	
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	
*Spiralator Position (%Open)				50	
*Manual Louver 1 Position (%Open)				50	
*Manual Louver 2 Position (%Open)				50	
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	✓	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐	☐	☐	✓	☐
Engine Plant 1 - Monitoring					
Time (hh mm)				0811	
Technician (Initials)				AM	
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				633 652	
*Power Setpoint (kWh) (Engine #2 | #1)				710	
Control Room - Laptop					
*Flow Total (MSCF)				2626.11.6	
*Flow Rate (SCFM)				734.5	
*Discharge Gas Temperature (F)				960	
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-43.9	
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	

Note * Collect during device operation only

Remarks

07/08 - Engine #2 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					07/23/21
Lowry Header - Monitoring					
Time (hh:mm)					1305
Technician (Initials)					CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)					195
Gas Temperature (F)					61.1
Flare 2 - Monitoring					
Time (hh:mm)					1310
Technician (Initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)					42.7
*Flare DP (inWC)					5.55
*Flare Flame Temperature (F)					1304
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)					84
*Gas Handling Skid Inlet Temperature (F)					64
*Recirculation Valve Position (%Closed)					90
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)					503
*Total Flow (MMSCF)					444.851
*Flow Pressure (inWC)					7.0
*Flow Temperature (F)					146
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)					601.14
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)					35764
*Blower 301 Vibration (in/Sec)					0.26
*Blower 301 Speed (%Max)					92
*Blower 301 Inlet Bearing Temp (F)					99
*Blower 301 Outlet Bearing Temp (F)					143
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					14.3
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-43.6
*Demister Outlet Pressure (inWC)					-46.3
*Demister DP (inWC)					+2.7
*Flame Arrester Inlet Pressure (inWC)					+7.5
*Flame Arrester Outlet Pressure (inWC)					+4.8
*Flame Arrester DP (inWC)					+2.7
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	✓ ✓
Flare 3 - Monitoring					
Time (hh:mm)					1319
Technician (Initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)					39.8
*Gas Handling Skid Inlet Temperature (F)					72
*Panel Temperature (F)					113
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1320
*Flame Arrestor Temperature (F)					108
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))					30 1278
*Blower Speed (Blower | Speed (%Max))					65
*Blower Vibration (Blower | Vibration (in/Sec))					0.02
*Blower Current (Blower | Current (Amps))					29.4
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					911
*Total Flow (MMSCF)					185.94
*Flow Pressure (inWC)					3.7
*Flow Temperature (F)					109
*Flow DP (inWC)					2.34
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					185.94
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-40.5
*Demister Outlet Pressure (inWC)					-41.5
*Demister DP (inWC)					+1.0
*Flame Arrester Inlet Pressure (inWC)					+4.1
*Flame Arrester Outlet Pressure (inWC)					+3.7
*Flame Arrester DP (inWC)					+0.4
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☐
Engine Plant 1 - Monitoring					
Time (hh mm)					1332
Technician (Initials)					CL
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					695 C10
*Power Setpoint (kWh) (Engine #2 | #1)					C13 C13
Control Room - Laptop					
*Flow Total (MSCF)					28G547.5
*Flow Rate (SCFM)					990.5
*Discharge Gas Temperature (F)					93.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)					-44.8
Other					
*Visible Emissions (Yes/No, If yes explain)					NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				07/29/21	07/30/21
Lowry Header - Monitoring					
Time (hh mm)				1424	1084
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				193	189
Gas Temperature (F)				62.0	62.0
Flare 2 - Monitoring					
Time (hh:mm)				1429	1011
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)				41.3	40.4
*Flare DP (InWC)				5.55	5.37
*Flare Flame Temperature (F)				1154	1128
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				81	79
*Gas Handling Skid Inlet Temperature (F)				70	70
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				499	497
*Total Flow (MMSCF)				949.17	949.77
*Flow Pressure (InWC)				7.1	6.9
*Flow Temperature (F)				146	140
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				605.51	606.10
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				35909	35929
*Blower 301 Vibration (In/Sec)				0.23	0.28
*Blower 301 Speed (%Max)				91	90
*Blower 301 Inlet Bearing Temp (F)				96	93
*Blower 301 Outlet Bearing Temp (F)				145	130
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				14.4	13.9
Gas Handling Skid					
*Demister Inlet Pressure (InWC)				-41.4	-41.5
*Demister Outlet Pressure (InWC)				-44.5	-43.7
*Demister DP (InWC)				+3.1	+2.2
*Flame Arrester Inlet Pressure (InWC)				+8.2	+8.3
*Flame Arrester Outlet Pressure (InWC)				+5.0	+4.9
*Flame Arrester DP (InWC)				+3.2	+3.4
Flare					
*Visible Emissions (Yes/No, If yes explain)				ND	ND
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Flare 3 - Monitoring					
Time (hh.mm)				1441	1136
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☑	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.1	39.9
*Gas Handling Skid Inlet Temperature (F)				72	73
*Panel Temperature (F)				114	102
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1267	1306
*Flame Arrestor Temperature (F)				108	106
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302-1424	302-1445
*Blower Speed (Blower | Speed (%Max))				C6	C6
*Blower Vibration (Blower | Vibration (in/Sec))				0.02	0.01
*Blower Current (Blower | Current (Amps))				27.8	26.6
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1015	1013
*Total Flow (MMSCF)				194.26	195.56
*Flow Pressure (inWC)				3.9	4.1
*Flow Temperature (F)				108	107
*Flow DP (inWC)				2.84	2.51
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				194.26	195.56
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☑	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-39.2	-39.6
*Demister Outlet Pressure (inWC)				-41.2	-40.6
*Demister DP (inWC)				+2.0	+1.0
*Flame Arrester Inlet Pressure (inWC)				+5.2	+4.8
*Flame Arrester Outlet Pressure (inWC)				+4.4	+4.1
*Flame Arrester DP (inWC)				+0.8	+0.7
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)				1451	1147
Technician (Initials)				CB	CB
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				C76 C69	C81 C68
*Power Setpoint (kWh) (Engine #2 | #1)				C79 C83	C74 C79
Control Room - Laptop					
*Flow Total (MSCF)				295163.3	296384.3
*Flow Rate (SCFM)				980.7	966.5
*Discharge Gas Temperature (F)				91.0	86.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-42.5	-42.7
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				08/05/21	08/06/21
Lowry Header - Monitoring					
Time (hh:mm)				1410	1453
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				194	194
Gas Temperature (F)				63.4	63.0
Flare 2 - Monitoring					
Time (hh:mm)				1414	1458
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				39.5	39.3
*Flare DP (inWC)				5.42	5.47
*Flare Flame Temperature (F)				1275	1281
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				82	80
*Gas Handling Skid Inlet Temperature (F)				70	70
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				498	506
*Total Flow (MMSCF)				953.91	954.64
*Flow Pressure (inWC)				7.1	7.3
*Flow Temperature (F)				143	141
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				C10.24	C10.98
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				36067	36091
*Blower 301 Vibration (in/Sec)				0.26	0.27
*Blower 301 Speed (%Max)				40	40
*Blower 301 Inlet Bearing Temp (F)				106	105
*Blower 301 Outlet Bearing Temp (F)				147	137
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				14.0	13.9
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-39.5	-39.3
*Demister Outlet Pressure (inWC)				-42.2	-40.8
*Demister DP (inWC)				+2.7	+1.5
*Flame Arrester Inlet Pressure (inWC)				+8.6	+6.2
*Flame Arrester Outlet Pressure (inWC)				+4.9	+4.8
*Flame Arrester DP (inWC)				+3.7	+3.4
Flare					
*Visible Emissions (Yes/No, If yes explain)				No	No
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Flare 3 - Monitoring					
Time (hh:mm)				1428	1505
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				39.6	42.0
*Gas Handling Skid Inlet Temperature (F)				73	72
*Panel Temperature (F)				114	112
*Recirculation Valve Position (%Closed)				1295	1297
*Flare Flame Temperature (F)				109	106
*Flame Arrestor Temperature (F)					
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302 1582	301 1506
*Blower Speed (Blower | Speed (%Max))				66	67
*Blower Vibration (Blower | Vibration (in/Sec))				0.01	0.02
*Blower Current (Blower | Current (Amps))				29.3	31.6
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1016	1117
*Total Flow (MMSCF)				203.76	205.23
*Flow Pressure (inWC)				4.5	4.4
*Flow Temperature (F)				109	106
*Flow DP (inWC)				2.50	2.32
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				203.76	205.23
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	✓	✓
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.2	-40.5
*Demister Outlet Pressure (inWC)				-41.2	-41.5
*Demister DP (inWC)				+1.0	+1.0
*Flame Arrester Inlet Pressure (inWC)				+5.5	+4.9
*Flame Arrester Outlet Pressure (inWC)				+4.2	+4.0
*Flame Arrester DP (inWC)				+1.3	+0.9
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Engine Plant 1 - Monitoring					
Time (hh:mm)				1436	1512
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				626 711	755 669
*Power Setpoint (kWh) (Engine #2 | #1)				691 670	673 650
Control Room - Laptop					
*Flow Total (MSCF)				304809.5	306205.2
*Flow Rate (SCFM)				955.8	973.6
*Discharge Gas Temperature (F)				91.0	89.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-44.3	-46.1
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				05/19/21	05/20/21
Lowry Header - Monitoring					
Time (hh mm)				1333	1645
Technician (initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				209	205
Gas Temperature (F)				64.0	64.5
Flare 2 - Monitoring					
Time (hh:mm)				1343	1648
Technician (initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				42.5	43.4
*Flare DP (inWC)				5.51	5.48
*Flare Flame Temperature (F)				1229	1167
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				80	78
*Gas Handling Skid Inlet Temperature (F)				72	74
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				500	500
*Total Flow (MMSCF)				963.91	964.72
*Flow Pressure (inWC)				7.0	7.0
*Flow Temperature (F)				146	144
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				020.25	021.06
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				30400	30427
*Blower 301 Vibration (in/Sec)				0.29	0.26
*Blower 301 Speed (%Max)				93	93
*Blower 301 Inlet Bearing Temp (F)				98	89
*Blower 301 Outlet Bearing Temp (F)				143	141
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				14.6	14.3
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-43.6	-43.6
*Demister Outlet Pressure (inWC)				-44.9	-46.1
*Demister DP (inWC)				+1.3	+2.5
*Flame Arrester Inlet Pressure (inWC)				+8.6	+8.1
*Flame Arrester Outlet Pressure (inWC)				+5.4	+4.9
*Flame Arrester DP (inWC)				+3.2	+3.2
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Flare 3 - Monitoring					
Time (hh.mm)				1354	1654
Technician (initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☑	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.2	37.4
*Gas Handling Skid Inlet Temperature (F)				74	72
*Panel Temperature (F)				99	105
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1315	1278
*Flame Arrestor Temperature (F)				100	105
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				301 1639	301 1812
*Blower Speed (Blower | Speed (%Max))				63	68
*Blower Vibration (Blower | Vibration (in/Sec))				0.01	0.02
*Blower Current (Blower | Current (Amps))				27.0	33.7
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				857	1099
*Total Flow (MMSCF)				223.52	221.90
*Flow Pressure (inWC)				3.0	4.5
*Flow Temperature (F)				102	102
*Flow DP (inWC)				1.58	3.35
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				223.52	221.90
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☑	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-39.7	-39.2
*Demister Outlet Pressure (inWC)				-41.0	-40.5
*Demister DP (inWC)				+1.3	+1.3
*Flame Arrester Inlet Pressure (inWC)				+3.0	+5.8
*Flame Arrester Outlet Pressure (inWC)				+2.1	+4.7
*Flame Arrester DP (inWC)				+0.9	+1.1
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)				1701	1401
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				695 662	— 670
*Power Setpoint (kWh) (Engine #2 | #1)				661 669	666 671
Control Room - Laptop					
*Flow Total (MSCF)				324741.8	323473.8
*Flow Rate (SCFM)				950.3	710.9
*Discharge Gas Temperature (F)				78.0	80.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-43.7	-44.1
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

08/19 – Engine #4 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					08/27/21
Lowry Header - Monitoring					
Time (hh mm)					1316
Technician (initials)					CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)					204
Gas Temperature (F)					84.0
Flare 2 - Monitoring					
Time (hh:mm)					1329
Technician (initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)					42.3
*Flare DP (InWC)					5.61
*Flare Flame Temperature (F)					1260
Control Panel - Touchscreen (Press Next)					
Panel Temperature (F)					82
*Gas Handling Skid Inlet Temperature (F)					72
*Recirculation Valve Position (%Closed)					20
Control Panel - Touchscreen - Flare Flow Data (Press Back 2x, Flare Flow Data)					
*Flow Rate (SCFM)					496
*Total Flow (MMSCF)					909.89
*Flow Pressure (InWC)					7.0
*Flow Temperature (F)					151
Control Panel - Touchscreen (Press Resettable Flow History, Analog Data Menu, Blower Data)					
*Resettable Total Flow (MMSCF)					625.92
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data (Press Main)					
*Blower 301 Runtime (Hours)					36589
*Blower 301 Vibration (In/Sec)					0.31
*Blower 301 Speed (%Max)					94
*Blower 301 Inlet Bearing Temp (F)					104
*Blower 301 Outlet Bearing Temp (F)					220
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					14.3
Gas Handling Skid					
*Demister Inlet Pressure (InWC)					-43.1
*Demister Outlet Pressure (InWC)					-45.3
*Demister DP (InWC)					+2.2
*Flame Arrester Inlet Pressure (InWC)					+8.2
*Flame Arrester Outlet Pressure (InWC)					+4.9
*Flame Arrester DP (InWC)					+3.3
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					55
*Manual Louver 1 Position (%Open)					30
*Manual Louver 2 Position (%Open)					80
Other					✓
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐	☐	☐	☐	✓ ✓
Flare 3 - Monitoring					
Time (hh mm)					1339
Technician (initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)					41.6
*Gas Handling Skid Inlet Temperature (F)					74
*Panel Temperature (F)					114
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1287
*Flame Arrestor Temperature (F)					111
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))					302-1606
*Blower Speed (Blower | Speed (%Max))					C7
*Blower Vibration (Blower | Vibration (In/Sec))					0.02
*Blower Current (Blower | Current (Amps))					30.5
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					1053
*Total Flow (MMSCF)					228.08
*Flow Pressure (inWC)					3.9
*Flow Temperature (F)					111
*Flow DP (inWC)					277
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					228.08
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-40.8
*Demister Outlet Pressure (inWC)					-42.0
*Demister DP (inWC)					+1.2
*Flame Arrester Inlet Pressure (inWC)					+4.6
*Flame Arrester Outlet Pressure (inWC)					+4.3
*Flame Arrester DP (inWC)					+1.3
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑

Engine Plant 1 - Monitoring

Time (hh mm)					1427
Technician (Initials)					CB
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					— 857
*Power Setpoint (kWh) (Engine #2 | #1)					677 682
Control Room - Laptop					
*Flow Total (MSCF)					333760.8
*Flow Rate (SCFM)					1259
*Discharge Gas Temperature (F)					93.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)					-44.8
Other					
*Visible Emissions (Yes/No, If yes explain)					NO

Note * Collect during device operation only

Remarks

08/27 - Engine #4 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)		09/01/21	09/02/21		
Lowry Header - Monitoring					
Time (hh mm)		1330	1438		
Technician (Initials)		CS	CS		
Control Panel - Digital Recorder					
Flow Rate (SCFM)		205	204		
Gas Temperature (F)		CS	CS		
Flare 2 - Monitoring					
Time (hh:mm)		1338	1441		
Technician (Initials)		CS	CS		
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☑	☑	☐	☐
Heating/Cooling OK (Check for Yes)	☐	☑	☑	☐	☐
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☑	☑	☐	☐
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)		42.3	43.0		
*Flare DP (inWC)		5.44	5.66		
*Flare Flame Temperature (F)		1224	1177		
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)		82	81		
*Gas Handling Skid Inlet Temperature (F)		72	72		
*Recirculation Valve Position (%Closed)		70	70		
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)		500	496		
*Total Flow (MMSCF)		973.10	973.85		
*Flow Pressure (inWC)		7.0	7.3		
*Flow Temperature (F)		148	147		
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)		C29.43	C30.18		
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)		36706	36731		
*Blower 301 Vibration (in/Sec)		0.32	0.28		
*Blower 301 Speed (%Max)		94	93		
*Blower 301 Inlet Bearing Temp (F)		99	92		
*Blower 301 Outlet Bearing Temp (F)		148	146		
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)		14.2	14.3		
Gas Handling Skid					
*Demister Inlet Pressure (inWC)		-43.6	-43.4		
*Demister Outlet Pressure (inWC)		-46.2	-46.6		
*Demister DP (inWC)		+2.6	+3.2		
*Flame Arrester Inlet Pressure (inWC)		+8.1	+8.2		
*Flame Arrester Outlet Pressure (inWC)		+4.9	+4.9		
*Flame Arrester DP (inWC)		+3.2	+3.3		
Flare					
*Visible Emissions (Yes/No, If yes explain)		NO	NO		
*Spiralator Position (%Open)		50	50		
*Manual Louver 1 Position (%Open)		50	50		
*Manual Louver 2 Position (%Open)		50	50		
Other					
Heat Trace OK (Check for Yes)	☐	☑	☑	☐	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☑ ☑	☑ ☑	☐ ☐	☐ ☐
Flare 3 - Monitoring					
Time (hh.mm)		1353	1455		
Technician (Initials)		CS	CS		
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☑	☑	☐	☐
*Heating/Cooling OK (Check for Yes)	☐	☑	☑	☐	☐
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☑	☑	☐	☐

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)		40.4	41.5		
*Gas Handling Skid Inlet Temperature (F)		73	72		
*Panel Temperature (F)		114	108		
*Recirculation Valve Position (%Closed)		100	100		
*Flare Flame Temperature (F)		1320	1269		
*Flame Arrestor Temperature (F)		109	107		
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))		302 1722	302 1747		
*Blower Speed (Blower | Speed (%Max))		71	70		
*Blower Vibration (Blower | Vibration (in/Sec))		0.03	0.02		
*Blower Current (Blower | Current (Amps))		32.8	32.2		
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)		111.8	1068		
*Total Flow (MMSCF)		235536	237.00		
*Flow Pressure (inWC)		5.4	5.1		
*Flow Temperature (F)		110	108		
*Flow DP (inWC)		3.13	3.53		
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)		235.36	237.00		
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☑	☑	☐	☐
Gas Handling Skid					
*Demister Inlet Pressure (inWC)		-39.0	-39.6		
*Demister Outlet Pressure (inWC)		-41.1	-40.9		
*Demister DP (inWC)		+2.1	+1.3		
*Flame Arrester Inlet Pressure (inWC)		+6.2	+6.4		
*Flame Arrester Outlet Pressure (inWC)		+5.7	+5.7		
*Flame Arrester DP (inWC)		+0.5	+0.7		
*Fail-Close Valve Air Pressure (psi)		105	105		
Flare					
*Visible Emissions (Yes/No, If yes explain)		NO	NO		
*Spiralator Position (%Open)		50	50		
*Manual Louver 1 Position (%Open)		50	50		
*Manual Louver 2 Position (%Open)		50	50		
Other					
*Heat Trace OK (Check for Yes)	☐	☑	☑	☐	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☑ ☑	☑ ☑	☐ ☐	☐ ☐
Engine Plant 1 - Monitoring					
Time (hh mm)		1404	1504		
Technician (Initials)		CS	CS		
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)		711 —	711 —		
*Power Setpoint (kWh) (Engine #2 | #1)		692 —	687 —		
Control Room - Laptop					
*Flow Total (MSCF)		338060.9	338807.0		
*Flow Rate (SCFM)		491.5	492.0		
*Discharge Gas Temperature (F)		88.0	79.0		
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)		-45.5	-44.1		
Other					
*Visible Emissions (Yes/No, If yes explain)		NO	NO		

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					09/10/21
Lowry Header - Monitoring					
Time (hh mm)					1437
Technician (initials)					CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)					204
Gas Temperature (F)					65.0
Flare 2 - Monitoring					
Time (hh:mm)					1440
Technician (initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)					42.2
*Flare DP (inWC)					5.38
*Flare Flame Temperature (F)					1338
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)					118
*Gas Handling Skid Inlet Temperature (F)					49
*Recirculation Valve Position (%Closed)					20
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)					497
*Total Flow (MMSCF)					979.4
*Flow Pressure (inWC)					6.9
*Flow Temperature (F)					129
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)					635.48
*Reset Date/Time (mm/dd/yy hh.mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)					36107
*Blower 301 Vibration (in/Sec)					0.24
*Blower 301 Speed (%Max)					92
*Blower 301 Inlet Bearing Temp (F)					98
*Blower 301 Outlet Bearing Temp (F)					139
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					141
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-42.7
*Demister Outlet Pressure (inWC)					-45.6
*Demister DP (inWC)					+2.9
*Flame Arrester Inlet Pressure (inWC)					+8.0
*Flame Arrester Outlet Pressure (inWC)					+4.9
*Flame Arrester DP (inWC)					+3.1
Flare					
*Visible Emissions (Yes/No, If yes explain)					No
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)					1455
Technician (initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)					40.1
*Gas Handling Skid Inlet Temperature (F)					73
*Panel Temperature (F)					128
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1312
*Flame Arrestor Temperature (F)					117
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))					302 1896
*Blower Speed (Blower | Speed (%Max))					77
*Blower Vibration (Blower | Vibration (in/Sec))					0.07
*Blower Current (Blower | Current (Amps))					41.5
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					1472
*Total Flow (MMSCF)					248.68
*Flow Pressure (inWC)					9.3
*Flow Temperature (F)					117
*Flow DP (inWC)					5.58
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					248.68
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-40.1
*Demister Outlet Pressure (inWC)					-42.2
*Demister DP (inWC)					+2.1
*Flame Arrester Inlet Pressure (inWC)					+10.6
*Flame Arrester Outlet Pressure (inWC)					+9.8
*Flame Arrester DP (inWC)					+0.8
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					0
*Manual Louver 1 Position (%Open)					0
*Manual Louver 2 Position (%Open)					0
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)					1504
Technician (Initials)					CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					711 707
*Power Setpoint (kWh) (Engine #2 | #1)					C52C87
Control Room - Laptop					
*Flow Total (MSCF)					342090.2
*Flow Rate (SCFM)					924.4
*Discharge Gas Temperature (F)					96.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)					-44.0
Other					
*Visible Emissions (Yes/No, If yes explain)					NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)			09/15/21		09/17/21
Lowry Header - Monitoring					
Time (hh mm)			1456		1539
Technician (initials)			CS		CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)			206		205
Gas Temperature (F)			65.0		65
Flare 2 - Monitoring					
Time (hh:mm)			1502		1542
Technician (initials)			CS		CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)			41.8		41.6
*Flare DP (inWC)			5.48		5.50
*Flare Flame Temperature (F)			1247		1275
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)			111		62
*Gas Handling Skid Inlet Temperature (F)			51		79
*Recirculation Valve Position (%Closed)			70		70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)			501		498
*Total Flow (MMSCF)			982.29		983.75
*Flow Pressure (inWC)			7.0		7.0
*Flow Temperature (F)			128		146
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)			C38.63		C40.09
*Reset Date/Time (mm/dd/yy hh.mm ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)			37012		37061
*Blower 301 Vibration (in/Sec)			0.26		0.24
*Blower 301 Speed (%Max)			93		91
*Blower 301 Inlet Bearing Temp (F)			90		86
*Blower 301 Outlet Bearing Temp (F)			138		135
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)			13.9		14.0
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-42.0		-42.3
*Demister Outlet Pressure (inWC)			-44.8		-45.1
*Demister DP (inWC)			+2.8		+2.8
*Flame Arrester Inlet Pressure (inWC)			-18.0		+7.8
*Flame Arrester Outlet Pressure (inWC)			+4.9		+4.9
*Flame Arrester DP (inWC)			+3.1		+2.9
Flare					
*Visible Emissions (Yes/No, If yes explain)			NO		NO
*Spiralator Position (%Open)			50		50
*Manual Louver 1 Position (%Open)			50		50
*Manual Louver 2 Position (%Open)			50		50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☑	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh.mm)			1511		1550
Technician (initials)			CS		CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☑	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)			39.7		39.6
*Gas Handling Skid Inlet Temperature (F)			74		73
*Panel Temperature (F)			119		98
*Recirculation Valve Position (%Closed)			100		100
*Flare Flame Temperature (F)			1299		1121
*Flame Arrestor Temperature (F)			116		107
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))			302 1793		302 2042
*Blower Speed (Blower | Speed (%Max))			79		76
*Blower Vibration (Blower | Vibration (in/Sec))			0.06		0.05
*Blower Current (Blower | Current (Amps))			42.1		39.3
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)			1416		1376
*Total Flow (MMSCF)			257.66		261.66
*Flow Pressure (inWC)			9.0		7.9
*Flow Temperature (F)			117		108
*Flow DP (inWC)			5.29		4.73
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)			257.66		261.66
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☑	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-39.6		-40.0
*Demister Outlet Pressure (inWC)			-41.7		-41.9
*Demister DP (inWC)			+2.1		+1.9
*Flame Arrester Inlet Pressure (inWC)			+10.7		+9.3
*Flame Arrester Outlet Pressure (inWC)			+9.8		+8.4
*Flame Arrester DP (inWC)			+0.9		+0.9
*Fail-Close Valve Air Pressure (psi)			105		105
Flare					
*Visible Emissions (Yes/No, If yes explain)			NO		NO
*Spiralator Position (%Open)			50		50
*Manual Louver 1 Position (%Open)			50		50
*Manual Louver 2 Position (%Open)			50		50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☑	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☐ ☐	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)			1518		1554
Technician (Initials)			CS		CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)			648 680		645 647
*Power Setpoint (kWh) (Engine #2 | #1)			682 697		682 683
Control Room - Laptop					
*Flow Total (MSCF)			3489247		3512661
*Flow Rate (SCFM)			968.2		961.3
*Discharge Gas Temperature (F)			89.0		72.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)			-43.1		-41.4
Other					
*Visible Emissions (Yes/No, If yes explain)			NO		NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					09/24/21
Lowry Header - Monitoring					
Time (hh:mm)					1507
Technician (Initials)					CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)					198
Gas Temperature (F)					65
Flare 2 - Monitoring					
Time (hh:mm)					1513
Technician (Initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)					37.9
*Flare DP (inWC)					5.04
*Flare Flame Temperature (F)					1172
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)					64
*Gas Handling Skid Inlet Temperature (F)					78
*Recirculation Valve Position (%Closed)					0
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)					497
*Total Flow (MMSCF)					98878
*Flow Pressure (inWC)					7.1
*Flow Temperature (F)					143
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)					6.45.12
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)					37228
*Blower 301 Vibration (in/Sec)					0.22
*Blower 301 Speed (%Max)					89
*Blower 301 Inlet Bearing Temp (F)					88
*Blower 301 Outlet Bearing Temp (F)					145
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					13.5
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-38.1
*Demister Outlet Pressure (inWC)					-41.3
*Demister DP (inWC)					+3.2
*Flame Arrester Inlet Pressure (inWC)					+8.4
*Flame Arrester Outlet Pressure (inWC)					+4.9
*Flame Arrester DP (inWC)					+3.5
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)					1530
Technician (Initials)					CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)					39.6
*Gas Handling Skid Inlet Temperature (F)					74
*Panel Temperature (F)					103
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1279
*Flame Arrestor Temperature (F)					109
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))					302 → 2207
*Blower Speed (Blower | Speed (%Max))					74
*Blower Vibration (Blower | Vibration (in/Sec))					0.04
*Blower Current (Blower | Current (Amps))					36.9
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					1391
*Total Flow (MMSCF)					275.25
*Flow Pressure (inWC)					7.5
*Flow Temperature (F)					109
*Flow DP (inWC)					4.68
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					275.25
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	✓
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-39.7
*Demister Outlet Pressure (inWC)					-41.5
*Demister DP (inWC)					+1.8
*Flame Arrester Inlet Pressure (inWC)					+9.0
*Flame Arrester Outlet Pressure (inWC)					+8.3
*Flame Arrester DP (inWC)					+0.7
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	✓ ✓
Engine Plant 1 - Monitoring					
Time (hh mm)					1528
Technician (Initials)					CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					695 686
*Power Setpoint (kWh) (Engine #2 | #1)					694 681
Control Room - Laptop					
*Flow Total (MSCF)					3611175.7
*Flow Rate (SCFM)					993.3
*Discharge Gas Temperature (F)					760
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)					-42.3
Other					
*Visible Emissions (Yes/No, If yes explain)					NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				09/30/21	10/01/21
Lowry Header - Monitoring					
Time (hh:mm)				1502	1422
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				196	192
Gas Temperature (F)				64.0	64.0
Flare 2 - Monitoring					
Time (hh:mm)				1505	1424
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				35.8	35.6
*Flare DP (inWC)				5.17	5.44
*Flare Flame Temperature (F)				1160	1174
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				56	65
*Gas Handling Skid Inlet Temperature (F)				78	75
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				500	504
*Total Flow (MMSCF)				993.11	993.81
*Flow Pressure (inWC)				6.9	6.8
*Flow Temperature (F)				134	137
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				649.44	650.14
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				37377	37395
*Blower 301 Vibration (In/Sec)				0.29	0.28
*Blower 301 Speed (%Max)				86	87
*Blower 301 Inlet Bearing Temp (F)				77	85
*Blower 301 Outlet Bearing Temp (F)				134	137
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				13.2	13.0
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-36.1	-36.0
*Demister Outlet Pressure (inWC)				-39.0	-38.9
*Demister DP (inWC)				+2.9	+2.9
*Flame Arrester Inlet Pressure (inWC)				+8.3	+8.2
*Flame Arrester Outlet Pressure (inWC)				+4.8	+4.9
*Flame Arrester DP (inWC)				+3.5	+3.3
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Flare 3 - Monitoring					
Time (hh:mm)				1516	1435
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.3	40.0
*Gas Handling Skid Inlet Temperature (F)				71	73
*Panel Temperature (F)				87	100
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1285	1183
*Flame Arrestor Temperature (F)				99	104
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302 2357	302 2374
*Blower Speed (Blower | Speed (%Max))				70	72
*Blower Vibration (Blower | Vibration (in/Sec))				0.02	0.03
*Blower Current (Blower | Current (Amps))				36.2	36.5
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1262	1297
*Total Flow (MMSCF)				286.65	288.44
*Flow Pressure (inWC)				6.2	6.8
*Flow Temperature (F)				101	107
*Flow DP (inWC)				4.08	4.10
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				286.65	288.44
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☑	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.1	-39.7
*Demister Outlet Pressure (inWC)				-41.5	-41.7
*Demister DP (inWC)				+1.4	+2.0
*Flame Arrester Inlet Pressure (inWC)				+7.5	+8.5
*Flame Arrester Outlet Pressure (inWC)				+7.0	+7.6
*Flame Arrester DP (inWC)				+0.5	+0.9
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)				1524	1443
Technician (Initials)				CS	
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				692 698	717 744
*Power Setpoint (kWh) (Engine #2 | #1)				635 651	688 697
Control Room - Laptop					
*Flow Total (MSCF)				36,984.5	37,273.6
*Flow Rate (SCFM)				913.7	942.4
*Discharge Gas Temperature (F)				63.0	65.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-42.1	-43.6
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)			10/13/21	10/14/21	
Lowry Header - Monitoring					
Time (hh:mm)			1513	1420	
Technician (Initials)			CB	CB	
Control Panel - Digital Recorder					
Flow Rate (SCFM)			209	218	
Gas Temperature (F)			93.0	93	
Flare 2 - Monitoring					
Time (hh:mm)			1517	1424	
Technician (Initials)			CB	CB	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☑	☐
Heating/Cooling OK (Check for Yes)	☐	☐	☑	☑	☐
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☑	☑	☐
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)			42.5	41.7	
*Flare DP (InWC)			5.49	5.38	
*Flare Flame Temperature (F)			1168	1145	
Control Panel - Touchscreen (Press Next)					
Panel Temperature (F)			83	79	
*Gas Handling Skid Inlet Temperature (F)			59	61	
*Recirculation Valve Position (%Closed)			70	70	
Control Panel - Touchscreen - Flare Flow Data (Press Back 2x, Flare Flow Data)					
*Flow Rate (SCFM)			502	499	
*Total Flow (MMSCF)			1002.41	1003.10	
*Flow Pressure (InWC)			6.8	6.7	
*Flow Temperature (F)			126	122	
Control Panel - Touchscreen (Press Resettable Flow History, Analog Data Menu, Blower Data)					
*Resettable Total Flow (MMSCF)			058.74	059.44	
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data (Press Main)					
*Blower 301 Runtime (Hours)			37052	37105	
*Blower 301 Vibration (in/Sec)			0.27	0.25	
*Blower 301 Speed (%Max)			92	91	
*Blower 301 Inlet Bearing Temp (F)			61	60	
*Blower 301 Outlet Bearing Temp (F)			127	121	
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)			14.0	13.7	
Gas Handling Skid					
*Demister Inlet Pressure (InWC)			-42.8	-42.7	
*Demister Outlet Pressure (InWC)			-45.6	-45.5	
*Demister DP (InWC)			+2.8	+2.8	
*Flame Arrester Inlet Pressure (InWC)			+8.0	+7.6	
*Flame Arrester Outlet Pressure (InWC)			+4.8	+4.6	
*Flame Arrester DP (InWC)			+3.2	+3.0	
Flare					
*Visible Emissions (Yes/No, If yes explain)			NO	NO	
*Spiralator Position (%Open)			50	50	
*Manual Louver 1 Position (%Open)			50	50	
*Manual Louver 2 Position (%Open)			50	50	
Other					
Heat Trace OK (Check for Yes)	☐	☐	☑	☑	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☑ ☑	☐ ☐
Flare 3 - Monitoring					
Time (hh:mm)			1538	1431	
Technician (Initials)			CB	CB	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☑	☐
*Heating/Cooling OK (Check for Yes)	☐	☐	☑	☑	☐
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☑	☑	☐

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)			40.4	39.9	
*Gas Handling Skid Inlet Temperature (F)			71	70	
*Panel Temperature (F)			92	85	
*Recirculation Valve Position (%Closed)			100	100	
*Flare Flame Temperature (F)			1265	1368	
*Flame Arrestor Temperature (F)			105	100	
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))			301 2153	301 2176	
*Blower Speed (Blower | Speed (%Max))			78	77	
*Blower Vibration (Blower | Vibration (In/Sec))			0.07	0.05	
*Blower Current (Blower | Current (Amps))			43.1	42.4	
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)			1558	1534	
*Total Flow (MMSCF)			313.92	316.03	
*Flow Pressure (inWC)			9.7	9.4	
*Flow Temperature (F)			110	104	
*Flow DP (inWC)			6.18	5.99	
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)			313.92	316.03	
*Reset Date/Time (mm/dd/yy hh mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☑	☑	☐
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-40.4	-40.2	
*Demister Outlet Pressure (inWC)			-42.8	-42.7	
*Demister DP (inWC)			+2.4	+2.5	
*Flame Arrester Inlet Pressure (inWC)			+11.6	+10.4	
*Flame Arrester Outlet Pressure (inWC)			+10.6	+9.7	
*Flame Arrester DP (inWC)			+1.8	+0.7	
*Fail-Close Valve Air Pressure (psi)			105	103	
Flare					
*Visible Emissions (Yes/No, If yes explain)			NO	NO	
*Spiralator Position (%Open)			50	50	
*Manual Louver 1 Position (%Open)			50	50	
*Manual Louver 2 Position (%Open)			50	50	
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☑	☑	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☑ ☑	☐ ☐
Engine Plant 1 - Monitoring					
Time (hh mm)			1540	1441	
Technician (Initials)			CS	CS	
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)			700 664	688 690	
*Power Setpoint (kWh) (Engine #2 | #1)			687	697	
Control Room - Laptop					
*Flow Total (MSCF)			384073.3	384909.2	
*Flow Rate (SCFM)			775.8	787.8	
*Discharge Gas Temperature (F)			83.0	76.0	
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)			-41.7	-40.5	
Other					
*Visible Emissions (Yes/No, If yes explain)			NO	NO	

Note * Collect during device operation only

Remarks

10/13 - Engine #2 Down
10/14 - Engine #2 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					10/22/21
Lowry Header - Monitoring					
Time (hh:mm)					1310
Technician (initials)					CB
Control Panel - Digital Recorder					
Flow Rate (SCFM)					186
Gas Temperature (F)					61.0
Flare 2 - Monitoring					
Time (hh:mm)					1314
Technician (initials)					CB
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)					40.5
*Flare DP (inWC)					5.53
*Flare Flame Temperature (F)					1172
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)					100
*Gas Handling Skid Inlet Temperature (F)					49
*Recirculation Valve Position (%Closed)					0
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)					503
*Total Flow (MMSCF)					1008.84
*Flow Pressure (inWC)					6.4
*Flow Temperature (F)					120
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)					665.17
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)					37896
*Blower 301 Vibration (in/Sec)					0.27
*Blower 301 Speed (%Max)					88
*Blower 301 Inlet Bearing Temp (F)					71
*Blower 301 Outlet Bearing Temp (F)					127
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					13.7
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-37.2
*Demister Outlet Pressure (inWC)					-44.4
*Demister DP (inWC)					+7.2
*Flame Arrester Inlet Pressure (inWC)					+7.4
*Flame Arrester Outlet Pressure (inWC)					+4.8
*Flame Arrester DP (inWC)					+2.6
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)					1332
Technician (initials)					CB
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (InWC)					40.9
*Gas Handling Skid Inlet Temperature (F)					70
*Panel Temperature (F)					104
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1248
*Flame Arrestor Temperature (F)					104
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower 1 | Runtime (Hours))					301 2367
*Blower Speed (Blower 1 | Speed (%Max))					70
*Blower Vibration (Blower 1 | Vibration (in/Sec))					0.03
*Blower Current (Blower 1 | Current (Amps))					32.2
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					1199
*Total Flow (MMSCF)					331.52
*Flow Pressure (InWC)					6.7
*Flow Temperature (F)					105
*Flow DP (InWC)					4.45
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					331.52
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (InWC)					-36.8
*Demister Outlet Pressure (InWC)					-42.2
*Demister DP (InWC)					+5.4
*Flame Arrester Inlet Pressure (InWC)					+6.5
*Flame Arrester Outlet Pressure (InWC)					+41.5
*Flame Arrester DP (InWC)					+2.0
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)					1345
Technician (Initials)					CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					699 699
*Power Setpoint (kWh) (Engine #2 | #1)					710 681
Control Room - Laptop					
*Flow Total (MSCF)					3955341.8
*Flow Rate (SCFM)					1010.3
*Discharge Gas Temperature (F)					75.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (InWC)					-42.5
Other					
*Visible Emissions (Yes/No, If yes explain)					NO
Note * Collect during device operation only					

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				10/28/21	10/29/21
Lowry Header - Monitoring					
Time (hh mm)				10/28/21	CS
Technician (initials)				1136	1402
Control Panel - Digital Recorder					
Flow Rate (SCFM)				192	208
Gas Temperature (F)				60.0	60.0
Flare 2 - Monitoring					
Time (hh:mm)				1640	1406
Technician (initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				42.4	43.9
*Flare DP (inWC)				5.12	5.44
*Flare Flame Temperature (F)				1216	1200
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				84	100
*Gas Handling Skid Inlet Temperature (F)				54	47
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				508	489
*Total Flow (MMSCF)				1012.90	1013.55
*Flow Pressure (inWC)				6.4	7.1
*Flow Temperature (F)				117	121
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				669.24	669.88
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				38031	38053
*Blower 301 Vibration (in/Sec)				0.24	0.24
*Blower 301 Speed (%Max)				89	90
*Blower 301 Inlet Bearing Temp (F)				56	68
*Blower 301 Outlet Bearing Temp (F)				114	120
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				14.6	14.3
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-44.6	-43.3
*Demister Outlet Pressure (inWC)				-46.7	-48.3
*Demister DP (inWC)				+2.1	+5.0
*Flame Arrester Inlet Pressure (inWC)				+7.5	+8.3
*Flame Arrester Outlet Pressure (inWC)				+4.5	+4.5
*Flame Arrester DP (inWC)				+3.0	+3.8
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)				1652	1417
Technician (initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☑	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.5	40.9
*Gas Handling Skid Inlet Temperature (F)				65	69
*Panel Temperature (F)				89	101
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1284	1105
*Flame Arrestor Temperature (F)				102	100
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				301 2494	301 2515
*Blower Speed (Blower | Speed (%Max))				77	67
*Blower Vibration (Blower | Vibration (in/Sec))				0.05	0.02
*Blower Current (Blower | Current (Amps))				46.0	31.6
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1547	1096
*Total Flow (MMSCF)				340.09	341.85
*Flow Pressure (inWC)				8.6	5.8
*Flow Temperature (F)				103	101
*Flow DP (inWC)				0.93	3.58
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				340.09	341.85
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☑	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-43.3	-42.0
*Demister Outlet Pressure (inWC)				-45.3	-43.2
*Demister DP (inWC)				+2.0	+1.2
*Flame Arrester Inlet Pressure (inWC)				+10.6	-5.8
*Flame Arrester Outlet Pressure (inWC)				+9.7	+4.8
*Flame Arrester DP (inWC)				+0.9	+1.0
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh:mm)				1704	1480
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				672 —	703 666
*Power Setpoint (kWh) (Engine #2 | #1)				— 688	691 673
Control Room - Laptop					
*Flow Total (MSCF)				4037605	4047553
*Flow Rate (SCFM)				605.4	996.3
*Discharge Gas Temperature (F)				77.0	74.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-41.7	-45.2
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

10/28 - Engine #4 & #2 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)					11/05/21
Lowry Header - Monitoring					
Time (hh:mm)					1355
Technician (Initials)					DS
Control Panel - Digital Recorder					
Flow Rate (SCFM)					218
Gas Temperature (F)					59.0
Flare 2 - Monitoring					
Time (hh:mm)					1402
Technician (Initials)					DS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)					41.6
*Flare DP (InWC)					5.32
*Flare Flame Temperature (F)					1230
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)					100
*Gas Handling Skid Inlet Temperature (F)					43
*Recirculation Valve Position (%Closed)					70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)					497
*Total Flow (MMSCF)					1018.59
*Flow Pressure (InWC)					6.7
*Flow Temperature (F)					118
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)					674.93
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)					38221
*Blower 301 Vibration (in/Sec)					0.25
*Blower 301 Speed (%Max)					90
*Blower 301 Inlet Bearing Temp (F)					67
*Blower 301 Outlet Bearing Temp (F)					121
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)					3.8
Gas Handling Skid					
*Demister Inlet Pressure (InWC)					-41.6
*Demister Outlet Pressure (InWC)					-44.2
*Demister DP (InWC)					+2.6
*Flame Arrester Inlet Pressure (InWC)					+8.1
*Flame Arrester Outlet Pressure (InWC)					+4.7
*Flame Arrester DP (InWC)					+3.4
Flare					
*Visible Emissions (Yes/No, If yes explain)					No
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 & T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)					1415
Technician (Initials)					DS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)					40.1
*Gas Handling Skid Inlet Temperature (F)					68
*Panel Temperature (F)					101
*Recirculation Valve Position (%Closed)					100
*Flare Flame Temperature (F)					1264
*Flame Arrestor Temperature (F)					102
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower 1 Runtime (Hours))					302 2582
*Blower Speed (Blower 1 Speed (%Max))					69
*Blower Vibration (Blower 1 Vibration (in/Sec))					6.02
*Blower Current (Blower 1 Current (Amps))					34.0
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)					1222
*Total Flow (MMSCF)					353.37
*Flow Pressure (inWC)					6.1
*Flow Temperature (F)					104
*Flow DP (inWC)					3.78
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)					353.37
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)					-39.4
*Demister Outlet Pressure (inWC)					-40.6
*Demister DP (inWC)					+1.2
*Flame Arrester Inlet Pressure (inWC)					+7.8
*Flame Arrester Outlet Pressure (inWC)					+7.1
*Flame Arrester DP (inWC)					+0.7
*Fail-Close Valve Air Pressure (psi)					105
Flare					
*Visible Emissions (Yes/No, If yes explain)					NO
*Spiralator Position (%Open)					50
*Manual Louver 1 Position (%Open)					50
*Manual Louver 2 Position (%Open)					50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh mm)					1424
Technician (Initials)					CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)					681 687
*Power Setpoint (kWh) (Engine #2 | #1)					689 686
Control Room - Laptop					
*Flow Total (MSCF)					415190.6
*Flow Rate (SCFM)					1073.0
*Discharge Gas Temperature (F)					74.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)					-43.9
Other					
*Visible Emissions (Yes/No, If yes explain)					NO
Note * Collect during device operation only					

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				11/11/21	11/12/21
Lowry Header - Monitoring					
Time (hh mm)				1402	1340
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				217	216
Gas Temperature (F)				58	58
Flare 2 - Monitoring					
Time (hh:mm)				1408	1343
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)				38.5	38.9
*Flare DP (InWC)				5.24	5.24
*Flare Flame Temperature (F)				1024	1230
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				75	83
*Gas Handling Skid Inlet Temperature (F)				54	49
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				499	498
*Total Flow (MMSCF)				1022.43	1023.1
*Flow Pressure (InWC)				6.5	6.6
*Flow Temperature (F)				111	112
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				678.8	679.5
*Reset Date/Time (mm/dd/yy hh.mm ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				35349	35372
*Blower 301 Vibration (In/Sec)				0.22	0.24
*Blower 301 Speed (%Max)				85	86
*Blower 301 Inlet Bearing Temp (F)				57	55
*Blower 301 Outlet Bearing Temp (F)				105	119
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				13.4	13.3
Gas Handling Skid					
*Demister Inlet Pressure (InWC)				-40.0	-39.2
*Demister Outlet Pressure (InWC)				-42.4	-42.1
*Demister DP (InWC)				+2.4	+2.9
*Flame Arrester Inlet Pressure (InWC)				+7.8	+7.8
*Flame Arrester Outlet Pressure (InWC)				+4.7	+4.6
*Flame Arrester DP (InWC)				+3.1	+3.2
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other				✓	✓
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Flare 3 - Monitoring					
Time (hh.mm)				1419	1355
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				39.6	39.8
*Gas Handling Skid Inlet Temperature (F)				~~69~~ 65	65
*Panel Temperature (F)				73	72
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1412	1376
*Flame Arrestor Temperature (F)				92	94
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302 2690	302 2714
*Blower Speed (Blower | Speed (%Max))				69	67
*Blower Vibration (Blower | Vibration (in/Sec))				0.01	0.01
*Blower Current (Blower | Current (Amps))				32.3	31.8
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1168	1124
*Total Flow (MMSCF)				342.75	344.33
*Flow Pressure (inWC)				5.9	4.6
*Flow Temperature (F)				95	95
*Flow DP (inWC)				3.44	3.21
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				342.7	344.55
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	✓	✓
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.0	-40.0
*Demister Outlet Pressure (inWC)				-41.5	-41.2
*Demister DP (inWC)				+1.5	+1.2
*Flame Arrester Inlet Pressure (inWC)				+7.0	+5.6
*Flame Arrester Outlet Pressure (inWC)				+6.4	+4.4
*Flame Arrester DP (inWC)				+0.6	+0.7
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				~~50~~ 50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Engine Plant 1 - Monitoring					
Time (hh:mm)				1430	1426
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				700 670	714 684
*Power Setpoint (kWh) (Engine #2 | #1)				699 677	705 705
Control Room - Laptop					
*Flow Total (MSCF)				424595.9	426150.9
*Flow Rate (SCFM)				1065.6	1089.2
*Discharge Gas Temperature (F)				78.0	80.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-42.1	-42.4
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				11/18/21	11/19/21
Lowry Header - Monitoring					
Time (hh:mm)				1443	1305
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				213	213
Gas Temperature (F)				57.0	57.0
Flare 2 - Monitoring					
Time (hh:mm)				1450	1305
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				36.4	36.3
*Flare DP (inWC)				5.38	5.21
*Flare Flame Temperature (F)				1111	1128
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				79	95
*Gas Handling Skid Inlet Temperature (F)				50	42
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				496	500
*Total Flow (MMSCF)				1027.5	1028.17
*Flow Pressure (inWC)				6.5	6.5
*Flow Temperature (F)				108	109
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				683.83	684.51
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				38518	38540
*Blower 301 Vibration (in/Sec)				0.25	0.24
*Blower 301 Speed (%Max)				85	84
*Blower 301 Inlet Bearing Temp (F)				55	63
*Blower 301 Outlet Bearing Temp (F)				105	117
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				13.0	13.5
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-36.4	-36.8
*Demister Outlet Pressure (inWC)				-39.3	-39.5
*Demister DP (inWC)				+2.9	+2.7
*Flame Arrester Inlet Pressure (inWC)				+7.6	+7.9
*Flame Arrester Outlet Pressure (inWC)				+4.6	+4.6
*Flame Arrester DP (inWC)				+3.0	+3.3
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)				1500	1325
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	☑	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	☑	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	☑	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.4	39.4
*Gas Handling Skid Inlet Temperature (F)				64	65
*Panel Temperature (F)				85	103
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1296	1285
*Flame Arrestor Temperature (F)				92	99
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302 2859	302 2881
*Blower Speed (Blower | Speed (%Max))				67	68
*Blower Vibration (Blower | Vibration (in/Sec))				0.01	0.02
*Blower Current (Blower | Current (Amps))				31.4	32.2
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1145	1160
*Total Flow (MMSCF)				374.15	375.66
*Flow Pressure (inWC)				4.8	4.9
*Flow Temperature (F)				94	100
*Flow DP (inWC)				3.23	3.39
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				374.15	375.66
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	☑	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.2	-39.6
*Demister Outlet Pressure (inWC)				-41.4	-41.3
*Demister DP (inWC)				+1.2	+1.7
*Flame Arrester Inlet Pressure (inWC)				+5.7	-1.4
*Flame Arrester Outlet Pressure (inWC)				+5.6	+5.8
*Flame Arrester DP (inWC)				+0.7	+0.6
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☒	☑	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	☑ ☑	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh:mm)				1513	1339
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				685 690	699 700
*Power Setpoint (kWh) (Engine #2 | #1)				700 688	685 671
Control Room - Laptop					
*Flow Total (MSCF)				4354720	4371267
*Flow Rate (SCFM)				1080.3	1083.1
*Discharge Gas Temperature (F)				93.0	800
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-42.2	-43.0
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
Note * Collect during device operation only					

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)			11/24/21		11/26/21
Lowry Header - Monitoring					
Time (hh:mm)			1312		1020
Technician (Initials)			CS		CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)			211		213
Gas Temperature (F)			56.0		56.0
Flare 2 - Monitoring					
Time (hh:mm)			1314		1024
Technician (Initials)			CS		CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☐	☑
Heating/Cooling OK (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)			34.2		35.7
*Flare DP (InWC)			4.95		5.44
*Flare Flame Temperature (F)			1054		1245
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)			68		83
*Gas Handling Skid Inlet Temperature (F)			52		47
*Recirculation Valve Position (%Closed)			70		70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)			503		505
*Total Flow (MMSCF)			1031.78		1033.14
*Flow Pressure (InWC)			4.5		4.7
*Flow Temperature (F)			102		110
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)			685.11		689.47
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)			35760		38705
*Blower 301 Vibration (in/Sec)			0.24		0.24
*Blower 301 Speed (%Max)			84		84
*Blower 301 Inlet Bearing Temp (F)			46		63
*Blower 301 Outlet Bearing Temp (F)			89		103
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)			13.1		13.2
Gas Handling Skid					
*Demister Inlet Pressure (InWC)			-36.3		-36.1
*Demister Outlet Pressure (InWC)			-36.7		-38.6
*Demister DP (InWC)			+2.4		+2.5
*Flame Arrester Inlet Pressure (InWC)			+7.16		+7.6
*Flame Arrester Outlet Pressure (InWC)			+4.21		+4.8
*Flame Arrester DP (InWC)			+3.2		+2.8
Flare					
*Visible Emissions (Yes/No, If yes explain)			No		No
*Spiralator Position (%Open)			50		50
*Manual Louver 1 Position (%Open)			50		50
*Manual Louver 2 Position (%Open)			50		50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☑	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☐ ☐	☑ ☑
Flare 3 - Monitoring					
Time (hh:mm)			1324		1023
Technician (Initials)			CS		CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☑	☐	☑
*Heating/Cooling OK (Check for Yes)	☐	☐	☑	☐	☑
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☑	☐	☑

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)			40.1		40.2
*Gas Handling Skid Inlet Temperature (F)			63		63
*Panel Temperature (F)			71		90
*Recirculation Valve Position (%Closed)			100		100
*Flare Flame Temperature (F)			1303		1271
*Flame Arrestor Temperature (F)			52		95
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))			302 30.1		302 304.6
*Blower Speed (Blower | Speed (%Max))			64		66
*Blower Vibration (Blower | Vibration (in/Sec))			0.01		0.01
*Blower Current (Blower | Current (Amps))			25.2		30.7
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)			1062		1105
*Total Flow (MMSCF)			38[illegible]		386.44
*Flow Pressure (inWC)			4.7		4.4
*Flow Temperature (F)			84		96
*Flow DP (inWC)			2.47		2.91
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)			353.64		386.44
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☑	☐	☑
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-40.4		-40.1
*Demister Outlet Pressure (inWC)			-41.2		-41.7
*Demister DP (inWC)			+0.8		+1.6
*Flame Arrester Inlet Pressure (inWC)			+4.2		+5.1
*Flame Arrester Outlet Pressure (inWC)			+4.6		+4.7
*Flame Arrester DP (inWC)			+0.4		+0.4
*Fail-Close Valve Air Pressure (psi)			105		105
Flare					
*Visible Emissions (Yes/No, If yes explain)			NO		NO
*Spiralator Position (%Open)			50		50
*Manual Louver 1 Position (%Open)			50		50
*Manual Louver 2 Position (%Open)			50		50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☑	☐	☑
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☐ ☐	☑ ☑
Engine Plant 1 - Monitoring					
Time (hh:mm)			1337		1045
Technician (Initials)			CS		CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)			705 697		700 692
*Power Setpoint (kWh) (Engine #2 | #1)			704 694		697 710
Control Room - Laptop					
*Flow Total (MSCF)			445071.9		448135.4
*Flow Rate (SCFM)			1145.5		1128.5
*Discharge Gas Temperature (F)			81.0		70.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)			-40.5		-42.8
Other					
*Visible Emissions (Yes/No, If yes explain)			NO		NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				12/02/21	12/03/21
Lowry Header - Monitoring					
Time (hh:mm)				1445	1319
Technician (Initials)				DS	DS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				200	201
Gas Temperature (F)				55.0	55.0
Flare 2 - Monitoring					
Time (hh:mm)				1450	1329
Technician (Initials)				DS	DS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				31.7	31.9
*Flare DP (inWC)				5.22	5.24
*Flare Flame Temperature (F)				1250	1203
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				102	79
*Gas Handling Skid Inlet Temperature (F)				56	48
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				507	499
*Total Flow (MMSCF)				1037.59	1038.27
*Flow Pressure (inWC)				6.4	6.4
*Flow Temperature (F)				99	105
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				693.92	694.20
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				38854	38876
*Blower 301 Vibration (in/Sec)				0.18	0.21
*Blower 301 Speed (%Max)				82	81
*Blower 301 Inlet Bearing Temp (F)				58	59
*Blower 301 Outlet Bearing Temp (F)				116	108
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				12.2	12.2
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-32.2	-32.5
*Demister Outlet Pressure (inWC)				-35.0	-34.3
*Demister DP (inWC)				+2.8	+1.8
*Flame Arrester Inlet Pressure (inWC)				+7.6	+7.7
*Flame Arrester Outlet Pressure (inWC)				+4.7	+4.7
*Flame Arrester DP (inWC)				+2.9	+3.0
Flare					
*Visible Emissions (Yes/No, If yes explain)				No	No
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Flare 3 - Monitoring					
Time (hh:mm)				1508	1339
Technician (Initials)				DS	DS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	■	☐	✓	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.3	40.2
*Gas Handling Skid Inlet Temperature (F)				65	63
*Panel Temperature (F)				110	93
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1294	1073
*Flame Arrestor Temperature (F)				98	82
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				302 3195	301 2946
*Blower Speed (Blower | Speed (%Max))				68	67
*Blower Vibration (Blower | Vibration (in/Sec))				0.02	0.02
*Blower Current (Blower | Current (Amps))				32.6	33.1
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				1171	1197
*Total Flow (MMSCF)				396.85	398.33
*Flow Pressure (inWC)				5.3	5.2
*Flow Temperature (F)				99	82
*Flow DP (inWC)				3.48	3.34
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				396.85	398.33
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	✓	✓
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-39.7	-39.3
*Demister Outlet Pressure (inWC)				-40.0	-41.8
*Demister DP (inWC)				+0.3	+2.5
*Flame Arrester Inlet Pressure (inWC)				+6.4	+6.4
*Flame Arrester Outlet Pressure (inWC)				+5.7	+5.4
*Flame Arrester DP (inWC)				+0.9	+1.0
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Engine Plant 1 - Monitoring					
Time (hh mm)				1519	1349
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				704 700	693 694
*Power Setpoint (kWh) (Engine #2 | #1)				700 687	680 695
Control Room - Laptop					
*Flow Total (MSCF)				457119.5	458557.9
*Flow Rate (SCFM)				1036.5	1031.1
*Discharge Gas Temperature (F)				71.0	70.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-44.5	-42.7
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)		12/07/21			
Lowry Header - Monitoring					
Time (hh:mm)		1249			
Technician (Initials)		CS			
Control Panel - Digital Recorder					
Flow Rate (SCFM)		148			
Gas Temperature (F)		53.0			
Flare 2 - Monitoring					
Time (hh:mm)		1253			
Technician (Initials)		CS			
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☑	☐	☐	☐
Heating/Cooling OK (Check for Yes)	☐	☑	☐	☐	☐
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☑	☐	☐	☐
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (InWC)		29.1			
*Flare DP (InWC)		5.27			
*Flare Flame Temperature (F)		1121			
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)		78			
*Gas Handling Skid Inlet Temperature (F)		46			
*Recirculation Valve Position (%Closed)		70			
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)		501			
*Total Flow (MMSCF)		1041.14			
*Flow Pressure (InWC)		6.4			
*Flow Temperature (F)		49			
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)		697.47			
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)		38972			
*Blower 301 Vibration (In/Sec)		0.19			
*Blower 301 Speed (%Max)		79			
*Blower 301 Inlet Bearing Temp (F)		53			
*Blower 301 Outlet Bearing Temp (F)		104			
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)		11.7			
Gas Handling Skid					
*Demister Inlet Pressure (InWC)		-29.6			
*Demister Outlet Pressure (InWC)		-33.0			
*Demister DP (InWC)		+3.4			
*Flame Arrester Inlet Pressure (InWC)		+7.4			
*Flame Arrester Outlet Pressure (InWC)		+4.5			
*Flame Arrester DP (InWC)		+2.9			
Flare					
*Visible Emissions (Yes/No, If yes explain)		NO			
*Spiralator Position (%Open)		50			
*Manual Louver 1 Position (%Open)		50			
*Manual Louver 2 Position (%Open)		50			
Other					
Heat Trace OK (Check for Yes)	☐	☑	☐	☐	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☑ ☑	☐ ☐	☐ ☐	☐ ☐
Flare 3 - Monitoring					
Time (hh:mm)		1305			
Technician (Initials)		CS			
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☑	☐	☐	☐
*Heating/Cooling OK (Check for Yes)	☐	☑	☐	☐	☐
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☑	☐	☐	☐

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (InWC)		40.2			
*Gas Handling Skid Inlet Temperature (F)		61			
*Panel Temperature (F)		88			
*Recirculation Valve Position (%Closed)		100			
*Flare Flame Temperature (F)		126.7			
*Flame Arrestor Temperature (F)		89			
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))		301 2641			
*Blower Speed (Blower | Speed (%Max))		63			
*Blower Vibration (Blower | Vibration (In/Sec))		0.01			
*Blower Current (Blower | Current (Amps))		27.9			
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)		910			
*Total Flow (MMSCF)		404.78			
*Flow Pressure (InWC)		2.9			
*Flow Temperature (F)		91			
*Flow DP (InWC)		2.04			
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)		404.78			
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☑	☐	☐	☐
Gas Handling Skid					
*Demister Inlet Pressure (InWC)		-39.9			
*Demister Outlet Pressure (InWC)		-40.8			
*Demister DP (InWC)		+0.9			
*Flame Arrester Inlet Pressure (InWC)		+3.6			
*Flame Arrester Outlet Pressure (InWC)		+3.1			
*Flame Arrester DP (InWC)		+0.5			
*Fail-Close Valve Air Pressure (psi)		105			
Flare					
*Visible Emissions (Yes/No, If yes explain)		NO			
*Spiralator Position (%Open)		80			
*Manual Louver 1 Position (%Open)		80			
*Manual Louver 2 Position (%Open)		80			
Other					
*Heat Trace OK (Check for Yes)	☐	☑	☐	☐	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☑ ☑	☐ ☐	☐ ☐	☐ ☐
Engine Plant 1 - Monitoring					
Time (hh mm)		1317			
Technician (Initials)		[illegible]			
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)		711 694			
*Power Setpoint (kWh) (Engine #2 | #1)		716 710			
Control Room - Laptop					
*Flow Total (MSCF)		464506.0			
*Flow Rate (SCFM)		1053.3			
*Discharge Gas Temperature (F)		79.0			
Engine Bay/Control Room Window					
*Inlet Gas Pressure (InWC)		-41.0			
Other					
*Visible Emissions (Yes/No, If yes explain)		NO			

Note * Collect during device operation only

Remarks

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)				12/16/21	12/17/21
Lowry Header - Monitoring					
Time (hh:mm)				1434	1453
Technician (Initials)				CS	CS
Control Panel - Digital Recorder					
Flow Rate (SCFM)				191	186
Gas Temperature (F)				53.0	53.0
Flare 2 - Monitoring					
Time (hh:mm)				1429	1437
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)				23.6	22.8
*Flare DP (inWC)				5.18	5.12
*Flare Flame Temperature (F)				1073	1114
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)				85	71
*Gas Handling Skid Inlet Temperature (F)				41	47
*Recirculation Valve Position (%Closed)				70	70
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)				499	501
*Total Flow (MMSCF)				1047.7	1048.4
*Flow Pressure (inWC)				6.6	6.2
*Flow Temperature (F)				88	55
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)				704.0	704.7
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)				39189	39213
*Blower 301 Vibration (In/Sec)				0.18	0.33
*Blower 301 Speed (%Max)				74	73
*Blower 301 Inlet Bearing Temp (F)				92	42
*Blower 301 Outlet Bearing Temp (F)				95	95
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)				11.1	11.1
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-24.2	-24.0
*Demister Outlet Pressure (inWC)				-26.5	-26.1
*Demister DP (inWC)				+2.3	+2.1
*Flame Arrester Inlet Pressure (inWC)				+7.7	+7.5
*Flame Arrester Outlet Pressure (inWC)				+4.4	+4.4
*Flame Arrester DP (inWC)				+3.3	+2.9
Flare					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Flare 3 - Monitoring					
Time (hh:mm)				1441	1445
Technician (Initials)				CS	CS
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	☐	✓	✓
*Heating/Cooling OK (Check for Yes)	☐	☐	☐	✓	✓
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	☐	✓	✓

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)				40.4	40.3
*Gas Handling Skid Inlet Temperature (F)				54	61
*Panel Temperature (F)				87	85
*Recirculation Valve Position (%Closed)				100	100
*Flare Flame Temperature (F)				1327	1355
*Flame Arrestor Temperature (F)				84	80
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower | Runtime (Hours))				301 2859	301 2883
*Blower Speed (Blower | Speed (%Max))				62	66
*Blower Vibration (Blower | Vibration (in/Sec))				0.01	0.01
*Blower Current (Blower | Current (Amps))				27.1	31.2
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)				878	1058
*Total Flow (MMSCF)				417.52	418.05
*Flow Pressure (inWC)				2.4	5.3
*Flow Temperature (F)				84	84
*Flow DP (inWC)				1.68	2.14
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)				417.52	418.05
*Reset Date/Time (mm/dd/yy hh:mm:ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☐	✓	✓
Gas Handling Skid					
*Demister Inlet Pressure (inWC)				-40.0	-40.5
*Demister Outlet Pressure (inWC)				-40.7	-41.5
*Demister DP (inWC)				+0.7	+1.0
*Flame Arrester Inlet Pressure (inWC)				+3.2	+5.5
*Flame Arrester Outlet Pressure (inWC)				+2.9	+5.3
*Flame Arrester DP (inWC)				+0.3	+0.2
*Fail-Close Valve Air Pressure (psi)				105	105
Flare					
*Visible Emissions (Yes/No, If yes explain)				No	No
*Spiralator Position (%Open)				50	50
*Manual Louver 1 Position (%Open)				50	50
*Manual Louver 2 Position (%Open)				50	50
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☐	✓	✓
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☐ ☐	✓ ✓	✓ ✓
Engine Plant 1 - Monitoring					
Time (hh:mm)				1450	1457
Technician (Initials)				CS	CS
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)				700 699	698 702
*Power Setpoint (kWh) (Engine #2 | #1)				707 709	— 688
Control Room - Laptop					
*Flow Total (MSCF)				472413.7	472975.2
*Flow Rate (SCFM)				1069.2	808.8
*Discharge Gas Temperature (F)				100.0	62.0
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)				-43.5	-42.5
Other					
*Visible Emissions (Yes/No, If yes explain)				NO	NO
Note * Collect during device operation only					

Remarks

12/17 - Engine #2 Down

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Date (mm/dd/yy)			12/29/21	12/30/21	
Lowry Header - Monitoring					
Time (hh mm)			1506	1442	
Technician (initials)			CS	CS	
Control Panel - Digital Recorder					
Flow Rate (SCFM)			193	126	
Gas Temperature (F)			51.0	51.0	
Flare 2 - Monitoring					
Time (hh:mm)			1512	1426	
Technician (initials)			CS	CS	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	✓	✓	☐
Heating/Cooling OK (Check for Yes)	☐	☐	✓	✓	☐
Control Panel - Digital Recorder					
Local Recorder On (Check for Yes)	☐	☐	✓	✓	☐
Control Panel - Touchscreen - Process Overview					
*Gas Handling Skid Inlet Pressure (inWC)			19.4	17.2	
*Flare DP (inWC)			5.03	5.04	
*Flare Flame Temperature (F)			1270	1112	
Control Panel - Touchscreen *(Press Next)*					
Panel Temperature (F)			76	72	
*Gas Handling Skid Inlet Temperature (F)			43	42	
*Recirculation Valve Position (%Closed)			70	70	
Control Panel - Touchscreen - Flare Flow Data *(Press Back 2x, Flare Flow Data)*					
*Flow Rate (SCFM)			500	503	
*Total Flow (MMSCF)			1057.07	1057.54	
*Flow Pressure (inWC)			6.1	6.4	
*Flow Temperature (F)			79	80	
Control Panel - Touchscreen *(Press Resettable Flow History, Analog Data Menu, Blower Data)*					
*Resettable Total Flow (MMSCF)			713.4	713.9	
*Reset Date/Time (mm/dd/yy hh.mm.ss)					
Control Panel - Touchscreen - Blower Data *(Press Main)*					
*Blower 301 Runtime (Hours)			39502	39520	
*Blower 301 Vibration (in/Sec)			0.21	0.21	
*Blower 301 Speed (%Max)			76	81	
*Blower 301 Inlet Bearing Temp (F)			32	81	
*Blower 301 Outlet Bearing Temp (F)			51	80	
Control Panel - Blower Keypad					
*Blower 301 Current (Amps)			10.3	10.3	
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-19.9	-16.8	
*Demister Outlet Pressure (inWC)			-22.3	-18.9	
*Demister DP (inWC)			+2.4	+2.1	
*Flame Arrester Inlet Pressure (inWC)			+7.2	+7.4	
*Flame Arrester Outlet Pressure (inWC)			+4.3	+4.6	
*Flame Arrester DP (inWC)			+2.9	+2.8	
Flare					
*Visible Emissions (Yes/No, If yes explain)			No	No	
*Spiralator Position (%Open)			50	50	
*Manual Louver 1 Position (%Open)			50	50	
*Manual Louver 2 Position (%Open)			50	50	
Other					
Heat Trace OK (Check for Yes)	☐	☐	✓	✓	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	✓ ✓	✓ ✓	☐ ☐
Flare 3 - Monitoring					
Time (hh:mm)			1523	1459	
Technician (initials)			CS	CS	
Control Panel					
*Indicator Lights OK (Check for Yes)	☐	☐	✓	✓	☐
*Heating/Cooling OK (Check for Yes)	☐	☐	✓	✓	☐
Control Panel - Digital Recorder					
*Remote Recorder On (Check for Yes)	☐	☐	✓	✓	☐

Collection and Control System Monitoring

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday
Control Panel - Touchscreen - Analog Data Menu - Process Overview					
*Gas Handling Skid Inlet Vacuum (inWC)			40.0	39.1	
*Gas Handling Skid Inlet Temperature (F)			54	57	
*Panel Temperature (F)			69	75	
*Recirculation Valve Position (%Closed)			100	100	
*Flare Flame Temperature (F)			1159	1400	
*Flame Arrestor Temperature (F)			75	82	
Control Panel - Touchscreen - Blower Data *(Press Back, Blower Menu, Select Current Blower)*					
*Blower Runtime (Blower 1 Runtime (Hours))			301 3171	501 3194	
*Blower Speed (Blower 1 Speed (%Max))			64	64	
*Blower Vibration (Blower 1 Vibration (In/Sec))			0.01	0.01	
*Blower Current (Blower 1 Current (Amps))			29.4	28.3	
Control Panel - Touchscreen - Flare Flow Data *(Press Back X2, Flare Flow Data)*					
*Flow Rate (SCFM)			1036	434	
*Total Flow (MMSCF)			435.81	437.24	
*Flow Pressure (inWC)			3.8	4.2	
*Flow Temperature (F)			79	86	
*Flow DP (inWC)			2.73	2.14	
Control Panel - Touchscreen *(Press Resettable)*					
*Resettable Total Flow (MMSCF)			435.81	437.24	
*Reset Date/Time (mm/dd/yy hh:mm ss)					
Control Panel - Touchscreen - Alarm History *(Press Main)*					
*Alarm History (Check box if no alarm)	☐	☐	☑	☑	☐
Gas Handling Skid					
*Demister Inlet Pressure (inWC)			-40.2	-40.4	
*Demister Outlet Pressure (inWC)			-41.8	-41.3	
*Demister DP (inWC)			+1.6	+0.9	
*Flame Arrester Inlet Pressure (inWC)			+4.6	+4.2	
*Flame Arrester Outlet Pressure (inWC)			+3.9	+3.6	
*Flame Arrester DP (inWC)			+0.7	+0.6	
*Fail-Close Valve Air Pressure (psi)			105	105	
Flare					
*Visible Emissions (Yes/No, If yes explain)			No	No	
*Spiralator Position (%Open)			50	50	
*Manual Louver 1 Position (%Open)			50	50	
*Manual Louver 2 Position (%Open)			50	50	
Other					
*Heat Trace OK (Check for Yes)	☐	☐	☑	☑	☐
*Propane Tank Level OK (T1 | T2 (Check for Yes))	☐ ☐	☐ ☐	☑ ☑	☑ ☑	☐ ☐
Engine Plant 1 - Monitoring					
Time (hh mm)			1534	1510	
Technician (Initials)			CS	CS	
Engine Control Panel					
*Power Setpoint (kWh) (Engine #4 | #3)			707 707	689 699	
*Power Setpoint (kWh) (Engine #2 | #1)			704	689	
Control Room - Laptop					
*Flow Total (MSCF)			4944825	4955648.6	
*Flow Rate (SCFM)			790.8	832.0	
*Discharge Gas Temperature (F)			63.0	70.0	
Engine Bay/Control Room Window					
*Inlet Gas Pressure (inWC)			-41.6	-38.5	
Other					
*Visible Emissions (Yes/No, If yes explain)			NO	NO	

Note * Collect during device operation only

Remarks

12/29 - Engine #1 Down
12/30 - Engine #1 Down

APPENDIX D-3

LANDFILL GAS MONITORING PROBES

(METHANE)

APPENDIX D-3
LFG GAS PROBE RESULTS (METHANE)
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Date	MP-1 Pressure (in. of H_2O)[a/]	MP-1 Methane (%)[b/]	MP-2 Pressure (in. of H_2O)	MP-2 Methane (%)	MP-3 Pressure (in. of H_2O)	MP-3 Methane (%)	MP-4 Pressure (in. of H_2O)	MP-4 Methane (%)	MP-5 Pressure (in. of H_2O)	MP-5 Methane (%)	MP-6B Pressure (in. of H_2O)	MP-6B Methane (%)	MP-7 Pressure (in. of H_2O)	MP-7 Methane (%)	MP-8 Pressure (in. of H_2O)	MP-8 Methane (%)	MP-8BH[c/] Pressure (in. of H_2O)	MP-8BH Methane (%)
8/23/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA[d/]	NA
11/17/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
	MP-9 Pressure (in. of H_2O)	MP-9 Methane (%)	MP-10 Pressure (in. of H_2O)	MP-10 Methane (%)	MP-11 Pressure (in. of H_2O)	MP-11 Methane (%)	MP-12 Pressure (in. of H_2O)	MP-12 Methane (%)	MP-13 Pressure (in. of H_2O)	MP-13 Methane (%)	MP-14 Pressure (in. of H_2O)	MP-14 Methane (%)	MP-15 Pressure (in. of H_2O)	MP-15 Methane (%)	MP-16 Pressure (in. of H_2O)	MP-16 Methane (%)	MP-17 Pressure (in. of H_2O)	MP-17 Methane (%)
8/23/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11/17/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MP-18 Pressure (in. of H_2O)	MP-18 Methane (%)	MP-19 Pressure (in. of H_2O)	MP-19 Methane (%)	MP-20 Pressure (in. of H_2O)	MP-20 Methane (%)	MP-21 Pressure (in. of H_2O)	MP-21 Methane (%)									Barometric Pressure (Start) (in. of Hg)[e/]	Barometric Pressure (Finish) (in. of Hg)
8/23/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									30.11	30.05
11/17/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									30.26	30.24

a/ (in. of H_2O) = Pressure measured in inches of water measurement taken in well casing before cap is removed.

b/ (%) = Percent of Methane measured

c/ MP-8BH is sampled if the water level was above the top of screen at MP-8. Six foot deep borehole probe (MP-8 BH) installed and sampled next to MP-8.

d/ NA = Not applicable

e/ (in. of Hg) = Barometric Pressure measured in inches of Mercury

APPENDIX E

COVER MONITORING

FIELD INSPECTION AND MAINTENANCE REPORTS

APPENDIX E-1

SITE AND LANDFILL COVER INSPECTIONS

No cover inspections performed this reporting period.

APPENDIX E-2

BUFFER ZONE INSPECTIONS

APPENDIX E-2.1

AUGUST 2021 BUFFER ZONE INSPECTION

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

Inspector: **Chris Carlson** Organization: **Parsons**

Date: **8/17/21**

Instructions: Complete checklist of visual evaluation items and then complete specific data items. Field measurements should be made with a cloth tape and noted on the attached site plan. Estimated measurements shall be so noted. Attach photographs or hand sketches of areas indicating fence damage, erosion, sedimentation, settlement, animal burrows, weeds etc. to further define conditions or problems.

1. Visual Evaluation Items

		CONDITION: (Check One)				
	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
1) E. ¼ Section 6						
a) Fencing / Security						
Locking Gates		X			X	
Barbwire		X			X	
Braces		X			X	
Other (litter, disposal)		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	X	_____	___	X	_____
Animal Burrows	_____	X	_____	___	X	_____
Erosion	_____	X	_____	___	X	_____
Sediment Accumulation	_____	X	_____	___	X	_____
Obstruction of Culverts	_____	X	_____	___	X	_____
c) Vegetation						
Weeds	_____	X	_____	___	X	_____
Ground Cover	_____	X	_____	___	X	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

b) Terrain
- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation
- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

		CONDITION: (Check One)				
	Map		Not	Action Required?		
	ID	Acceptable	Acceptable	Yes	No	REMARKS
2) N. ½ Section 7						
a) Fencing / Security						
Locking Gates	_____	__X__	_____	___	_X_	_____
Barbwire	_____	__X__	_____	___	_X_	_____
Barbwire	_____	__X__	_____	___	_X_	_____
Braces	_____	__X__	_____	___	_X_	_____
Other (litter, disposal)	_____	__X__	_____	___	_X_	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	X	_____	___	X	_____
Animal Burrows	_____	X	_____	___	X	Approximately 4 Active Burrows
Erosion	_____	X	_____	___	X	_____
Sediment Accumulation	_____	X	_____	___	X	_____
Obstruction of Culverts	_____	X	_____	___	X	_____
c) Vegetation						
Weeds	_____	X	_____	___	X	_____
Ground Cover	_____	X	_____	___	X	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

b) Terrain
- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation
- Map ID: _NA_
- Area: _____feet by _____feet
-

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

		CONDITION: (Check One)				
	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
3) E. ½ Section 1						
a) Fencing / Security						
Locking Gates	_____	__X__	_____	___	_X_	_____
Barbwire	_____	__X__	_____	___	_X_	_____
Braces	_____	__X__	_____	___	_X_	_____
Other (litter, disposal)	_____	__X__	_____	___	_X_	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	X	_____	___	X	_____
Animal Burrows	_____	X	_____		X	Approximately 10 Active Burrows
Erosion	_____	X	_____	___	X	_____
Sediment Accumulation	_____	X	_____	___	X	_____
Obstruction of Culverts	_____	X	_____	___	X	_____
c) Vegetation						
Weeds	_____	X	_____	___	X	_____
Ground Cover	_____	X	_____	___	X	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security

- Map ID: _NA_
- Area: _____linier feet

- Map ID: _NA_
- Area: _____linier feet

b) Terrain

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

		CONDITION: (Check One)				
	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
4) E. ½ Section 36						
a) Fencing / Security						
Locking Gates	A		X	X		Gate found open/unlocked. Locked now.
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Braces		X			X	
Other (litter, disposal)		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	X	_____	___	X	_____
Animal Burrows	_____	X	_____	___	X	_____
Erosion	_____	X	_____	___	X	_____
Sediment Accumulation	_____	X	_____	___	X	_____
Obstruction of Culverts	_____	X	_____	___	X	_____
c) Vegetation						
Weeds	_____	X	_____	___	X	_____
Ground Cover	_____	X	_____	___	X	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: **_A_**
- Area: **NA** linier feet (Gate left open and unlocked by harvest crew)

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

b) Terrain
- Map ID: **_NA_**
- Area: **_NA_** feet by **_NA_** feet
- Depth: **_NA_** feet

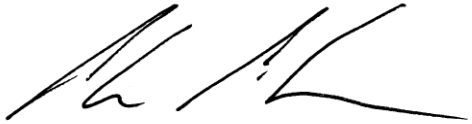
- Map ID: **_NA_**
- Area: **_NA_** feet by **_NA_** feet
- Depth: **_NA_** feet

c) Vegetation
- Map ID: **_NA_**
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Signature of Inspector:

Attachments



__**X**__ Yes ____ No

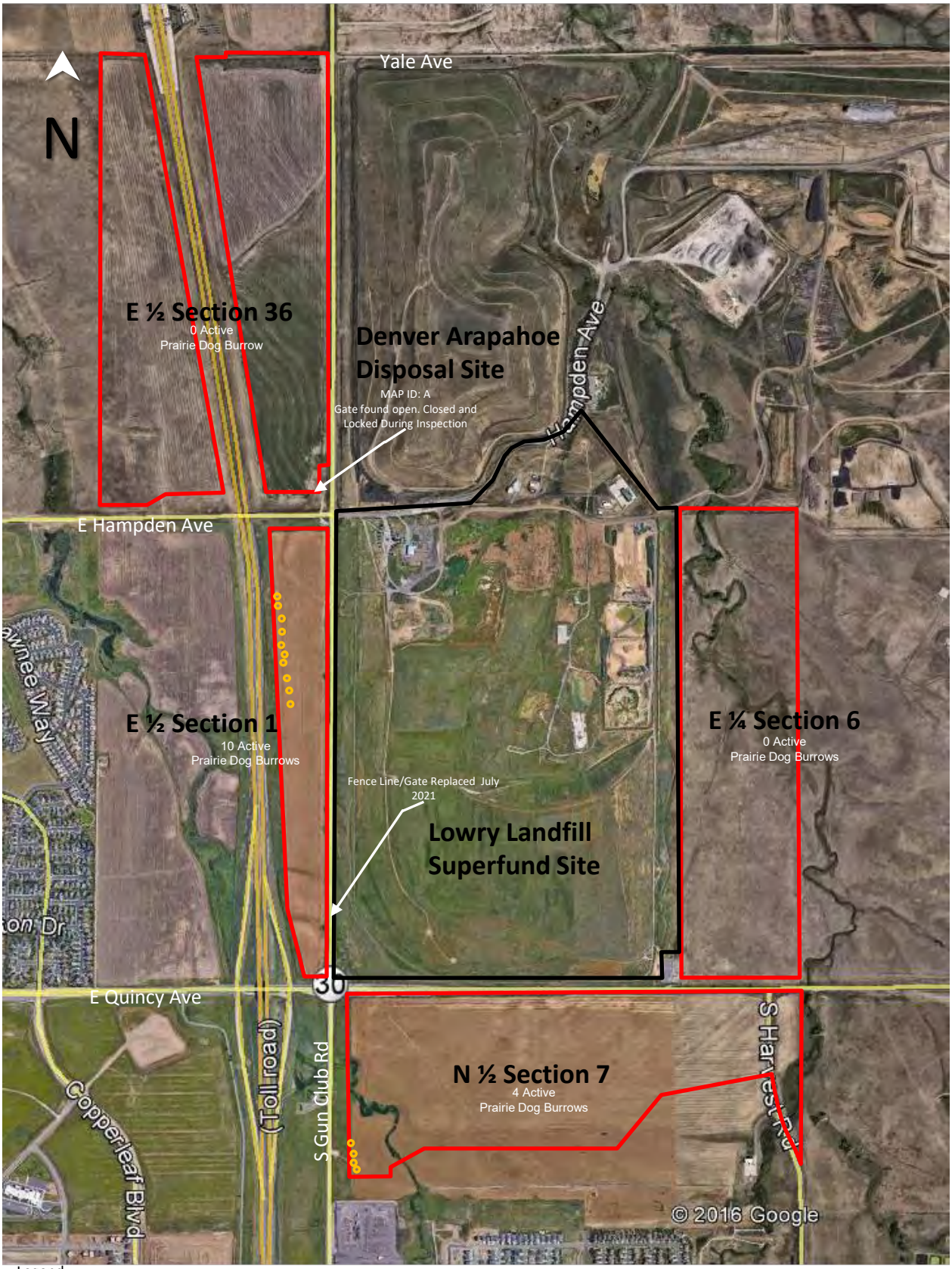
If yes, list attachments:

__**August 2021 Buffer Property Map.pdf**_____

__**Buffer Zone Pictures (8-17-21).pdf**_____

Date: __**8/17/21**_____

Actions taken: Gate found open on Section 36 by harvest crew, closed and locked. Prairie dog burrows to be addressed with mitigation, in the Spring of 2022, sooner if numbers multiply quickly.



Legend

- Lowry Landfill Site Boundary
- Lowry Trust Buffer Property
- Active Prairie Dog Burrows
- Weeds

August 17, 2021
Buffer Zone Inspection



E ½ Section 36 (MAP ID A) Gate Found Open. Closed and Locked at Time of Inspection



E ½ Section 1 New Fencing Along Newly Constructed S Gun Club Road and E Quincy Ave Intersection Installed by SEMA Construction in July



E ½ Section 1 New Fencing Along Newly Constructed S Gun Club Road and E Quincy Ave Intersection
Installed by SEMA Construction in July



E ½ Section 1 New Fencing Along Newly Constructed S Gun Club Road and E Quincy Ave Intersection
Installed by SEMA Construction in July



E ½ Section 1 MAP ID D). Prairie Dog Burrows Present 10 Active.

APPENDIX E-2.2

NOVEMBER 2021 BUFFER ZONE INSPECTION

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

Inspector: **Chris Carlson** Organization: **Parsons**

Date: **11/8/21 and 12/20/21**

Instructions: Complete checklist of visual evaluation items and then complete specific data items. Field measurements should be made with a cloth tape and noted on the attached site plan. Estimated measurements shall be so noted. Attach photographs or hand sketches of areas indicating fence damage, erosion, sedimentation, settlement, animal burrows, weeds etc. to further define conditions or problems.

1. Visual Evaluation Items

		CONDITION: (Check One)				
	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
1) E. ¼ Section 6						
a) Fencing / Security						
Locking Gates		X			X	
Barbwire		X			X	
Braces		X			X	
Other (litter, disposal)		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	__X__	_____	___	_X_	_____
Animal Burrows	_____	__X__	_____	___	_X_	_____
Erosion	_____	__X__	_____	___	_X_	_____
Sediment Accumulation	_____	__X__	_____	___	_X_	_____
Obstruction of Culverts	_____	__X__	_____	___	_X_	_____
c) Vegetation						
Weeds	_____	__X__	_____	___	_X_	_____
Ground Cover	_____	__X__	_____	___	_X_	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

b) Terrain
- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation
- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM

		CONDITION: (Check One)				
	Map		Not	Action Required?		
	ID	Acceptable	Acceptable	Yes	No	REMARKS
2) N. ½ Section 7						
a) Fencing / Security						
Locking Gates	_____	__X__	_____	___	_X_	_____
Barbwire	__A__	_____	__X__	_X_	___	Approx. 100 LF of barbwire damaged.
Barbwire	_____	__X__	_____	___	_X_	_____
Braces	_____	__X__	_____	___	_X_	_____
Other (litter, disposal)	_____	__X__	_____	___	_X_	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement		X			X	
Animal Burrows		X			X	Approximately 4 Active Burrows
Erosion		X			X	
Sediment Accumulation		X			X	
Obstruction of Culverts		X			X	
c) Vegetation						
Weeds		X			X	
Ground Cover		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: **_A_**
- Area: **100** linier feet (Barbwire fencing near E Quincy Ave. damaged by vehicle)

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

b) Terrain
- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation
- Map ID: _NA_
- Area: _____feet by _____feet
-

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

		CONDITION: (Check One)				
	Map ID	**Acceptable**	**Not Acceptable**	**Action Required? Yes**	**No**	**REMARKS**
3) E. ½ Section 1						
a) Fencing / Security						
Locking Gates		X			X	
Barbwire		X			X	
Braces		X			X	
Other (litter, disposal)		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement	_____	X	_____	___	X	_____
Animal Burrows	_____	X	_____		X	Approximately 13 Active Burrows
Erosion	_____	X	_____	___	X	_____
Sediment Accumulation	_____	X	_____	___	X	_____
Obstruction of Culverts	_____	X	_____	___	X	_____
c) Vegetation						
Weeds	_____	X	_____	___	X	_____
Ground Cover	_____	X	_____	___	X	_____

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security

- Map ID: _NA_
- Area: _____linier feet

- Map ID: _NA_
- Area: _____linier feet

b) Terrain

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

- Map ID: _NA_
- Area: _____feet by _____feet
- Depth: _____feet

c) Vegetation

- Map ID: _NA_
- Area: _____feet by _____feet

- Map ID: _NA_
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

		CONDITION: (Check One)				
	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
4) E. ½ Section 36						
a) Fencing / Security						
Locking Gates		X			X	
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Barbwire		X			X	
Braces		X			X	
Other (litter, disposal)		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

	Map ID	Acceptable	Not Acceptable	Action Required? Yes	No	REMARKS
b) Terrain						
Settlement		X			X	
Animal Burrows		X			X	Approximately 20 Active Burrows
Erosion		X			X	
Sediment Accumulation		X			X	
Obstruction of Culverts		X			X	
c) Vegetation						
Weeds		X			X	
Ground Cover		X			X	

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Specific Items *(Write N.A. if not applicable)*

a) Fence / Security
- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

- Map ID: **NA**
- Area: **NA** linier feet

b) Terrain
- Map ID: **_NA_**
- Area: **_NA_** feet by **_NA_** feet
- Depth: **_NA_** feet

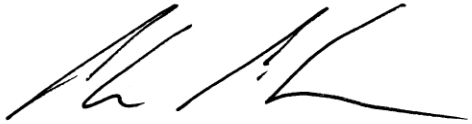
- Map ID: **_NA_**
- Area: **_NA_** feet by **_NA_** feet
- Depth: **_NA_** feet

c) Vegetation
- Map ID: **_NA_**
- Area: _____feet by _____feet

BUFFER ZONE FIELD INSPECTION AND MAINTENANCE FORM (Continued)

Signature of Inspector:

Attachments



__**X**__ Yes ____ No

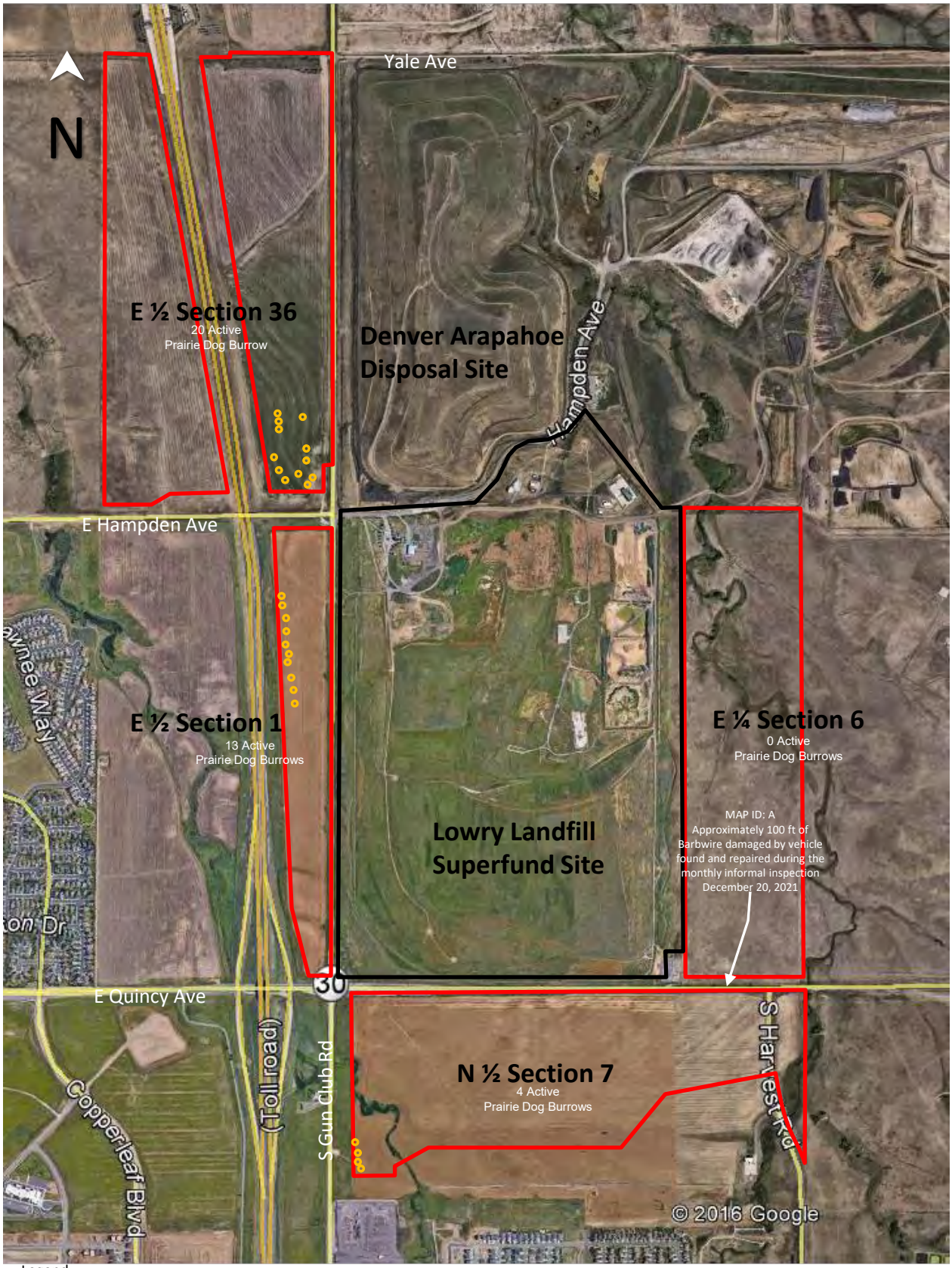
If yes, list attachments:

__**November 2021 Buffer Property Map.pdf**_____

__**Buffer Zone Pictures (11-8-21 and 12-20-21)).pdf**_____

Date: __**12/20/21**_____

Actions taken: Fence damaged on Section 7 near E Quincy Avenue found and repaired during informal monthly inspection on December 20, 2021. Prairie dog burrows to be addressed with mitigation, in the Spring of 2022, sooner if numbers multiply quickly.



Legend

- Lowry Landfill Site Boundary
- Lowry Trust Buffer Property
- Active Prairie Dog Burrows
- Weeds

November 8, 2021
Buffer Zone Inspection



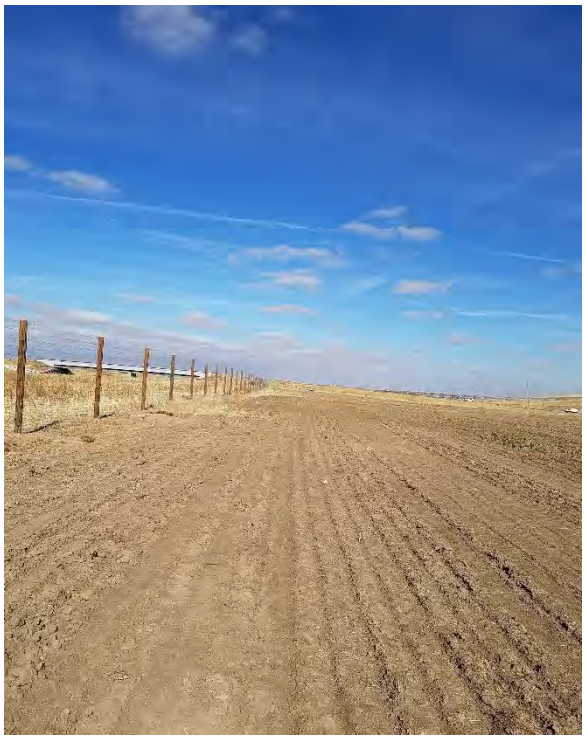
N ½ Section 7 (MAP ID A) Approximately 100 LF of Barbwire Fence Found Damaged 12/20/21



N ½ Section 7 (MAP ID A) Approximately 100 LF of Barbwire Fence Found Damaged 12/20/21



N ½ Section 7 (MAP ID A) Approximately 100 LF of Barbwire Fence Found Damaged 12/20/21. Repaired 12/20/21.



E ½ Section 1 Approximately 10 Active Prairie Dog Burrows Present 11/8/21.



E ¼ Section 6 Fencing Good and No Active Prairie Dog Burrows 11/8/21



E ¼ Section 6 Fencing Good and No Active Prairie Dog Burrows 11/8/21



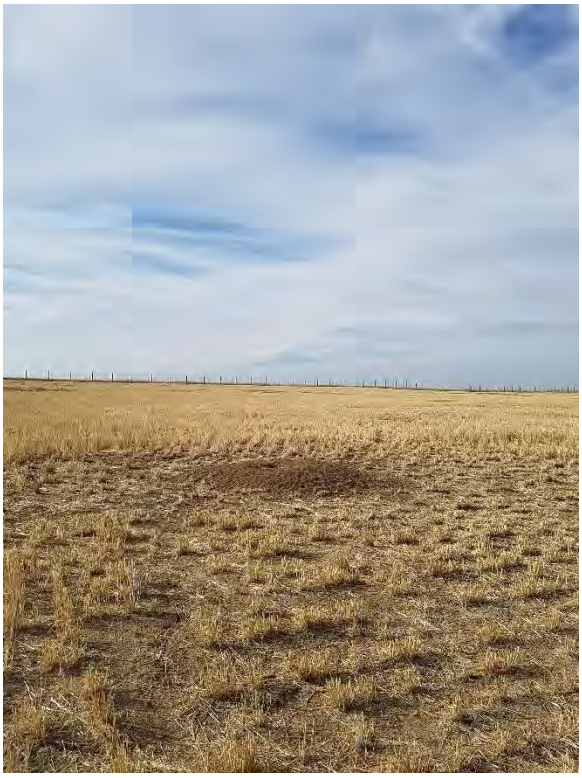
E ¼ Section 6 Fencing Good and No Active Prairie Dog Burrows 11/8/21



N ½ Section 7 Active Prairie Dog Burrows 11/8/21



N ½ Section 7 Active Prairie Dog Burrows 11/8/21



E ½ Section 36 Active Prairie Dog Burrows 11/8/21



E ½ Section 36 Active Prairie Dog Burrows 11/8/21



E ½ Section 36 Active Prairie Dog Burrows 11/8/21



E ½ Section 36 Active Prairie Dog Burrows 11/8/21

APPENDIX F

ANALYTICAL DATA PACKAGES, DATA VALIDATION REPORTS, AND DATA QUALITY ASSESSMENT

APPENDIX F-1

SAMPLE LOCATION CROSS REFERENCE TABLE

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
GW[b/] - Compliance/Effectiveness/B-326-UD & B-313 RAWP[c/]	B-313	8/12/2021	280-151819-1	EUROFINS	NR
GW - Compliance/Effectiveness/B-326-UD & B-313 RAWP	B-313	11/16/2021	A214611	PACE	NR
GW - Compliance/Effectiveness	B-314	10/27/2021	280-154753-1	EUROFINS	X
GW - Compliance/Effectiveness	B-314	10/27/2021	A214317	PACE	X
GW - B-326-UD & B-313 RAWP	B-321	8/11/2021	280-151744-1	EUROFINS	NR
GW - B-326-UD & B-313 RAWP	B-321	8/30/2021	A213505	PACE	NR
GW - Molybdenum Investigation	B-326-UD	8/12/2021	280-151836-1	EUROFINS	NR
GW - North End Monitoring	B-326-UD	8/30/2021	A213505	PACE	NR
GW - Molybdenum Investigation	B-326-UD	10/12/2021	280-154070-1	EUROFINS	NR
GW - North End Monitoring	B-326-UD	10/12/2021	A214120	PACE	X
GW - Molybdenum Investigation	B-326-WD	8/12/2021	280-151836-1	EUROFINS	NR
GW - North End Monitoring	B-326-WD	8/30/2021	A213505	PACE	NR
GW - Confirmation Sample	B-326-WD	9/27/2021	A213905	PACE	NR
GW - Compliance/Effectiveness/Molybdenum Investigation	B-326-WD	10/12/2021	280-154071-1	EUROFINS	X
GW - Compliance/Effectiveness	B-326-WD	10/12/2021	A214120	PACE	X
GW - Performance Evaluation	BKGD-3WD	8/16/2021	280-151930-1	EUROFINS	X
GW - Performance Evaluation	BKGD-3WD	8/16/2021	A213302	PACE	X
GW - Compliance/Effectiveness	BM-11X-100N	10/28/2021	280-154815-1	EUROFINS	NR
GW - Compliance/Effectiveness	BM-11X-100N	10/28/2021	A214330	PACE	NR
GW - Compliance/Effectiveness	BM-11X-100S	10/28/2021	280-154815-1	EUROFINS	NR
GW - Compliance/Effectiveness	BM-11X-100S	10/28/2021	A214330	PACE	NR
GW - Compliance	BM-15E2	11/16/2021	280-155721-1	EUROFINS	NR
GW - Compliance	BM-15E2	11/16/2021	A214611	PACE	NR
GW - Compliance/Effectiveness	BM-15N6	10/13/2021	280-154169-1	EUROFINS	NR
GW - Compliance/Effectiveness	BM-15N6	10/13/2021	A214121	PACE	NR
GW - Compliance	GW-106	10/13/2021	280-154115-1	EUROFINS	NR
GW - Compliance	GW-106	10/13/2021	A214121	PACE	NR
GW - Effectiveness	MNA-01	11/23/2021	280-156069-1	EUROFINS	NR
GW - Effectiveness	MNA-03	11/23/2021	280-156069-1	EUROFINS	NR
WTP[d/] - Compliance	MP-001	7/6/2021	280-150534-1	EUROFINS	X
WTP - Compliance	MP-001	7/7/2021	21-07031	EBS[e/]	X
WTP - Compliance	MP-001	7/7/2021	280-150532-1	EUROFINS	X
WTP - Compliance	MP-001	7/7/2021	280-150534-1	EUROFINS	X
WTP - Compliance	MP-001	8/2/2021	280-151434-1	EUROFINS	X
WTP - Compliance	MP-001	8/3/2021	280-151431-1	EUROFINS	X
WTP - Compliance	MP-001	8/3/2021	280-151434-1	EUROFINS	X
WTP - Compliance	MP-001	9/7/2021	280-152738-1	EUROFINS	X

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Compliance	MP-001	9/8/2021	280-152738-1	EUROFINS	X
WTP - Compliance	MP-001	9/8/2021	280-152739-1	EUROFINS	X
WTP - Compliance	MP-001	10/4/2021	280-153738-1	EUROFINS	X
WTP - Compliance	MP-001	10/5/2021	21-10013	EBS	X
WTP - Compliance	MP-001	10/5/2021	280-153738-1	EUROFINS	X
WTP - Compliance	MP-001	10/5/2021	280-153741-1	EUROFINS	X
WTP - Compliance	MP-001	11/1/2021	280-155031-1	EUROFINS	X
WTP - Compliance	MP-001	11/2/2021	280-155028-1	EUROFINS	X
WTP - Compliance	MP-001	11/2/2021	280-155029-1	EUROFINS	X
WTP - Compliance	MP-001	11/2/2021	280-155031-1	EUROFINS	X
WTP - Compliance	MP-001	12/6/2021	280-156498-1	EUROFINS	X
WTP - Compliance	MP-001	12/7/2021	280-156498-1	EUROFINS	X
WTP - Compliance	MP-001	12/7/2021	280-156500-1	EUROFINS	X
GW - North End Monitoring	MW05-WD	8/18/2021	A213314	PACE	NR
GW - North End Monitoring	MW102-WD	8/31/2021	A213506	PACE	NR
GW - North End Monitoring	MW102-WD	11/18/2021	A214617	PACE	NR
GW - North End Monitoring	MW103-WD	8/5/2021	A213109	PACE	NR
GW - North End Monitoring	MW103-WD	11/2/2021	A214421	PACE	NR
GW - Compliance	MW105-WD	10/19/2021	280-154402-1	EUROFINS	NR
GW - Compliance	MW105-WD	10/19/2021	A214210	PACE	NR
GW - Compliance	MW108-WD	11/1/2021	280-154968-1	EUROFINS	NR
GW - Compliance	MW108-WD	11/1/2021	A214417	PACE	NR
GW -Molybdenum Investigation	MW113-EW-1	7/29/2021	280-151315-1	EUROFINS	NR
GW - North End Monitoring	MW113-EW-1	7/29/2021	A213022	PACE	X
GW -Molybdenum Investigation	MW113-EW-1	10/19/2021	280-154399-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-EW-1	10/19/2021	280-154405-1	EUROFINS	NR
GW - North End Monitoring	MW113-EW-1	10/19/2021	A214210	PACE	NR
GW -Molybdenum Investigation	MW113-UD	7/29/2021	280-151317-1	EUROFINS	NR
GW - North End Monitoring	MW113-UD	7/29/2021	A213022	PACE	X
GW -Molybdenum Investigation	MW113-UD	8/25/2021	280-152231-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-UD	9/9/2021	280-152782-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-UD	10/19/2021	280-154405-1	EUROFINS	NR
GW - North End Monitoring	MW113-UD	10/19/2021	A214210	PACE	NR
GW -Molybdenum Investigation	MW113-UD	11/17/2021	280-155787-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-UD	12/15/2021	280-156887-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	7/13/2021	280-150730-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	7/29/2021	280-151317-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	8/11/2021	280-151746-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	8/25/2021	280-152231-1	EUROFINS	NR

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
GW -Molybdenum Investigation	MW113-WD	9/8/2021	280-152740-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	9/23/2021	280-153333-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	10/5/2021	280-153751-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	10/19/2021	280-154405-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	11/2/2021	280-155030-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	11/17/2021	280-155787-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	11/30/2021	280-156216-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	12/15/2021	280-156887-1	EUROFINS	NR
GW -Molybdenum Investigation	MW113-WD	12/28/2021	280-157266-1	EUROFINS	NR
GW - North End Monitoring	MW114-WD	8/5/2021	A213109	PACE	NR
GW - North End Monitoring	MW114-WD	11/17/2021	A214618	PACE	NR
GW - North End Monitoring	MW117-WD	8/5/2021	A213109	PACE	NR
GW - North End Monitoring	MW117-WD	11/17/2021	A214618	PACE	NR
GW - North End Monitoring	MW118-WD	8/9/2021	A213210	PACE	NR
GW - North End Monitoring	MW118-WD	11/17/2021	A214618	PACE	NR
GW - North End Monitoring	MW121-WDR	8/18/2021	A213314	PACE	NR
GW - North End Monitoring	MW122-WDR	8/18/2021	A213314	PACE	NR
GW - North End Monitoring	MW123-WD	8/18/2021	A213314	PACE	NR
GW - North End Monitoring	MW124-WD	8/18/2021	A213314	PACE	NR
GW - North End Monitoring	MW125-WD	8/30/2021	A213505	PACE	NR
GW - North End Monitoring	MW129-WD	9/7/2021	A213606	PACE	X
GW - North End Monitoring	MW132-WD	7/21/2021	A212910	PACE	NR
GW - North End Monitoring	MW132-WD	11/2/2021	A214421	PACE	NR
GW - North End Monitoring	MW135-WD	7/28/2021	A213020	PACE	NR
GW - North End Monitoring	MW141-WD	7/28/2021	A213020	PACE	NR
GW - North End Monitoring	MW142-WD	7/28/2021	A213020	PACE	NR
GW - North End Monitoring	MW144-WD	8/4/2021	A213106	PACE	NR
GW - North End Monitoring	MW151-WD	7/19/2021	A212904	PACE	NR
GW - North End Monitoring	MW151-WD	11/11/2021	A214602	PACE	NR
GW - North End Monitoring	MW153-EW-1	7/21/2021	A212910	PACE	NR
GW - North End Monitoring	MW153-EW-1	11/8/2021	A214504	PACE	NR
GW - North End Monitoring	MW154-EW-1	7/21/2021	A212910	PACE	NR
GW - North End Monitoring	MW154-EW-1	11/11/2021	A214602	PACE	NR
GW - North End Monitoring	MW155-EW-1	7/21/2021	A212910	PACE	NR
GW - North End Monitoring	MW155-EW-1	11/22/2021	A214701	PACE	NR
GW - North End Monitoring	MW156-EW-1	7/21/2021	A212910	PACE	NR
GW - North End Monitoring	MW156-EW-1	11/22/2021	A214701	PACE	NR
GW - North End Monitoring	MW156-WD	7/19/2021	A212904	PACE	NR
GW - North End Monitoring	MW156-WD	11/11/2021	A214602	PACE	NR

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
GW - North End Monitoring	MW157-WD	7/19/2021	A212904	PACE	NR
GW - North End Monitoring	MW157-WD	11/11/2021	A214602	PACE	NR
GW - North End Monitoring	MW160-WD	7/19/2021	A212904	PACE	NR
GW - North End Monitoring	MW160-WD	11/8/2021	A214504	PACE	NR
GW - RAWP/MW77 Response Action/Molybdenum Investigation	MW170-EW-1	8/9/2021	280-151705-1	EUROFINS	NR
GW - RAWP/MW77 Response Action	MW170-EW-1	8/9/2021	A213210	PACE	NR
GW - RAWP/MW77 Response Action/Molybdenum Investigation	MW170-EW-1	10/27/2021	280-154754-1	EUROFINS	NR
GW - RAWP/MW77 Response Action	MW170-EW-1	10/27/2021	A214317	PACE	X
GW - North End Monitoring	MW176-DEN	8/4/2021	A213106	PACE	NR
GW - North End Monitoring	MW179-UDEN	9/8/2021	A213606	PACE	X
GW - Compliance	MW23-UPPER-C	10/18/2021	280-154346-1	EUROFINS	NR
GW - Compliance	MW23-UPPER-C	10/18/2021	A214204	PACE	NR
GW - Compliance	MW36-WDR	11/2/2021	280-155019-1	EUROFINS	NR
GW - Compliance	MW36-WDR	11/2/2021	A214421	PACE	NR
GW - MW38 Source Control	MW38-1028N-256E	11/10/2021	280-155451-1	EUROFINS	NR
GW - MW38 Source Control	MW38-1028N-256E	11/10/2021	A214510	PACE	NR
GW - MW38 Source Control	MW38-170S-140W	11/9/2021	280-155385-1	EUROFINS	NR
GW - MW38 Source Control	MW38-170S-140W	11/9/2021	A214510	PACE	NR
GW - MW38 Source Control	MW38-825S-445E	11/8/2021	280-155385-1	EUROFINS	NR
GW - MW38 Source Control	MW38-825S-445E	11/8/2021	A214504	PACE	NR
GW - Compliance	MW38-830N-230E	10/14/2021	280-154169-1	EUROFINS	NR
GW - Compliance	MW38-830N-230E	10/14/2021	A214134	PACE	NR
GW - Compliance	MW43-WD	11/16/2021	280-155721-1	EUROFINS	NR
GW - Compliance	MW43-WD	11/16/2021	A214611	PACE	NR
GW - Compliance	MW54-WD	10/14/2021	280-154169-1	EUROFINS	NR
GW - Compliance	MW54-WD	10/14/2021	A214134	PACE	NR
GW - Compliance	MW60-WD	10/28/2021	280-154815-1	EUROFINS	NR
GW - Compliance	MW60-WD	10/28/2021	A214330	PACE	NR
GW - Compliance/Effectiveness	MW62-WDR	10/27/2021	280-154752-1	EUROFINS	X
GW - Compliance/Effectiveness	MW62-WDR	10/27/2021	A214317	PACE	X
GW - VES[f/] Performance	MW70-WD	11/9/2021	280-155383-1	EUROFINS	NR
GW - Compliance	MW71-WD	11/1/2021	280-154968-1	EUROFINS	NR
GW - Compliance	MW71-WD	11/1/2021	A214417	PACE	NR
GW - Compliance	MW74-WD	10/14/2021	280-154169-1	EUROFINS	NR
GW - Compliance	MW74-WD	10/14/2021	A214134	PACE	NR
GW - North End Monitoring	MW77-EW-1	8/31/2021	A213506	PACE	NR

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
GW - North End Monitoring	MW77-EW-1	11/18/2021	A214617	PACE	NR
GW - North End Monitoring	MW77-EW-2	9/1/2021	A213508	PACE	NR
GW - North End Monitoring	MW77-EW-2	9/14/2021	A213709	PACE	NR
GW - North End Monitoring	MW77-EW-2	11/18/2021	A214617	PACE	NR
GW - Compliance	MW77-WD	10/27/2021	280-154752-1	EUROFINS	X
GW - Compliance	MW77-WD	10/27/2021	A214317	PACE	X
GW - Compliance	MW78-WD	11/1/2021	280-154968-1	EUROFINS	NR
GW - Compliance	MW78-WD	11/1/2021	A214417	PACE	NR
GW - Compliance	MW90-WD	10/13/2021	280-154115-1	EUROFINS	NR
GW - Compliance	MW90-WD	10/13/2021	A214121	PACE	NR
GW - Compliance	MW91-WD	10/18/2021	280-154346-1	EUROFINS	NR
GW - Compliance	MW91-WD	10/18/2021	A214204	PACE	NR
GW - North End Monitoring	MW98-WD	8/31/2021	A213506	PACE	NR
GW - North End Monitoring	MW98-WD	11/18/2021	A214617	PACE	NR
GW - NBBW-IW-3 Response Action	NBBW-IW-3	8/5/2021	280-151558-1	EUROFINS	NR
GW - Effectiveness	PM-13X	11/3/2021	280-155266-1	EUROFINS	NR
GW - Effectiveness	PM-13X	11/3/2021	A214429	PACE	NR
GW - Compliance/Effectiveness	PM-14X	10/26/2021	280-154710-1	EUROFINS	NR
GW - Compliance/Effectiveness	PM-14X	10/26/2021	A214308	PACE	NR
GW - Effectiveness	PM-3X	11/3/2021	280-155095-1	EUROFINS	NR
GW - Effectiveness	PM-3X	11/3/2021	A214426	PACE	NR
GW - Effectiveness	PM-6X	11/3/2021	280-155095-1	EUROFINS	NR
GW - Effectiveness	PM-6X	11/3/2021	A214426	PACE	NR
GW - Molybdenum Investigation	PTP-11	8/26/2021	280-152303-1	EUROFINS	NR
GW - Molybdenum Investigation	PTP-11	11/4/2021	280-155264-1	EUROFINS	NR
GW - Molybdenum Investigation	PTP-12	8/26/2021	280-152303-1	EUROFINS	NR
GW - Molybdenum Investigation	PTP-12	11/4/2021	280-155264-1	EUROFINS	NR
GW - North End Monitoring	PTP-12	11/4/2021	A214429	PACE	NR
GW - Molybdenum Investigation	PTP-13	8/25/2021	280-152231-1	EUROFINS	NR
GW - North End Monitoring	PTP-13	8/25/2021	A213408	PACE	NR
GW - Molybdenum Investigation	PTP-13	11/10/2021	280-155455-1	EUROFINS	NR
GW - North End Monitoring	PTP-13	11/10/2021	A214510	PACE	NR
WTP - Early Warning	TP-110	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Early Warning	TP-110	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Early Warning	TP-110	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Early Warning	TP-110	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Early Warning	TP-110	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Early Warning	TP-110	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Early Warning	TP-120	7/6/2021	280-150497-1	EUROFINS	NR

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Early Warning	TP-120	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Early Warning	TP-120	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Early Warning	TP-120	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Early Warning	TP-120	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Early Warning	TP-120	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Early Warning	TP-140	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Early Warning	TP-140	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Early Warning	TP-140	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Early Warning	TP-140	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Early Warning	TP-140	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Early Warning	TP-140	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Early Warning	TP-150	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Early Warning	TP-150	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Early Warning	TP-150	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Early Warning	TP-150	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Early Warning	TP-150	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Early Warning	TP-150	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Early Warning	TP-160	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Early Warning	TP-160	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Early Warning	TP-160	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Early Warning	TP-160	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Early Warning	TP-160	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Early Warning	TP-160	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Early Warning	TP-170	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	7/6/2021	280-150501-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	7/13/2021	280-150720-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	7/20/2021	280-150952-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	7/27/2021	280-151192-1	EUROFINS	NR
WTP - Early Warning	TP-170	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	8/2/2021	280-151452-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	8/10/2021	280-151714-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	8/17/2021	280-151955-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	8/24/2021	280-152189-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	8/24/2021	280-152190-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Molybdenum Performance	TP-170	8/31/2021	280-152445-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	9/7/2021	280-152673-1	EUROFINS	NR
WTP - Early Warning	TP-170	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	9/14/2021	280-152941-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	9/21/2021	280-153217-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	9/28/2021	280-153488-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Early Warning	TP-170	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	10/4/2021	280-153739-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	10/12/2021	280-154068-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	10/19/2021	280-154400-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	10/26/2021	280-154713-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	11/1/2021	280-154971-1	EUROFINS	NR
WTP - Early Warning	TP-170	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	11/9/2021	280-155387-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	11/16/2021	280-155726-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	11/23/2021	280-156073-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	11/30/2021	280-156210-1	EUROFINS	NR
WTP - Early Warning	TP-170	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	12/6/2021	280-156505-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	12/14/2021	280-156803-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	12/21/2021	280-157113-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-170	12/28/2021	280-157265-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-170	12/28/2021	280-157267-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	7/6/2021	280-150501-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	7/13/2021	280-150720-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	7/20/2021	280-150952-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	7/27/2021	280-151192-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Molybdenum Performance	TP-173A	8/2/2021	280-151452-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	8/10/2021	280-151714-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	8/17/2021	280-151955-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	8/24/2021	280-152189-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	8/31/2021	280-152445-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	9/7/2021	280-152673-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	9/14/2021	280-152941-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	9/21/2021	280-153217-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	9/28/2021	280-153488-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	10/4/2021	280-153739-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	10/12/2021	280-154068-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	10/19/2021	280-154400-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	10/26/2021	280-154713-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	11/1/2021	280-154971-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	11/9/2021	280-155387-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	11/16/2021	280-155726-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	11/23/2021	280-156073-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	11/30/2021	280-156210-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	12/6/2021	280-156505-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	12/14/2021	280-156803-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	12/21/2021	280-157113-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-173A	12/28/2021	280-157267-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	7/6/2021	280-150501-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	7/13/2021	280-150720-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	7/20/2021	280-150952-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	7/27/2021	280-151192-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	8/2/2021	280-151452-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	8/10/2021	280-151714-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	8/17/2021	280-151955-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	8/24/2021	280-152189-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	8/31/2021	280-152445-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	9/7/2021	280-152673-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	9/14/2021	280-152941-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	9/21/2021	280-153217-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	9/28/2021	280-153488-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	10/4/2021	280-153739-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	10/12/2021	280-154068-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	10/19/2021	280-154400-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	10/26/2021	280-154713-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
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LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Molybdenum Performance	TP-174A	11/1/2021	280-154971-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	11/9/2021	280-155387-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	11/16/2021	280-155726-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	11/23/2021	280-156073-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	11/30/2021	280-156210-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	12/6/2021	280-156505-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	12/14/2021	280-156803-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	12/21/2021	280-157113-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-174A	12/28/2021	280-157267-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	7/6/2021	280-150501-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	7/13/2021	280-150720-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	7/20/2021	280-150952-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	7/27/2021	280-151192-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	8/2/2021	280-151452-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	8/10/2021	280-151714-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	8/17/2021	280-151955-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	8/24/2021	280-152189-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	8/31/2021	280-152445-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	9/7/2021	280-152673-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	9/14/2021	280-152941-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	9/21/2021	280-153217-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	9/28/2021	280-153488-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	10/4/2021	280-153739-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	10/12/2021	280-154068-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	10/19/2021	280-154400-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	10/26/2021	280-154713-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	11/1/2021	280-154971-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	11/9/2021	280-155387-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	11/16/2021	280-155726-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	11/23/2021	280-156073-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	11/30/2021	280-156210-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	12/6/2021	280-156505-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	12/14/2021	280-156803-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	12/21/2021	280-157113-1	EUROFINS	NR
WTP - Molybdenum Performance	TP-183	12/28/2021	280-157267-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/13/2021	280-150721-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3300	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	11/30/2021	280-156205-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3300	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3300	12/28/2021	280-157265-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/6/2021	280-150497-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/2/2021	280-151437-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/7/2021	280-152675-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/4/2021	280-153737-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/5/2021	280-153740-1	EUROFINS	NR

APPENDIX F-1
SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3310	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/1/2021	280-154978-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/6/2021	280-156501-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3310	12/28/2021	280-157265-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/17/2021	280-151952-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3320	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3320	12/28/2021	280-157265-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3331	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3331	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	9/28/2021	280-153491-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3332	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3332	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	11/16/2021	280-155723-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3333	12/28/2021	280-157261-1	EUROFINS	NR

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SAMPLE LOCATION CROSS-REFERENCE TABLE
JULY THROUGH DECEMBER 2021 OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3340	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/16/2021	280-155723-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-3340	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-3340	12/28/2021	280-157265-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-710	12/28/2021	280-157265-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-730	7/6/2021	280-150498-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/13/2021	280-150719-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/20/2021	280-150947-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/27/2021	280-151190-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/3/2021	280-151428-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/10/2021	280-151706-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/17/2021	280-151952-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/24/2021	280-152186-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/31/2021	280-152444-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/7/2021	280-152672-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/14/2021	280-152937-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/21/2021	280-153218-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	9/28/2021	280-153491-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/5/2021	280-153736-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/12/2021	280-154066-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/19/2021	280-154398-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/26/2021	280-154711-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/2/2021	280-155026-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/9/2021	280-155380-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/16/2021	280-155723-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
WTP - Biotreatment System	TP-730	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/23/2021	280-156070-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/30/2021	280-156205-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/7/2021	280-156495-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/14/2021	280-156800-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/21/2021	280-157111-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/28/2021	280-157261-1	EUROFINS	NR
WTP - Biotreatment System	TP-730	12/28/2021	280-157265-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	7/6/2021	280-150500-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	7/13/2021	280-150721-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	7/20/2021	280-150951-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	7/27/2021	280-151191-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	8/3/2021	280-151451-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	8/10/2021	280-151712-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	8/17/2021	280-151954-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	8/24/2021	280-152190-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	8/31/2021	280-152446-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	9/7/2021	280-152674-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	9/14/2021	280-152940-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	9/21/2021	280-153216-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	9/28/2021	280-153489-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	10/5/2021	280-153740-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	10/12/2021	280-154064-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	10/19/2021	280-154401-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	10/26/2021	280-154712-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	11/2/2021	280-155027-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	11/9/2021	280-155384-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	11/16/2021	280-155724-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	11/23/2021	280-156071-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	11/30/2021	280-156207-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	12/7/2021	280-156511-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	12/14/2021	280-156804-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	12/21/2021	280-157116-1	EUROFINS	NR
WTP - Biotreatment System	TP-740	12/28/2021	280-157265-1	EUROFINS	NR

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Data Type	Sample Location	Sample Date	Project Number	Lab	Validated?[a/]
GW - Compliance	U-518R-WD	10/26/2021	280-154710-1	EUROFINS	NR
GW - Compliance	U-518R-WD	10/26/2021	A214308	PACE	NR
WTP - Sludge Analysis	WTP SLUDGE	9/28/2021	21-09091	EBS	NR
WTP - Sludge Analysis	WTP SLUDGE	9/28/2021	280-153533-1	EUROFINS	NR
WTP - Sludge Analysis (TENORM[g/])	WTP SLUDGE-1	9/28/2021	21-09090	EBS	NR
WTP - Sludge Analysis (TENORM)	WTP SLUDGE-2	9/28/2021	21-09090	EBS	NR
WTP - Sludge Analysis (TENORM)	WTP SLUDGE-3	9/28/2021	21-09090	EBS	NR

a/ Validated:
X = Level III validation
NR = Not required
b/ GW = groundwater
c/ RAWP = Response Action Work Plan
d/ WTP = Water Treatment Plant
e/ EBS - Eberline Services
f/ VES = Vapor Extraction System
g/ TENORM = Technologically Enhanced Naturally Occurring Radioactive Material

APPENDIX F-2

ANALYTICAL DATA PACKAGES

AND

DATA VALIDATION REPORTS

The data packages and DVRs are included in the Appendix F-2 folder in this submittal

APPENDIX F-3

DATA QUALITY ASSESSMENT

APPENDIX F-3

DATA QUALITY ASSESSMENT

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OPERATIONS AND MAINTENANCE STATUS REPORT
LOWRY LANDFILL SUPERFUND SITE

Based on the project or task requirements, a data evaluation process was performed on project analytical data. The data evaluation process provides an evaluation of the data quality in relation to specific project data quality criteria and with reference to the sampling and analysis requirements of the Quality Assurance Project Plan (QAPP).

The overall quality assurance objective for all measurement data is to maximize the probability that the data generated are of documented quality and are defensible for the intended data uses. To meet these objectives, data shall be: (1) representative of actual site physical and chemical conditions; (2) comparable to previous and subsequent data and other studies; (3) complete to the extent that necessary conclusions may be reached; and (4) of known quantitative statistical significance in terms of precision and accuracy, at levels appropriate for each stated data use for the project.

The data review process is performed in two phases. The initial phase, data verification, involves inspecting the laboratory data deliverables to determine if project requirements were met. The second phase, data validation, includes a review of data to assess data usability and application of data qualifiers to the analytical results based on adherence to method protocols and laboratory-specific quality assurance/quality control (QA/QC) limits.

F-3.1 DATA VERIFICATION

Data verification is the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual requirements. Data verification is the review of sample data deliverables for completeness and compliance with project requirements. A checklist was completed for each data package to ensure that all documentation was provided. If deficiencies were revealed, resubmissions of the missing or incorrect data were requested and the data deliverable was updated. In addition, transcription checks of 100% of the compliance, effectiveness, vertical migration, Response Action, and North End groundwater results, Water Treatment Plant (WTP) Early Warning, molybdenum testing, and WTP effluent (MP-001) samples were performed to ensure the data reported in the database and the hardcopy data packages were the same. The following problems were noted during sample verification:

The following SDGs were missing raw metals data and required resubmission by the laboratory:

- 280-154710-1
- 280-154752-1
- 280-155030-1
- 280-155264-1

The following additional problems were identified:

The following wells were resampled when the coolers shipped overnight to PACE laboratory in Wisconsin were delayed. The delay caused the temperature of the samples to increase to an unacceptable level (>6°C) making them unusable for analysis. For part of the reporting period, corrective action involved shipping the VOC vials in our largest coolers filled to the maximum with extra ice and frozen plastic bottles. In that way the temperature in the coolers is maintained for a greater amount of time depending on the weather. Corrective action shifted to a more economical solution of collecting duplicate VOC vials from each well and storing them on-Site. The 14-day holding time allows enough time to resend the vials if a cooler is lost or delayed. This option saves on the cost of shipping the larger, heavier coolers.

- MW121-WDR
- MW122-WDR
- MW123-WD
- MW124-WD
- MW05-WD
- MW125-WD
- B-326-UD
- B-326-WD
- B-313 – not enough water in the well to resample
- B-321
- MW117-WD
- MW114-WD
- MW103-WD
- Second resampling event - B-326-UD, B-326-WD, MW125-WD

Additional problems encountered are described below.

280-151819 B-313 Nitrate – the laboratory analyzed the sample within the holding time but the result exceeded the calibration curve (55000 E µg/L). The reanalysis was performed out of holding time (55000 H µg/L). The first analysis result was reported with a J qualifier to indicate an estimated concentration.

280-154071 B-326-WD Nitrite – the laboratory analyzed the sample within the holding time (0.15 J- µg/L) but the associated Continuing Calibration Verification (CCV) sample was below the lower control limit. The reanalysis was performed out of holding time (not detected). The first analysis result is reported with a J- qualifier for an estimated concentration with a low bias. This SDG was also revised to include the Wet Chemistry raw data that was omitted from the original report.

280-151434 MP-001 – The laboratory miscalculated the LCS recovery for WTP compliance 8260B compounds. A check of the calculation revealed the wrong spike concentration was used to calculate the recovery of each compound. The data package was revised and resubmitted.

Two wells were resampled to confirm anomalous data. B-326-WD (A213505) was reported as a trace detect (0.77 J µg/L, 8/30/21). Because the previous sample result from June 2021 was 7.5 µg/L a confirmation sample was collected on 9/27/21. The result for the confirmation sample B-326-WD was 0.69 J µg/L confirming the original result.

MW77-EW-2 (SDG A213508) (9/1/21) was reported as 20 µg/L which was inconsistent with historical data (2 µg/L or less). The laboratory reran the sample out of holding time and reported 0.12 J µg/L. This result was rejected for the holding time violation. The well was resampled on 9/14/21 resulting in a reported value of 0.13 J µg/L (SDG A213709). The laboratory believes the sample was accidentally spiked with the matrix spiking solution.

No other problems were encountered from data verification of the analytical data.

F-3.2 DATA VALIDATION

Data validation was performed on the following selected locations during the reporting period.

- 10% of the 31 compliance and effectiveness groundwater (GW) samples. Samples for validation were chosen at random:
- A representative set of the investigation wells (Molybdenum testing and North End Monitoring) were also validated.
- All MP-00l (WTP effluent) samples.

A Level III validation (summary quality control review) was performed consisting of manually examining data deliverables to determine data quality. Data validation included application of data qualifiers to the analytical results based on adherence to method protocols and project-specific QA/QC limits. Method protocols reviewed included:

- Analytical holding times,
- Method blanks (MB),
- Trip blanks (TB),
- Equipment blanks (EBs),
- Ambient blanks (AB),
- Matrix spikes/matrix spike duplicates (MS/MSDs),
- Laboratory control samples (LCSs),
- Shipping cooler temperatures,
- Laboratory duplicates,
- Internal Standards (ISs),
- Surrogates,
- Chemical recovery (radionuclides), or
- An out-of-control QC parameter that is mentioned in the case narrative.

Data qualifiers were applied to analytical results during the data validation process. All data were validated using method applicable guidelines and in accordance with the requirements of the National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994a & b, as amended) and by SW-846 guidelines specific to the method or as directed by EPA. All

radionuc1ide results that were less than the critical value (Lc) were qualified as not detected (U). Radionuc1ides were validated according to the guidelines and criteria specified in the Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (EPA, 2004, as amended).

The following definitions provide explanations of the USEPA qualifiers that may be assigned to analytical results during data validation.

U = The analyte was analyzed for and is not present above the level of the associated value. The associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.

UJ = The analyte analyzed for was not present above the level of the associated value. The associated numerical value may not accurately represent the concentration necessary to detect the analyte in the sample.

UJ- = Same as UJ qualification but with an indication of negative bias in the associated numerical value.

UJ+ = Same as UJ qualification but with an indication of positive bias in the associated numerical value.

NJ = The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the sample.

J = The analyte was analyzed for, and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample.

J- = Same as J qualification but with an indication of negative bias in the sample concentration.

J+ = Same as J qualification but with an indication of positive bias in the sample concentration.

Data quality is summarized below only where problems were noted during the validation. Frequency requirements for field sample collection of QC samples (MS/MSDs, field duplicates, and blanks) were reviewed and meet project requirements. The frequency requirements for laboratory specific method QC were met overall.

F -3.2.1 Groundwater

Eleven samples associated with the 33 compliance and effectiveness wells plus 16 samples associated with investigation and North End groundwater monitoring were validated. Locations of wells sampled during the reporting period are shown on Figures 4.9 and 4.10. Data validation reports (DVRs), included in Appendix F-2, are cross-referenced by location and SDG number in Table F-l. Raw data packages and DVRs are presented in Appendix F-2.

The following methods were validated as required:

- SW8260B (VOCs),
- SW8260_SIM (low-level 1,4-Dioxane),
- SW6010B (Metals),
- E300.0A (Nitrate and Nitrite).

The following groundwater samples were validated as indicated for each method:

Location	Sample Date	300.0A	6010B	8260_SIM	8260B
B-314	10/27/2021	X	X	X	X
B-326-UD	10/12/2021			X	
B-326-WD	10/12/2021	X	X	X	X
BKGD-3WD	8/16/2021	X	X	X	X
MW113-EW-1	7/29/2021			X	
MW113-UD	7/29/2021			X	
MW129-WD	9/7/2021			X	
MW170-EW-1	10/27/2021			X	
MW179-UDEN	9/8/2021			X	
MW62-WDR	10/27/2021	X	X	X	X
MW77-WD	10/27/2021	X	X	X	X

The results listed in the table below were qualified for exceeding the linear range (LR) of the calibration curve or exceeding the holding time. No other qualifiers were necessary for groundwater samples after validation.

Data Qualifications – Groundwater

Location	Parameter Name	Sample Date	Result	Units	Final Q	HT	LR	CCV %D
B-313	Nitrogen, Nitrate	8/12/2021	55000	µg/L	J		J	
B-326-WD	Nitrogen, Nitrite	10/12/2021	150	µg/L	J-			J-
MW77-EW-2	1,4-Dioxane	9/1/2021	0.12	µg/L	R	R		

HT = Holding Time LR = Linear Range CCV %D = Continuing Calibration Verification % Difference

Holding Time

Holding times for sample extraction and/or analysis as required by the methods is calculated from the date and time of sample collection to the time of sample preparation and/or analysis. 1,4-Dioxane in one sample was qualified as rejected for exceeding holding time (14 days).

Linear Range

One samples nitrate concentration exceeded the linear range of the calibration curve. The dilution reanalysis was performed after the holding time expired so could not be used. The results exceeding the linear range were reported and qualified as J, estimated.

Continuing Calibration Verification Standard

The CCV standard verifies that instrument response and accuracy are consistent with the initial calibration curve and includes all target compounds. One nitrite sample was qualified as J- (estimated with a low bias) because the associated CCV was below the control limit.

F-3.2.2 WTP Effluent (MP-00l)

The WTP effluent sample (MP-001) was validated for the following methods:

- E200.8 and E200.7 – Metals,
- E624 – VOCs,
- E625 –SVOCs,
- SW8260SIM – 1,4-Dioxane,
- E900.0 - Gross alpha/beta,
- EPA 60017-79-08 - Plutonium-238, -239, -240,
- ER110 LANL - Americium-241,
- SM 7500-RA-B – Radium-226 and Total Radium, and
- EPA-RA-05 – Radium-228.

Data validation reports included in Appendix F are cross-referenced by location and SDG number in Appendix F-l. DVRs and raw data packages are presented in Appendix F-2.

The results listed in the table below were qualified because out-of-control chemical recovery, uncertainty, LCS recovery, MS recovery, trip blanks, and method blanks.

Data Qualifications – WTP Effluent

Sample ID	Sample Date	Parameter Name	Result	CE	Units	Q	Unc	MS Rec	Chem Rec	MB	TB	LCS Rec
MP-001_ 070621_1200	7/6/2021	Methylene Chloride	0.21		µg/L	U					U	
MP-001	7/7/2021	Alpha, Gross	8.22	5.8	pCi/l	UJ+		S+		B+		
MP-001	7/7/2021	Americium -241	0.041	0.042	pCi/l	J	Q					
MP-001	7/7/2021	Benzidine	95		µg/L	R		R				
MP-001	7/7/2021	bis(2-Ethylhexyl) phthalate	2		µg/L	U				U		
MP-001_ 070721_0000	7/7/2021	Methylene Chloride	0.22		µg/L	U					U	
MP-001_ 070721_0400	7/7/2021	Methylene Chloride	0.18		µg/L	U					U	
MP-001	7/7/2021	Plutonium-238	0.025	0.038	pCi/l	UJ			J			
MP-001	7/7/2021	Plutonium-239/240	0.011	0.033	pCi/l	UJ			J			
MP-001	7/7/2021	Radium-228	0.86	0.53	pCi/l	J	Q					

Sample ID	Sample Date	Parameter Name	Result	CE	Units	Q	Unc	MS Rec	Chem Rec	MB	TB	LCS Rec
MP-001	10/5/2021	Alpha, Gross	14.24	5.17	pCi/l	UJ+		S+				
MP-001	10/5/2021	Americium -241	0.15	0.14	pCi/l	J	Q		J			
MP-001	10/5/2021	Benzidine	95		µg/L	R		R				
MP-001	10/5/2021	bis(2-Ethylhexyl) phthalate	3.2		µg/L	R				R		
MP-001	10/5/2021	Plutonium-238	-0.016	0.028	pCi/l	UJ			J			
MP-001	10/5/2021	Plutonium-239/240	-0.008	0.025	pCi/l	UJ+			J			S+
MP-001	10/5/2021	Radium-226	0.17	0.24503	pCi/l	J	Q		J			
MP-001	10/5/2021	Radium-228	0.49	0.39	pCi/l	J	Q		J			

CE = Counting Error MS Rec = Matrix Spike Recovery Chem Rec = Chemical Recovery (RADs) Unc = Uncertainty
LCS Rec = Laboratory Control Sample Recovery MB = Method Blank

Uncertainty

Samples for americium-241 and radium-228 were qualified because of a high counting error in relation to the sample result (uncertainty). This indicates that the uncertainty of a measured value is too large compared to the result value. This usually occurs when the result value is just above the critical value. The final result is qualified as estimated (J).

Matrix Spike Recovery

Benzidine in two samples was rejected due to low matrix spike recoveries. Benzidine was extracted and analyzed in duplicate for each sample collected because of this problem. Benzidine experiences oxidative losses during extraction inhibiting recovery of matrix spikes. Because benzidine has never been detected at Lowry, Metro has allowed a variance for the method. The lab must analyze it twice and if the spikes fail twice, we do not have to resample. LCS recoveries will still need to be in control plus all other QC.

Gross alpha in two samples were out of control for matrix spike recoveries. Gross alpha may be biased high in the associated samples as indicated by matrix spike recoveries that were above the upper control limits. Qualifications resulting from matrix spike recoveries are most likely matrix-related because the associated LCSs were in control.

Chemical Recovery

Americium-241, radium-226, and radium-228 in one sample and plutonium-238 and plutonium-239/240, n two samples were qualified as estimated for chemical recovery. Chemical recovery measures the yield of a radioactive isotope of the analyte added to the sample to measure any losses of the analyte during the chemical separations or other processes employed in the analysis. Sample concentrations are corrected for chemical recovery but the lower the yield the greater the variance in the result. Therefore, the sample results were qualified as estimated (J).

Method Blanks

The method blank measures possible contamination by the laboratory. Two bis(2-ethyhexyl) phthalate sample were qualified for method blank contamination (U or R). One gross alpha sample was qualified as B+ (estimated with a high bias, final Q = J+). This indicates contamination originating from lab processes.

Trip Blanks

The trip blank is used to indicate potential contamination by VOCs during sample shipping and handling. Methylene chloride in three sample was qualified as U for trip blank contamination. Methylene chloride is also a common lab contaminant.

Laboratory Control Samples

LCSs are designed to check the accuracy of the analytical procedure by measuring a known concentration of the analyte of interest. Plutonium-239/240 in one sample was out of control for LCS spike recoveries (S+). Plutonium-239/240 may be biased high as indicated by LCS spike recovery that was above the upper control limits.

F-3.3 DATA ASSESSMENT

Data quality assessment (DQA) criteria were used to evaluate the quality of the field sampling efforts, field screening results, and laboratory results for compliance with project data quality objectives (DQOs). The DQA criteria are expressed in terms of analytical precision, accuracy, representativeness, completeness, and comparability (PARCC). Procedures used to assess data accuracy and precision are in accordance with the respective analytical methods and QAPP requirements.

F-3.3.1 Precision

Precision is the measure of variability between individual sample measurements under prescribed conditions. The relative percent difference (RPD) for field duplicate, MS/MSD, and laboratory duplicate analyses demonstrates the precision of the analytical methods and, in the case of field duplicates, sampling methods. An RPD within the method-specific control limit indicates satisfactory precision in a measurement system. Methods (matrix specific) were considered out of control when greater than 50 percent of all precision data exceeded criteria. Out-of-control methods are evaluated for trends in bias. If a specific bias is evident, it is discussed below.

Precision results (i.e., MS/MSD, laboratory replicates, and field duplicates) for all methods and matrices were in control overall. The tables below present field duplicate precision for groundwater, WTP effluent, and landfill gas where at least one of the duplicate results was detected. Field duplicates have an RPD control limit for sample concentrations exceeding the RL by 5 times of 35% and a range limit equal to the two times the RL is applied to sample values less than 5 times the RL. The field duplicate results were in control.

Field Duplicate Results

Sample ID	Analyte	Sample Date	RL	Sample Conc (µg/L)	Dupe Conc (µg/L)	Range	RPD
MW113-EW-1	1,4-Dioxane	7/29/2021	0.9	92	97	5	5%
MW156-WD	1,4-Dioxane	11/11/2021	0.9	0.25	0.25	0	0%
MW113-EW-1	Molybdenum, Dissolved	7/29/2021	20	6600	6400	200	3%
MW113-EW-1	Nitrate as N	7/29/2021	500	1120	1100	20	2%
MW113-EW-1	Molybdenum, Total	7/29/2021	20	6600	6400	200	3%
B-314	Nitrate as N	10/27/2021	500	160	150	10	6%
B-314	1,1-Dichloroethane	10/27/2021	1	1.5	1.5	0	0%
MP-001_070721_0800	1,1,1-Trichloroethane	7/7/2021	1	6.8	6.7	0.1	1%
MP-001_100521_0800	1,1,1-Trichloroethane	10/5/2021	1	7.6	7.4	0.2	3%
MP-001_070721_0800	1,1-Dichloroethane	7/7/2021	1	21	21	0	0%
MP-001_100521_0800	1,1-Dichloroethane	10/5/2021	1	19	19	0	0%
MP-001_070721_0800	1,1-Dichloroethene	7/7/2021	1	1.2	1.2	0	0%
MP-001_100521_0800	1,1-Dichloroethene	10/5/2021	1	0.99	0.91	0.08	8%
MP-001_070721_0800	1,2-Dichloroethane	7/7/2021	1	0.74	0.61	0.13	19%
MP-001_100521_0800	1,2-Dichloroethane	10/5/2021	1	0.62	0.63	0.01	2%
MP-001_070721_0800	1,2-Dichloroethene, Total	7/7/2021	1	4.9	5.1	0.2	4%
MP-001_100521_0800	1,2-Dichloroethene, Total	10/5/2021	1	5	4.4	0.6	13%
MP-001_100521_0800	1,2-Dichloropropane	10/5/2021	1	0.23	0	0.23	
MP-001_070721_0800	1,4-Dioxane	7/7/2021	1.4	19	17	2	11%
MP-001_100521_0800	1,4-Dioxane	10/5/2021	20	19	15	4	24%
MP-001_100521_0800	1,4-Dioxane	10/5/2021	1.4	17	17	0	0%
MP-001	Bis(2-ethylhexyl) phthalate	10/5/2021	9.5	3.2	3.2	0	0%
MP-001_070721_0800	Chloroform	7/7/2021	1	0.43	0.44	0.01	2%
MP-001_100521_0800	Chloroform	10/5/2021	1	0.43	0.37	0.06	15%
MP-001_070721_0800	cis-1,2-Dichloroethene	7/7/2021	1	4.9	5.1	0.2	4%
MP-001_100521_0800	cis-1,2-Dichloroethene	10/5/2021	1	5	4.4	0.6	13%
MP-001_070721_0800 DUPE	Methylene Chloride	7/7/2021	5	0.2	0	0.2	
MP-001	Molybdenum	7/7/2021	5	12	12	0	0%
MP-001	Molybdenum	10/5/2021	5	19	17	2	11%
MP-001	Naphthalene	7/7/2021	9.6	1.1	0.29	0.81	
MP-001	Selenium	7/7/2021	2.5	15	14	1	7%
MP-001	Selenium	10/5/2021	2.5	16	16	0	0%
MP-001	Zinc	7/7/2021	10	2.6	3.2	0.6	21%
MP-001	Zinc	10/5/2021	10	2.4	3.5	1.1	37%

No qualifiers are applied based on field duplicate results unless resampling is indicated. Field duplicates are used as a measure of field sampling reproducibility and may be used to judge the representativeness of the samples collected.

F-3.3.2 Accuracy

F-3.3.2.1 Accuracy of Laboratory QC Samples

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. The results of surrogate, MS/MSD, and LCS analyses, when expressed in terms of percent recovery, demonstrate the accuracy of the method. Surrogate and MS/MSD spike recoveries indicate accuracy relevant to a unique sample matrix. LCS spike recoveries indicate accuracy relevant to an analytical batch lot and are strictly a measure of laboratory analytical accuracy conditions independent of samples and matrices. As with precision determinations, methods (matrix specific) were considered systematically out of control when greater than 50 percent of all accuracy data exceeded criteria. Out-of-control methods are evaluated for trends in bias. If a specific bias is evident, it is discussed below. If insufficient data are available (i.e., fewer than 20 occurrences) to represent a viable sample population, then statistical certainty in an out-of-control condition cannot be assumed. Control charts were developed to demonstrate if a change in the lab analysis process is occurring over time. The most current analyses were compared against the control limits and mean of the previous twenty analyses. By comparing current data to the control limits and mean of the previous set, you can determine whether the process variation is consistent (in control) or is unpredictable (out of control, affected by special causes of variation).

Control charts were developed for groundwater for the LCS/LCSD and MS/MSD spike recoveries for cadmium (representing SW6010B, Figures F-3.1, F-3.2, F-3.3, and F-3.4), trichloroethene (TCE) (representing SW8260B, Figures F-3.5, F-3.6, F-3.7, and F-3.8), and 1,4-dioxane by method SW8260 SIM (Figures F-3.9, F-3.10, and F-3.11). LCSs and MSs never exceeded the upper or lower control limit during the reporting period except for one 1,4-dioxane LCS which was 89% just under the control limit of 90%.

Control charts or plots were developed for WTP effluent for the LCS/LCSD and MS/MSD spike recoveries for TCE (representing SW8260B, Figures F-3.12, F-3.13, F-3.14 and F-3.15), selenium (representing SW6010B, Figures, F-3.16, F-3.17, 3.18, and F-3.19), and pyridine by method SW8270 (Figures F-3.20, F-3.21, F-3.22 and F-3.23). LCS, LCSD, MS and MSD results were in control for the reporting period.

Accuracy results (i.e., MS/MSD, LCS, surrogate spikes, and post digestion spikes) for all methods and matrices are predominantly in control except where noted. MP-001 was resampled for out-of-control matrix spike recoveries for benzidine. Benzidine experiences oxidative losses during the extraction inhibiting recovery of matrix spikes. The accuracy results which were out-of-control are not significant for any one compound, method, or matrix (except benzidine) and do not represent a negative impact to data quality. Therefore, overall accuracy was acceptable.

One PE sample concentration was prepared in duplicate for all groundwater compounds of concern. The laboratory received an unspiked BKGD-3WD sample also. This was a double-blind study in which the laboratory did not know the samples were performance evaluation samples of known concentration. The following table lists the results for each compound. The concentrations were chosen to fall within the linear range of the analysis at the low end of the concentration range or near the performance standard. Bromodichloromethane, bromoform and

dibromochloromethane were below the acceptable range and cadmium was slightly above the acceptable range.

Performance Evaluation Sample Results

Compound	BKGD -3WD Result	BKGD-3WD Matrix Spike 1	% Rec	BKGD-3WD Matrix Spike 2	% Rec	RPD	ERA Cert Value	ERA Acceptable Range (estimated 95% confidence interval)	GWPS
1,1,1-Trichloroethane	0	4.4	87%	5.2	103%	17%	5.03	3.62-6.13	200
1,1,2,2-Tetrachloroethane	0	4.3	85%	4.8	95%	11%	5.04	3.94-6.39	1
1,1,2-Trichloroethane	0	4.5	90%	4.8	96%	6%	5.01	4.09-6.07	5
1,1-Dichloroethane	0	4.6	93%	5	101%	8%	4.95	3.9-6.08	990
1,1-Dichloroethene	0	6.8	97%	8.1	116%	17%	7	4.89-9.41	7
1,2-Dichloroethane	0	4.8	97%	5	101%	4%	4.97	3.97-6.14	5
1,2-Dichloropropane	0	4.6	92%	4.9	98%	6%	4.99	3.98-6.02	5
1,4-Dioxane (low-level)	0	3.8	95%	3.7	93%	3%	4	2.80-5.20	0.9
Acetone	0	46	92%	48	96%	4%	49.9	22.6-68.5	1600
Arsenic	0	56	102%	56	102%	0%	55	48.1-60.5	52.18
Benzene	0	4.9	97%	5.4	107%	10%	5.04	3.95-6.01	5
Bromodichloromethane	0	3.9	78%	4.2	84%	7%	5	4.06-6.25	1
Bromoform	0	2.9	73%	3	75%	3%	4	2.99-5.09	4
Cadmium	0	6.4	107%	6.5	108%	2%	6	5.33-6.40	5.48
Carbon Tetrachloride	0	3.8	76%	4.4	89%	15%	4.97	3.25-6.22	5
Chlorobenzene	0	4.7	94%	5	100%	6%	5.02	3.99-5.95	100
Chloroform	0	3.1	90%	3.4	98%	9%	3.46	2.74-4.23	3.5
cis-1,2-Dichloroethene	0	4.8	96%	5.1	102%	6%	5	3.92-6.13	70
Dibromochloromethane	0	10	71%	11	78%	10%	14.1	11.1-17.4	14
Ethylbenzene	0	4.6	92%	5.1	102%	10%	5	3.69-6.08	700
Methylene chloride	0	4.5	91%	4.7	95%	4%	4.97	3.65-6.24	5
Naphthalene	0	3.5	71%	3.9	79%	11%	4.96	3.11-6.27	140
Nitrogen, Nitrate	660	2500	92%	2500	92%	0%	2000	1760-2220	28000
Nitrogen, Nitrite	0	2000	100%	2000	100%	0%	2000	1780-2210	1000
Tetrachloroethene	0	4.7	93%	5.3	105%	12%	5.03	3.18-6.02	5
Toluene	0	4.8	96%	5.3	106%	10%	5	3.87-5.94	1000
trans-1,2-Dichloroethene	0	1.9	96%	2.2	112%	15%	1.97	1.5-2.48	100
Trichloroethene	0	4.6	93%	5.3	107%	14%	4.96	3.69-5.94	5
Vinyl chloride	0	5.8	116%	6.7	134%	14%	5	3.03-7.47	2

%Rec = percent recovery

RPD = Relative percent difference

ERA Cert value = Environmental Resource Associates Certified Value

GWPS – Groundwater performance standard

F-3.4.3 Representativeness

Compliance sample data are believed to be representative of the site conditions prevailing at the time of sample collection because samples were properly collected, stored, and preserved. Although blank contamination did occur, sample data quality was not adversely affected. Holding times were met for all compliance samples other than specified above. Samples that exceeded holding times were resampled.

F-3.4.4 Comparability

All samples were reported in industry-standard units. Water reporting units were micrograms per liter (µg/L) or picoCuries per liter (pCi/L) (adjusted in the database if mg/L). Landfill gas units were in ug/m^3. Analytical protocols for the methods were adhered to and analytical results are considered comparable.

F-3.4.5 Completeness

Completeness is defined as the percentage of laboratory measurements judged to be valid on a method-by-method basis. Valid data are defined as all data and/or qualified data which meet the DQOs for this project. Data completeness is expressed as percent complete (PC), which is (1-(the number of rejected samples per compound ÷ total number of samples per compound) X 100. Completeness for the reporting period was 100%, understanding that all results qualified with U, UJ* or J* are usable to meet project objectives. Benzidine results were 0% complete but are not included in the calculation. The method required by the Metro permit is inadequate to analyze for this compound and does not provide a usable result. The goal for meeting analytical holding times was l00% and was met for all reported compliance samples except benzidine. The nitrate samples that were out of holding time were replaced with usable but estimated values or resampled.

F-3.4.6 Conclusion

The groundwater, landfill gas, and WTP data for the reporting period are of acceptable quality and are considered usable to support project objectives. Samples are representative of the Site and comparable with previous and future investigations (when used in accordance with the validation qualifiers).

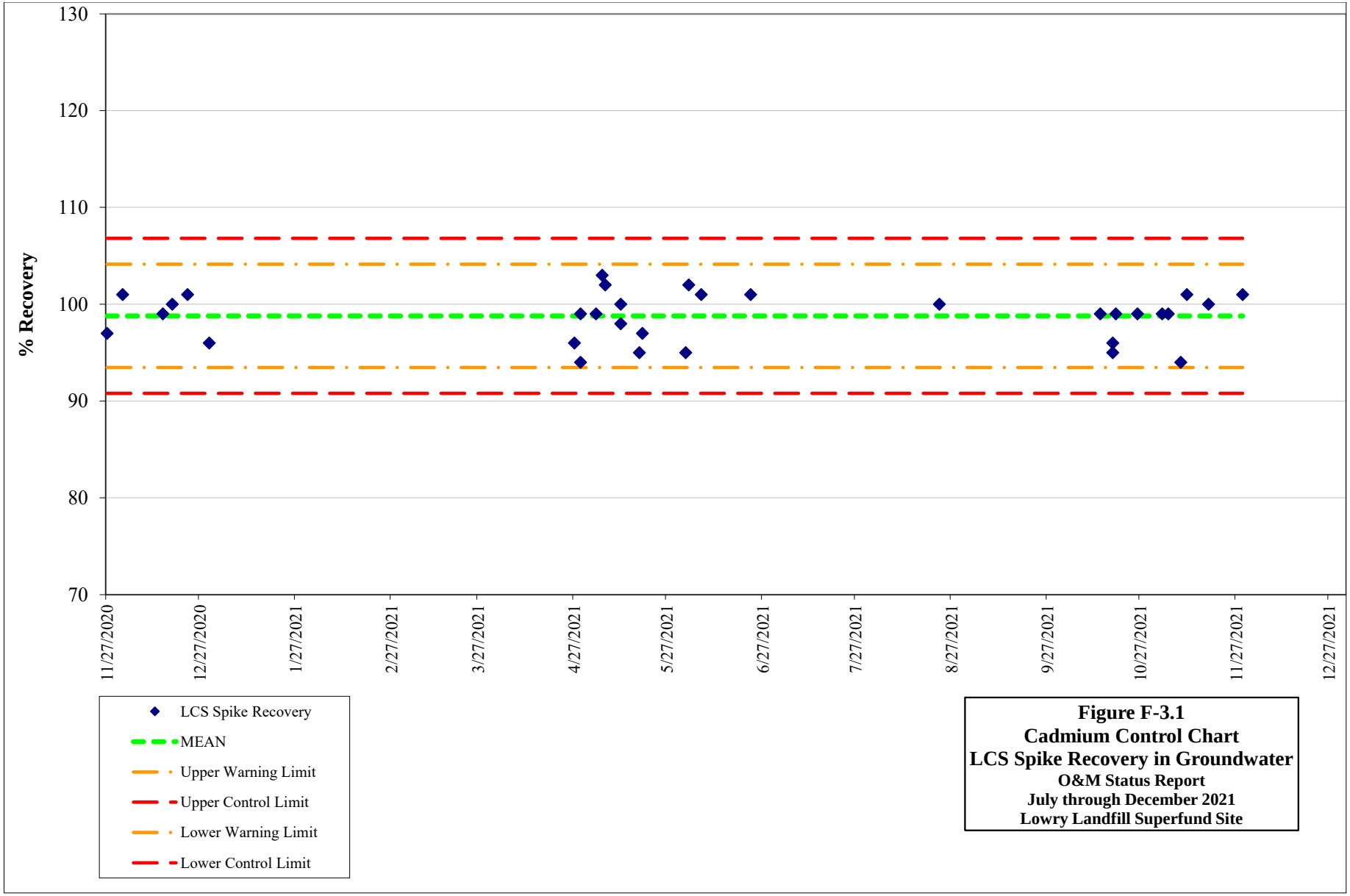

Figure F-3.1
Cadmium Control Chart
LCS Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

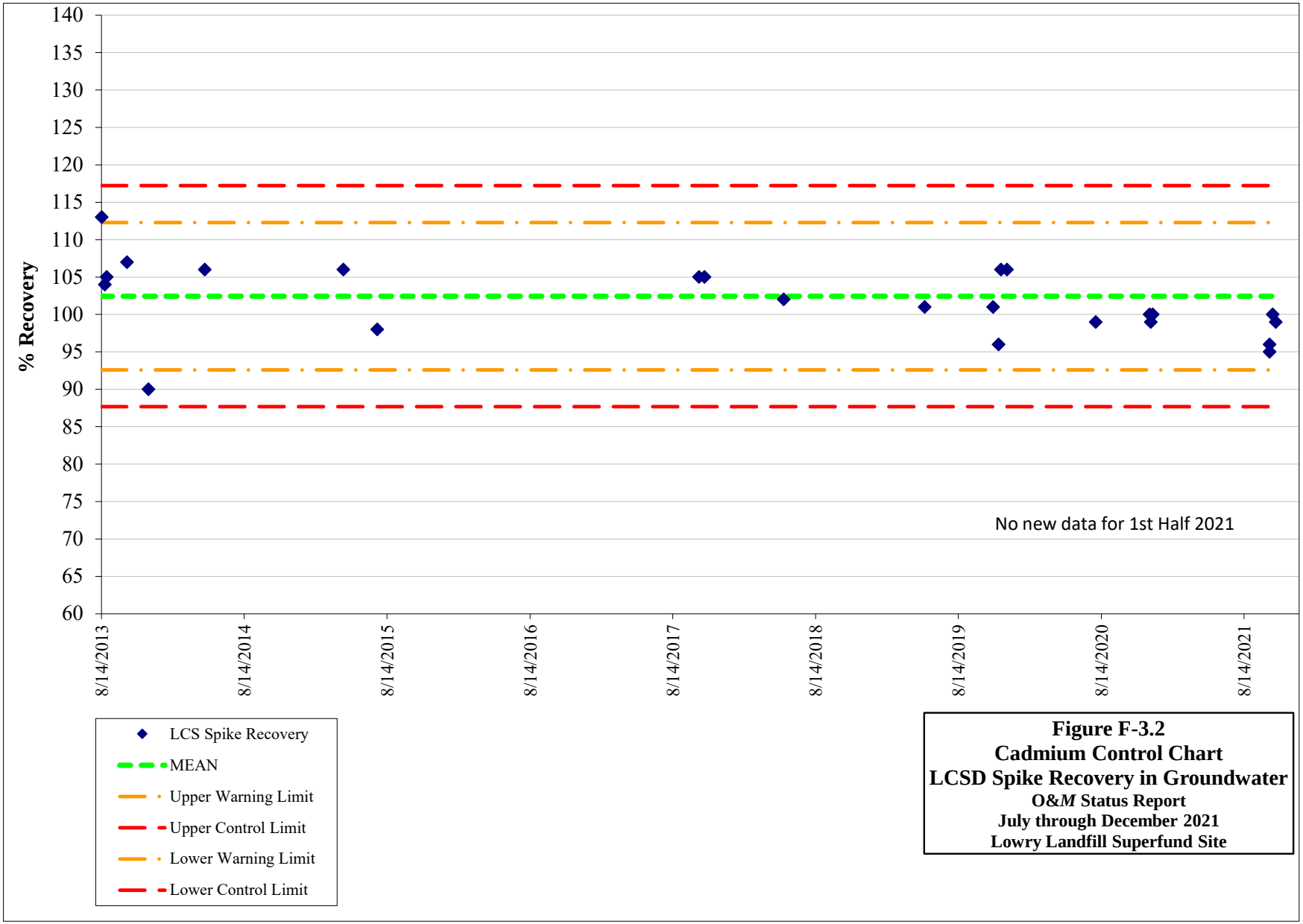

Figure F-3.2
Cadmium Control Chart
LCSD Spike Recovery in Groundwater
O&*M* Status Report
July through December 2021
Lowry Landfill Superfund Site

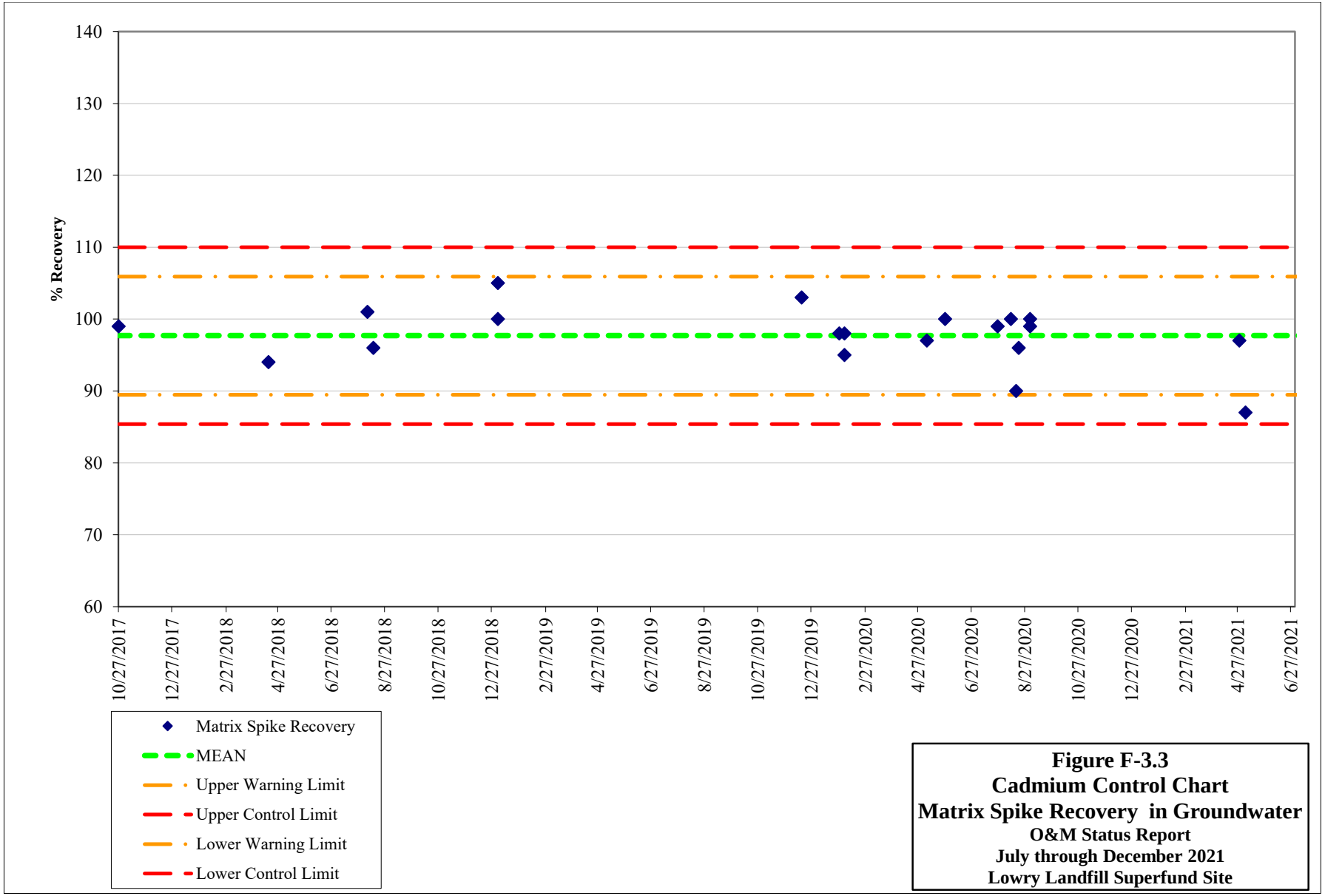

Figure F-3.3
Cadmium Control Chart
Matrix Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

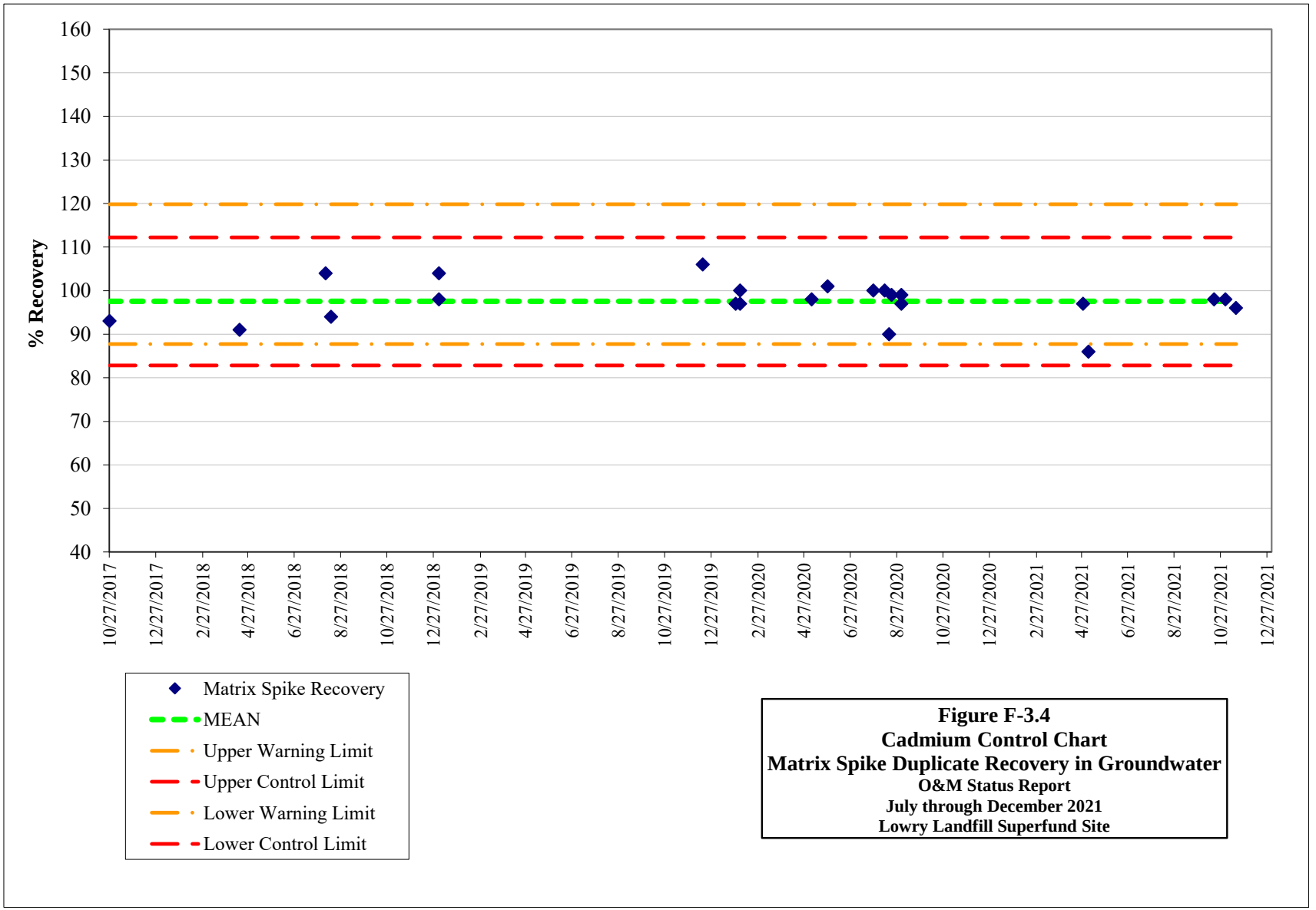

Figure F-3.4
Cadmium Control Chart
Matrix Spike Duplicate Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

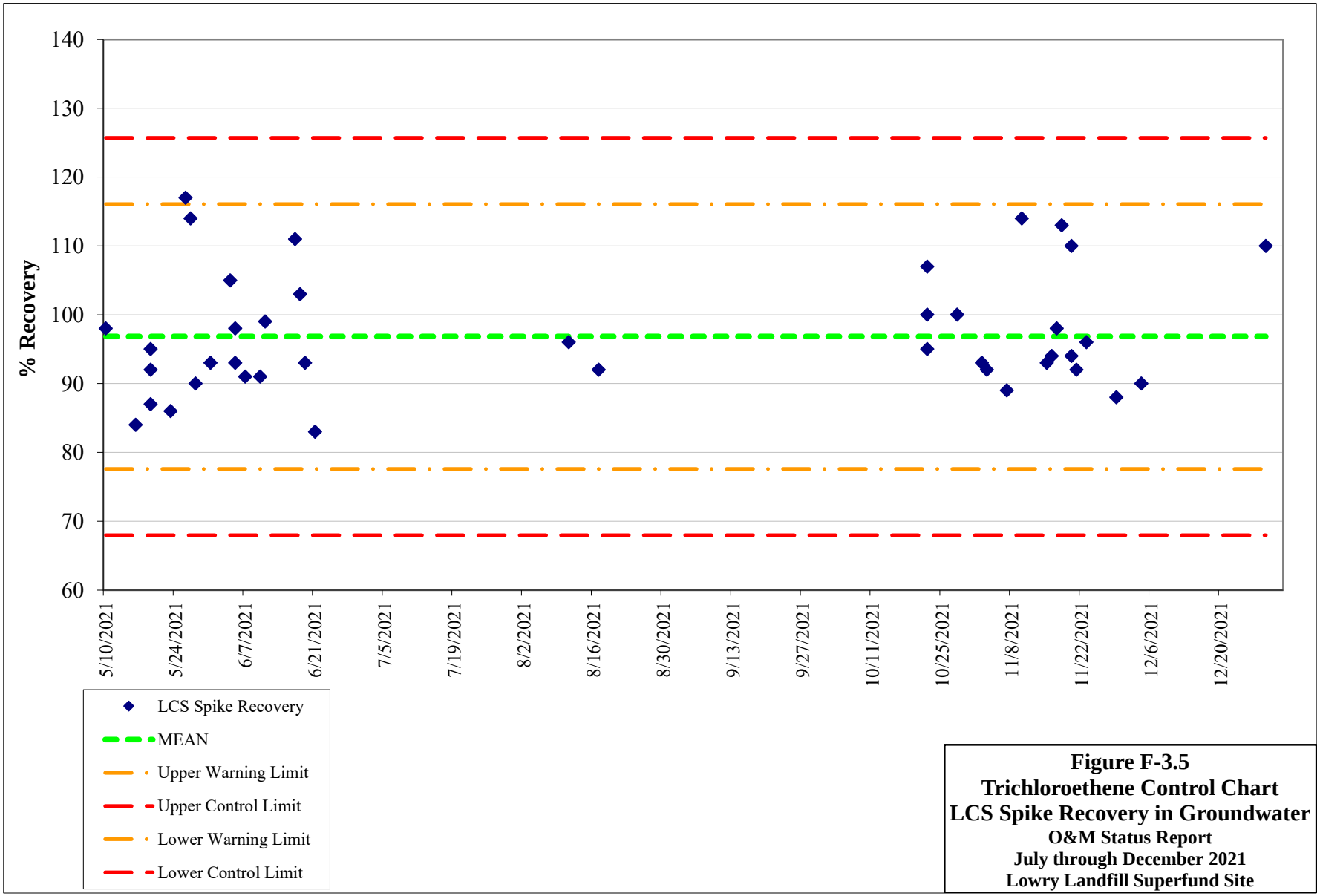

Figure F-3.5
Trichloroethene Control Chart
LCS Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

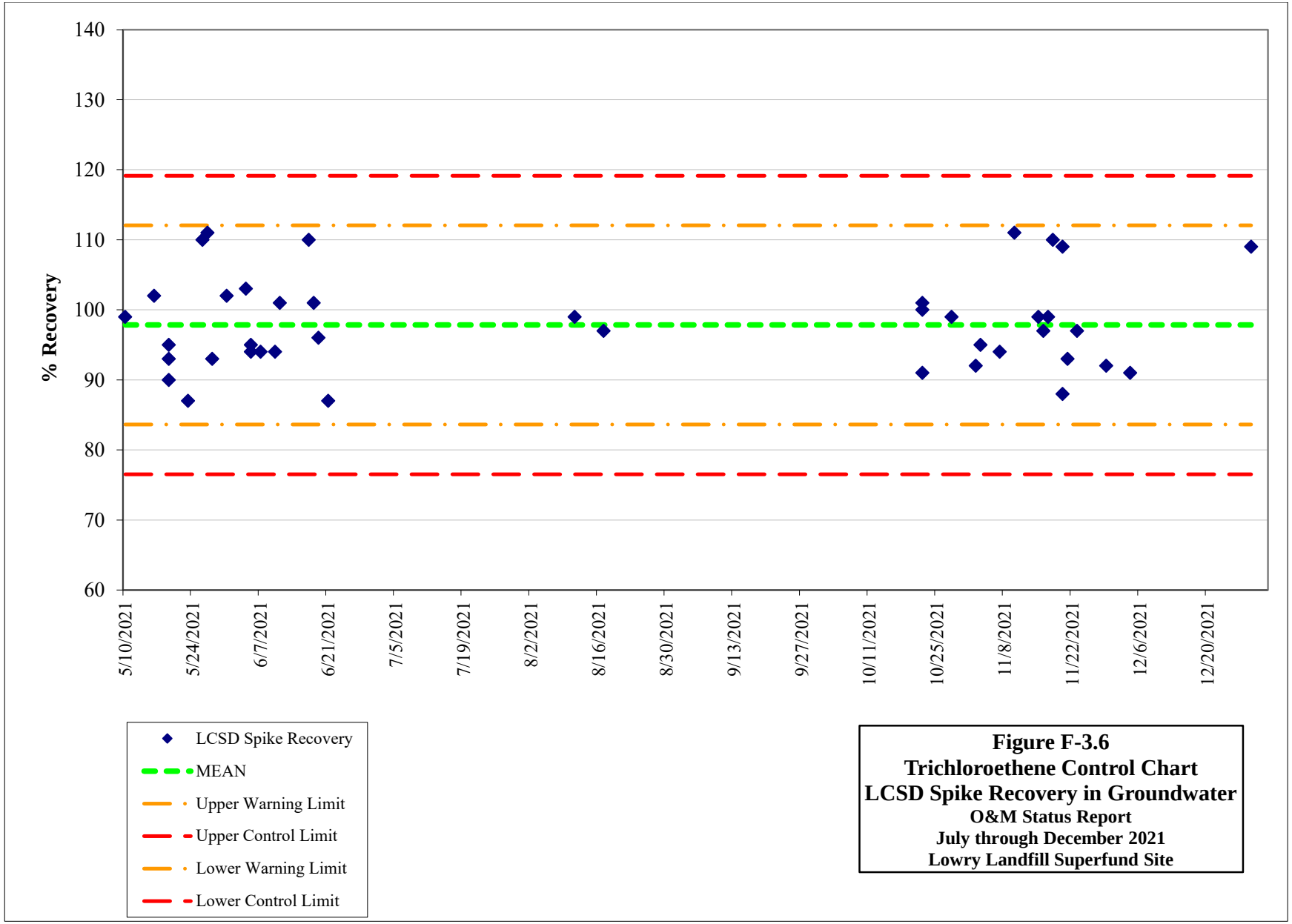

Figure F-3.6
Trichloroethene Control Chart
LCSD Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

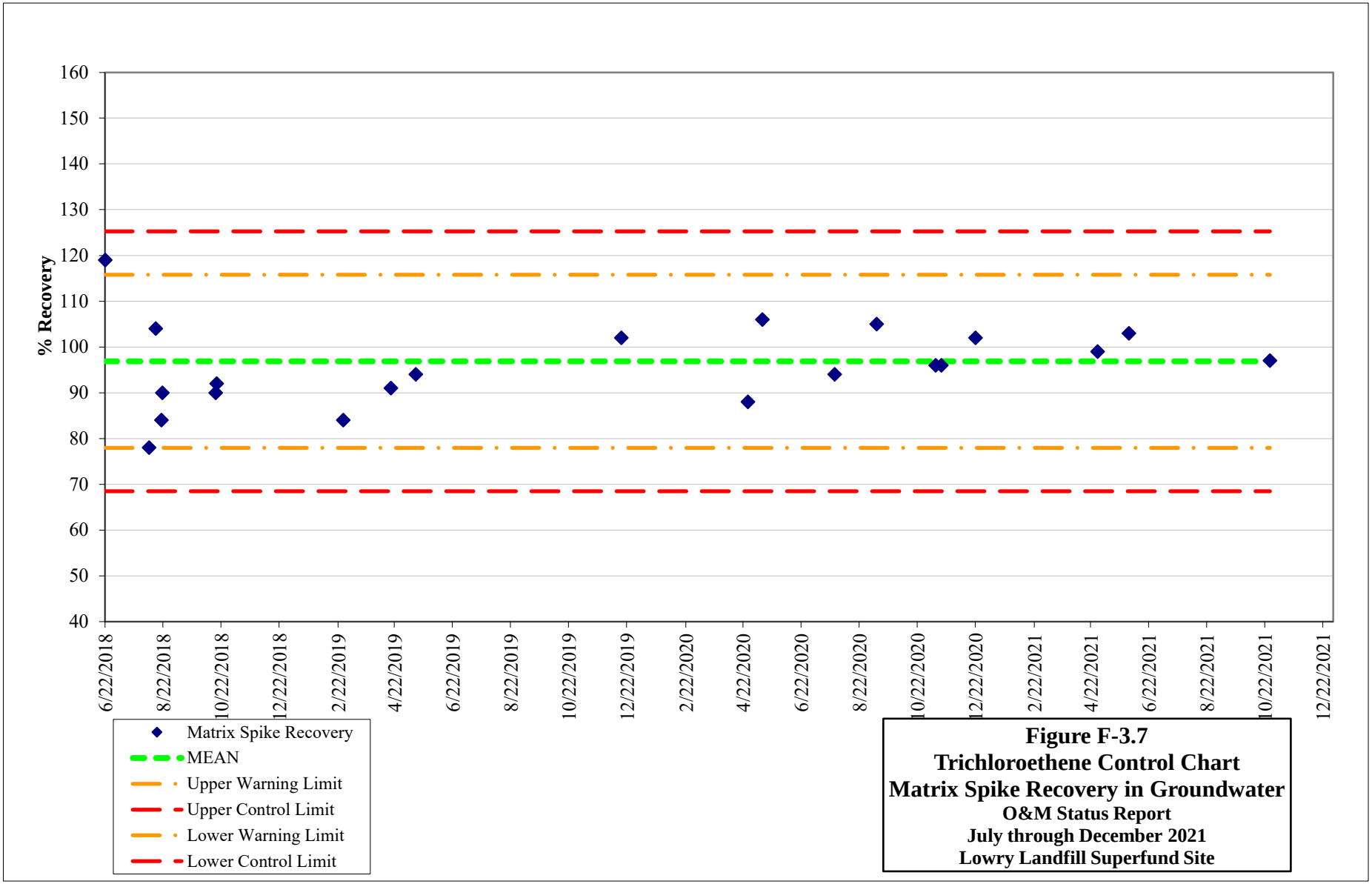

Figure F-3.7
Trichloroethene Control Chart
Matrix Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

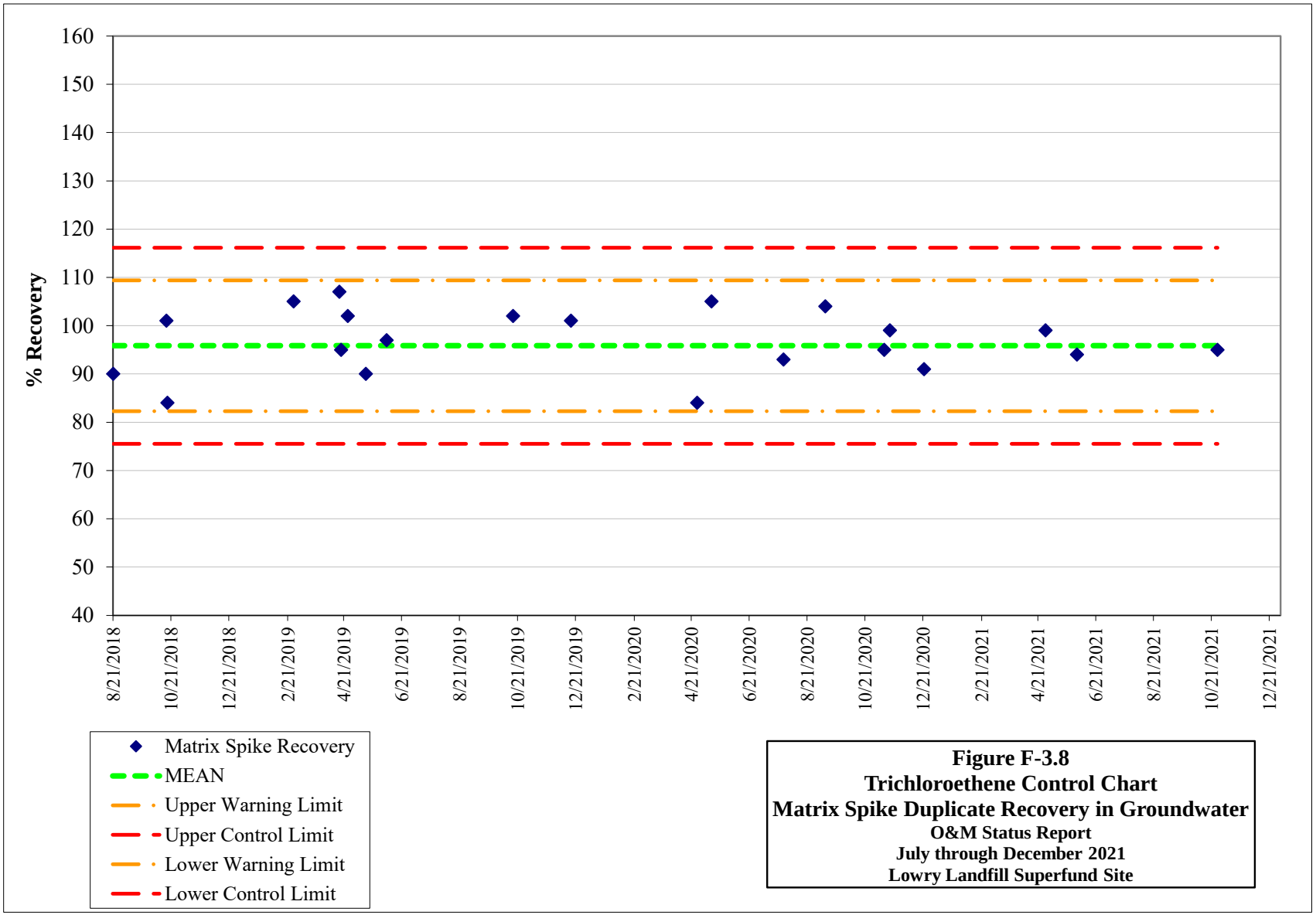

Figure F-3.8
Trichloroethene Control Chart
Matrix Spike Duplicate Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

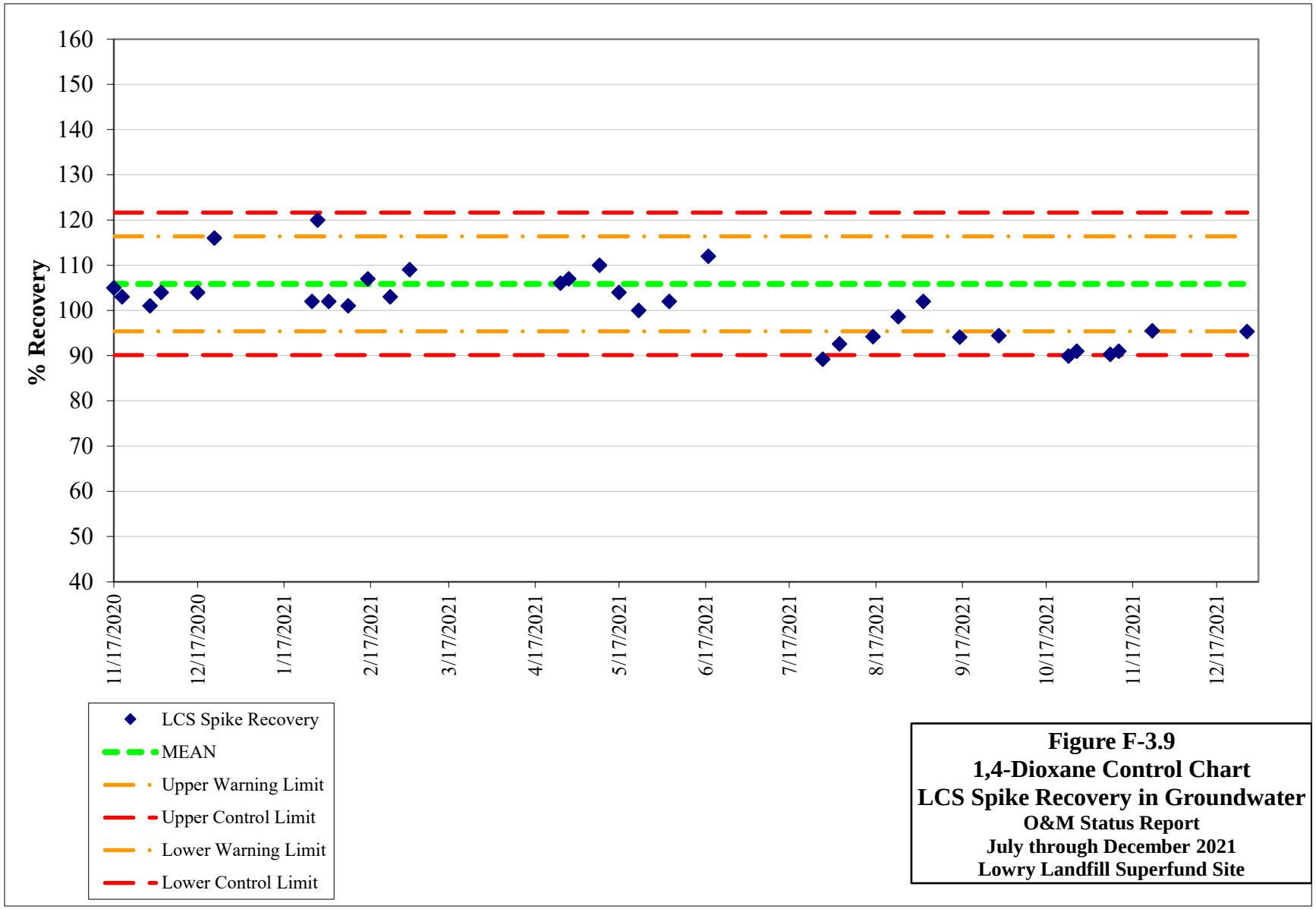

Figure F-3.9
1,4-Dioxane Control Chart
LCS Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

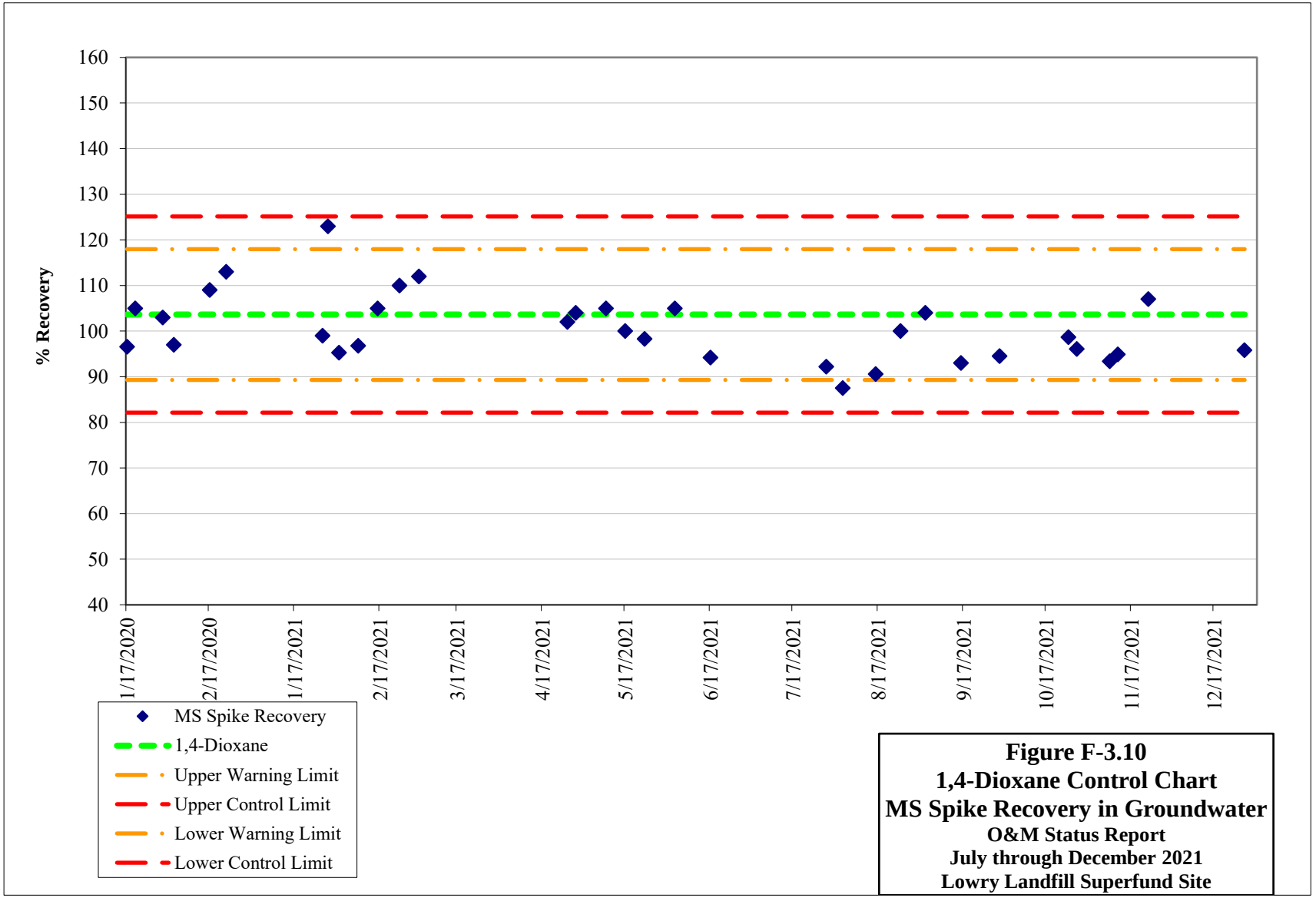

Figure F-3.10
1,4-Dioxane Control Chart
MS Spike Recovery in Groundwater
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

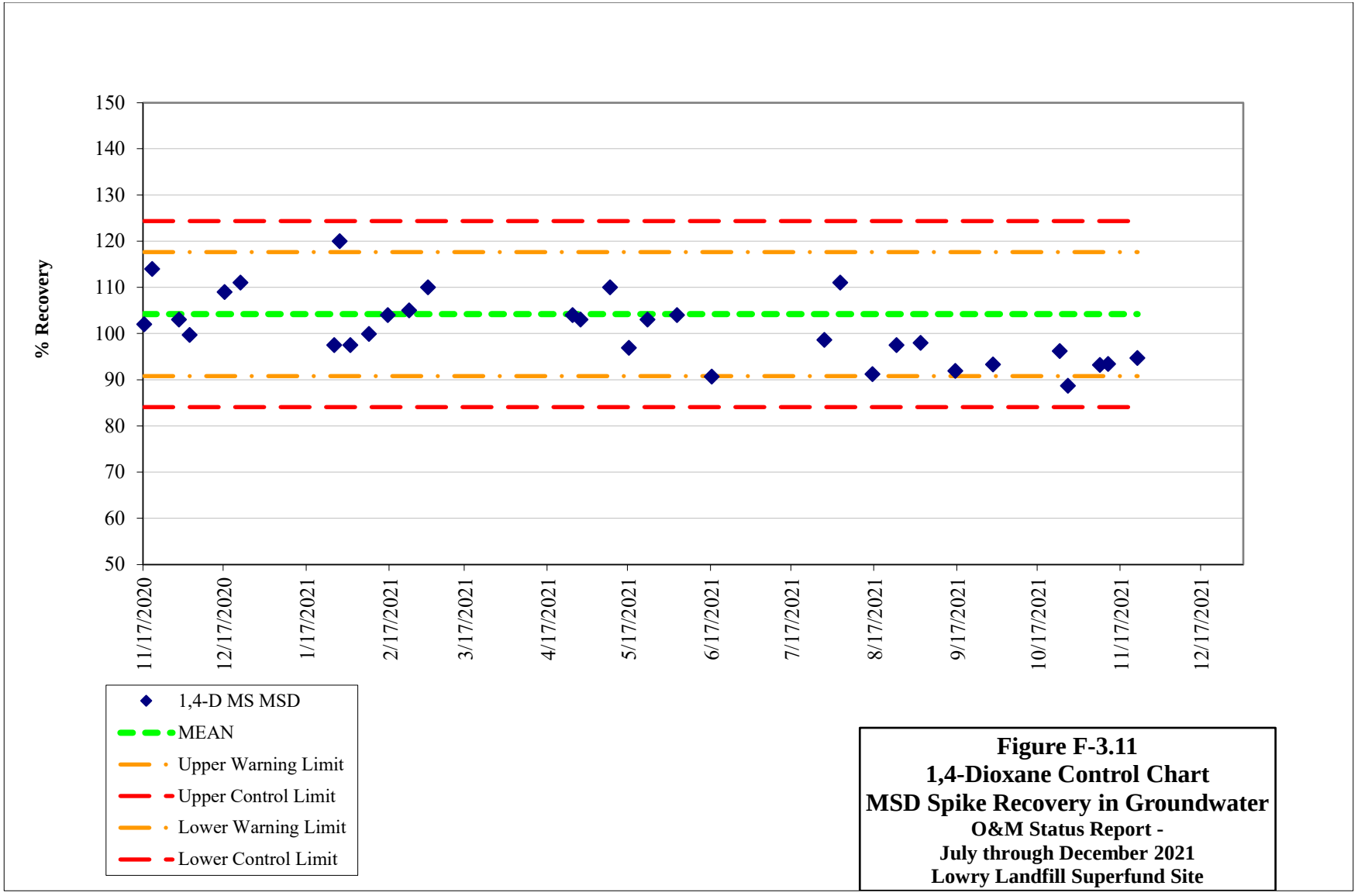

Figure F-3.11
1,4-Dioxane Control Chart
MSD Spike Recovery in Groundwater
O&M Status Report -
July through December 2021
Lowry Landfill Superfund Site

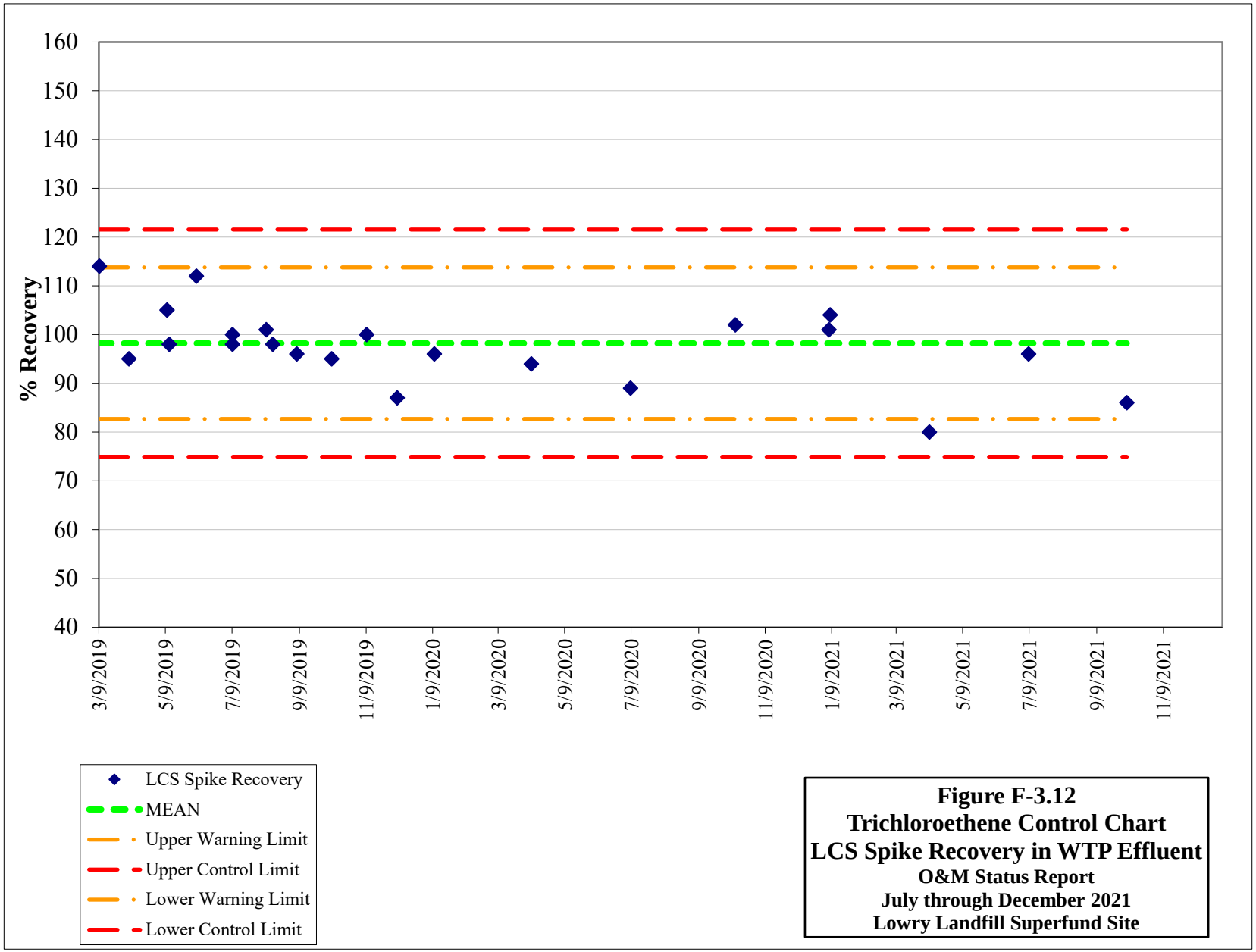

Figure F-3.12
Trichloroethene Control Chart
LCS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

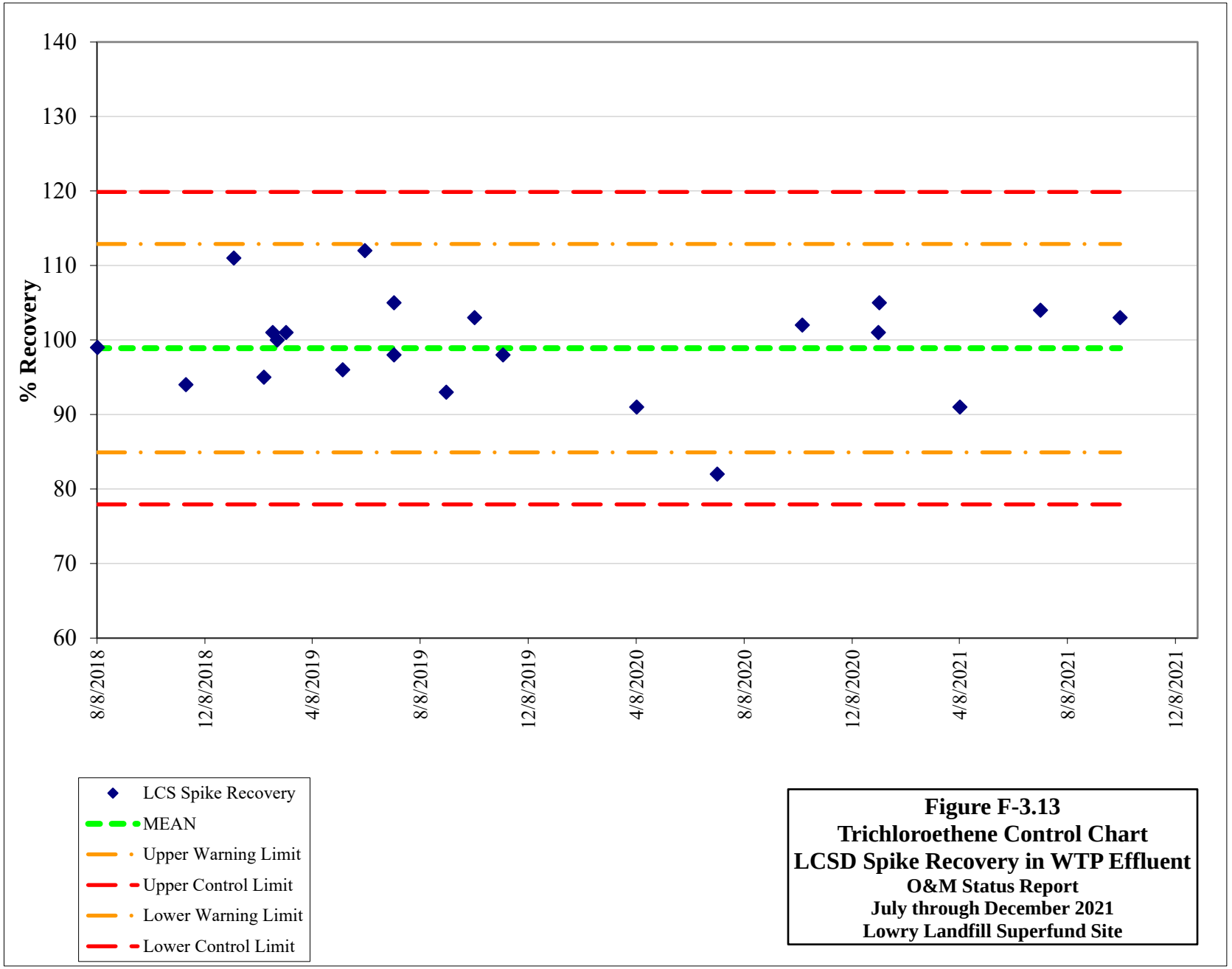

Figure F-3.13
Trichloroethene Control Chart
LCSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

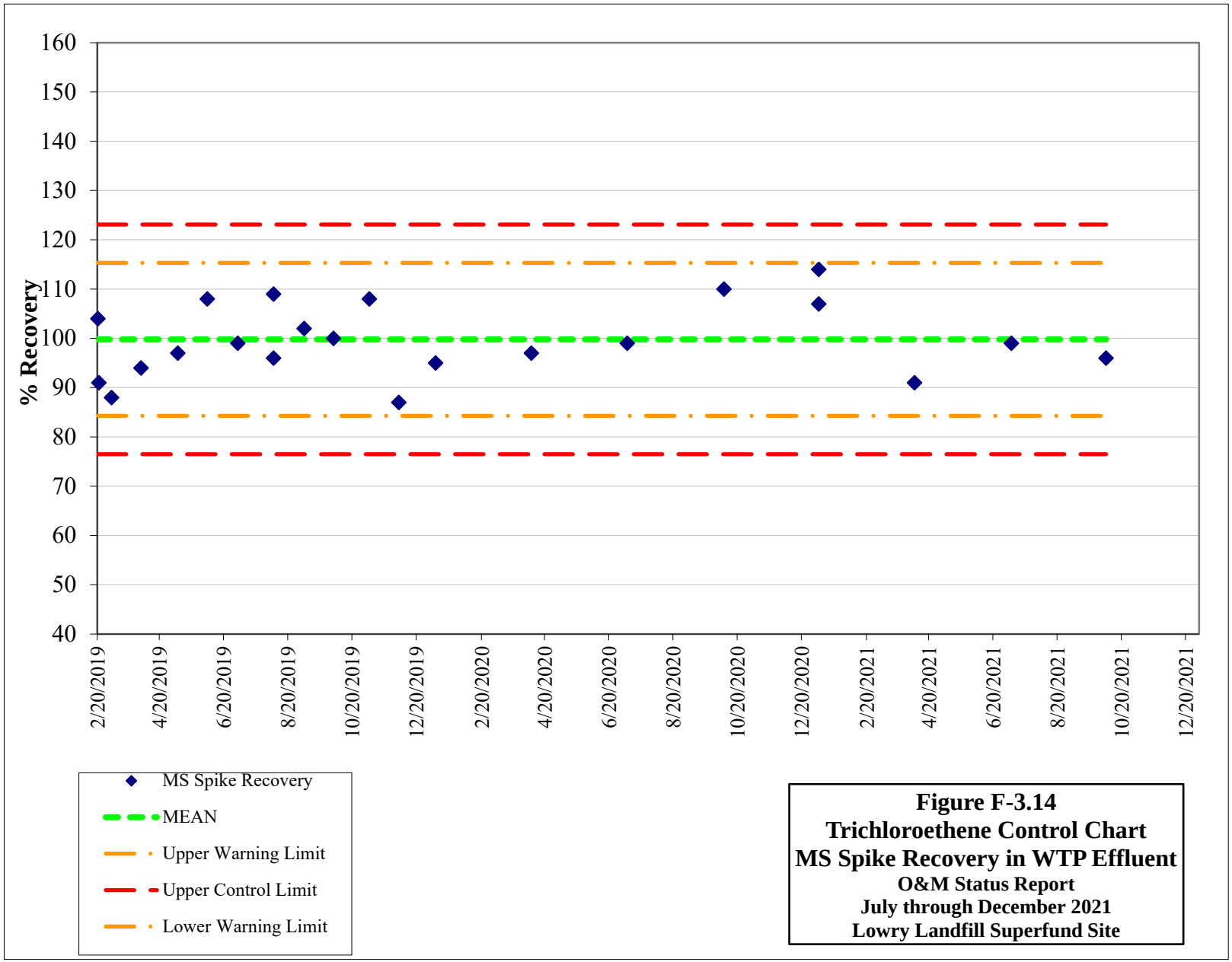

Figure F-3.14
Trichloroethene Control Chart
MS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

WTP

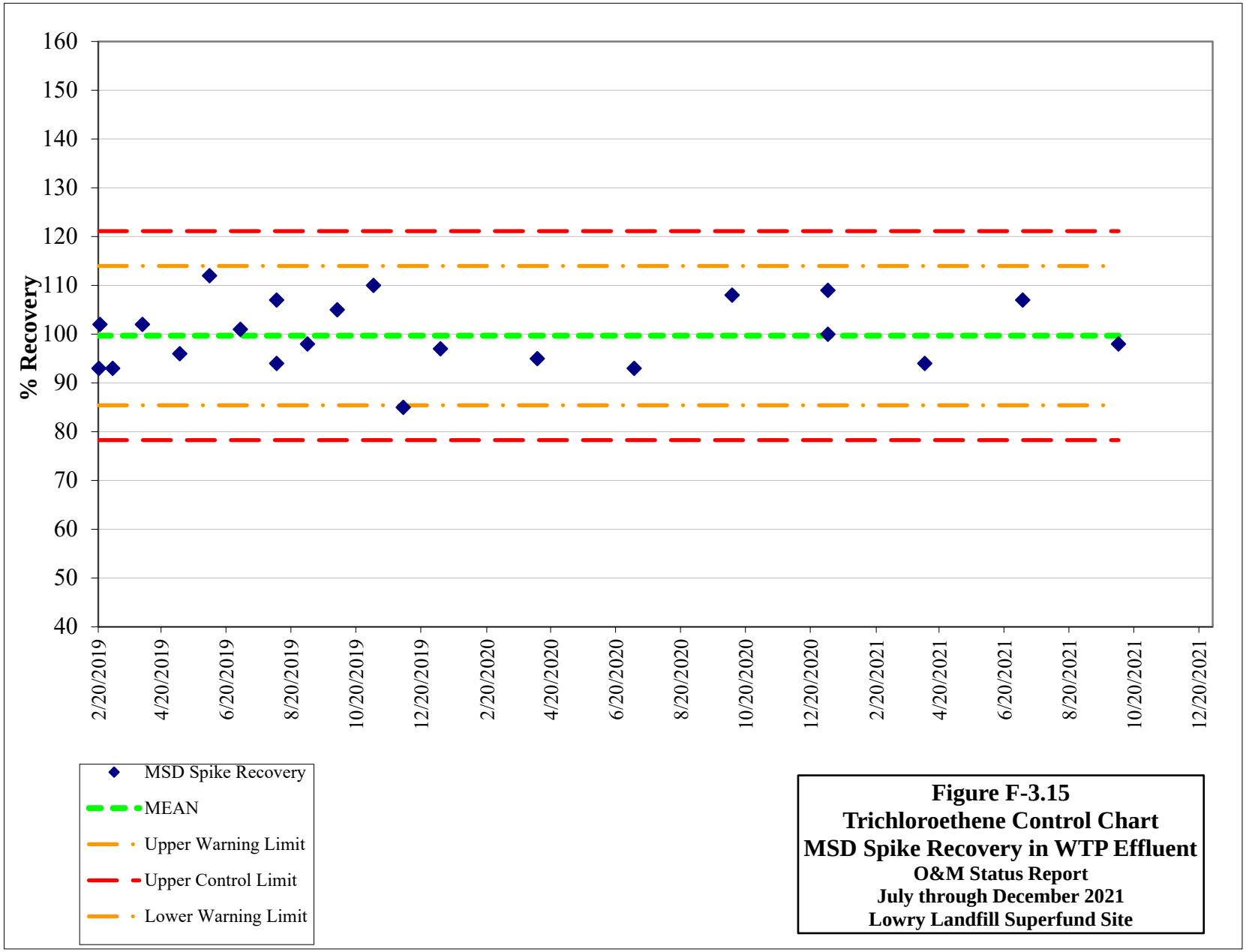

Figure F-3.15
Trichloroethene Control Chart
MSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

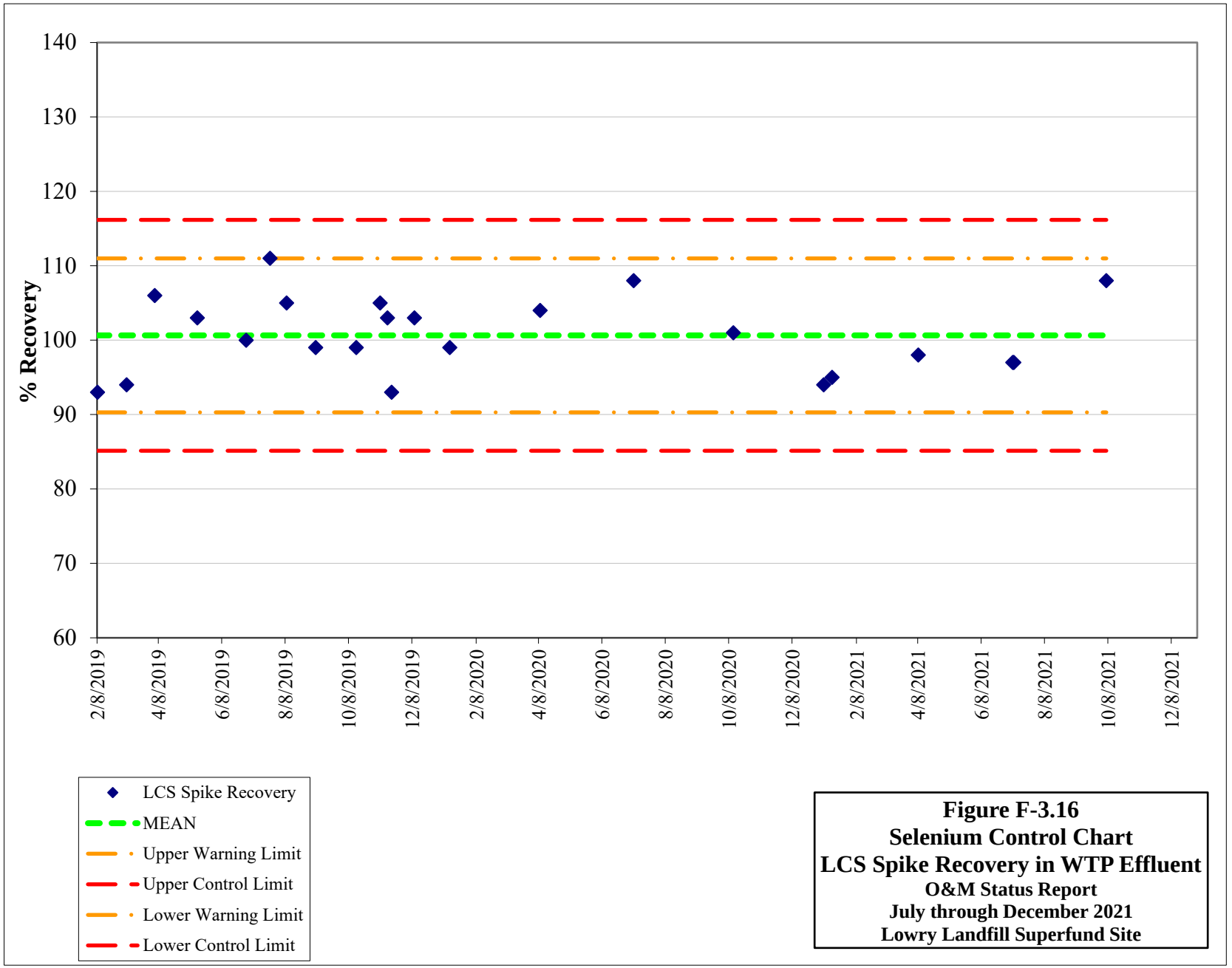

Figure F-3.16
Selenium Control Chart
LCS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

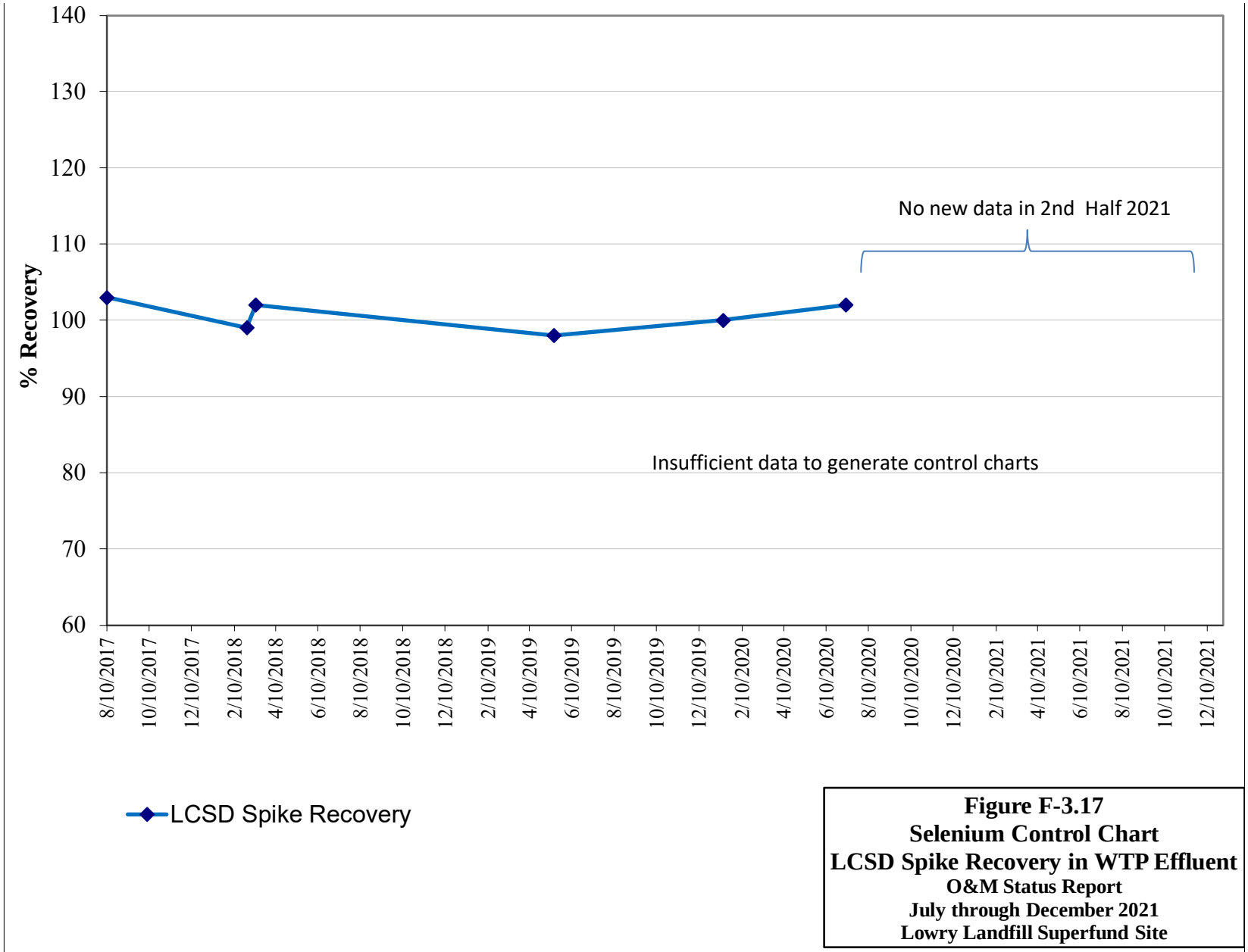

Figure F-3.17
Selenium Control Chart
LCSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

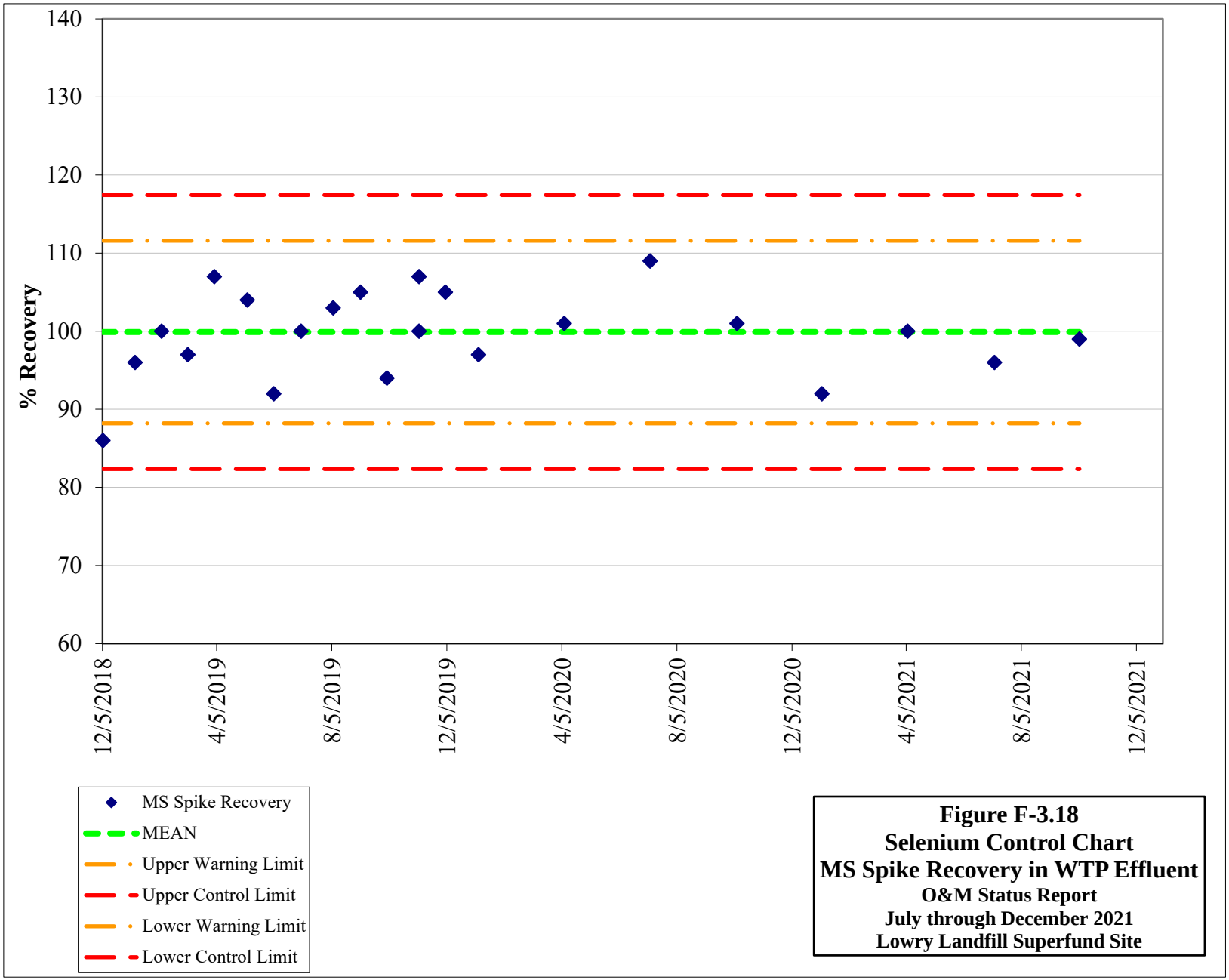

Figure F-3.18
Selenium Control Chart
MS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

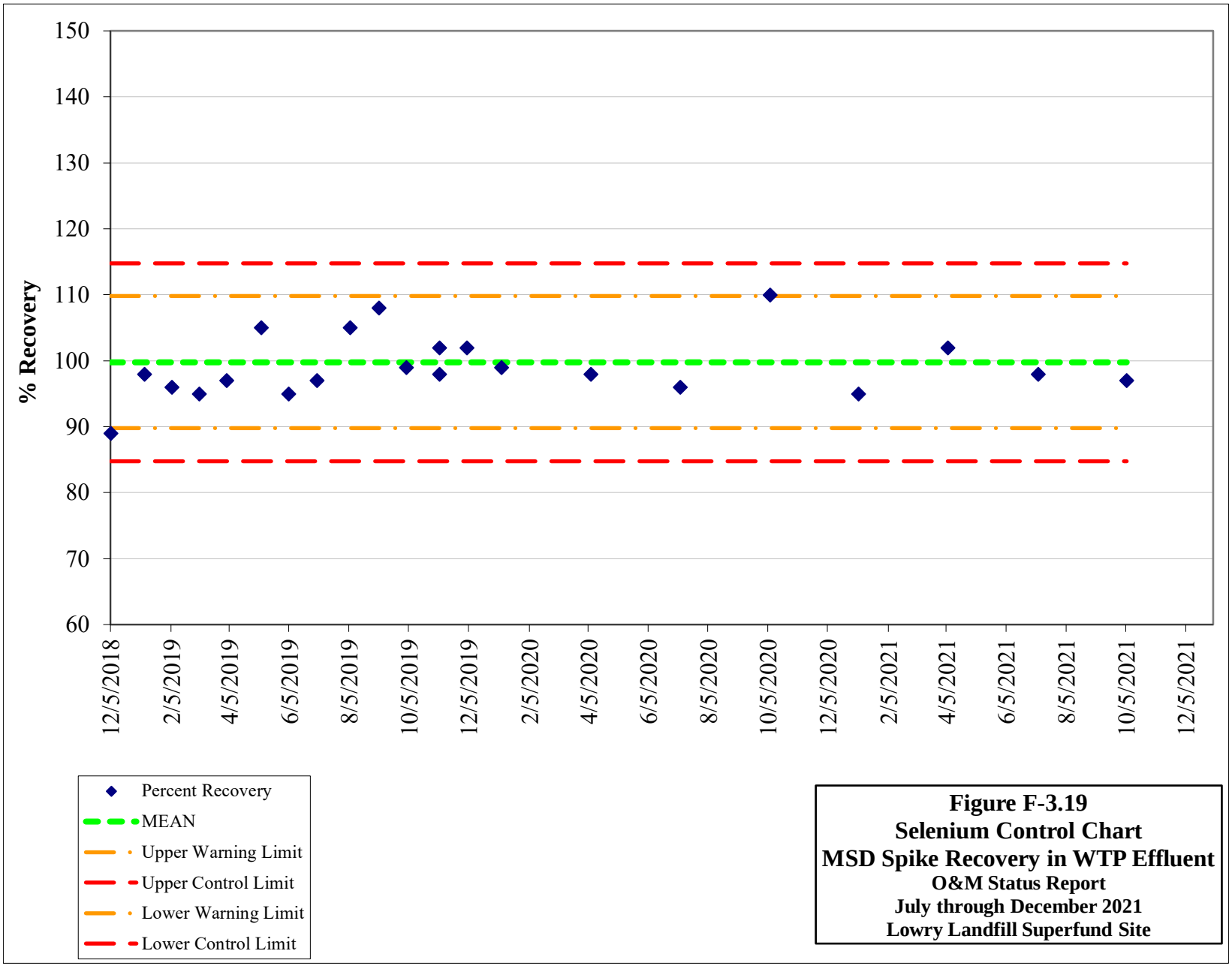

Figure F-3.19
Selenium Control Chart
MSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

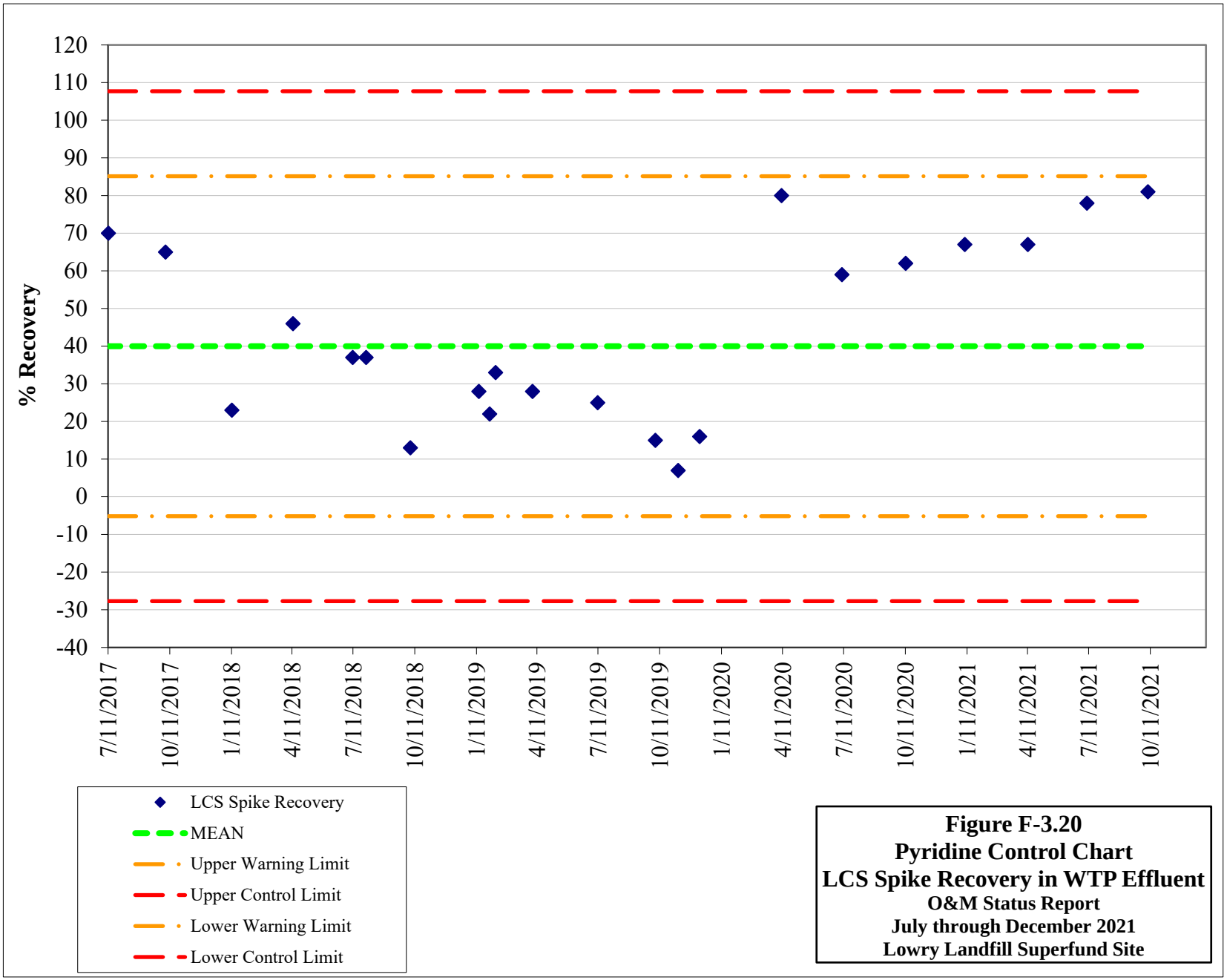

Figure F-3.20
Pyridine Control Chart
LCS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

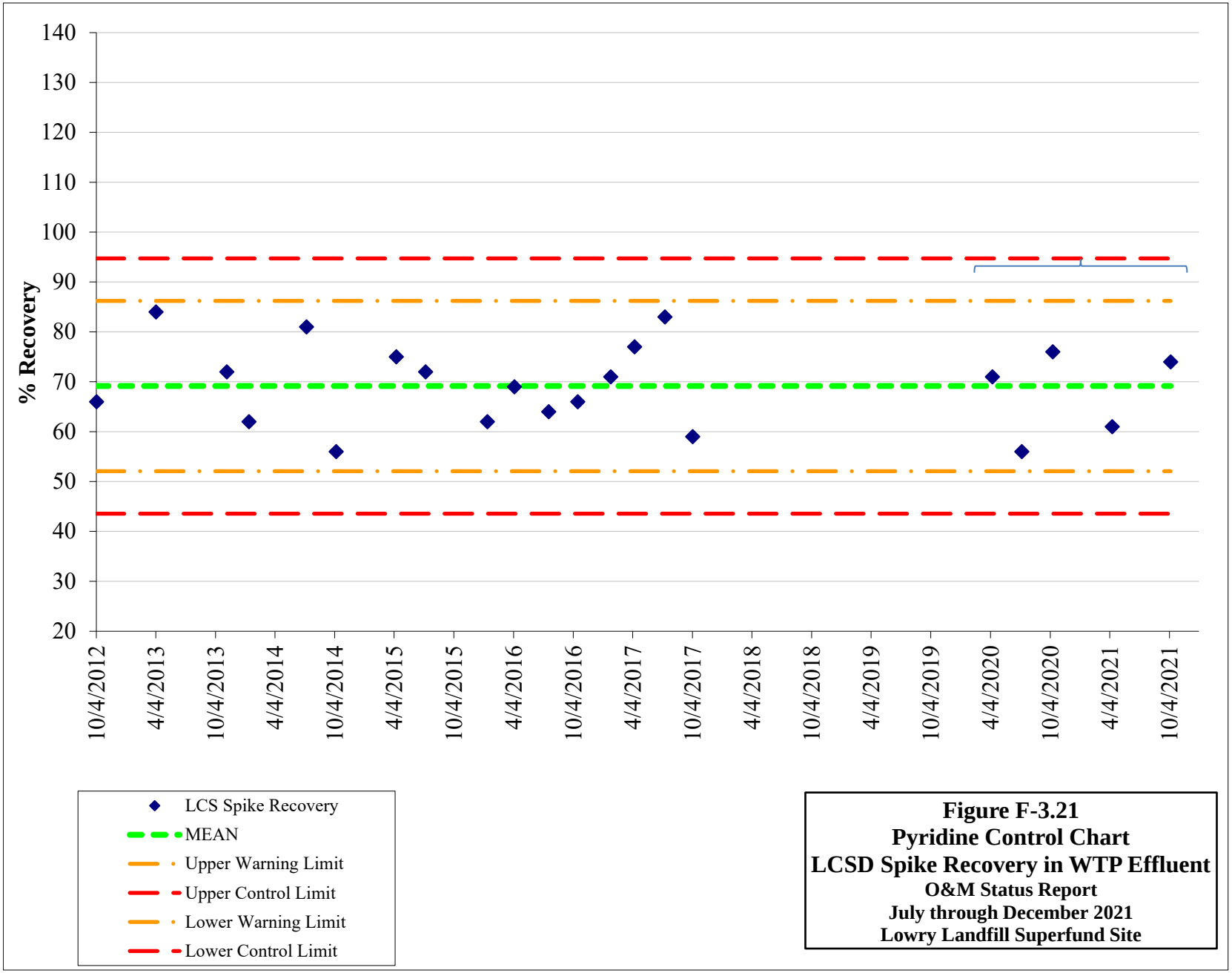

Figure F-3.21
Pyridine Control Chart
LCSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

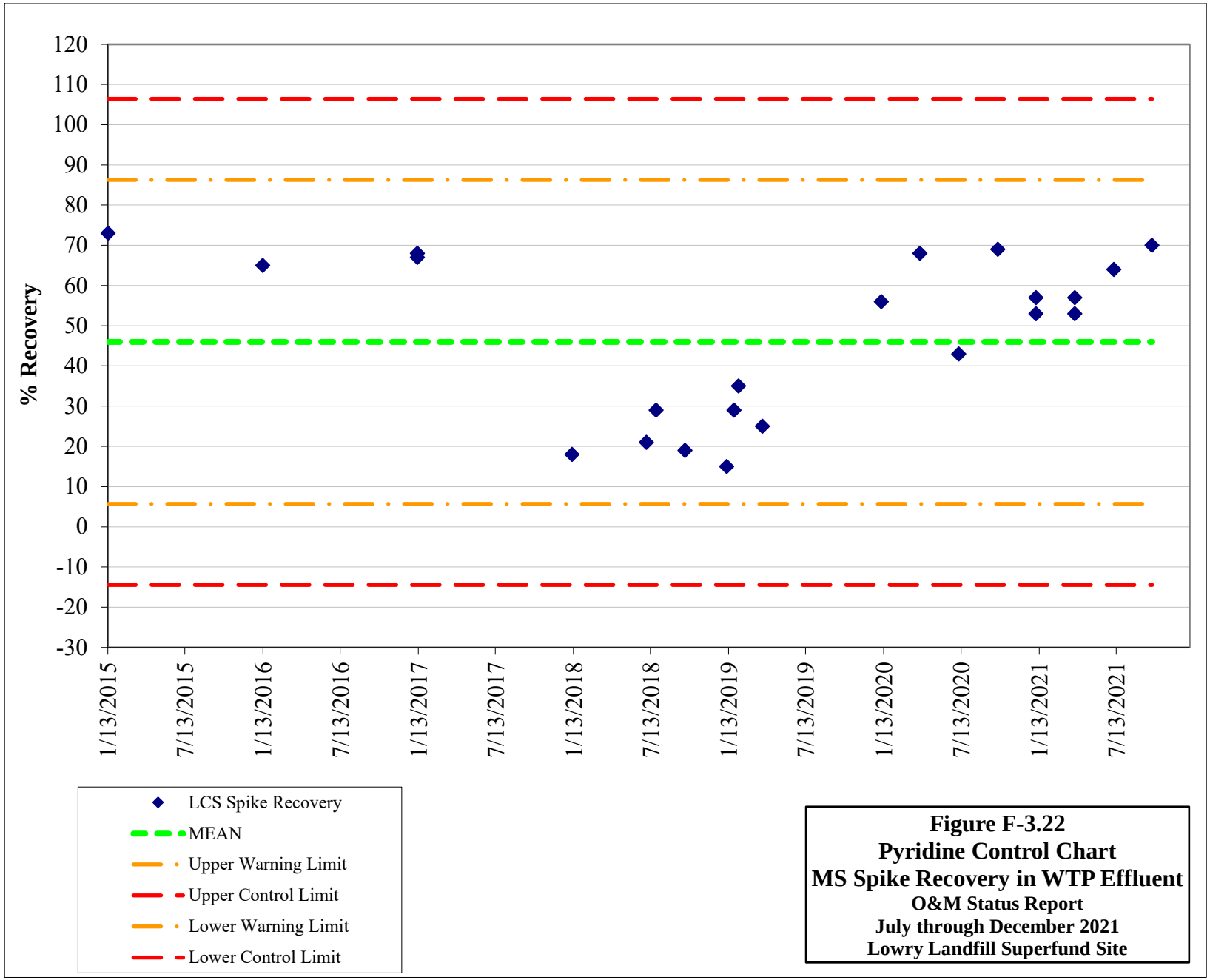

Figure F-3.22
Pyridine Control Chart
MS Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

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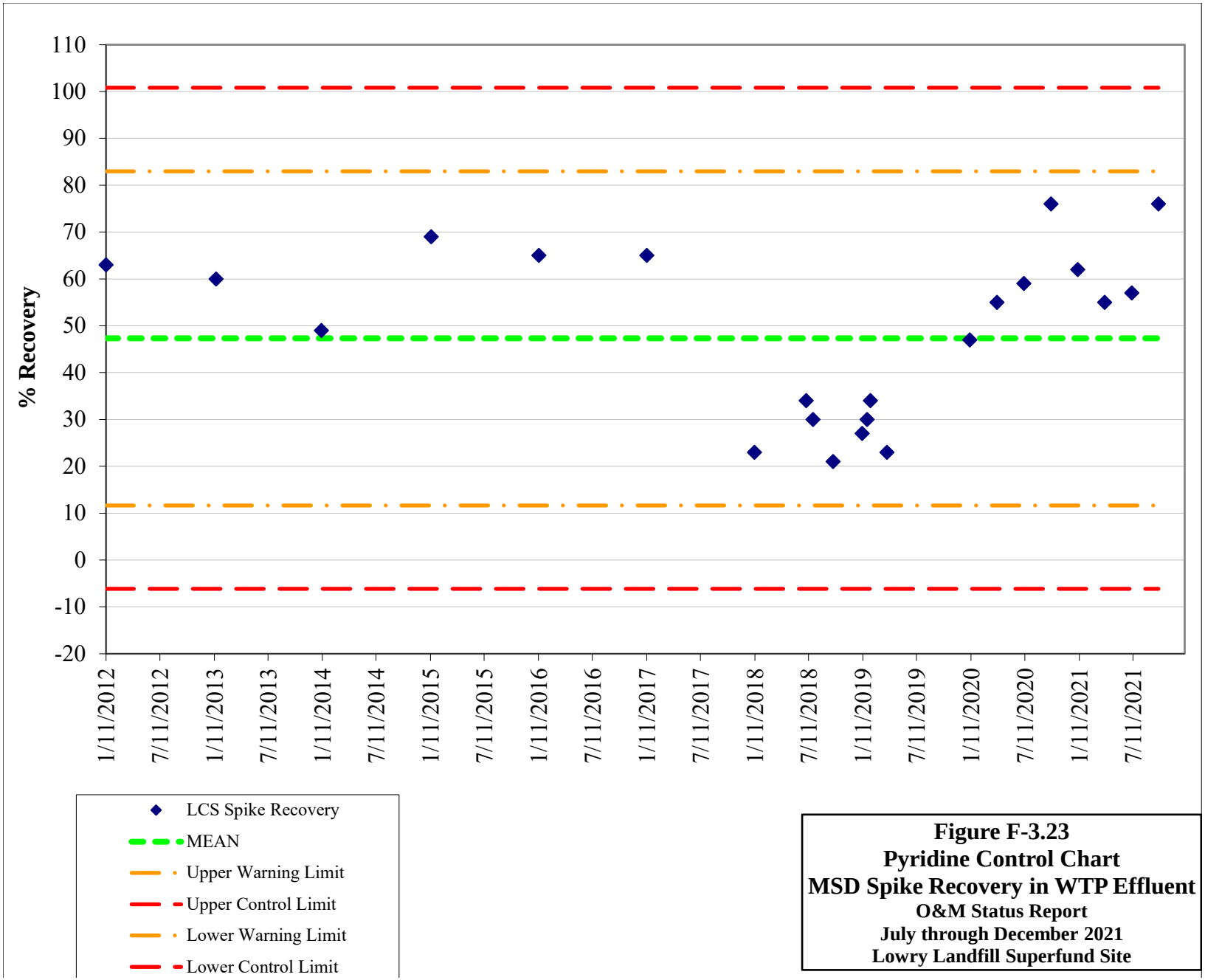

Figure F-3.23
Pyridine Control Chart
MSD Spike Recovery in WTP Effluent
O&M Status Report
July through December 2021
Lowry Landfill Superfund Site

APPENDIX G

ELECTRONIC DATABASE

The analytical data is presented in the access database in this submittal.