

Flambeau Mining Company
4700 Daybreak Parkway
South Jordan, UT 84095
801-204-2526



January 31, 2024

Ms. Molly Gardner
Wisconsin Department of Natural Resources
Mellen Ranger Station
620 W. Layman Drive
PO Box 709
Mellen, WI 54546-0709

Dear Ms. Gardner:

The Flambeau Mining Company (Flambeau) is submitting 5 copies of the attached 2023 Annual Summary Memorandum pursuant to Pursuant to Sections 2 and 3 of the *Findings of Fact, Conclusions of Law and Revised Mining Permit – Flambeau Mining Company* (Wisconsin Department of Natural Resources, dated December 20, 2022). This submittal also addresses other requirements of the Mining Permit and associated approvals.

Monitoring and evaluations conducted during 2023 continue to document that the Flambeau River remains fully protected and Flambeau remains in full compliance with its permit standards.

If you have any comments or questions regarding this submittal, please contact me at stephen.bourn@riotinto.com.

Sincerely,

Stephen Bourn
President – Flambeau Mining Company

attachments

cc: Terry DuSell, Rusk County Board of Supervisors
Erle Barber IV, Town of Grant Chairman
Al Christianson, City of Ladysmith Administrator
Yvonne Johnson, Rusk County Zoning Administrator
Leland Roberts, Flambeau Mining Company
Steve Donohue, P.H., Foth Infrastructure & Environment, LLC
Foth File: 17F777.24\4000

Memorandum

2121 Innovation Court, Suite 100
 De Pere, WI 54115
 (920) 497-2500
 foth.com

January 31, 2024

TO: Stephen Bourn, Flambeau Mining Company
 Leland Roberts, Flambeau Mining Company

CC: Foth Project #: 17F777.24

FR: Nick Glander, Foth Infrastructure & Environment, LLC
 Steve Lehrke, Ph.D., Foth Infrastructure & Environment, LLC
 Steve Donohue, P.H., Foth Infrastructure & Environment, LLC

RE: 2023 Annual Summary Memorandum – Reclaimed Flambeau Mine
 Flambeau Mining Company

1. Purpose and Need

This 2023 Annual Summary Memorandum documents the work that was completed by Flambeau Mining Company (Flambeau) at the Reclaimed Flambeau Mine Site, Ladysmith, Wisconsin, in 2023, to satisfy the requirements of the Mining Permit (MP). These requirements are summarized in Table 1.

Table 1 – Mine Permit Location Information Key

Condition Number	Location of Information	Condition Requirement
(WDNR, 2022 ¹) MP, 1f	Section 2	<i>"Flambeau Mining Company shall continue to conduct environmental monitoring and long-term care activities as described in the 2020 Updated Monitoring Plan."</i>
(WDNR, 2022 ¹) MP, 1g	Section 2	<i>"Flambeau Mining Company shall maintain all necessary monitoring devices, including wells and piezometers, in good working condition and shall replace or repair any damaged or inoperable devices, as needed."</i>
(WDNR, 2022 ¹),1h	Section 3	<i>"Flambeau Mining Company shall maintain the mining site to manage surface water runoff and minimize, to the extent practicable, erosion and sedimentation, and shall repair any areas of excessive erosion, perform routine maintenance, and augment, as necessary, any components of the</i>

Condition Number	Location of Information	Condition Requirement
		<i>surface water management system to ensure effective and controlled drainage from the site. Any construction activities affecting the surface water drainage system shall be conducted in compliance with applicable regulatory authorities."</i>
(WDNR, 2022 ¹),11	Section 3	<i>"If in the course of conducting routine monitoring, maintenance or other construction activities on the site, materials or conditions that could result in significant environmental pollution are encountered, Flambeau Mining Company shall notify the Department within five business days and formulate a plan to investigate and report to the Department on any necessary actions to address the issue in accordance with applicable law and regulatory requirements."</i>
(WDNR, 2022 ¹),11	Section 3, Attachment A, Attachment B	<i>"By January 31 of each year, Flambeau Mining Company shall submit an annual report to the Department covering the period of January 1 through December 31 of the preceding year. The annual report shall summarize and document all monitoring activities including assessments of any trends detected and any exceedances of groundwater quality standards at the intervention boundary, assess the backfilled pit water quality and potential impacts to the Flambeau River, summarize any routine maintenance activities conducted on the mining site, qualitatively discuss and document overall site conditions, identify any deviations or unanticipated conditions experienced during the year, summarize any remedial measures implemented to prevent or mitigate significant environmental pollution, and document continued coverage of the reclamation bond and long-term care bond required under s. 293.51, Wis. Stats."</i>

1. *Findings of Fact, Conclusions of Law and Revised Mining Permit – Flambeau Mining Company, Wisconsin Department of Natural Resources, December 20, 2022.*

Long-term monitoring is conducted in accordance with the Updated Monitoring Plan (August 2020) and Quality Assurance Project Plan (QAPP) (August 2020) which were amended and submitted to the Wisconsin Department of Natural Resources (Department) in August 2020.

2. 2022 Certificate of Completion Determination

On November 4, 2021, Flambeau submitted a petition seeking issuance of a Certificate of Completion of Reclamation for the Industrial Outlot area of the Reclaimed Flambeau Mine. The Department issued a public notice on June 6, 2022, announcing the request and provided the public a comment period before and after the public hearing held on July 6, 2022. The hearing was conducted virtually, and provisions were also made to accept in-person statements at the Ladysmith Service Center. After the comment period, the Department determined Flambeau met the requirements of the approved Reclamation Plan, as amended by the 1998 Modification Approval. The Certificate of Completion of Reclamation for the Industrial Outlot portion of the mining site was issued on December 20, 2022.

The Certificate of Completion of Reclamation issued in 2007 signified that Flambeau had fulfilled the requirements of reclamation for the mining site, except the Industrial Outlot. As a result, the Certification of Completion of Reclamation for the Industrial Outlot, considered together with the 2007 Certification of Completion of Reclamation, signifies that the Flambeau Mining Company has fulfilled the requirements of reclamation for the entire mine site.

As stated in number 27 of the Findings of Fact to the Revised Mining Permit, the Department has been engaged with Flambeau on a study of Stream C to determine if Stream C is attaining its designated uses. This engagement began in 2023 with Stream C monitoring; however, with delays due to the lack of precipitation and flow in Stream C, the study of Stream C will continue in 2024.

3. 2023 Site Monitoring

Environmental monitoring at the Reclaimed Flambeau Mine, during 2023, included assessing the quality of groundwater and backfill pore water. All data obtained during environmental monitoring continues to show that Flambeau remains in compliance with all permit standards and the Flambeau River remains protected.

3.1 Groundwater Sampling and Analysis

Semi-annual groundwater monitoring was performed in accordance with descriptions provided in the Updated Monitoring Plan, the QAPP, and the Local Agreement. Results of the 2023 monitoring were submitted to the Department's Mine Reclamation Unit on July 7, 2023 and January 5, 2024. Those reports are incorporated by reference.

Figure 1 shows the groundwater potentiometric surface using data obtained during 2023. The map was generated using the shallowest measured water levels, and thus represents shallow groundwater flow in the native formations and in the replaced till and sandstone in the backfilled pit footprint. The potentiometric surface shows a direction of regional shallow groundwater flow toward the Flambeau River.

Figure 2 shows the potentiometric surface using the deeper water level for nested wells, where available, and the water levels for the B completion in the backfill monitoring wells. Beyond the pit footprint, the groundwater levels generally mimic the shallow groundwater conditions. Within the pit backfill, the surface reflects a general direction of groundwater flow in the backfilled Type I and Type II stockpile materials along the axis of the pit toward the Flambeau River.

Figure 3 shows hydraulic head in the cross section along the axis of the pit. The cross section is interpreted to show predominantly horizontal flow in the backfilled Type I and Type II stockpile materials but with a downward hydraulic gradient at the eastern pit area and an upward hydraulic gradient with convergent groundwater flow near the Flambeau River. These observations are consistent with previous, post-mining years.

3.1.1 Trend Analysis

A detailed analysis of statistical trends occurring in the groundwater and surface water data was performed. Statistical tests evaluated the long-term trends occurring during the post-mining period (October 1997 to the present) and the short-term trends for the most recent five years. Historical trend graphs of the data are also presented.

A detailed discussion of the trend results for each well nest is provided in Section 3. In general, the number of more notable concentration trends as observed in earlier Annual Memos has reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. Most trends noted through the Mann-Kendall nonparametric test for the most recent five-year dataset are due to slight but consecutive concentration changes (either increasing or decreasing) and not reflective of a substantial overall concentration change. The majority of the observed trends continue to occur in the semi-annual groundwater indicator monitoring parameters.

For the intervention boundary wells, the statistically increasing trends noted in the previous Annual Memo for conductivity in MW-1002, MW-1002G and MW-1005, and for alkalinity and hardness in MW-1002G, have ceased.

For the MW-1013 in-pit well nest, iron at MW-1013 previously had an increasing trend which has since stabilized, however, iron in this well continues to exhibit a strong degree of seasonal variation with increased concentrations observed during the fall event.

For the in-pit well nest at MW-1014, copper in in MW-1014B remains at lowered concentrations after a substantial decrease in 2019. Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

No statistical trends were noted in the five-year datasets for surface water at sampling location SW-1 and SW-2. A tabular summary of the 2022 analytical SW-3 results is provided in Attachment B.

3.2 Protection of the Flambeau River

Potential impact to the Flambeau River was estimated by performing a concentration reduction factor (CRF) calculation in the Request to Modify the Updated Monitoring Plan (November 2018). This calculation was initially presented in Appendix L of the Mine Permit Application for the Flambeau Project (December 1989), and then updated with current gradient and concentration data for copper, iron, manganese, and sulfate in a memorandum submitted by Flambeau, to the Department, on October 17, 2000, entitled "Backfilled Pit Water Quality Assessment" (October 2000). The 2023 calculation, updated using the current gradient and concentrations, is incorporated by reference. The results of the 2023 calculation were consistent with the 1989 and 2000 CRF calculations, with the CRF being on the order of 0.00000010 and 0.0000010 milligrams per liter (mg/L) for average and low flow conditions,

respectively. This CRF results in negligible, unmeasurable, and incremental impacts to the Flambeau River that are 3 to 5 orders of magnitude lower than background concentrations in the Flambeau River indicating that the River remains protected. The 2023 Flambeau River analytical results are summarized in Attachment A for SW-1 and SW-2. The 2023 Flambeau River analytical results are summarized in Attachment B for SW-3.

3.3 Annual Site Inspection

The site was inspected during the 2023 groundwater monitoring events. During these events, there were no areas of erosion or settling observed; vegetative growth appeared normal; and all monitoring devices were functional, with the following exception:

The beaver dam/issue, first observed in 2019, had expanded and was impeding drainage to the weir causing flooding in the local area. The beaver removal began in 2020 and continued in 2021. In spring 2021, the beaver dam was removed, and the trailway was restored. There were no beaver removal activities conducted in 2022. In the fall of 2023, the presence of beaver activity in the wetland area was noted during a site inspection. The beaver(s) constructed only a mud hut, with no trees begin harvested. With no site damage being noted to trails, trees, or the wetland perimeter; no beaver removal activities were conducted. Beaver activity will continue to be monitored in spring of 2024.

3.4 Other Activities

The Flambeau River was voluntarily monitored in the spring and fall for copper, iron, manganese, total hardness, zinc, and total suspended solids (TSS). These results are summarized in Attachment A for SW-1 and SW-2. The results are summarized in Attachment B for SW-3. The results indicate that the Flambeau River remains protected.

4. References

Stream C Fall Sampling Results Memorandum	January 2024
Stream C Spring Sampling Results Memorandum	August 2023
2022 Annual Summary Memorandum	January 2023
2022 Revised Mining Permit	December 2022
2021 Annual Summary Memorandum	January 2022
2020 Annual Summary Memorandum	January 2021
Reclaimed Flambeau Mine Well Abandonment Documentation Submittal	November 2020
2020 Updated Monitoring Plan	August 2020
Reclaimed Flambeau Mine Well Abandonment Work Plan	August 2020
Beaver Removal Work Plan	August 2020
2019 Annual Summary Memorandum	January 2020
2018 Annual Summary Memorandum	January 2019

Request to Modify the Updated Monitoring Plan	November 2018
2017 Annual Report	January 2018
2016 Annual Report	January 2017
Copper Park Business and Recreation Area Supplement Construction Documentation Report	November 2016
2015 Annual Report	January 2016
2015 Flambeau Mining Company Surface Water Monitoring Plan	September 2015
Copper Park Business and Recreation Area Work Plan Supplement	May 2015
Quality Assurance Project Plan	February 2015
2014 Annual Report	January 2015
2013 Annual Report	January 2014
Copper Park Business and Recreation Area Maintenance and Monitoring Plan	February 2013
2012 Annual Report	January 2013
Copper Park Business and Recreation Area Construction Documentation Report	January 2013
2012 Annual Reclamation Report	November 2012
2011 Annual Report	January 2012
2011 Annual Reclamation Report	November 2011
Copper Park Business and Recreation Area Work Plan	May 2011
2010 Annual Report	January 2011
2010 Annual Reclamation Report	November 2010
2009 Annual Report	February 2010
2009 Annual Reclamation Report	November 2009
2008 Annual Report	January 2009
2008 Annual Reclamation Report	November 2008
2008 Monitoring Results and Copper Park Lane Work Plan	October 2008
2007 Annual Report	January 2008
COC Stipulation Monitoring Work Plan	December 2007
Quality Assurance Project Plan – Stipulation Monitoring Work Plan QAPP for the Flambeau Mine	December 2007
2007 Annual Reclamation Report	November 2007

Stipulation and Order	May 2007
2006 Annual Report	January 2007
Biofilter Management Plan	January 2007
2006 Annual Reclamation Report	November 2006
Construction Documentation Report – Flambeau Industrial Outlot	September 2006
2005 Annual Report	January 2006
2005 Annual Reclamation Report	November 2005
2004 Annual Reclamation Report	November 2004
2001 Annual Reclamation Report	November 2001
2000 Annual Report	January 2001
Revised Mining Permit Quality Assurance/Quality Control Plan	August 1991
Updated Monitoring Plan	July 1991
Mining Permit	January 1991
Operational Phase and Long Term Care Quality Assurance Plan	November 1993
Mine Permit Application	December 1989
Local Agreement	August 1988

5. Submittal Summary

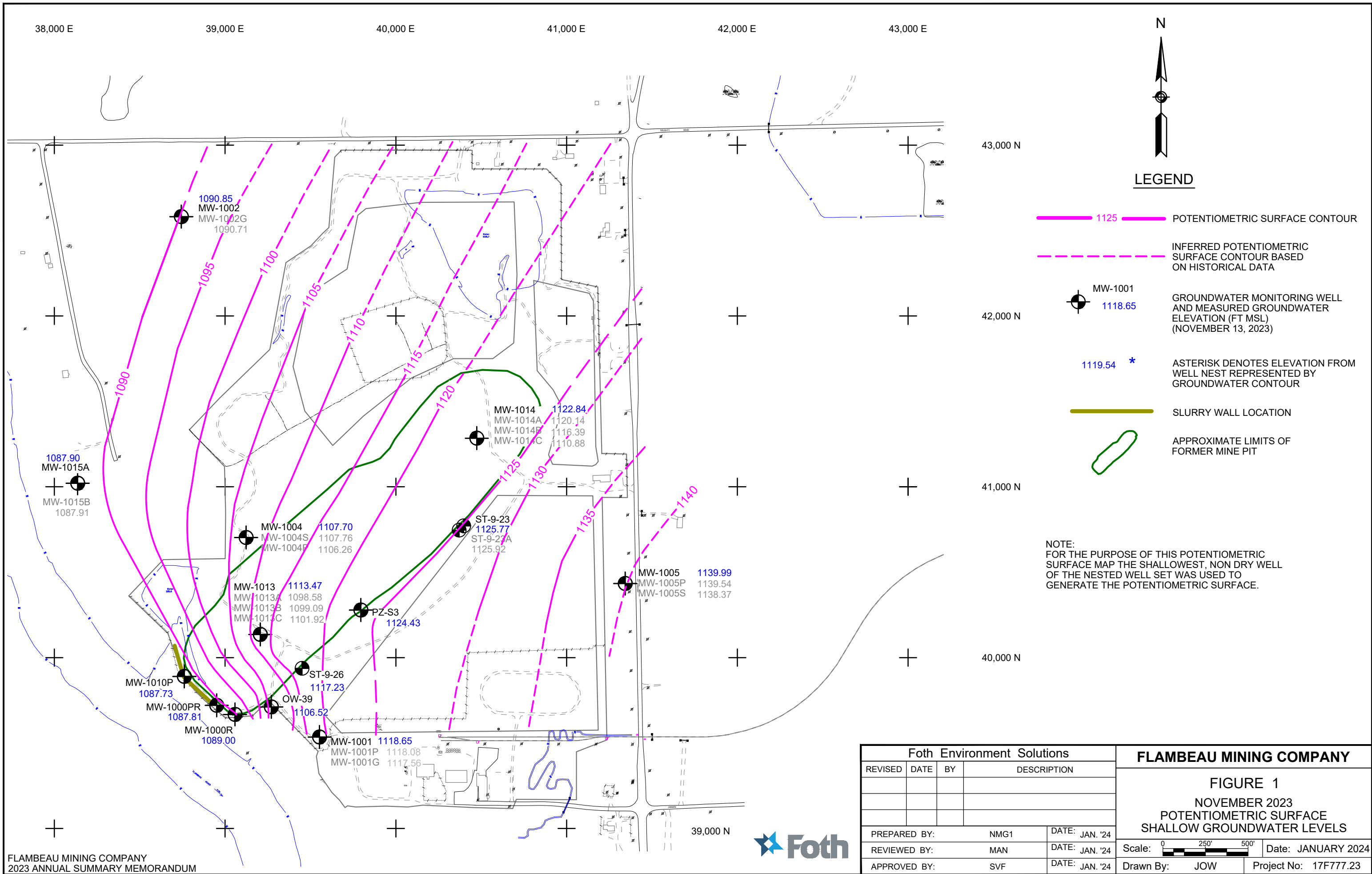
Document	Date	Submittee
2022 Annual Summary Memorandum	January 2023	Greg Pils ¹
Environmental Groundwater Monitoring (First half 2023)	July 2023	Molly Gardner ¹
Environmental Groundwater Monitoring (Second half 2023)	January 2024	Molly Gardner ¹

1. Wisconsin Department of Natural Resources
Division of External Services
Bureau of Environmental Analysis & Sustainability

Attachments

Figure 1	November 2023 Potentiometric Surface, Shallow Groundwater Levels
Figure 2	November 2023 Potentiometric Surface, Wells Screened at Mid-Depths
Figure 3	2023 Mine Pit Cross Section A-A' with In-Pit Groundwater Monitoring Wells
Attachment A	Groundwater Quality & Elevation/Surface Water Quality Trends
Attachment B	SW-3 2023 Data Table

Figures



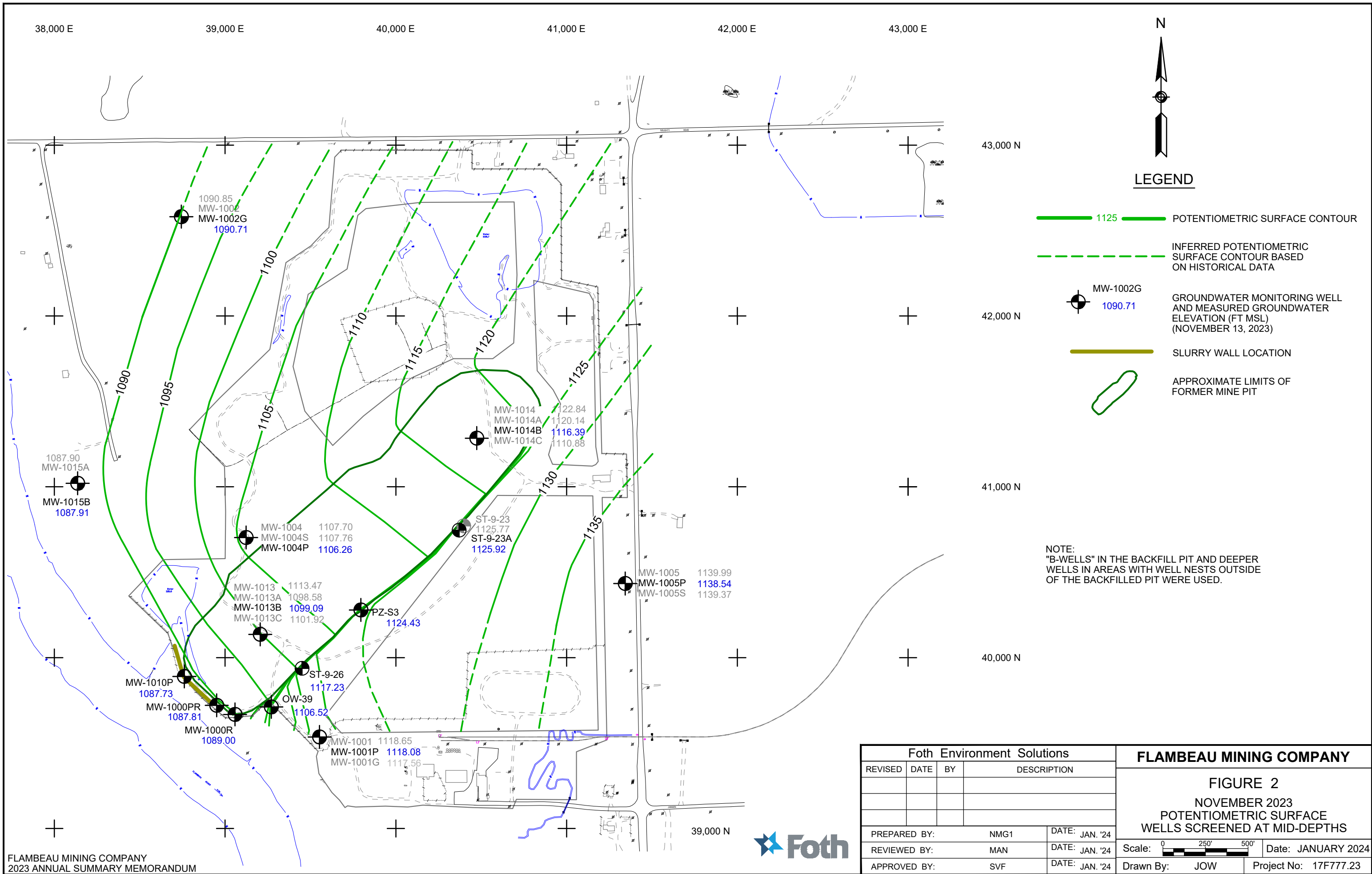
LEGEND

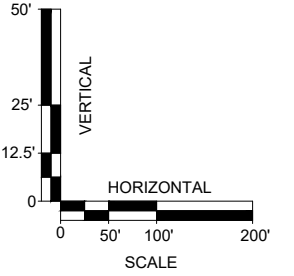
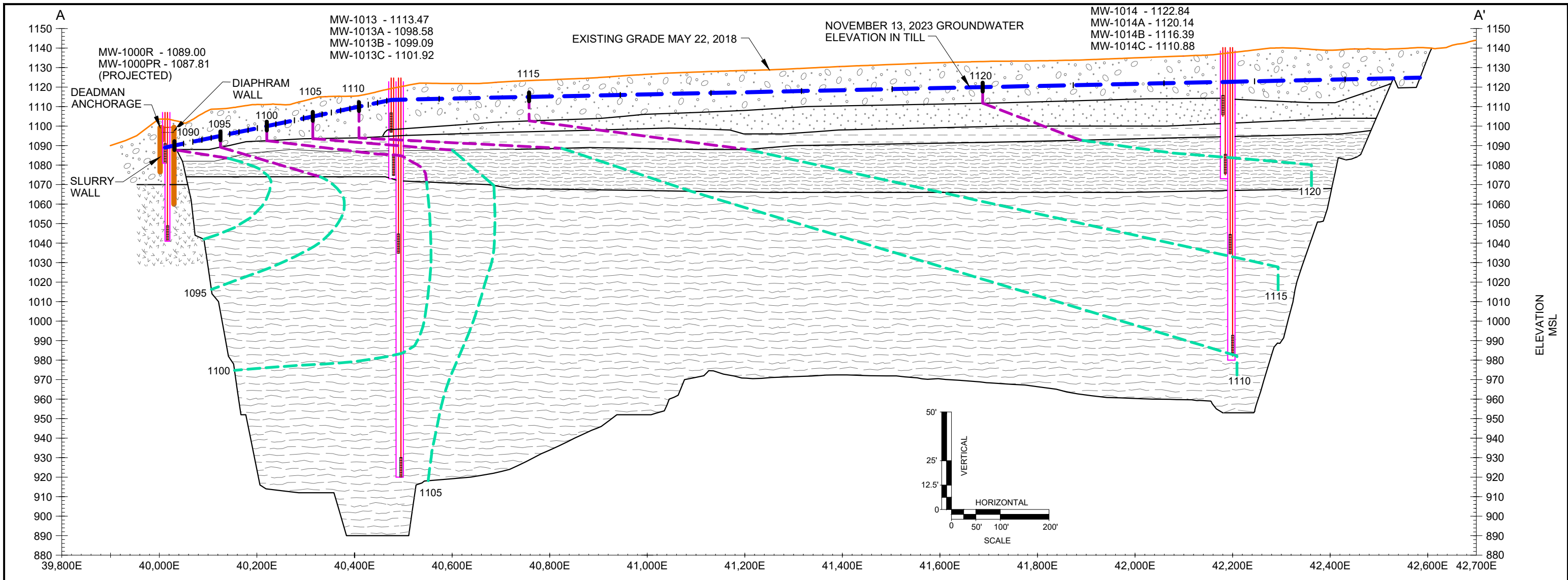
- 1125 POTENTIOMETRIC SURFACE CONTOUR
- - - - INFERRED POTENTIOMETRIC SURFACE CONTOUR BASED ON HISTORICAL DATA
- MW-1001 1118.65 GROUNDWATER MONITORING WELL AND MEASURED GROUNDWATER ELEVATION (FT MSL) (NOVEMBER 13, 2023)
- 1119.54 * ASTERISK DENOTES ELEVATION FROM WELL NEST REPRESENTED BY GROUNDWATER CONTOUR
- SLURRY WALL LOCATION
- APPROXIMATE LIMITS OF FORMER MINE PIT

NOTE:
FOR THE PURPOSE OF THIS POTENTIOMETRIC SURFACE MAP THE SHALLOWEST, NON DRY WELL OF THE NESTED WELL SET WAS USED TO GENERATE THE POTENTIOMETRIC SURFACE.

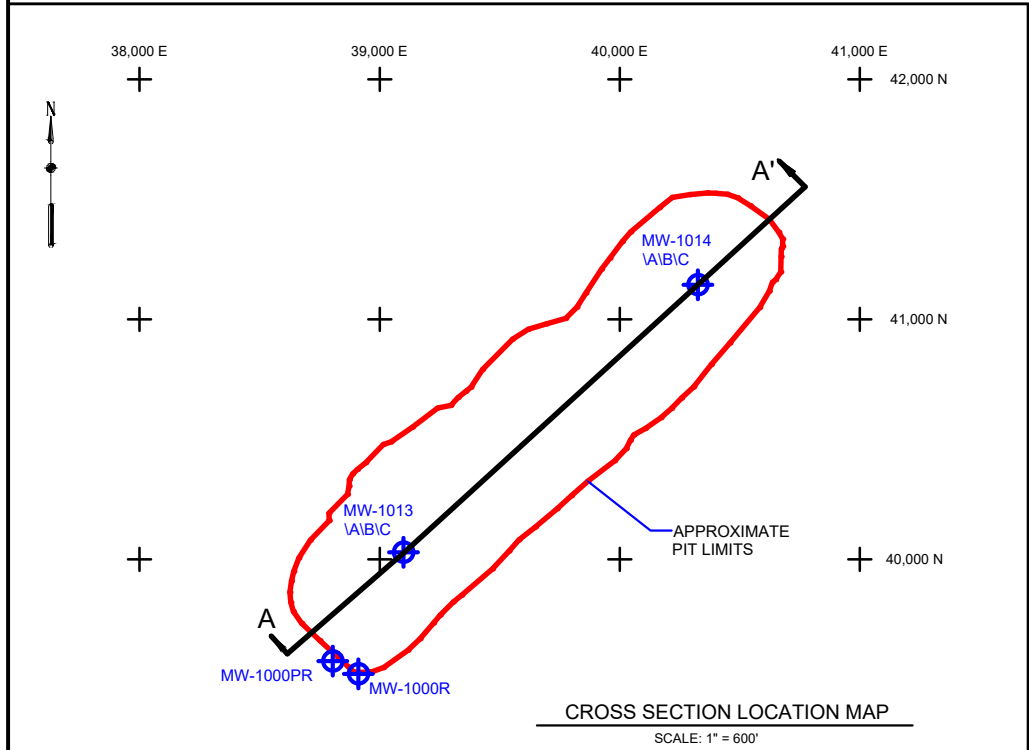
Foth Environment Solutions				FLAMBEAU MINING COMPANY	
REVISED	DATE	BY	DESCRIPTION		
				FIGURE 1 NOVEMBER 2023 POTENTIOMETRIC SURFACE SHALLOW GROUNDWATER LEVELS	
PREPARED BY:		NMG1	DATE:	JAN. '24	Scale: Date: JANUARY 2024
REVIEWED BY:		MAN	DATE:	JAN. '24	
APPROVED BY:		SVF	DATE:	JAN. '24	
				Drawn By:	JOW
				Project No:	17F777.23







MINE PIT COORDINATES
SECTION A - A'



- LEGEND**
- TILL
 - SANDSTONE
 - SAPROLITE
 - TYPE I MATERIAL
 - TYPE II MATERIAL
 - PRECAMBRIAN
 - WATER TABLE
 - GROUNDWATER EQUIPOTENTIAL LINE IN TYPE I AND II BACKFILL
 - GROUNDWATER EQUIPOTENTIAL LINE IN SHALLOW FLOW SYSTEM

Foth Environment Solutions			
REVISED	DATE	BY	DESCRIPTION
PREPARED BY:	NMG1	DATE:	JAN. '24
REVIEWED BY:	MAN	DATE:	JAN. '24
APPROVED BY:	SVF	DATE:	JAN. '24

FLAMBEAU MINING COMPANY

FIGURE 3
2023 MINE PIT CROSS SECTION A - A'
WITH IN-PIT GROUNDWATER
MONITORING WELLS

Scale: Date: JANUARY 2024

Drawn By: JOW Project No: 17F777.23



Attachment A
Groundwater Quality & Elevation/Surface Water Quality Trends

2121 Innovation Court, Suite 100
De Pere, WI 54115
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January 18, 2024

TO: Stephen Bourn, Flambeau Mining Company
Leland Roberts, Flambeau Mining Company

CC: Steve Donohue, P.H., Foth Infrastructure & Environment, LLC
Nick Glander, Foth Infrastructure & Environment, LLC
Sharon Kozicki, P.G., Foth Infrastructure & Environment, LLC

FR: Stephen Lehrke, Ph.D., Foth Infrastructure & Environment, LLC

RE: 2023 Annual Memo – Groundwater and Surface Water Trends

1. Background

Groundwater and surface water sample results collected during the 2023 monitoring programs were added to the analytical monitoring historical database. These results were statistically tested and graphically displayed to determine whether any significant increasing or decreasing trends are occurring in the groundwater or surface water chemistry. This is done to satisfy the requirements of Part 4, Condition 9 of the Mine Permit, to summarize the monitoring activities and any observed trends. The 2023 surface water samples from the Flambeau River were collected voluntarily by Flambeau Mining Company (Flambeau).

The trend analyses presented in this memorandum (memo) reflect the changes to the long-term groundwater monitoring program as provided in the approved 2020 Updated Monitoring Plan (Foth, 2020)¹. Analytes previously collected on a quarterly schedule are now collected semi-annually, and analytes collected on an annual basis are now limited to calcium, chloride, lead, magnesium, potassium, and zinc. Groundwater elevation data is also collected semi-annually at the intervention boundary and in-pit wells, along with eight piezometer locations retained for that purpose.

Groundwater quality results, trend graphs, and statistical test results are included as attachments: Attachment 1 presents the semi-annual monitoring parameters, and Attachment 2 presents the annual monitoring parameters. Surface water quality results, trend graphs, and statistical test results are included as Attachment 3. Hydrographs are included as Attachment 4.

Intervention boundary wells included in the trend analyses are MW-1000R, MW-1000PR, MW-1010P, MW-1002, MW-1002G, MW-1004, MW-1004P, MW-1004S, MW-1005, MW-1005P, and MW-1005S. The in-pit wells included in the trend analyses are MW-1013, MW-1013A,

¹ Foth, 2020. *2020 Updated Monitoring Plan*, Reclaimed Flambeau Mine, Project I.D.: 17F777.20, Flambeau Mining Company, Ladysmith, Wisconsin. August 2020.

MW-1013B, MW-1013C, MW-1014, MW-1014A, MW-1014B, and MW-1014C. Wells MW-1015A and MW-1015B (also included in the analyses) were constructed in January 2001 approximately 1,000 feet northwest of the backfilled pit and adjacent to the compliance boundary.

Statistical trend test methods are described in Section 2 of this memo, with more detailed results provided in Section 3, and a summary of conclusions of the trend results provided in Section 4.

2. Statistical Methods

Groundwater and surface water trends over time were assessed using the non-parametric Mann-Kendall test. This test indicates general increasing or decreasing trends over the time periods evaluated. Two data sets (utilizing two distinct start dates) were assessed: “short-term” trends encompass the results of 2019 through 2023, i.e., the last five years, and “long-term” trends encompass the results from October 1997, when the post-mining period began, through the end of 2023.

Monitoring and long-term trend analyses began in July 1999 for the annual monitoring parameters. Monitoring and long-term trend analyses began in February 1999 for the in-pit wells (i.e., MW-1013B, MW-1013C, MW-1014A, MW-1014B, and MW-1014C), and in April 2001 for wells MW-1015A and MW-1015B. Trend analyses for wells MW-1013, MW-1013A, and MW-1014 began in October 2005, and for MW-1000R and MW-1004 in October 2010, when groundwater levels recovered sufficiently to collect samples.

The statistical results of the non-parametric Mann-Kendall test are used in conjunction with the time series graphs in Attachments 1, 2, and 3 to evaluate trend conditions within the context of the broader site hydrology. It should be noted that a statistically increasing or decreasing trend as determined through the Mann-Kendall test does not necessarily indicate a substantial increase or decrease in actual parameter concentrations. For example, there are situations where variation in the data is small, allowing slight but consecutive increasing or decreasing concentration changes to be detected as a statistically significant trend. Although these minor trends may occur, they should not be construed as an indication of a broader impact on water quality.

In some cases, the Mann-Kendall trend test results of Attachments 1, 2, and 3 may indicate a statistical trend in the “long-term” data (i.e., results since October 1997), while “short-term” data do not illustrate a trend. In these situations, higher or lower concentration data may have been observed in the past, but more recent concentration data has stabilized. The trend result discussion given below focuses on cases that exhibit trends only in the more recent “short-term” data of 2019 through 2023.

The procedure for the Mann-Kendall test is given in Gilbert (1987)² and U.S. Environmental Protection Agency (USEPA) (2009)³. The Type I error for each test was set to 0.01 (two-tailed), with the exception of the five-year trend tests for the annual parameters. To counteract the decrease in statistical power due to small sample sizes in those cases, the type I error (two-

²Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.

³USEPA, 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance*. EPA 530-R-09-007. Office of Resource Conservation and Recovery, Program Implementation and Information Division, Washington, D.C.

tailed) was set to 0.05 to increase the statistical power (power of detecting existing trends). All non-detected values were replaced with a common value below the lowest detected value.

In the trend test results of Attachments 1, 2, and 3, a “+” indicates a statistically increasing trend and a “-” indicates a statistically decreasing trend. If neither a “+” or “-” is given, no statistically significant trend is present as measured by the Mann-Kendall test.

3. Trend Results

The majority of trends, increasing and/or decreasing, were exhibited in the groundwater results for the semi-annual parameters. Statistical trend results at each well are summarized below. Historical trend graphs from Attachment 1 (semi-annual parameters), Attachment 2 (annual parameters), Attachment 3 (surface water), and Attachment 4 (hydrographs) aid in interpretation. The results are organized by well nest and location.

As previously noted, the Mann-Kendall test may at times indicate that a statistical trend exists due to slight but consecutive concentration changes (either increasing or decreasing) in conjunction with low overall variability in the data. In those instances, trend tests (Attachments 1, 2, and 3) indicate either an increasing (“+”) or decreasing (“-”) result which does not reflect a substantial overall concentration change as illustrated in the corresponding time series graphs. The discussion below is limited to statistical trends existing in the recent five-year dataset that show at least a modest change in relative concentration level.

3.1 Semi-Annual Parameters (Attachment 1)

Semi-annual parameters include alkalinity, arsenic, copper, hardness, iron, manganese, sulfate, total dissolved solids (TDS), pH, conductivity, oxidation reduction potential (ORP), and water elevation.

3.1.1 Intervention Boundary Wells

- ◆ **MW-1000R/MW-1000PR/MW-1010P (Figures B-1a through B-1d):** These three wells are located near the immediate southwest boundary and hydraulically downgradient of the reclaimed mine pit.

Changes in Reported Trends from 2023 Annual Memo:

- None to report.

Continuing Trends from 2023 Annual Memo:

- None to report.

- ◆ **MW-1002/MW-1002G (Figures B-2a through B-2d):** This well nest is located approximately 1,800 feet to the northwest and hydraulically side-gradient to the former mine pit.

Changes in Reported Trends from 2023 Annual Memo:

- The statistically increasing trends noted in the previous Annual Memo for conductivity in the five-year data for MW-1002 and MW-1002G, and for alkalinity and hardness in MW-1002G, have since stabilized.

Continuing Trends from 2023 Annual Memo:

- None to report.
- ◆ **MW-1004/MW-1004S/MW-1004P (Figures B-3a through B-3d):** This well nest is located near the immediate northwest boundary and is hydraulically downgradient of the former mine pit.

Changes in Reported Trends from 2023 Annual Memo:

- None to report. No statistical trends in the recent five-year datasets are occurring.

Continuing Trends from 2023 Annual Memo:

- None to report.
- ◆ **MW-1005/MW-1005S/MW-1005P (Figures B-4a through B-4d):** This well nest is located approximately 1,000 feet to the southeast and hydraulically upgradient of the former mine pit.

Changes in Reported Trends from 2023 Annual Memo:

- The increasing trend noted in the previous Annual Memo in the five-year data for conductivity in MW-1005 has reversed and stabilized, now being within the range of variability observed historically.

Continuing Trends from 2023 Annual Memo:

- None to report.
- ◆ **MW-1015A/MW-1015B (Figures B-5a through B-5d):** This well nest is located approximately 1,000 feet to the west and hydraulically downgradient of the former mine pit.

Changes in Reported Trends from 2023 Annual Memo:

- None to report.

Continuing Trends from 2023 Annual Memo:

- None to report.

3.1.2 In-Pit Wells

- ◆ **MW-1013/MW-1013A/MW-1013B/MW-1013C (Figures B-6a through B-6d):** This well nest is located within the former mine pit on the southwest side.

Changes in Reported Trends from 2023 Annual Memo:

- The increasing trend noted in the previous Annual Memo in the five-year data for alkalinity in MW-1013 has since stabilized, and the increasing trend for alkalinity in

MW-1013C has reversed and stabilized, now being within the range of variability observed historically.

Continuing Trends from 2023 Annual Memo:

- A statistically decreasing trend continues in the five-year data for sulfate for the already low concentrations in MW-1013.
- Iron in MW-1013 has historically exhibited a large degree of variation. Between 2006 and 2009 seasonal effects were apparent, with iron being highest during the first and fourth quarter sampling events. While the seasonal effect seemed to diminish following 2009, iron concentrations in this well were elevated in 2013, and again in 2018, and to a lesser degree in 2019. While no statistical trend is currently reported, the seasonal effect was once again stronger during 2020 through 2023, with the fourth quarter concentrations elevated from the second quarter concentrations.
- ◆ **MW-1014/MW-1014A/MW-1014B/MW-1014C (Figures B-7a through B-7d):** This well nest is located within the former mine pit on the northeast side.

Changes in Reported Trends from 2023 Annual Memo:

- The decreasing trend noted in the previous Annual Memo in the five-year data for copper in MW-1014B has since stabilized, with concentrations being lower than those observed historically prior to 2019.

Continuing Trends from 2023 Annual Memo:

- A smaller statistically increasing trend in the five-year dataset is given for manganese in MW-1014A, but concentrations remain below those seen prior to 2004.
- Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations still remain below the maximum observed in this well during July 2000.

3.2 Annual Parameters (Attachment 2)

As previously noted, per the 2020 Updated Monitoring Plan, analytes collected on an annual basis are now limited to calcium, chloride, lead, magnesium, potassium, and zinc. Similar to previous trend analyses, the annual groundwater parameters illustrate few statistically significant trends. Of those trends that are noted, most reflect relatively small consecutive concentration changes. The following summary is limited to those trends which show at least a modest change in recent concentrations.

Historical trend charts for the annual parameters are illustrated on Figures B-8a through B-14b of Attachment 2.

Changes in Reported Trends from 2023 Annual Memo:

- None to report.

Continuing Trends from 2023 Annual Memo:

- The statistically decreasing trend previously reported in the five-year dataset for chloride in MW-1015B continues. Chloride concentrations have been sequentially decreasing in this well since the high observed during 2017.
- Calcium, chloride, and magnesium had small concentration increases during 2011 in MW-1005, which remained consistent through 2015. Concentrations of these parameters rose again from 2016 through 2018, potentially attributed to application of road salt on State Highway 27 along with rising water levels and evaporative concentration effects. However, concentrations have since remained generally consistent, with no statistical trend currently reported in the five-year datasets.

3.3 Surface Water (Attachment 3)

Flambeau voluntarily continued surface water sampling of the Flambeau River in 2023. Sampling parameters currently include copper, hardness, iron, manganese, zinc, total suspended solids (TSS), pH, conductivity, dissolved oxygen (DO) and ORP. Concentrations were generally stable with no statistical trends in the five-year data.

3.4 Hydrographs (Attachment 4)

As observed in the hydrographs (Figures B-16a through B-16j), water levels have stabilized in all wells that showed significant drawdown during the production period from 1993 to 1997.

Groundwater elevations increased steadily from 1999 through 2002 for the in-pit wells MW-1013A, MW-1013B, MW-1013C, MW-1014, MW-1014A, MW-1014B, and MW-1014C, and stabilized after 2003. At MW-1013, groundwater elevation rose through 2004 and stabilized during 2005.

Generally, higher groundwater elevations are noted for all wells during 2010 and 2011, reflecting the increased precipitation observed in those years. Elevations dropped in 2012 and rebounded during summer 2013. An increase in water levels was observed from 2014 through 2017 for both the intervention boundary and the in-pit wells. Decreased elevations were observed in 2018, followed by a rebound in 2019, tapering elevations during 2020 through 2021, and then again small rebound in 2022 through 2023.

4. Conclusions

A detailed analysis of statistical trends occurring in the groundwater and surface water data was performed. Statistical tests evaluated the long-term trends occurring during the post-mining period (October 1997 to the present) and the short-term trends for the most recent five years. Historical trend graphs of the data are also presented.

A detailed discussion of the trend results for each well nest is provided in Section 3. In general, the number of more notable concentration trends as observed in earlier Annual Memos has reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. Most trends noted through the Mann-Kendall nonparametric test for the most recent five-year dataset are due to slight but consecutive concentration changes (either increasing or decreasing) and not reflective of a substantial overall

concentration change. The majority of the observed trends continue to occur in the semi-annual groundwater indicator monitoring parameters.

For the intervention boundary wells, the statistically increasing trends noted in the previous Annual Memo for conductivity in MW-1002, MW-1002G and MW-1005, and for alkalinity and hardness in MW-1002G, have ceased.

For the MW-1013 in-pit well nest, iron at MW-1013 previously had an increasing trend which has since stabilized, however, iron in this well continues to exhibit a strong degree of seasonal variation with increased concentrations observed during the fall event.

For the in-pit well nest at MW-1014, copper in in MW-1014B remains at lowered concentrations after a substantial decrease in 2019. Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

No statistical trends were noted in the five-year datasets for surface water.

Attachments

- Attachment 1: Groundwater – Semi-Annual Parameters
- Attachment 2: Groundwater - Annual Parameters
- Attachment 3: Surface Water
- Attachment 4: Hydrographs and Groundwater Elevation Data

Attachment 1
Groundwater – Semi-Annual Parameters

Trend Analysis
Trend Graphs
2023 Data

**Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2023**

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1000PR												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	16	-33	41	-36	-34	-26	-30	-20	-24	0	12	-38
p-Level	0.310	0.026	0.005	0.014	0.020	0.086	0.044	0.196	0.116	1.000	0.460	0.008
Trend			+									-
Trend Results for All Data Since Oct. 1997												
Sample Size	97	78	97	97	97	97	97	97	97	97	81	97
Mann-Kendall S	1869	1476	-1102	-3377	-295	-3009	-3534	-3297	1465	-3400	-1384	1472
p-Level	0.000	0.000	0.001	0.000	0.359	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Trend	+	+	-	-		-	-	-	+	-	-	+
MW-1000R												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	10	-3	-4	10	0	-12	-18	15	-13	8	-8	-34
p-Level	0.546	0.893	0.84	0.546	1	0.46	0.25	0.345	0.420	0.638	0.638	0.02
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	45	45	45	45	45	45	45	45	45	45	44	96
Mann-Kendall S	-496	-30	-512	-454	-231	-495	-226	-425	5	-506	-388	1647
p-Level	0.000	0.695	0.000	0.000	0.003	0.000	0.028	0.000	0.969	0.000	0.000	0.000
Trend	-		-	-	-	-	-	-		-	-	+
MW-1010P												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	34	-11	-9	13	0	46	22	8	-14	24	6	-38
p-Level	0.020	0.503	0.592	0.420	1.000	0.000	0.152	0.638	0.380	0.116	0.738	0.008
Trend					+							-
Trend Results for All Data Since Oct. 1997												
Sample Size	97	78	97	97	97	97	97	97	97	97	82	97
Mann-Kendall S	1484	926	-1063	3432	-1739	-799	3683	1667	812	2816	464	1162
p-Level	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.011	0.000	0.064	0.000
Trend	+	+	-	+	-		+	+		+		+
MW-1002												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	-14	0	-1	-16	-1	-1	0	2	-33	12	-4	-22
p-Level	0.380	1.000	0.973	0.310	0.973	0.973	1.000	0.946	0.026	0.460	0.840	0.152
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	97	75	97	97	97	97	97	97	97	97	32	97
Mann-Kendall S	1603	-58	-34	1689	-667	-319	-1963	345	-351	1340	-143	1097
p-Level	0.000	0.502	0.888	0.000	0.008	0.124	0.000	0.283	0.275	0.000	0.021	0.001
Trend	+			+	-		-			+		+
MW-1002G												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	36	0	-9	37	0	0	-6	20	-31	28	2	-22
p-Level	0.014	1.000	0.592	0.011	1.000	1.000	0.738	0.196	0.038	0.062	0.946	0.152
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	97	75	97	97	97	97	97	97	97	97	32	97
Mann-Kendall S	2209	-117	293	3174	-448	36	-503	1782	-580	2650	-139	1043
p-Level	0.000	0.057	0.098	0.000	0.053	0.862	0.117	0.000	0.071	0.000	0.025	0.001
Trend	+			+				+		+		+

**Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2023**

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1004												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	8	0	5	8	7	5	9	-3	-8	28	8	-30
p-Level	0.638	1	0.789	0.638	0.688	0.789	0.592	0.893	0.638	0.062	0.638	0.044
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	44	44	44	44	44	44	44	44	44	44	43	84
Mann-Kendall S	-215	-10	252	-172	-11	-13	-120	126	238	-52	-354	906
p-Level	0.030	0.834	0.011	0.084	0.918	0.901	0.228	0.206	0.016	0.606	0.000	0.000
Trend											-	+
MW-1004S												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	-4	0	-4	-18	0	1	-14	0	-21	6	14	-30
p-Level	0.840	1.000	0.840	0.250	1.000	0.973	0.380	1.000	0.174	0.738	0.380	0.044
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	97	77	97	97	97	97	97	97	97	97	82	97
Mann-Kendall S	129	-51	1042	582	-820	-237	2055	-531	336	-55	-1204	1689
p-Level	0.690	0.511	0.001	0.070	0.000	0.357	0.000	0.097	0.296	0.866	0.000	0.000
Trend			+		-		+				-	+
MW-1004P												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	31	4	0	-23	2	8	22	12	6	26	-28	-15
p-Level	0.038	0.840	1.000	0.134	0.946	0.638	0.152	0.460	0.738	0.086	0.062	0.345
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	98	78	98	98	98	98	98	98	98	98	78	98
Mann-Kendall S	1399	832	-927	1590	2448	2243	599	75	663	1145	-1111	1949
p-Level	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.820	0.042	0.000	0.000	0.000
Trend	+	+	-	+	+	+				+	-	+
MW-1005												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	2	-19	-1	10	-12	6	14	9	-36	32	8	-10
p-Level	0.946	0.223	0.973	0.546	0.460	0.738	0.380	0.592	0.014	0.032	0.638	0.546
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	97	75	97	97	97	97	97	97	97	97	32	96
Mann-Kendall S	-654	-442	684	2210	-236	1106	1742	2193	-982	2283	-93	1708
p-Level	0.042	0.042	0.009	0.000	0.462	0.001	0.000	0.000	0.002	0.000	0.136	0.000
Trend			+	+		+	+	+	-	+		+
MW-1005S												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	-14	8	0	-21	-17	-6	44	-5	-19	26	4	-4
p-Level	0.380	0.638	1.000	0.174	0.280	0.738	0.002	0.789	0.223	0.086	0.840	0.840
Trend							+					
Trend Results for All Data Since Oct. 1997												
Sample Size	97	75	97	97	97	97	97	97	97	97	32	97
Mann-Kendall S	-539	-62	-37	-202	-946	-512	142	-1084	258	-55	45	1742
p-Level	0.084	0.778	0.708	0.522	0.003	0.106	0.632	0.001	0.423	0.866	0.478	0.000
Trend					-			-				+

**Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2023**

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1005P												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	34	19	0	-6	14	-27	11	-11	-35	2	-24	-6
p-Level	0.020	0.223	1.000	0.738	0.380	0.074	0.503	0.503	0.017	0.946	0.116	0.738
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	97	75	97	97	97	97	97	97	97	97	84	97
Mann-Kendall S	658	604	-135	1008	2580	1239	-416	-188	-118	842	-14	1413
p-Level	0.035	0.000	0.464	0.001	0.000	0.000	0.039	0.559	0.715	0.009	0.960	0.000
Trend		+		+	+	+				+		+
MW-1015A												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	30	0	0	39	0	44	50	22	4	14	6	-38
p-Level	0.044	1.000	1.000	0.007	1.000	0.002	0.000	0.152	0.840	0.380	0.738	0.008
Trend				+		+	+					-
Trend Results for All Data Since Oct. 1997												
Sample Size	91	84	91	91	92	92	91	91	92	92	68	92
Mann-Kendall S	1721	-167	133	1770	-117	-784	-56	419	507	1823	-676	756
p-Level	0.000	0.045	0.423	0.000	0.486	0.008	0.850	0.150	0.088	0.000	0.000	0.011
Trend	+			+		-				+	-	
MW-1015B												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	31	0	0	-30	13	22	36	-34	4	12	-10	-34
p-Level	0.038	1.000	1.000	0.044	0.420	0.152	0.014	0.020	0.840	0.460	0.546	0.020
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	91	84	91	91	92	92	91	91	92	92	69	92
Mann-Kendall S	-6	32	85	1648	-241	-1368	704	70	514	1386	996	814
p-Level	0.985	0.814	0.351	0.000	0.418	0.000	0.000	0.813	0.083	0.000	0.000	0.006
Trend				+		-	+			+	+	+
MW-1013												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	13	36	-5	15	32	27	-50	11	-32	32	-11	4
p-Level	0.420	0.014	0.789	0.345	0.032	0.074	0.000	0.503	0.032	0.032	0.503	0.840
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	65	65	65	65	65	65	65	65	65	65	65	92
Mann-Kendall S	447	130	166	-626	383	934	-1718	-265	-57	-726	-759	2879
p-Level	0.011	0.448	0.344	0.000	0.031	0.000	0.000	0.134	0.751	0.000	0.000	0.000
Trend				-		+	-			-	-	+
MW-1013A												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	29	4	0	-4	1	14	6	4	-26	22	-4	-16
p-Level	0.053	0.840	1.000	0.840	0.973	0.380	0.738	0.840	0.086	0.152	0.840	0.310
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	65	65	65	65	65	65	65	65	65	65	64	92
Mann-Kendall S	810	-24	-138	113	60	952	54	541	-150	-117	-625	2332
p-Level	0.000	0.866	0.342	0.525	0.727	0.000	0.763	0.002	0.398	0.511	0.000	0.000
Trend	+					+		+			-	+

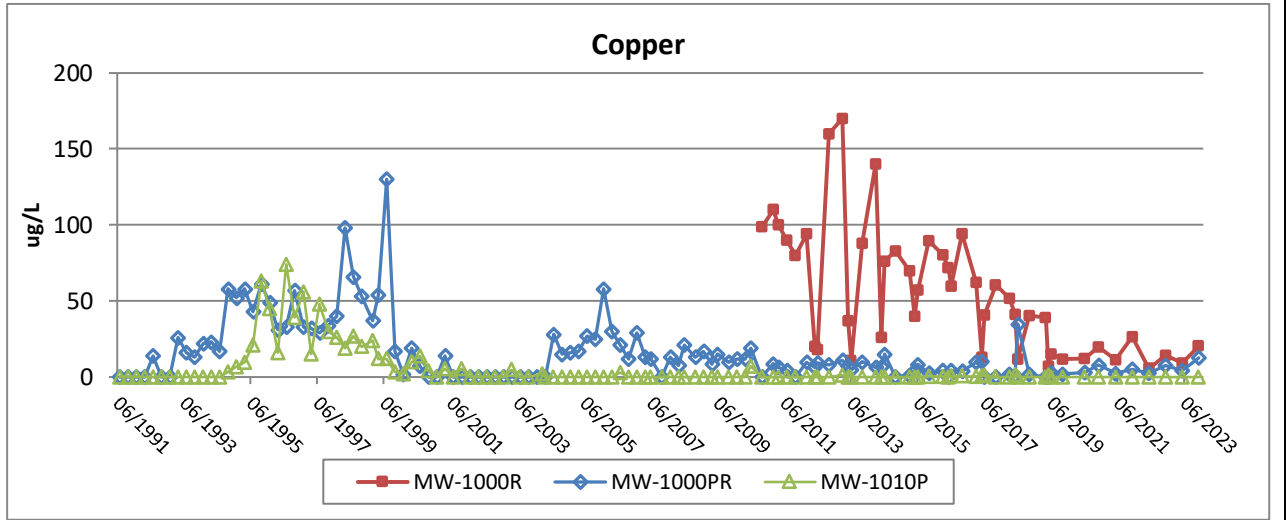
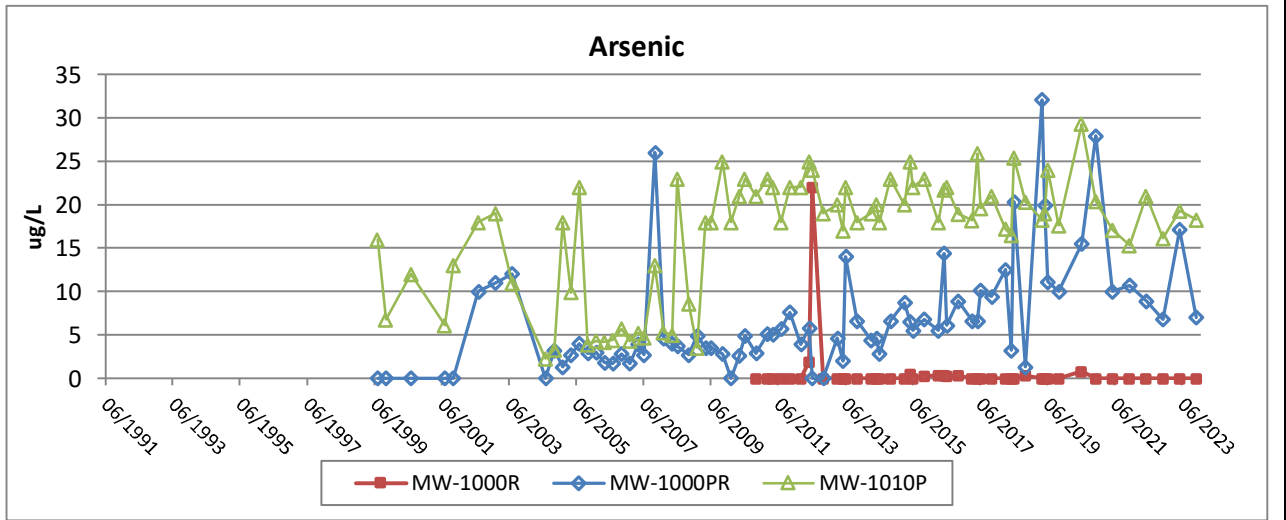
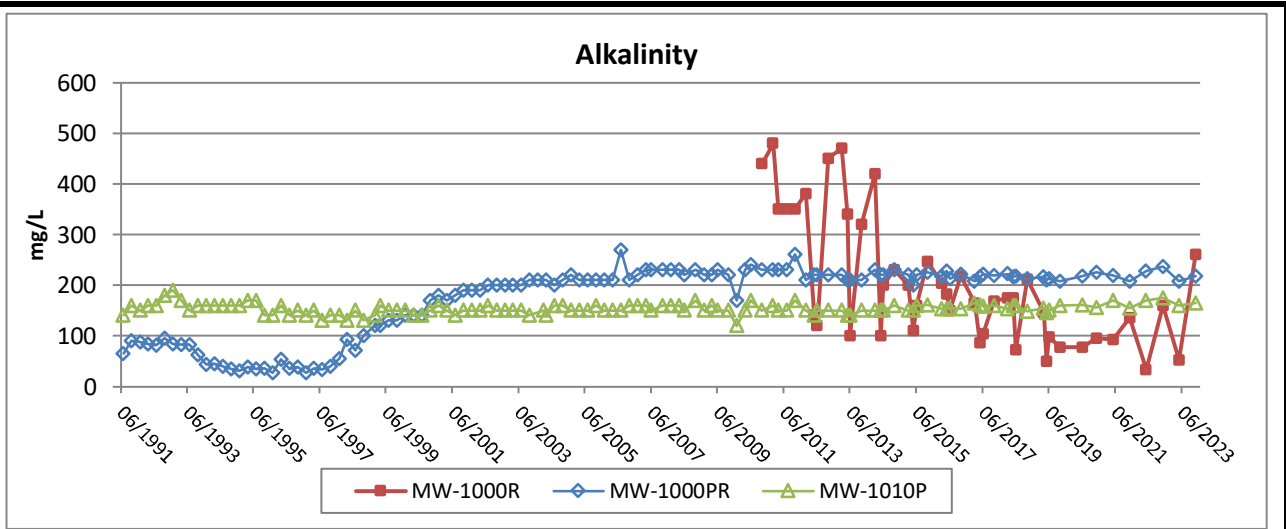
**Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2023**

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1013B												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	22	-7	-6	16	3	4	-2	14	-14	10	-4	-14
p-Level	0.152	0.688	0.738	0.310	0.893	0.840	0.946	0.380	0.380	0.546	0.840	0.380
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	92	80	92	92	92	92	92	92	92	92	84	92
Mann-Kendall S	-357	-46	1796	-719	-763	-1046	1531	-1362	-459	-1379	-796	2361
p-Level	0.229	0.843	0.000	0.013	0.004	0.000	0.000	0.000	0.121	0.000	0.002	0.000
Trend			+		-	-	+	-		-	-	+
MW-1013C												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	8	26	-10	-4	6	0	18	-12	-10	4	-4	-10
p-Level	0.638	0.086	0.546	0.840	0.738	1.000	0.250	0.460	0.546	0.840	0.840	0.546
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	92	80	92	92	92	92	92	92	92	91	84	92
Mann-Kendall S	308	1784	129	-1876	3536	101	-729	-2416	423	-2086	-384	2375
p-Level	0.299	0.000	0.575	0.000	0.000	0.735	0.012	0.000	0.154	0.000	0.139	0.000
Trend		+		-	+			-		-		+
MW-1014												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	28	2	9	26	3	20	46	35	-16	8	10	9
p-Level	0.062	0.946	0.592	0.086	0.893	0.196	0.000	0.017	0.310	0.638	0.546	0.592
Trend							+					
Trend Results for All Data Since Oct. 1997												
Sample Size	65	65	65	65	65	65	65	65	65	65	65	89
Mann-Kendall S	381	41	-389	439	-2	825	-254	371	-127	-254	-949	2307
p-Level	0.030	0.737	0.028	0.013	0.992	0.000	0.151	0.036	0.475	0.152	0.000	0.000
Trend						+					-	+
MW-1014A												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	1	-4	48	20	0	52	-3	15	-4	22	2	10
p-Level	0.973	0.840	0.000	0.196	1.000	0.000	0.893	0.345	0.840	0.152	0.946	0.546
Trend			+			+						
Trend Results for All Data Since Oct. 1997												
Sample Size	87	77	87	87	87	87	87	87	87	87	84	92
Mann-Kendall S	1111	382	1514	185	-1289	-1598	300	-468	-601	-1246	-868	2545
p-Level	0.000	0.077	0.000	0.480	0.000	0.000	0.271	0.078	0.027	0.000	0.001	0.000
Trend	+		+		-	-				-	-	+
MW-1014B												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	-6	-6	-24	11	32	18	10	7	-22	14	10	-2
p-Level	0.738	0.738	0.116	0.503	0.032	0.250	0.546	0.688	0.152	0.380	0.546	0.946
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	92	80	92	92	92	92	92	92	93	93	84	93
Mann-Kendall S	-1216	-158	-1852	-2179	222	-3383	-1226	-2321	428	-2384	-1965	2426
p-Level	0.000	0.505	0.000	0.000	0.246	0.000	0.000	0.000	0.155	0.000	0.000	0.000
Trend	-		-	-		-	-	-		-	-	+

**Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2023**

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1014C												
Trend Results for Most Recent 5 Years												
Sample Size	12	12	12	12	12	12	12	12	12	12	12	12
Mann-Kendall S	23	44	0	7	-32	5	17	13	-6	8	-2	-2
p-Level	0.134	0.002	1.000	0.688	0.032	0.789	0.280	0.420	0.738	0.638	0.946	0.946
Trend		+										
Trend Results for All Data Since Oct. 1997												
Sample Size	92	80	92	92	92	92	92	92	92	92	84	92
Mann-Kendall S	-2680	2123	52	-2270	-3121	-2856	-2201	-2131	968	-3065	-146	2262
p-Level	0.000	0.000	0.794	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.575	0.000
Trend	-	+		-	-	-	-	-	+	-		+

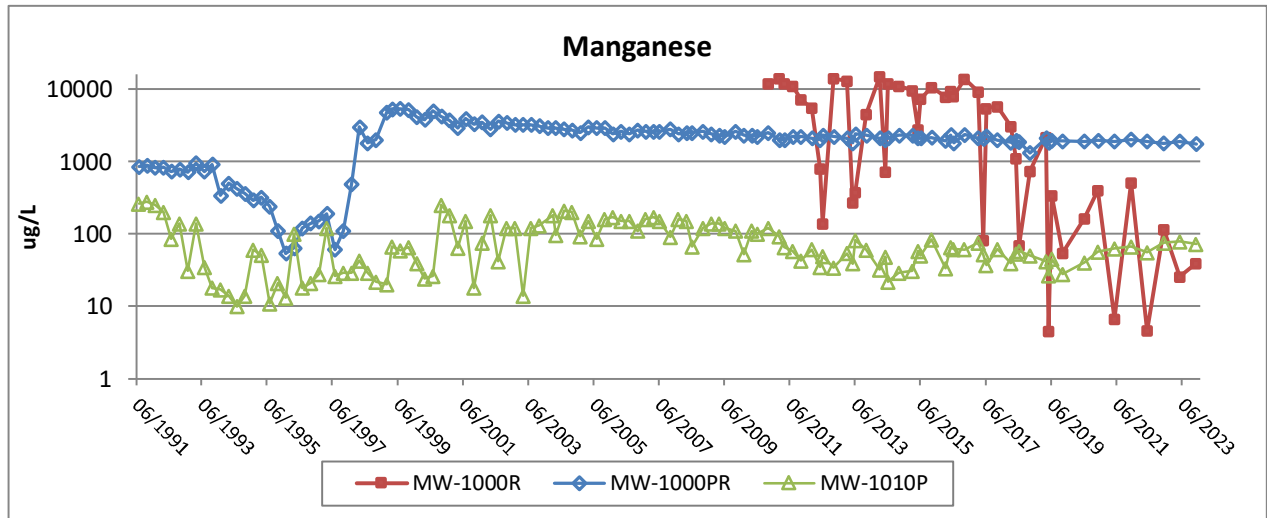
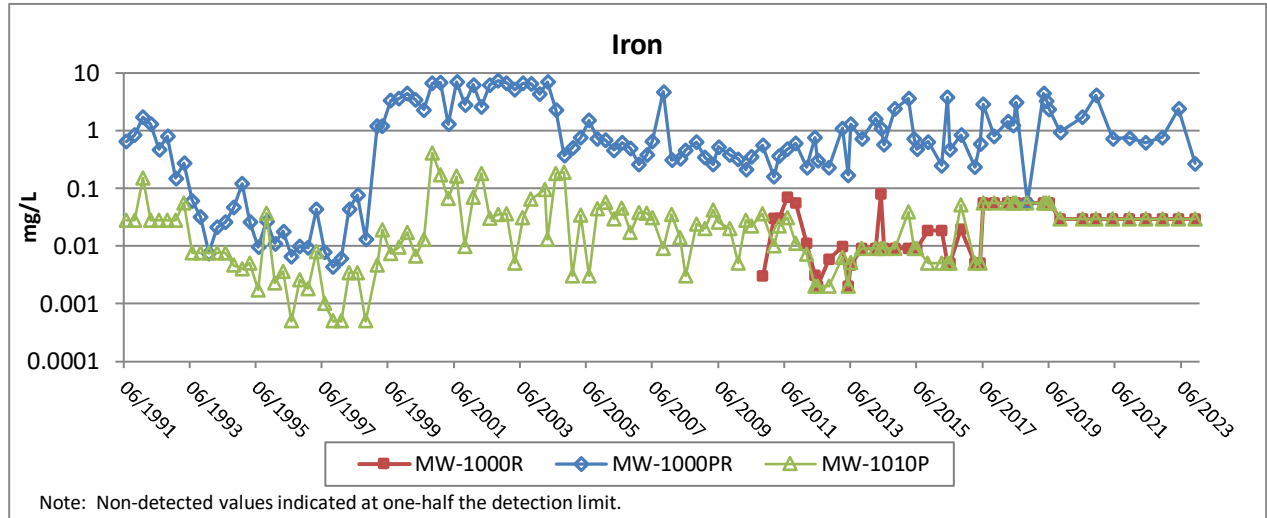
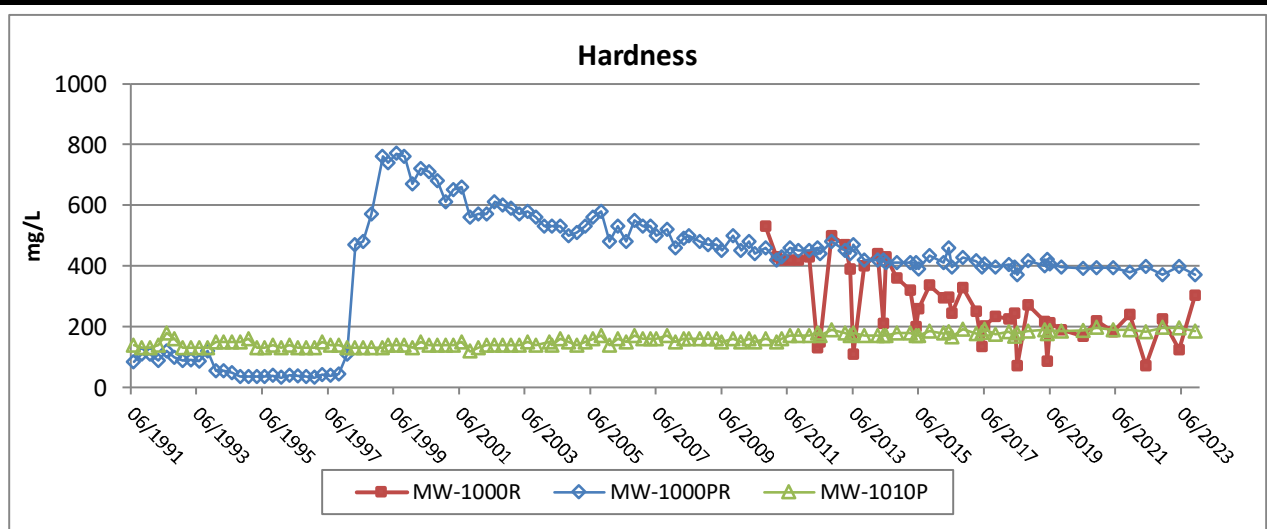
Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-".
All trend tests performed at a Type I (two-tailed) error rate of 0.01.



Note: Fourth quarter 2010 was the first time MW-1000R had sufficient water recovery for sampling.

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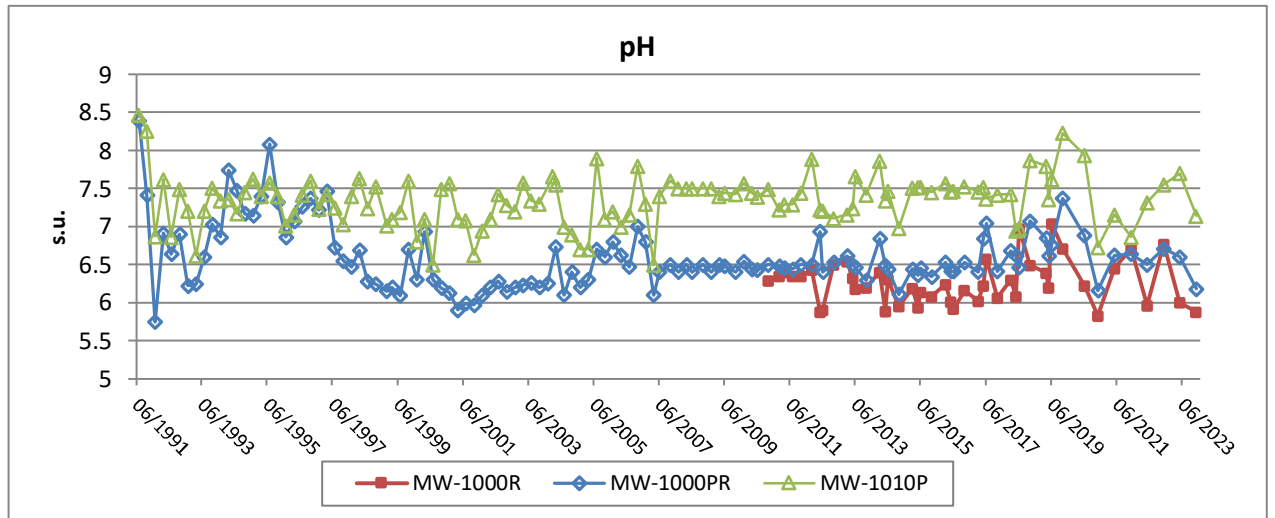
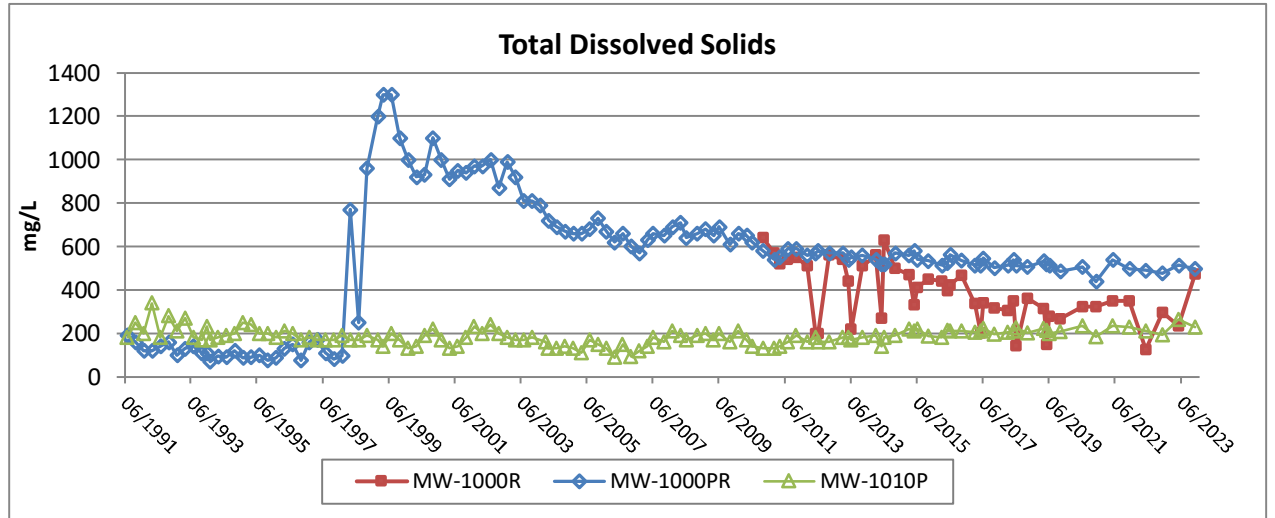
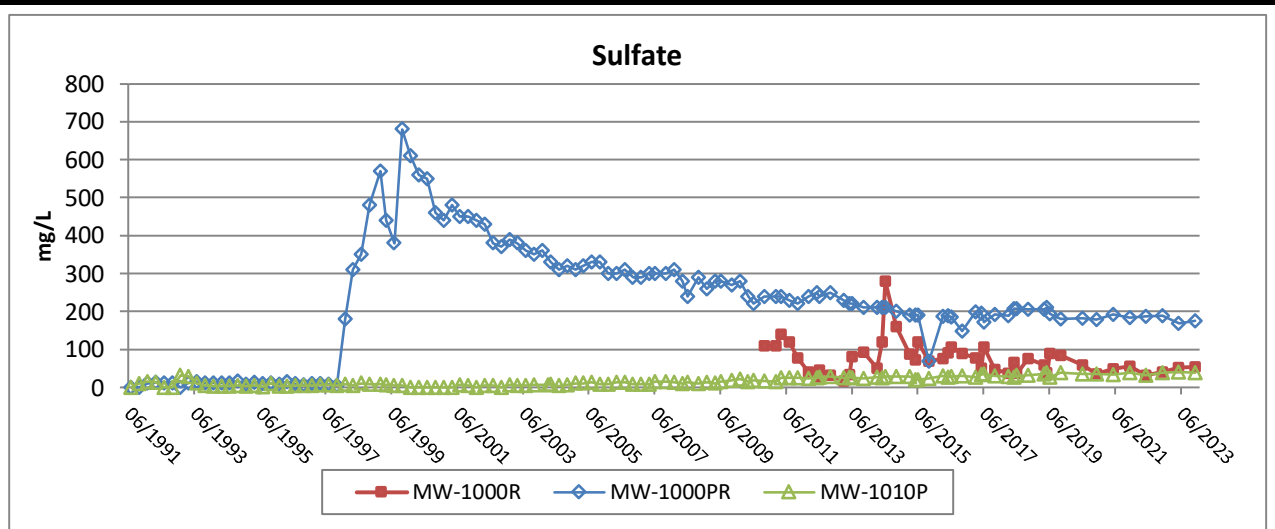
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FLAMBEAU MINING COMPANY		
Figure B-1a Groundwater Trend Graphs - Semi-Annual Results MW-1000R/MW-1000PR/MW-1010P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



Note: Iron trend graphs are displayed on a logarithmic scale so the trend patterns of MW-1000R, MW-1000PR and MW-1010P are visible at different concentration scales.

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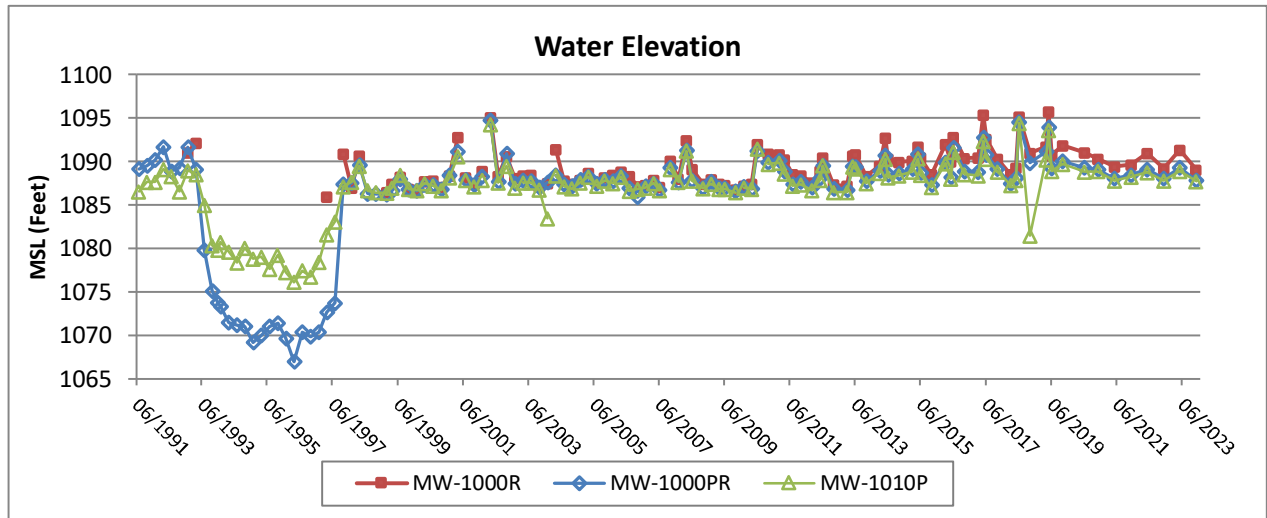
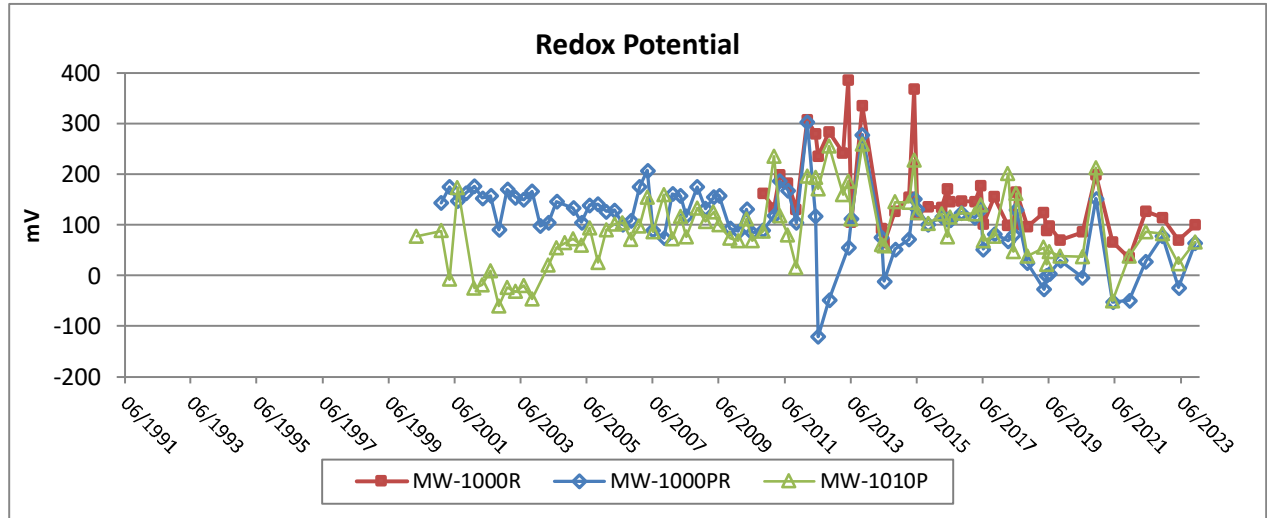
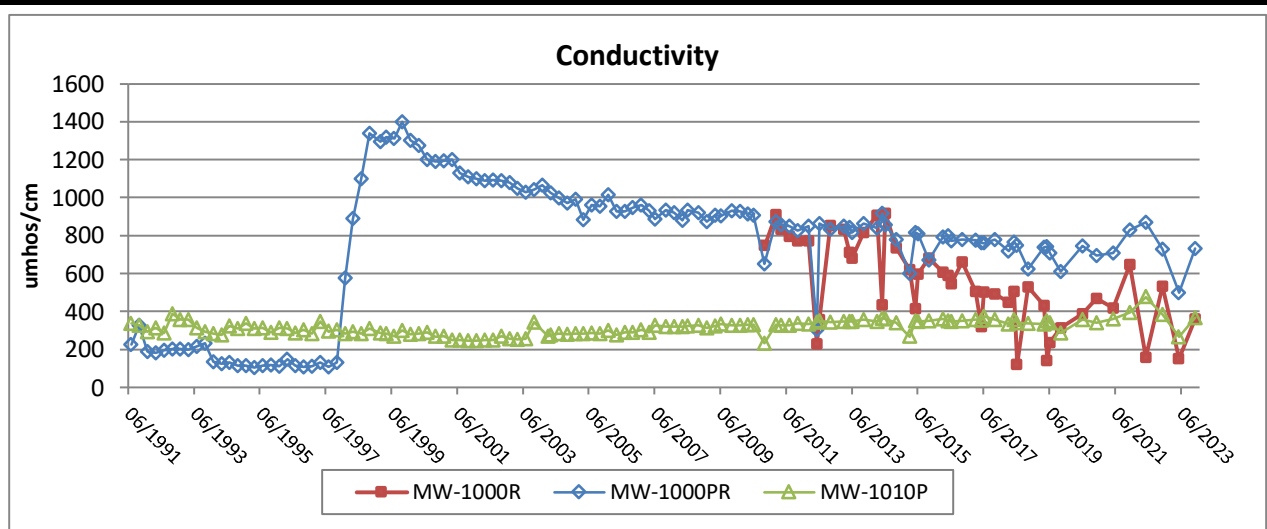
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FLAMBEAU MINING COMPANY		
Figure B-1b Groundwater Trend Graphs - Semi-Annual Results MW-1000R/MW-1000PR/MW-1010P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

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FLAMBEAU MINING COMPANY		
Figure B-1c Groundwater Trend Graphs - Semi-Annual Results MW-1000R/MW-1000PR/MW-1010P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

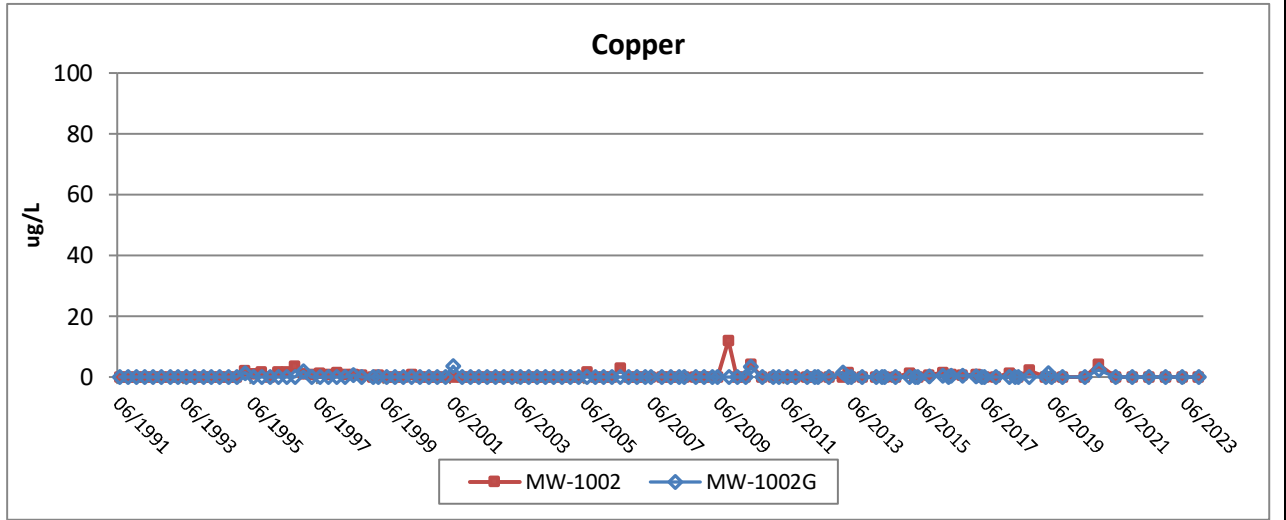
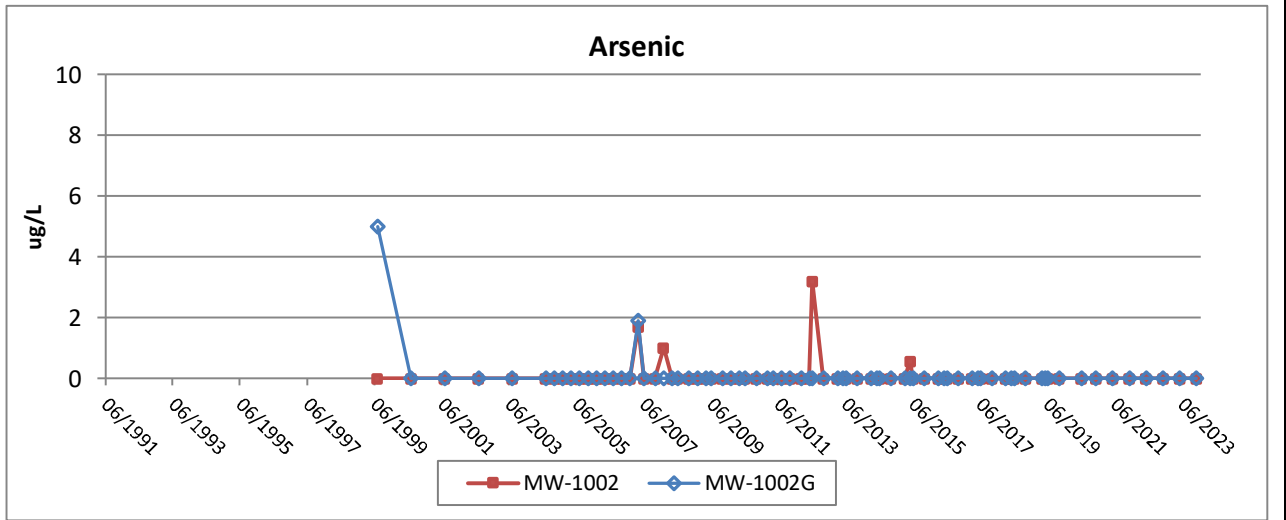
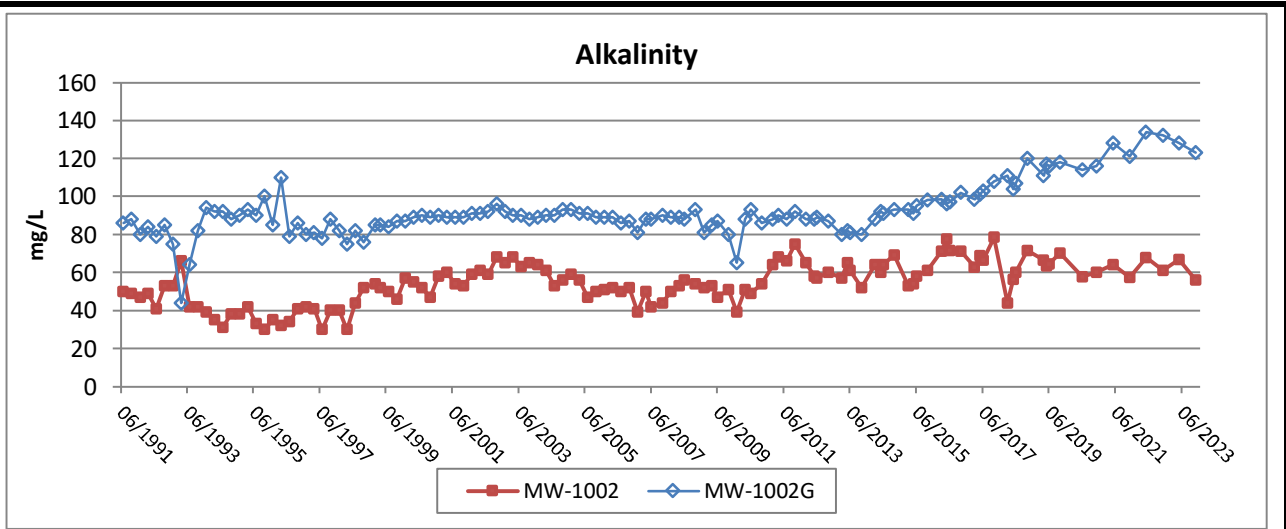


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Figure B-1d
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

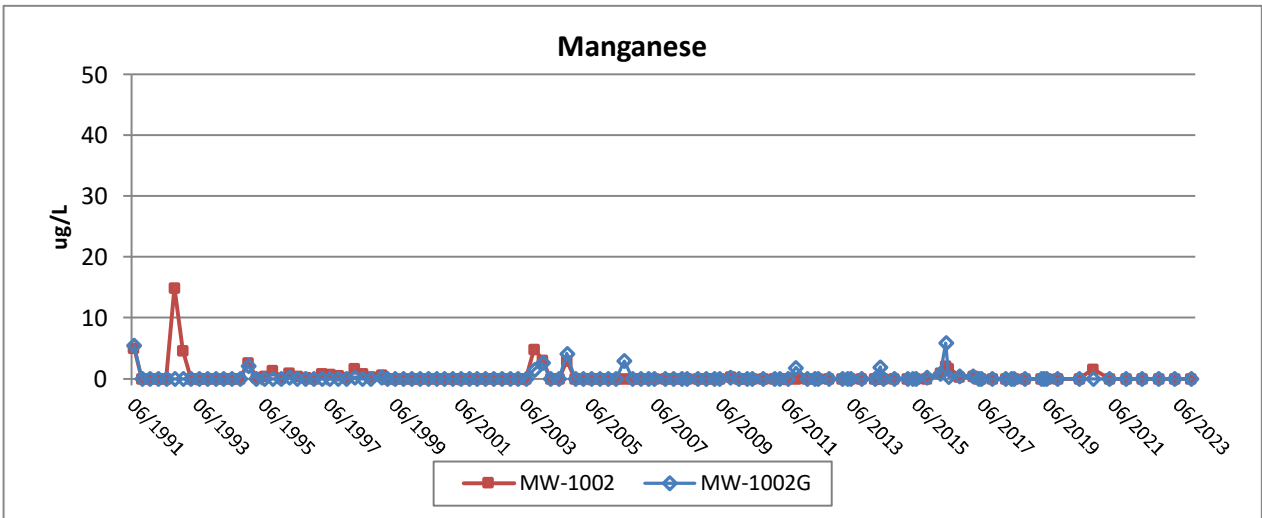
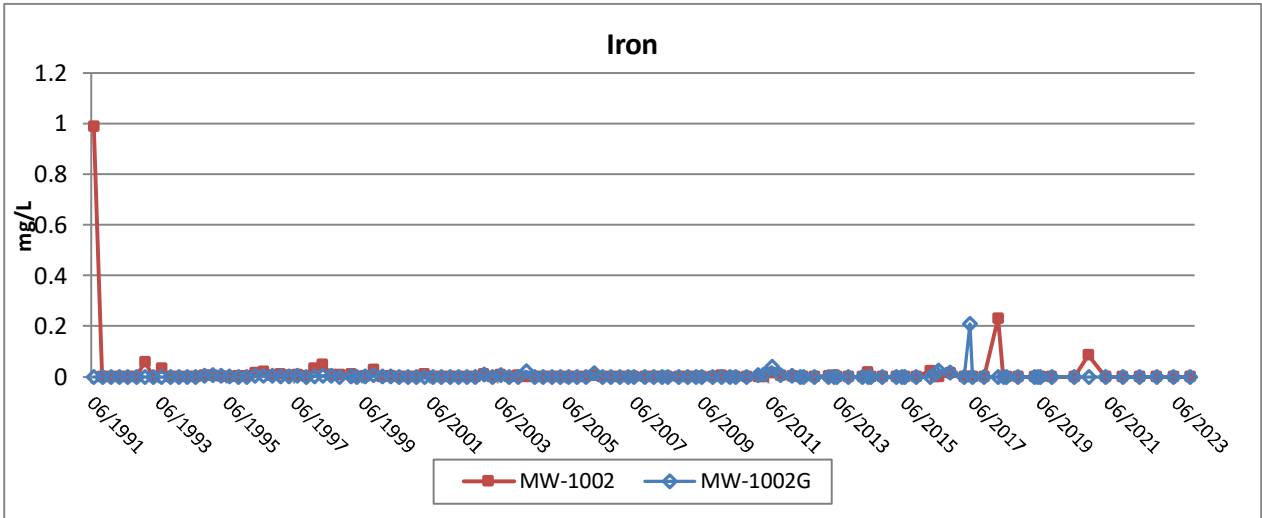
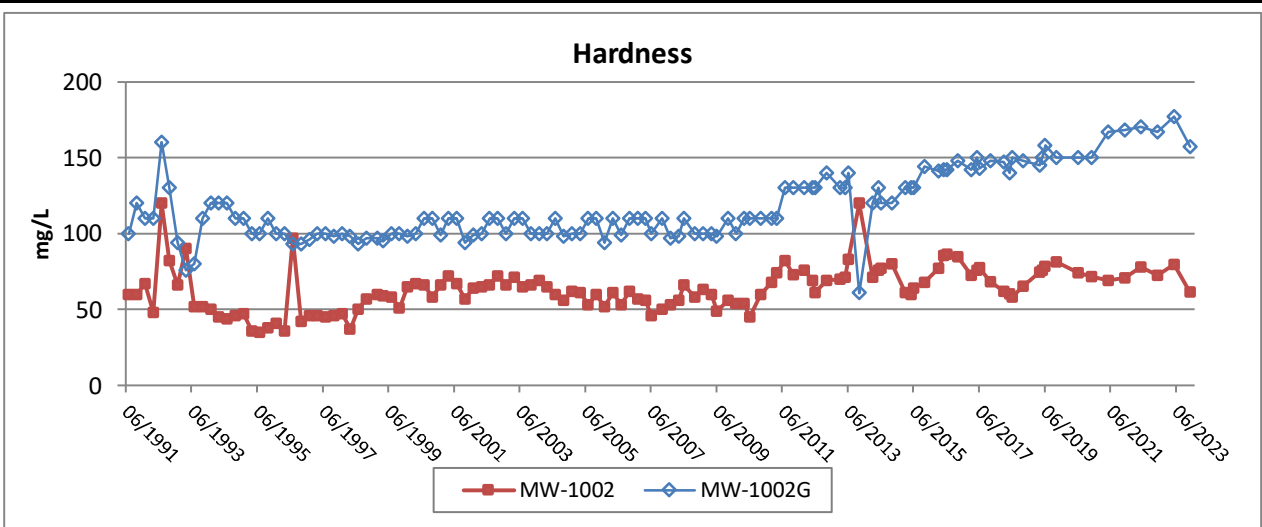
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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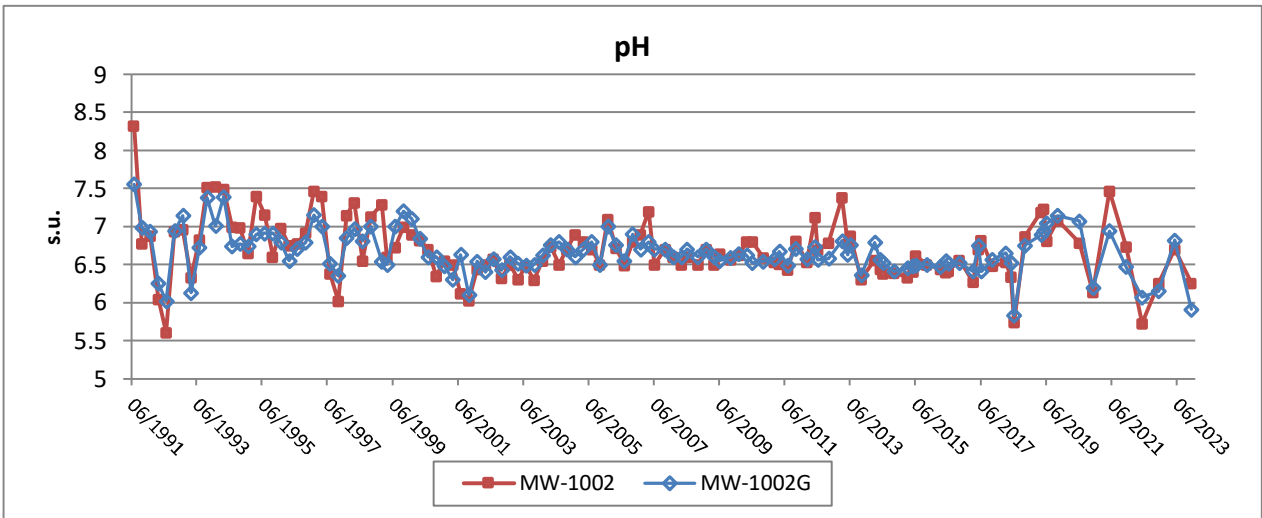
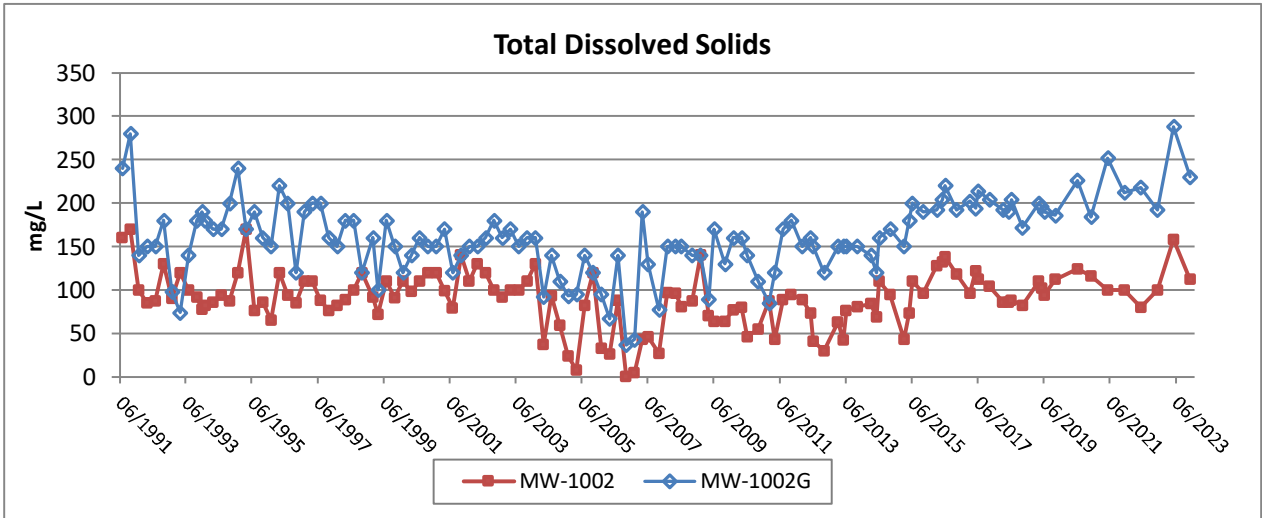
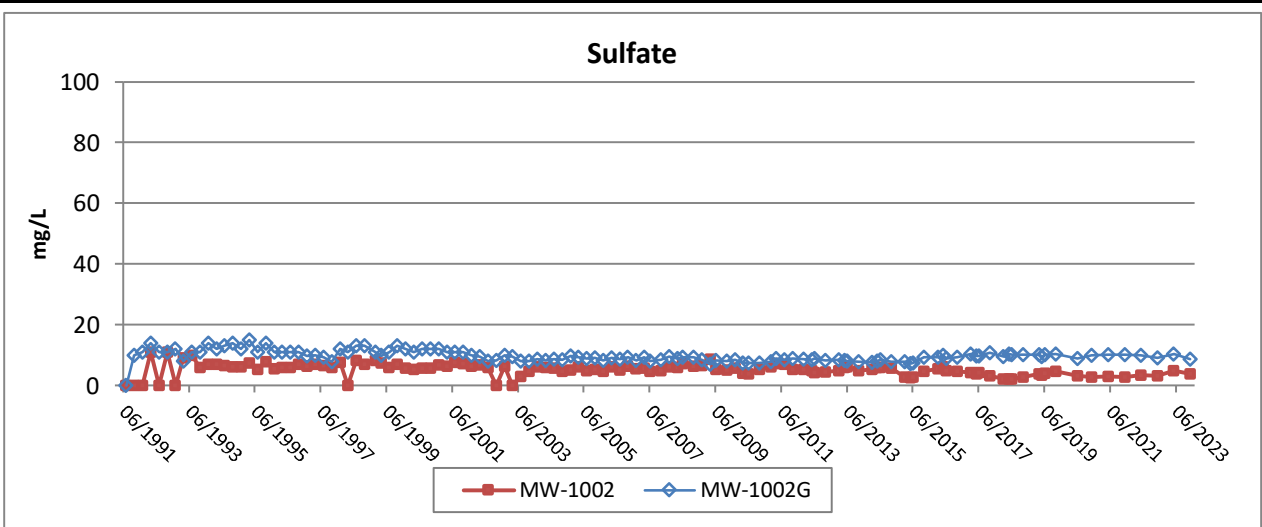
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FLAMBEAU MINING COMPANY		
Figure B-2a Groundwater Trend Graphs - Semi-Annual Results MW-1002/MW-1002G		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

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Figure B-2b Groundwater Trend Graphs - Semi-Annual Results MW-1002/MW-1002G		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

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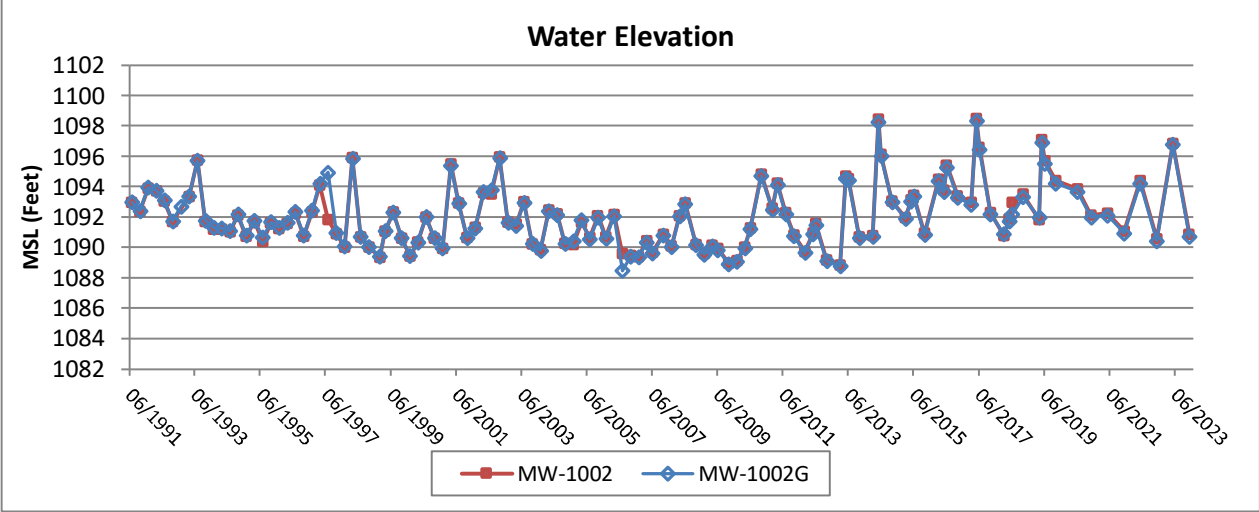
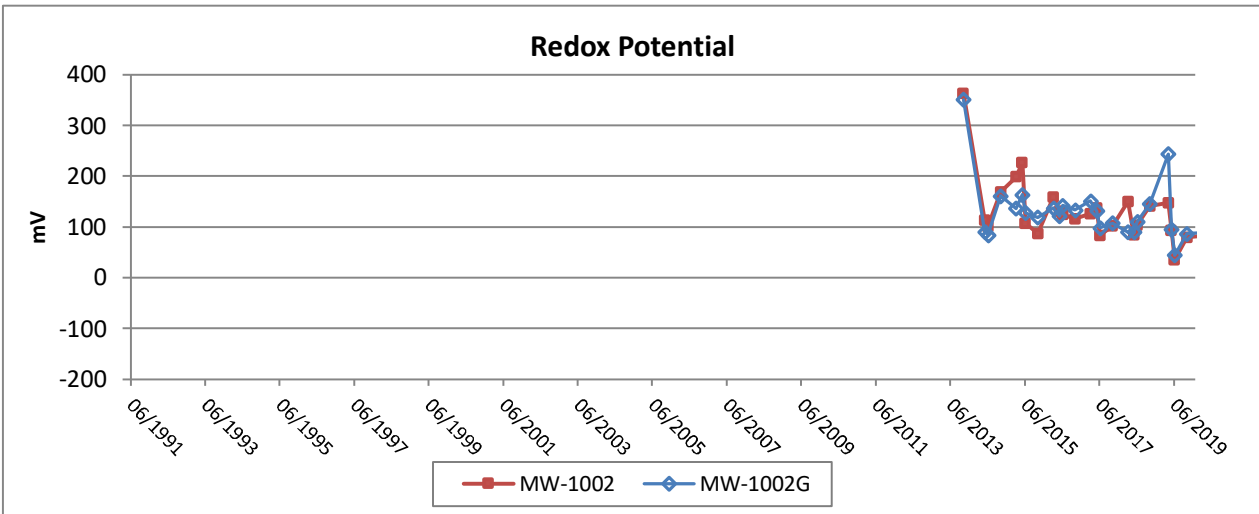
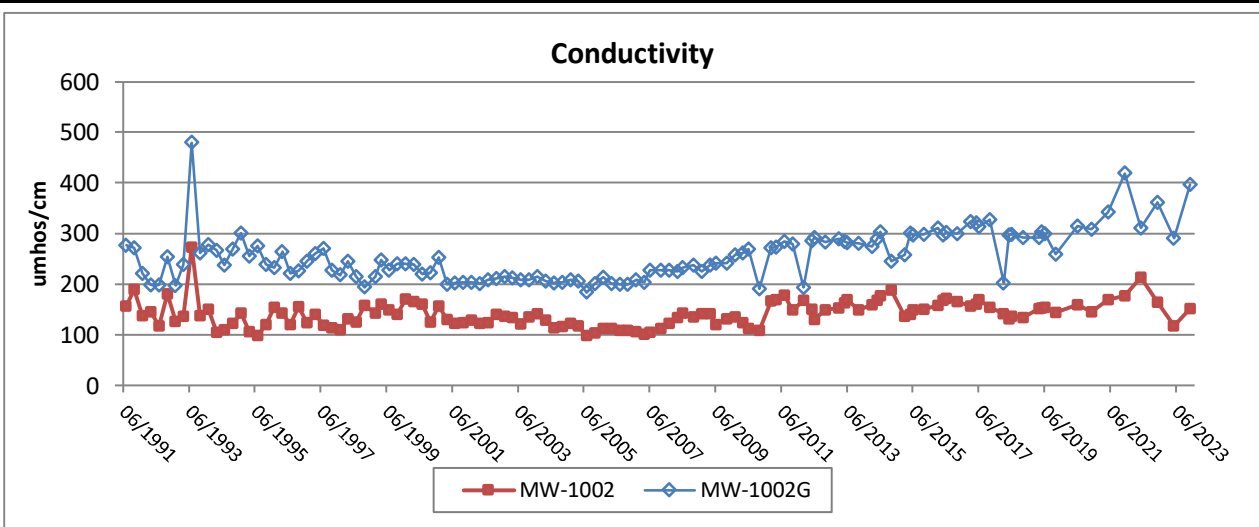


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Figure B-2c
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

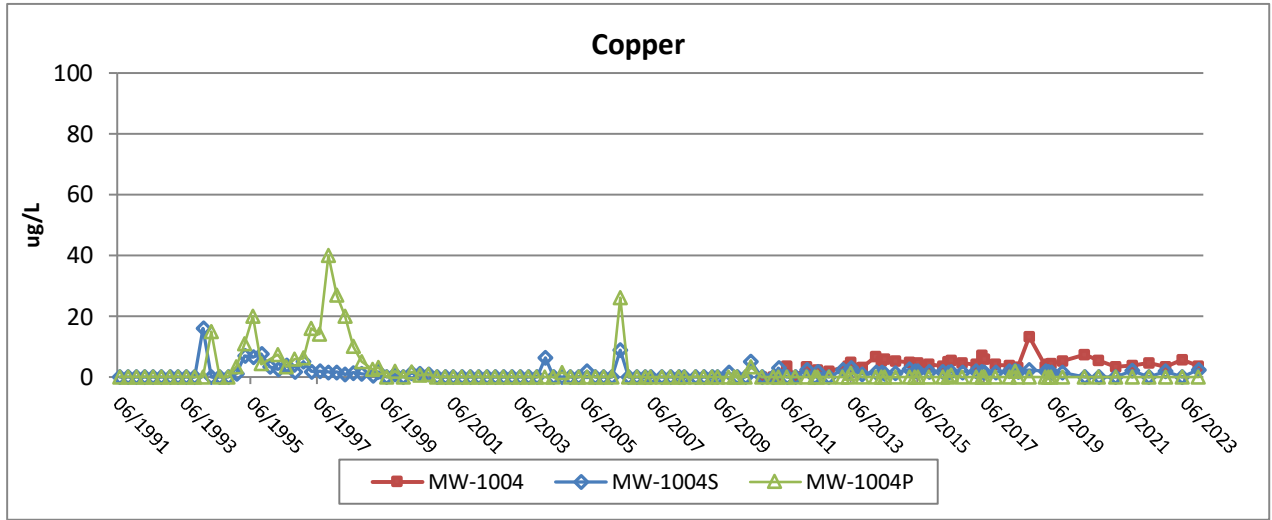
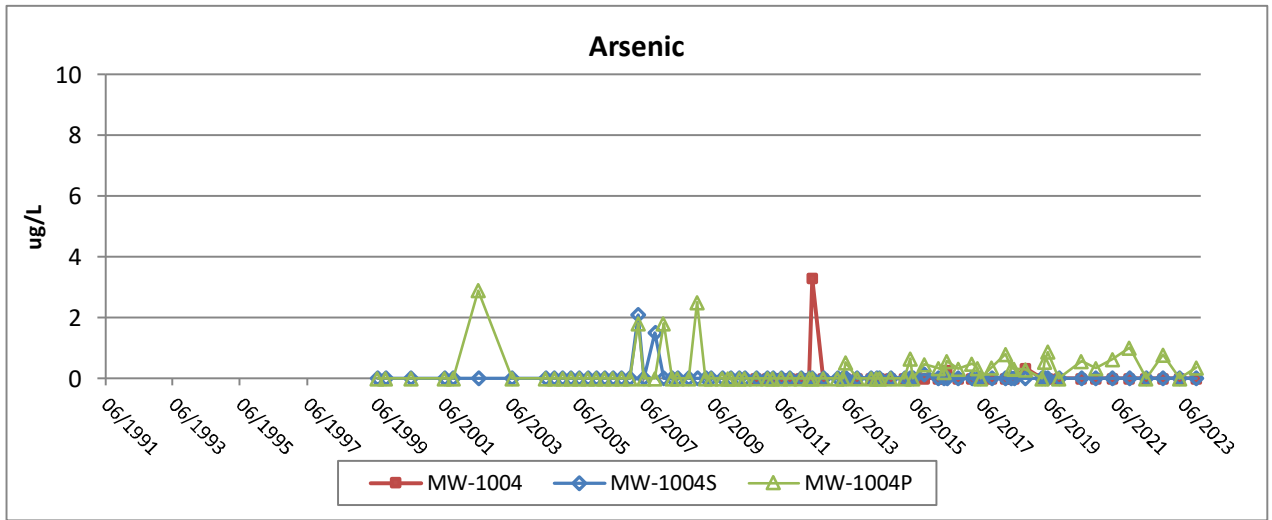
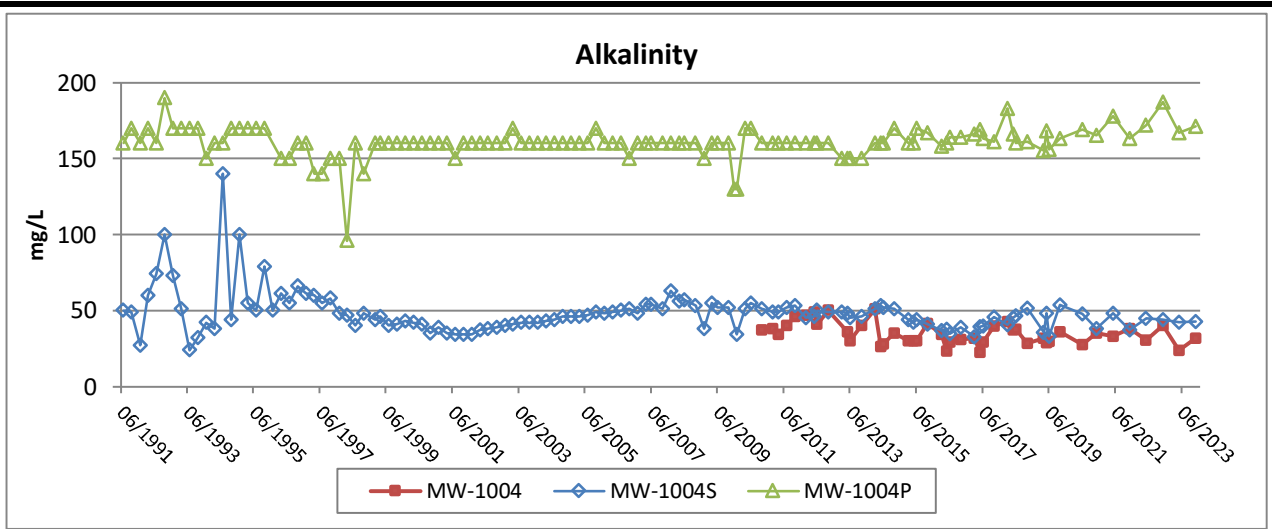
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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FLAMBEAU MINING COMPANY		
Figure B-2d Groundwater Trend Graphs - Semi-Annual Results MW-1002/MW-1002G		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

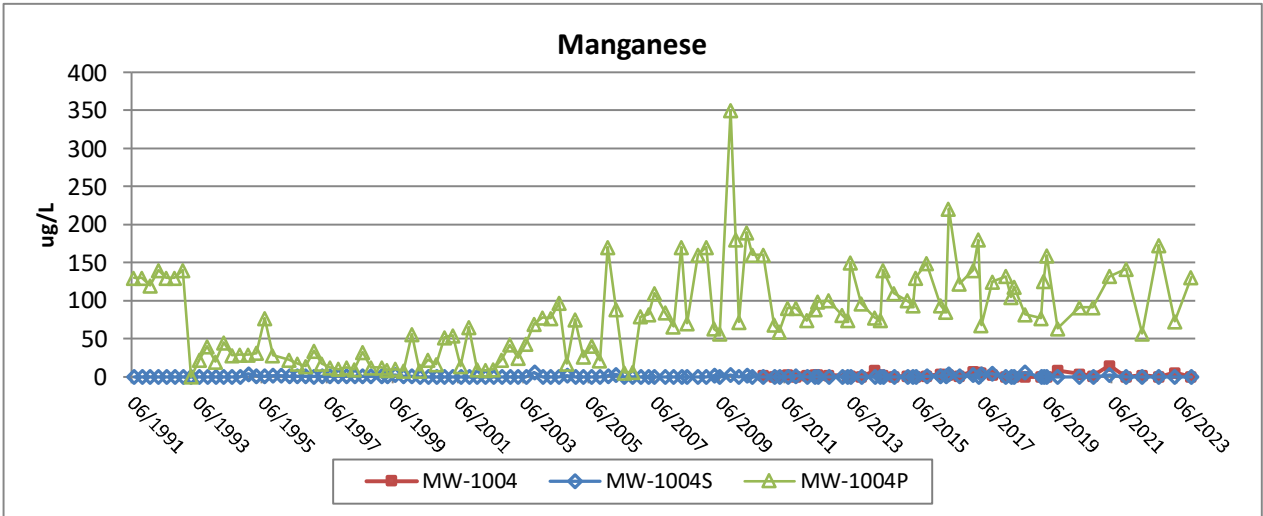
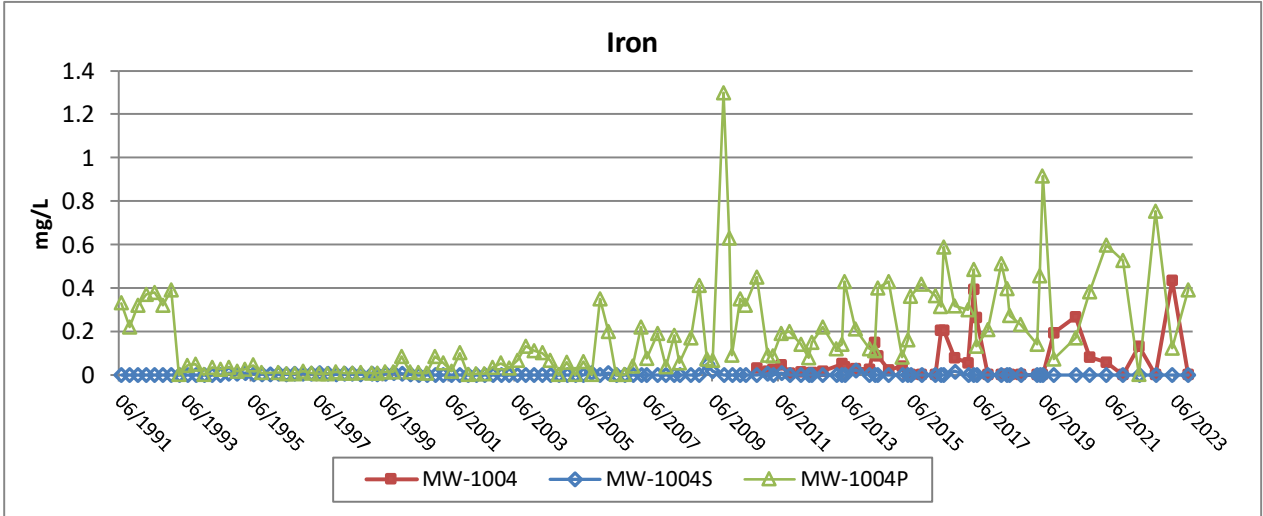
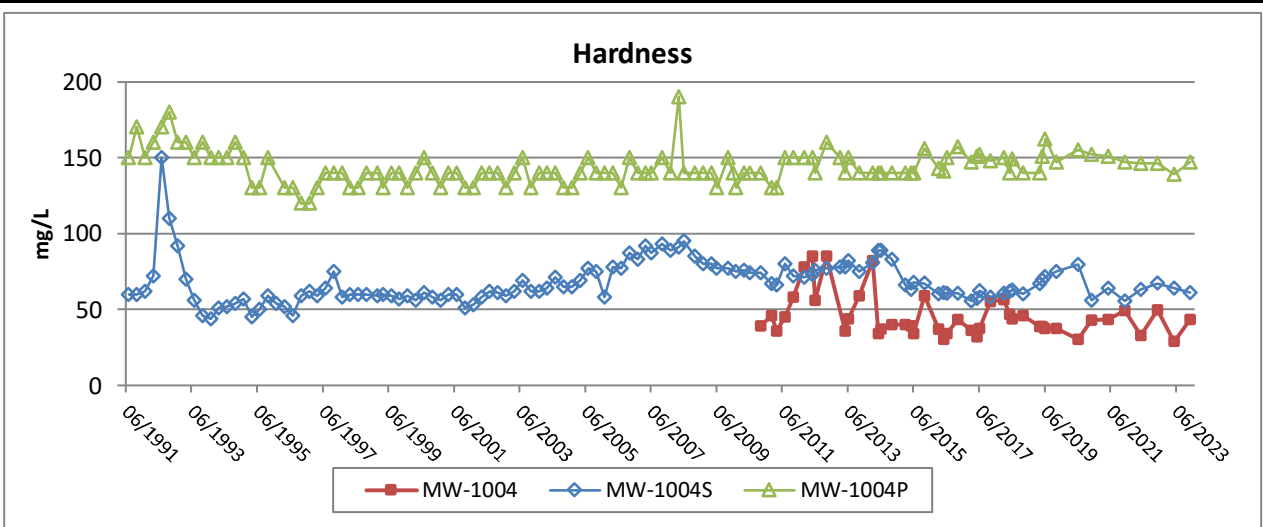
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Note: Fourth quarter 2010 was the first time MW-1004 had sufficient water recovery for sampling.

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Figure B-3a Groundwater Trend Graphs - Semi-Annual Results MW-1004/MW-1004S/MW-1004P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

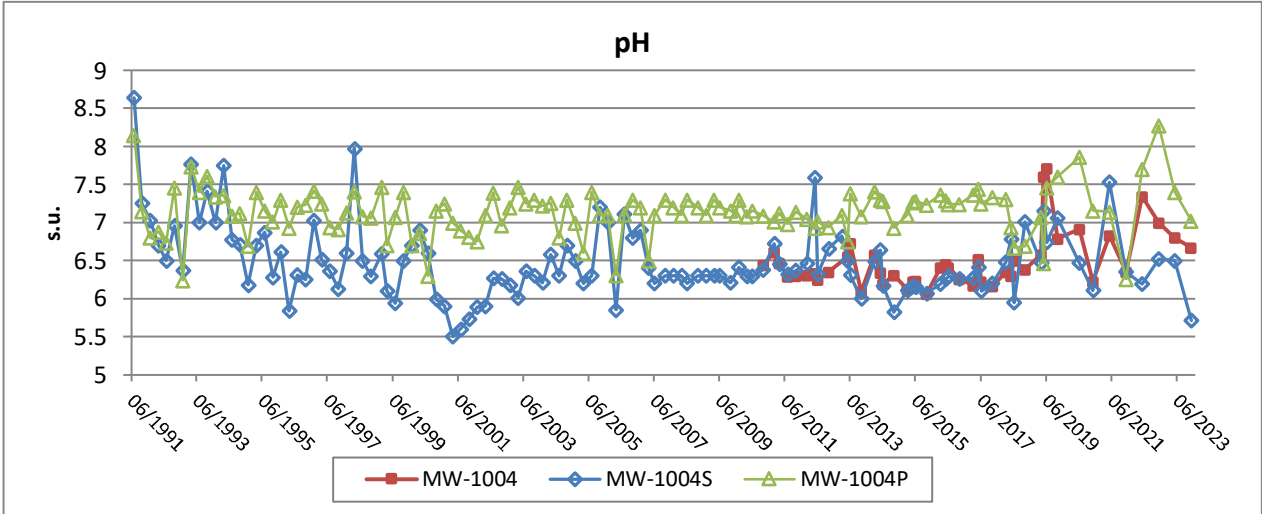
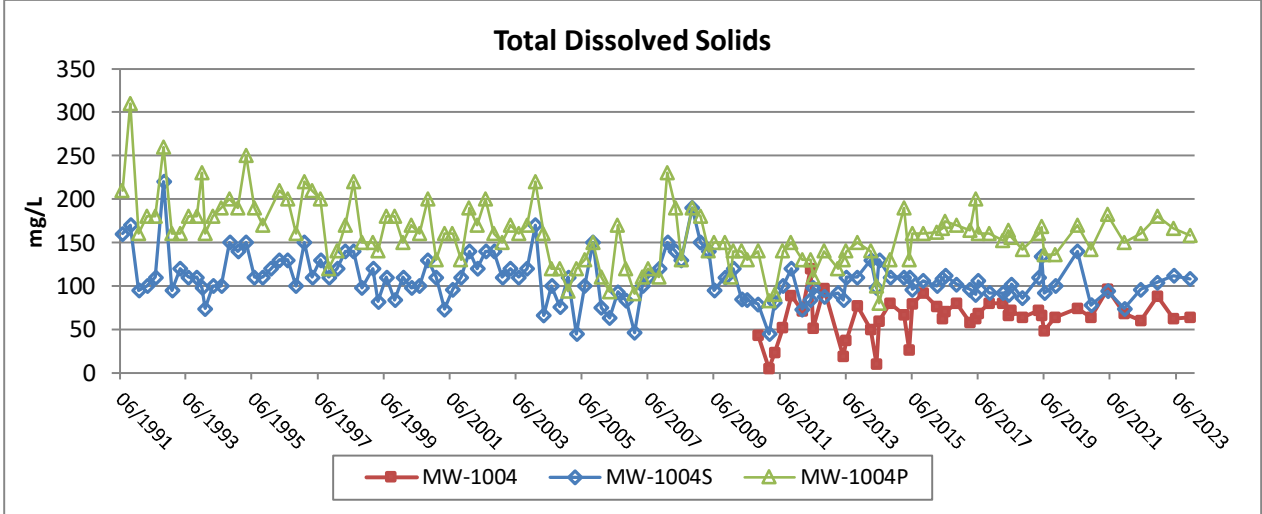
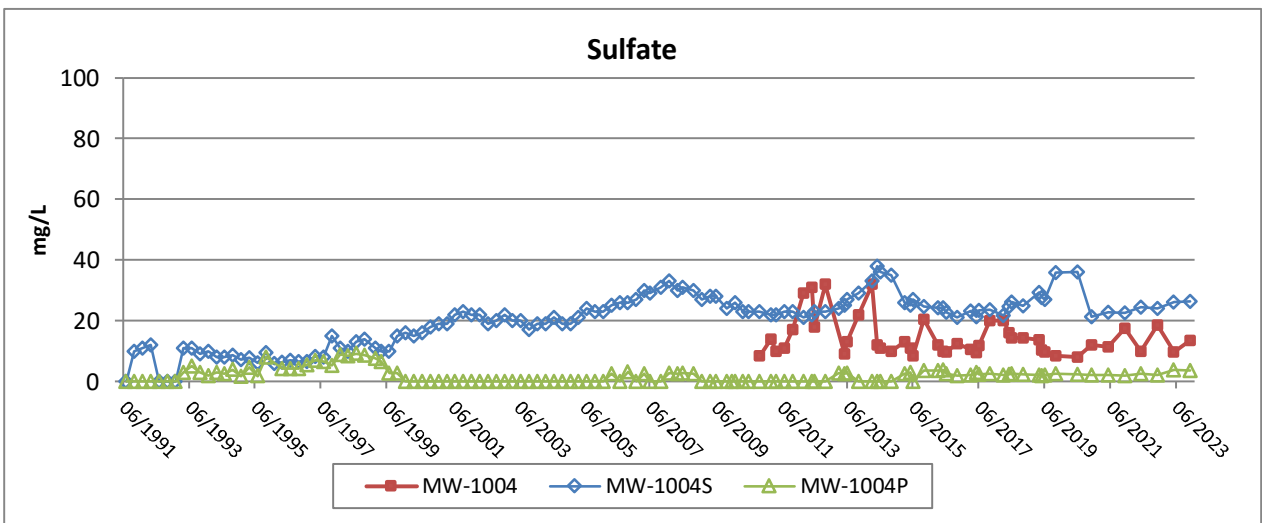


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Figure B-3b
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

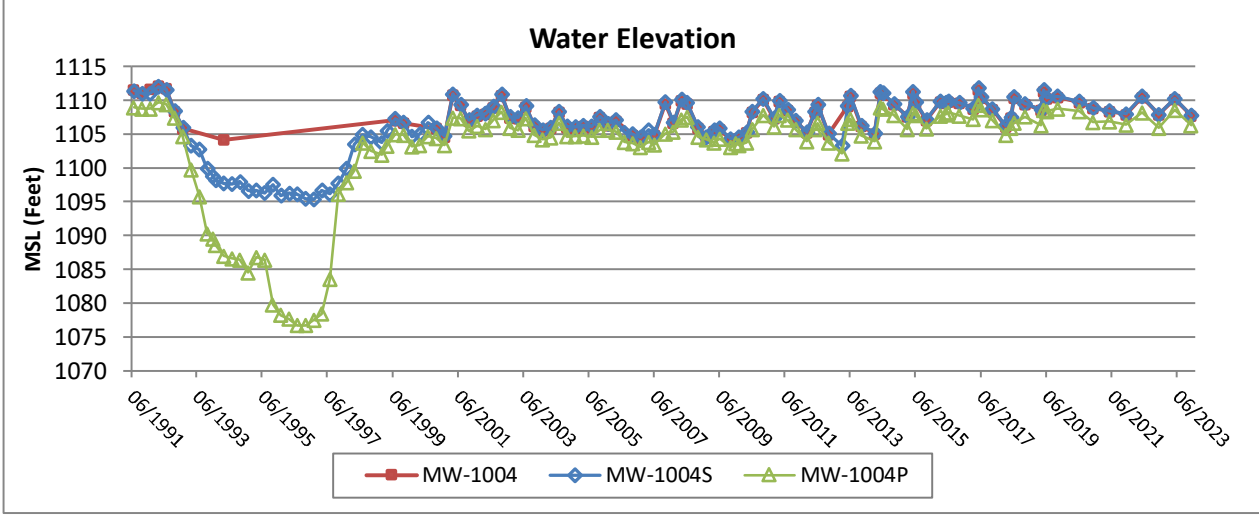
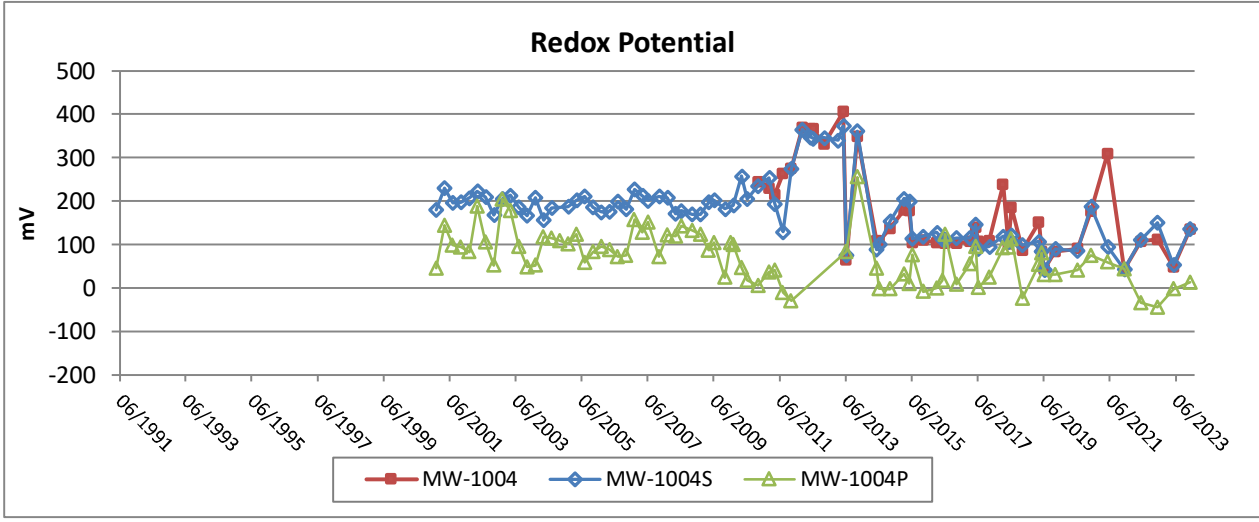
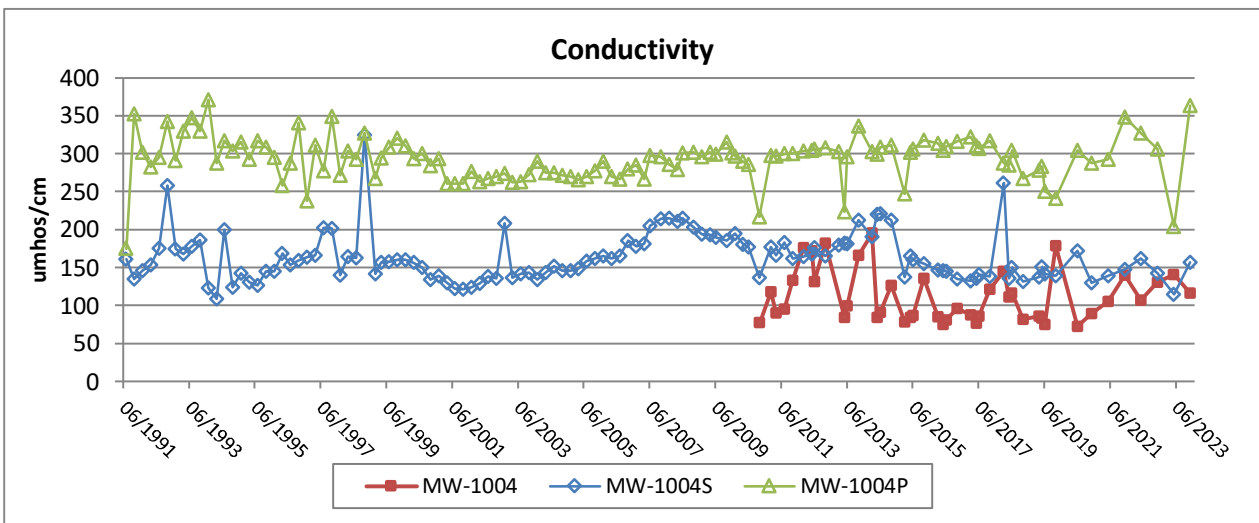
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Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

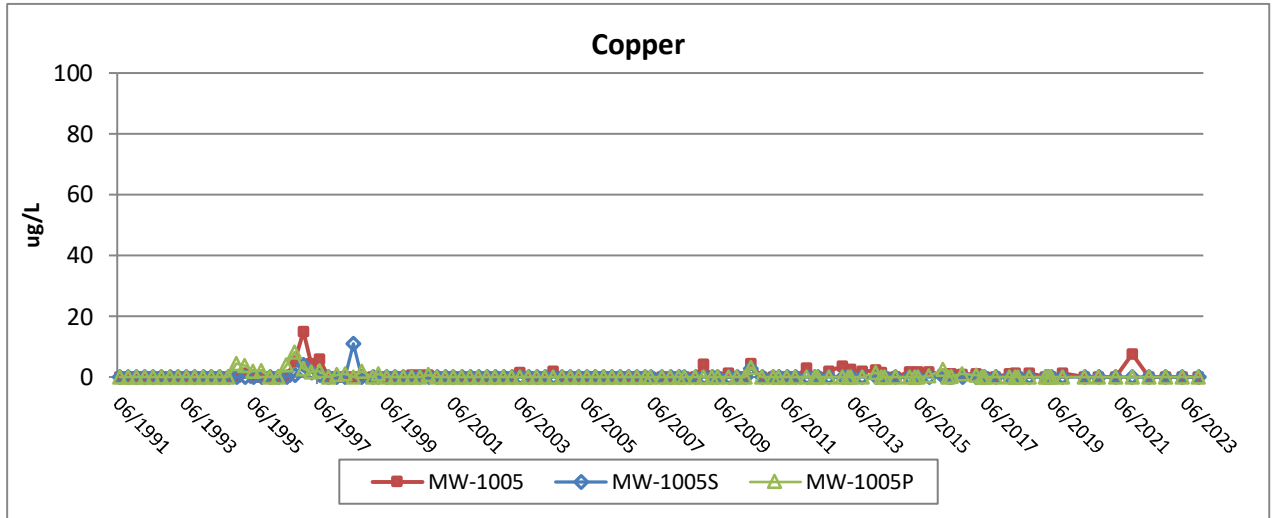
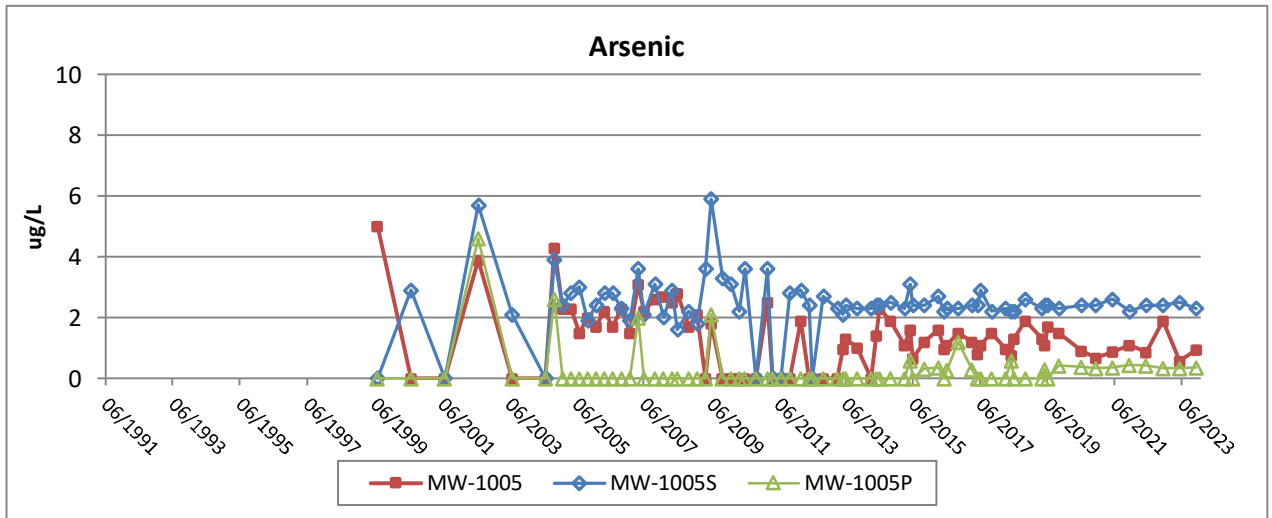
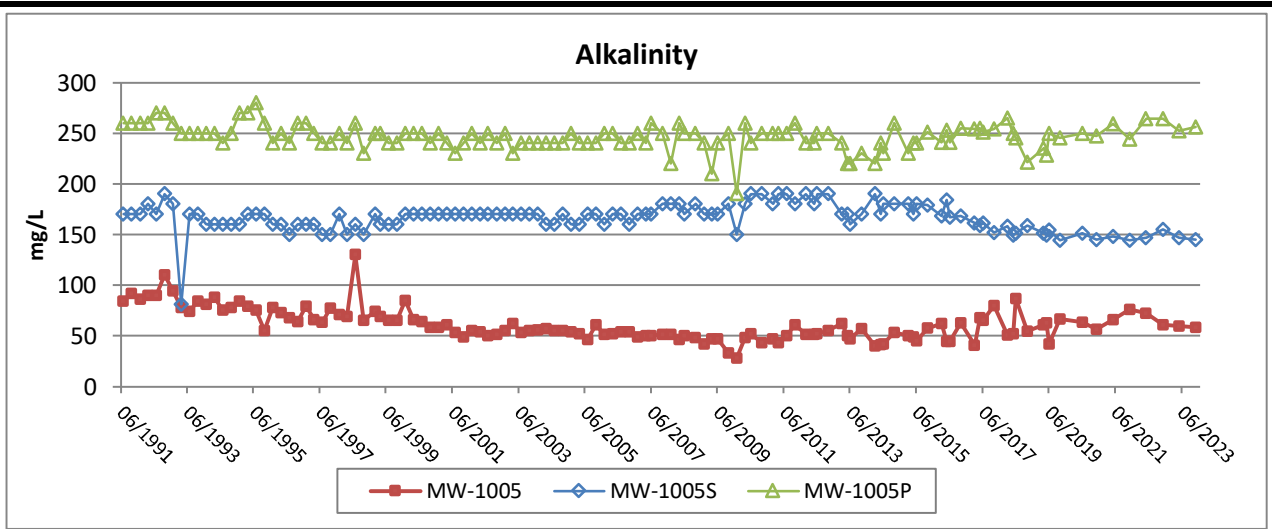
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FLAMBEAU MINING COMPANY		
Figure B-3c Groundwater Trend Graphs - Semi-Annual Results MW-1004/MW-1004S/MW-1004P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



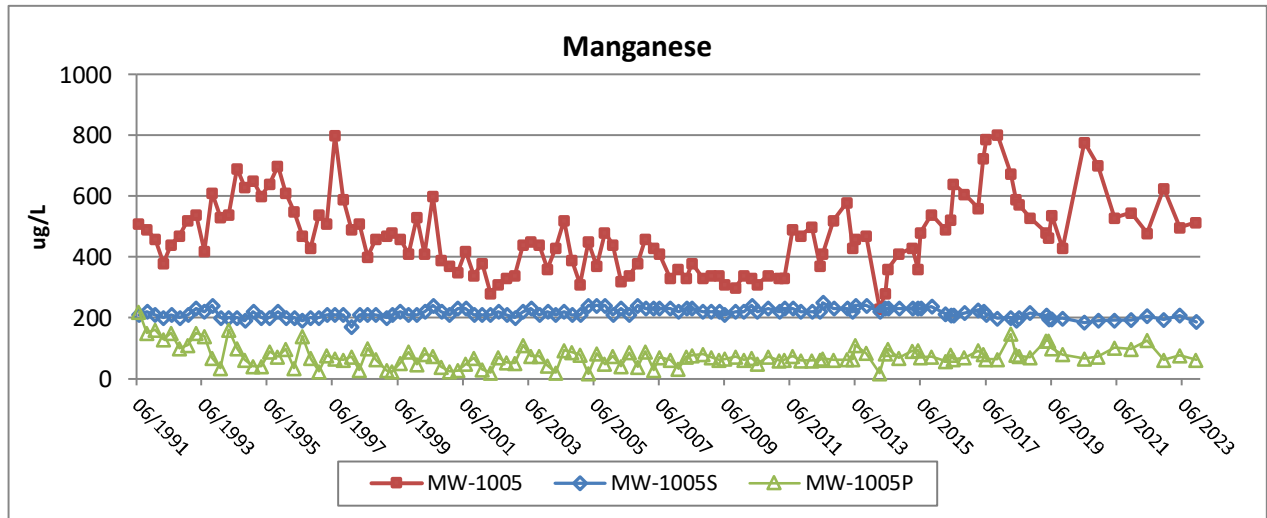
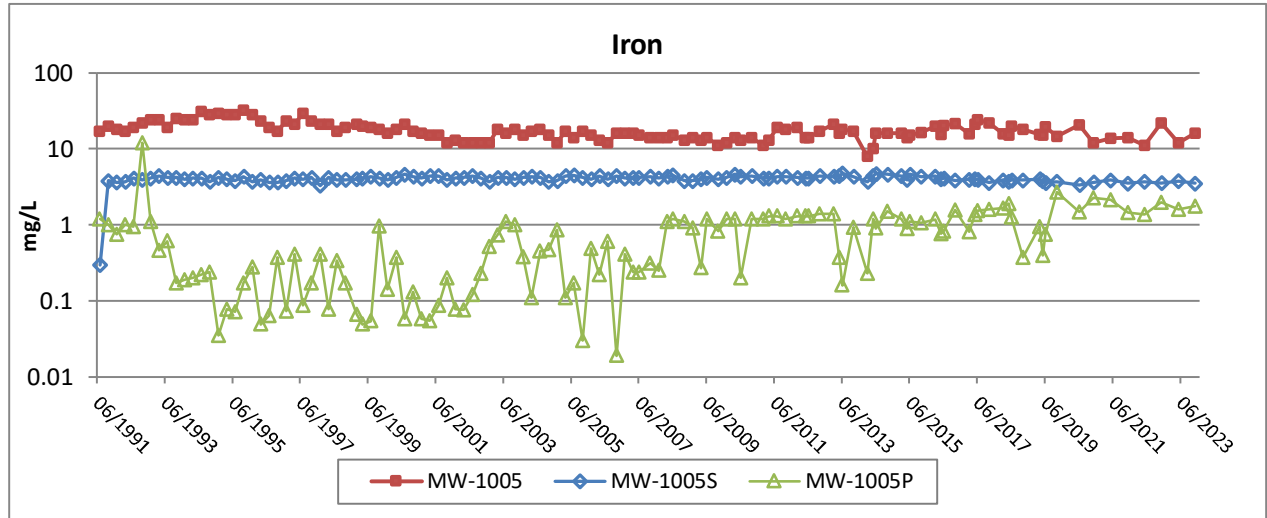
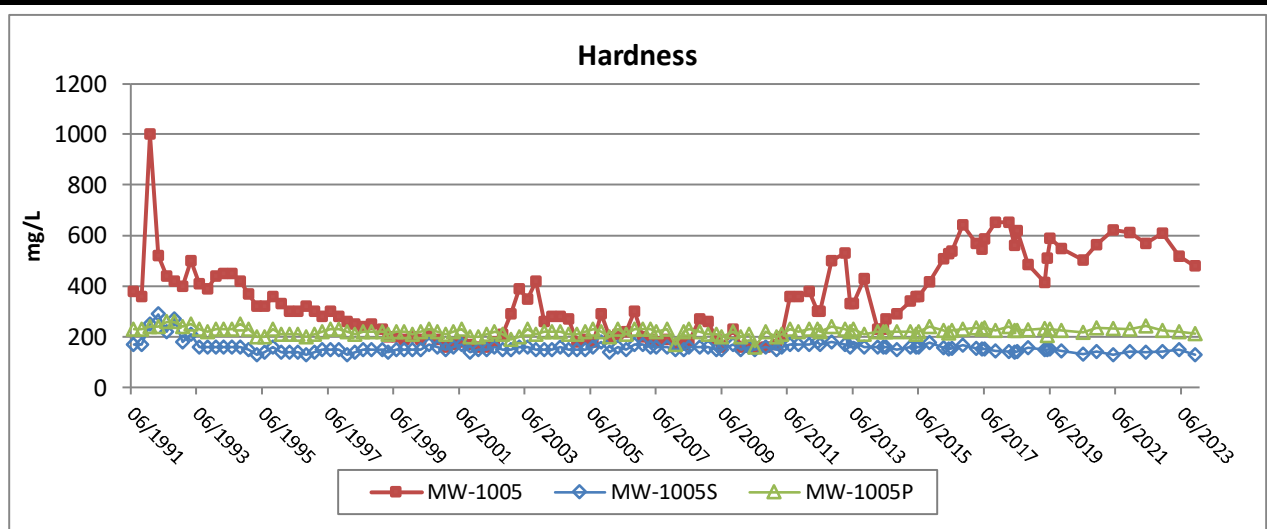
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FLAMBEAU MINING COMPANY		
Figure B-3d Groundwater Trend Graphs - Semi-Annual Results MW-1004/MW-1004S/MW-1004P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

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FLAMBEAU MINING COMPANY		
Figure B-4a Groundwater Trend Graphs - Semi-Annual Results MW-1005/MW-1005S/MW-1005P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

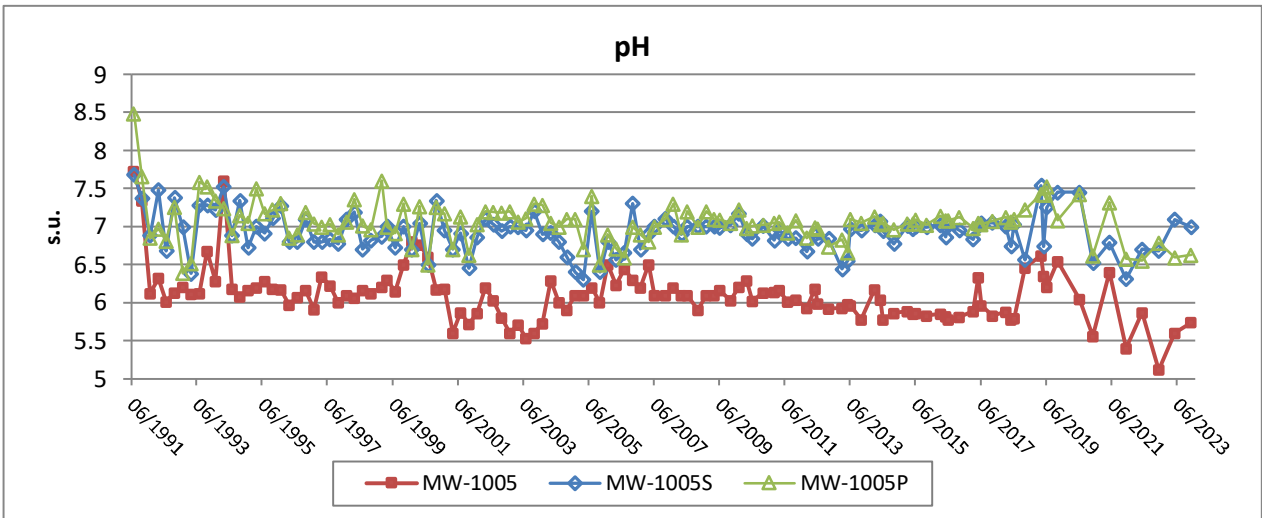
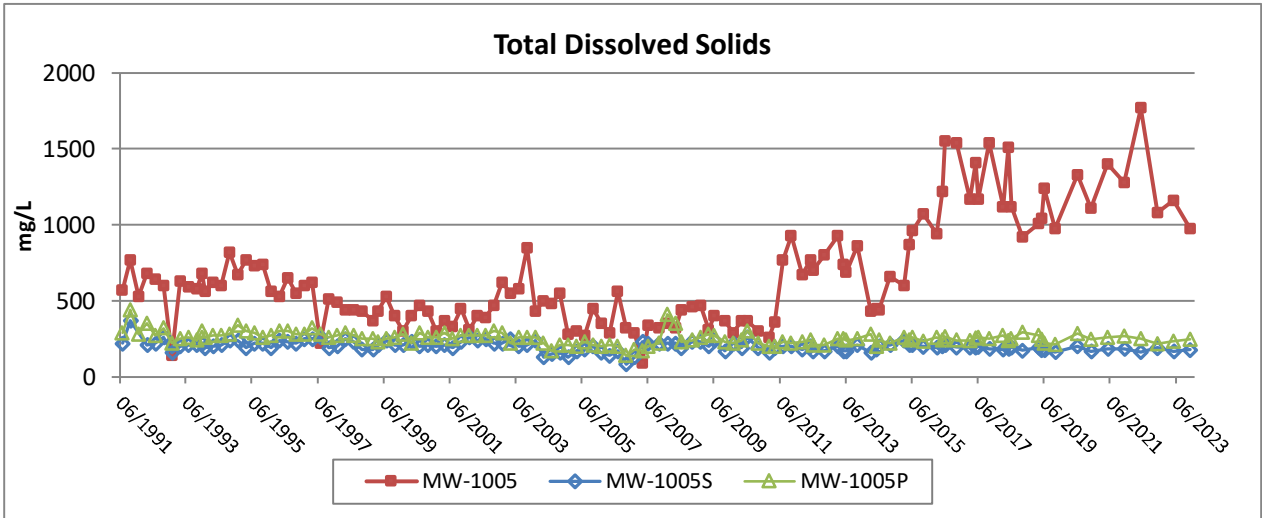
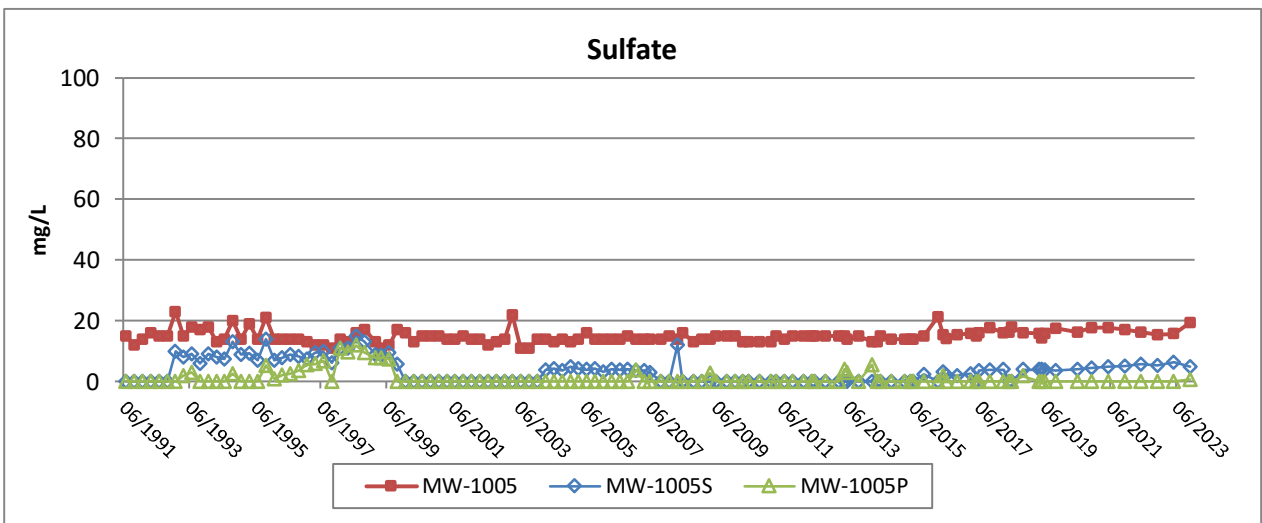
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Note: Iron trend graphs are displayed on a logarithmic scale so the trend patterns of MW-1005, MW-1005S and MW-1005P are visible at different concentration scales.

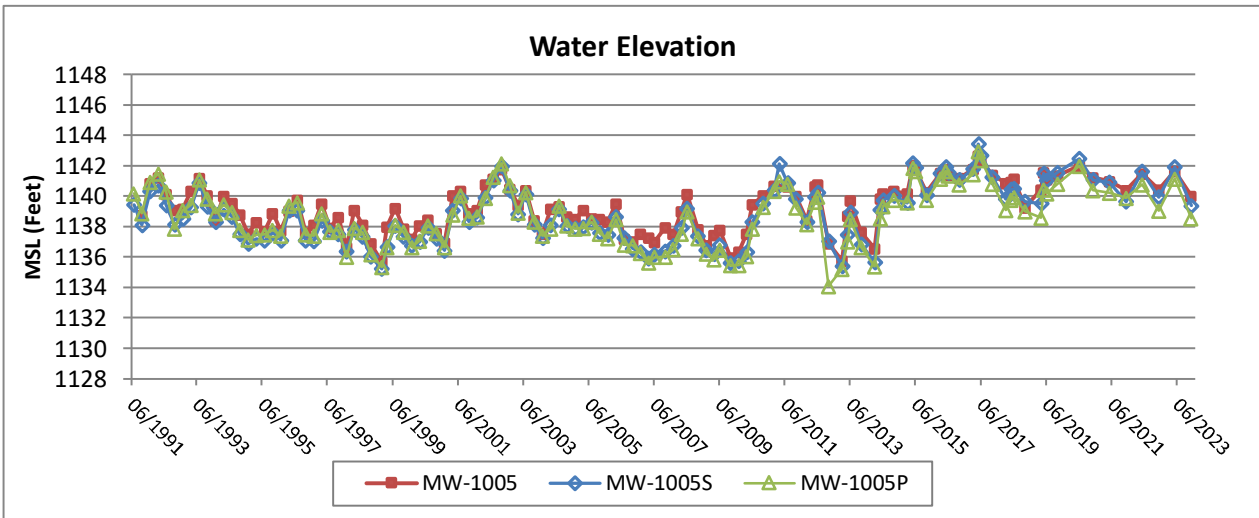
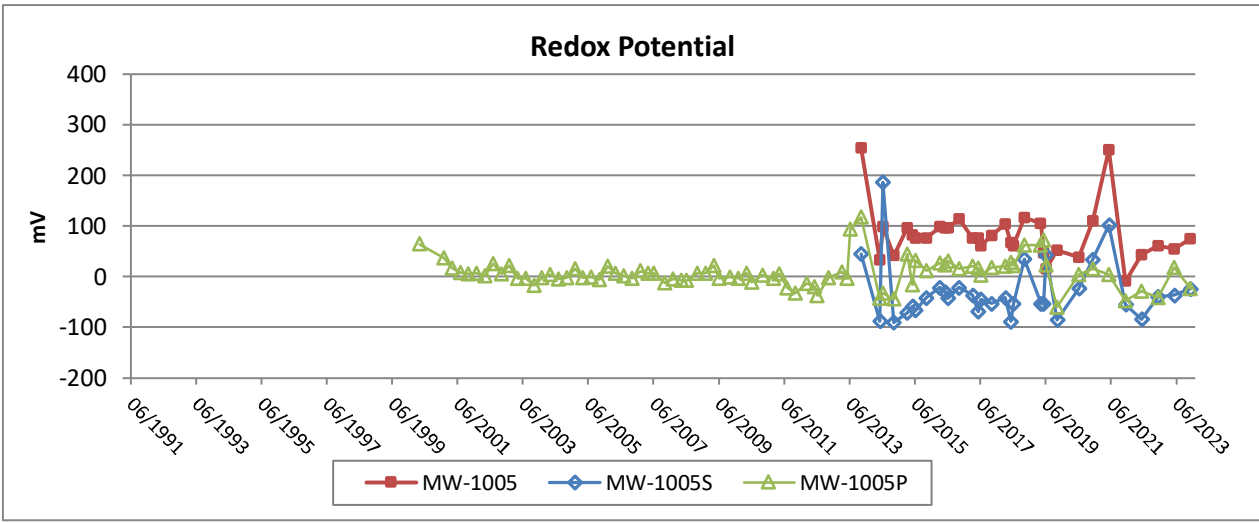
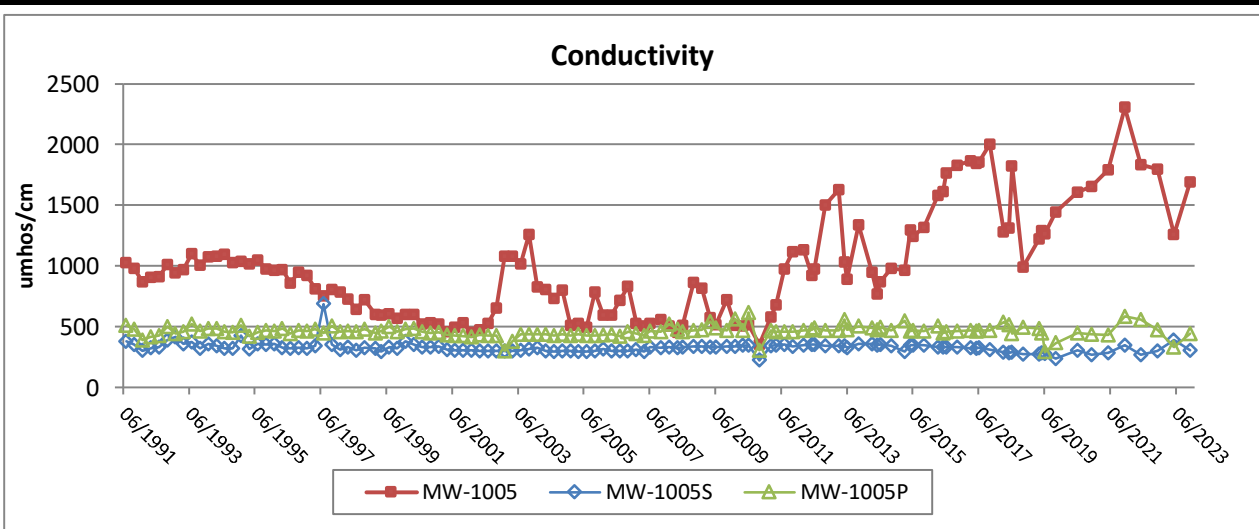
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FLAMBEAU MINING COMPANY		
Figure B-4b Groundwater Trend Graphs - Semi-Annual Results MW-1005/MW-1005S/MW-1005P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



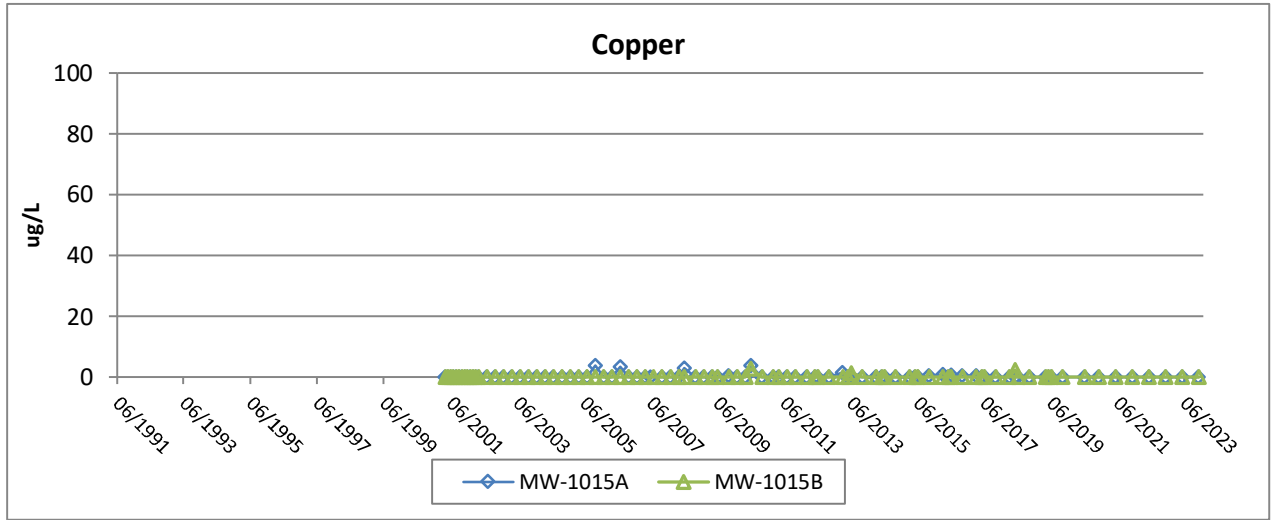
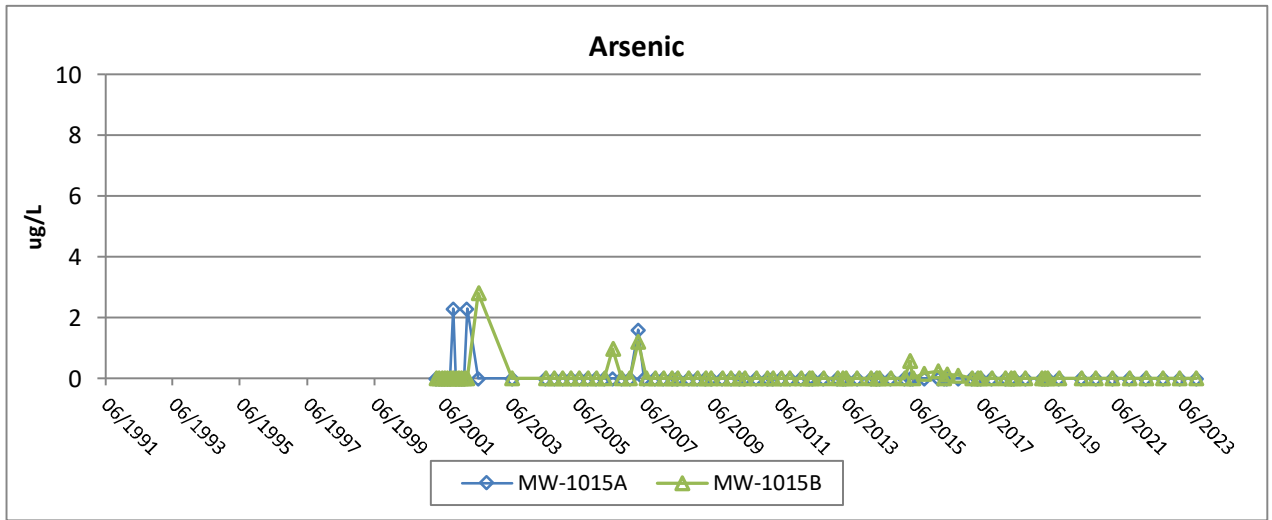
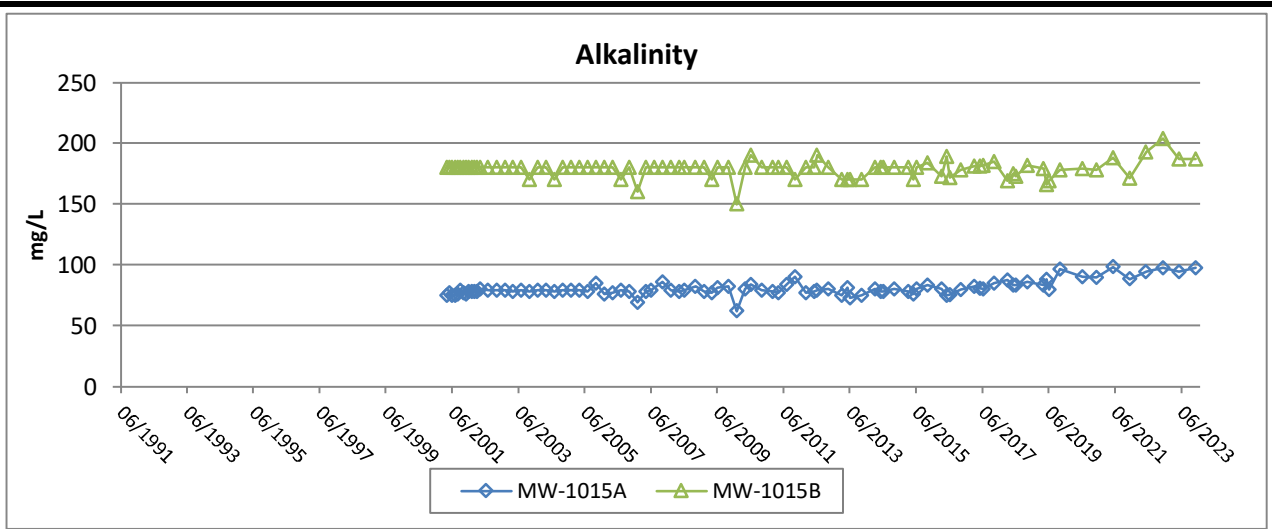
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FLAMBEAU MINING COMPANY		
Figure B-4c Groundwater Trend Graphs - Semi-Annual Results MW-1005/MW-1005S/MW-1005P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24


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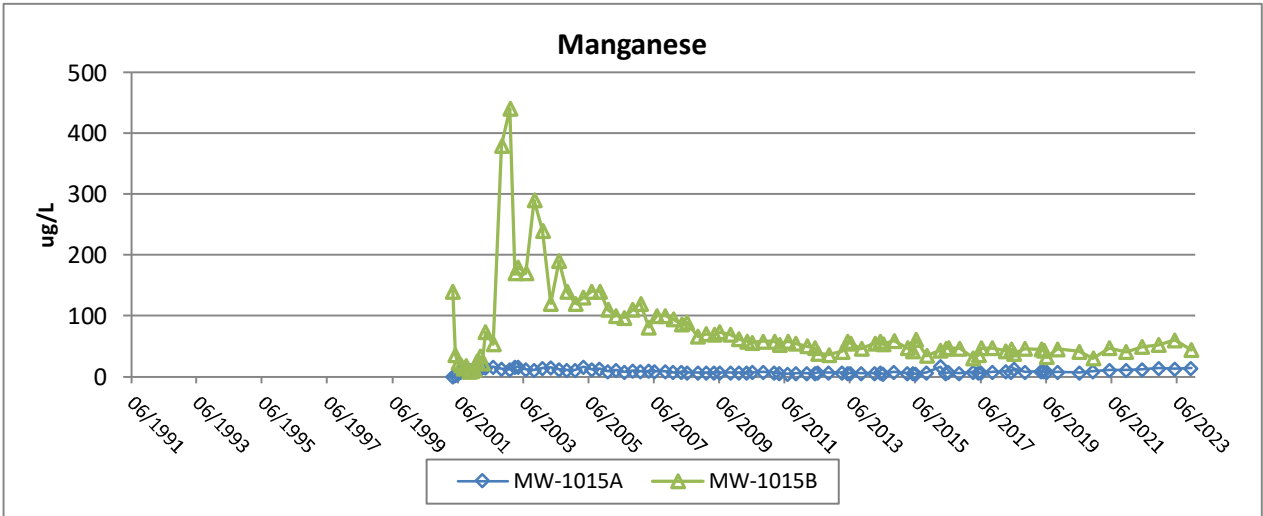
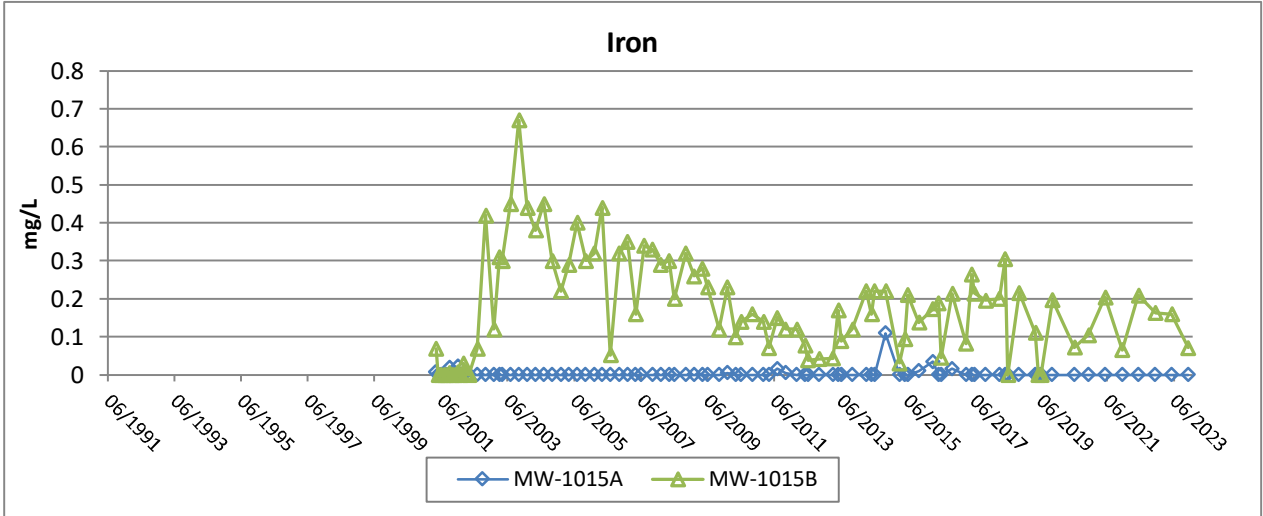
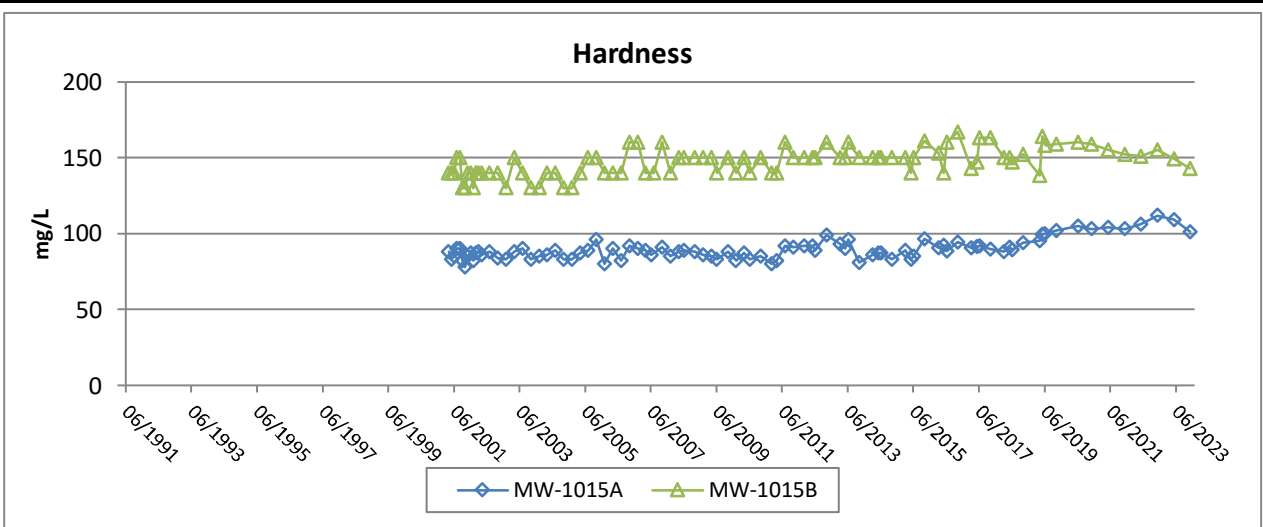


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FLAMBEAU MINING COMPANY		
Figure B-4d Groundwater Trend Graphs - Semi-Annual Results MW-1005/MW-1005S/MW-1005P		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

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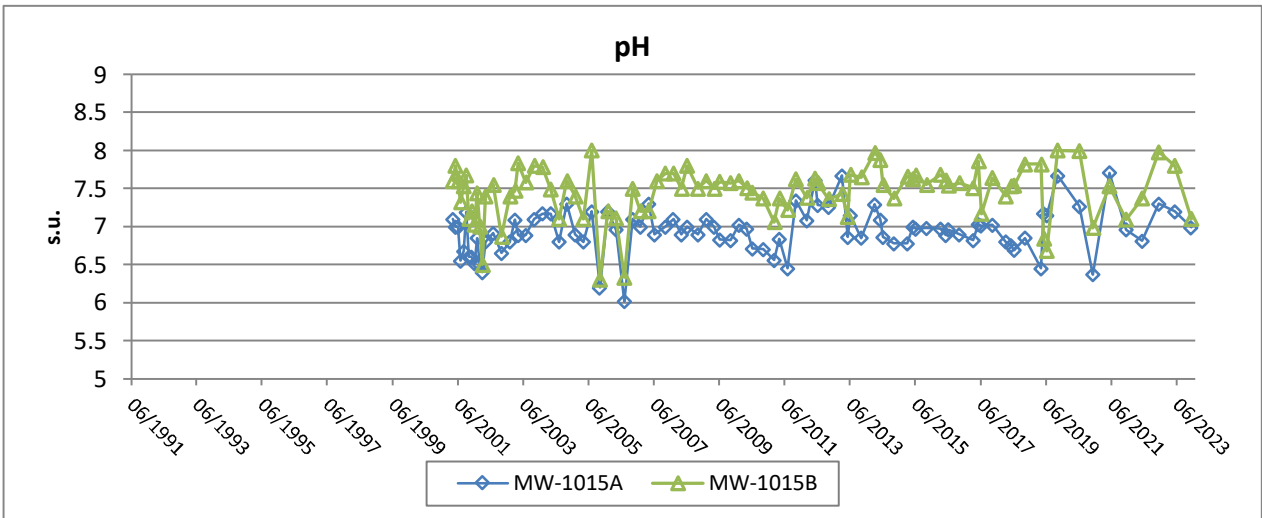
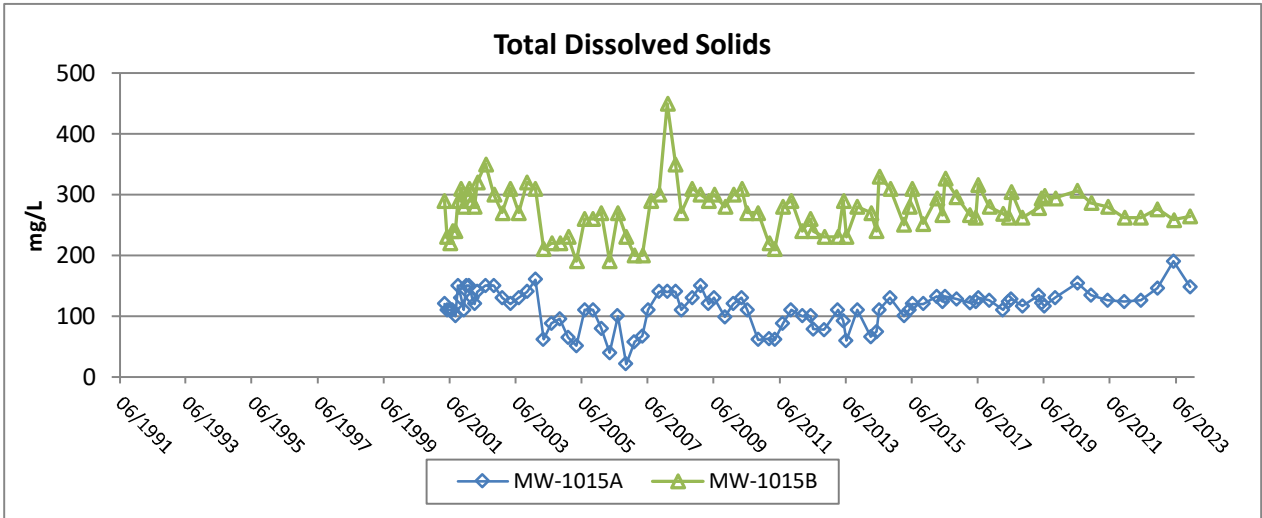
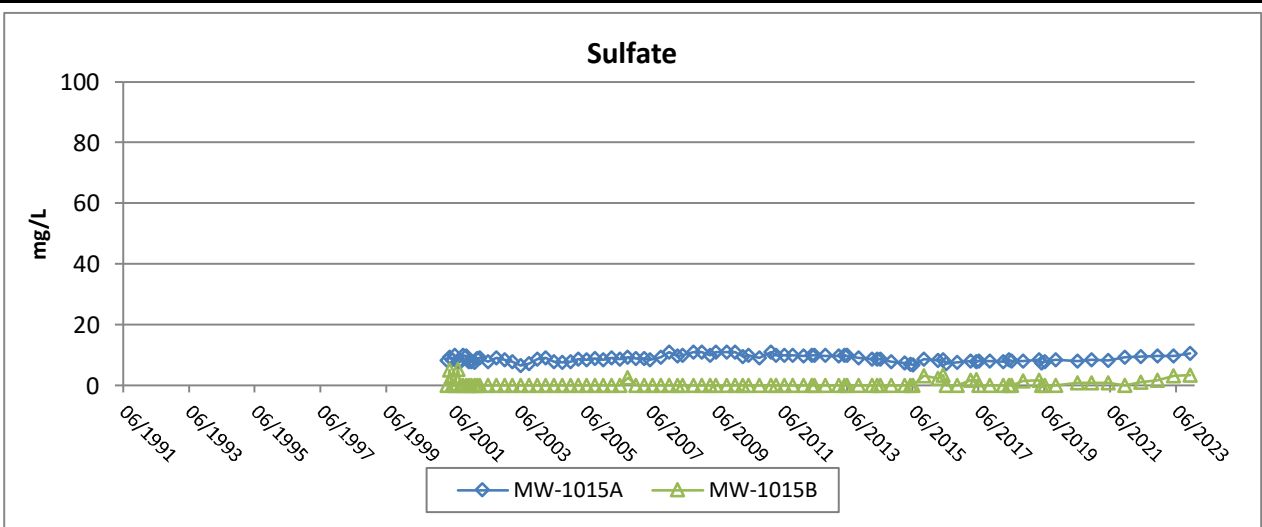


		
FLAMBEAU MINING COMPANY		
Figure B-5a Groundwater Trend Graphs - Semi-Annual Results MW-1015A/MW-1015B		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24




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FLAMBEAU MINING COMPANY		
Figure B-5b Groundwater Trend Graphs - Semi-Annual Results MW-1015A/MW-1015B		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

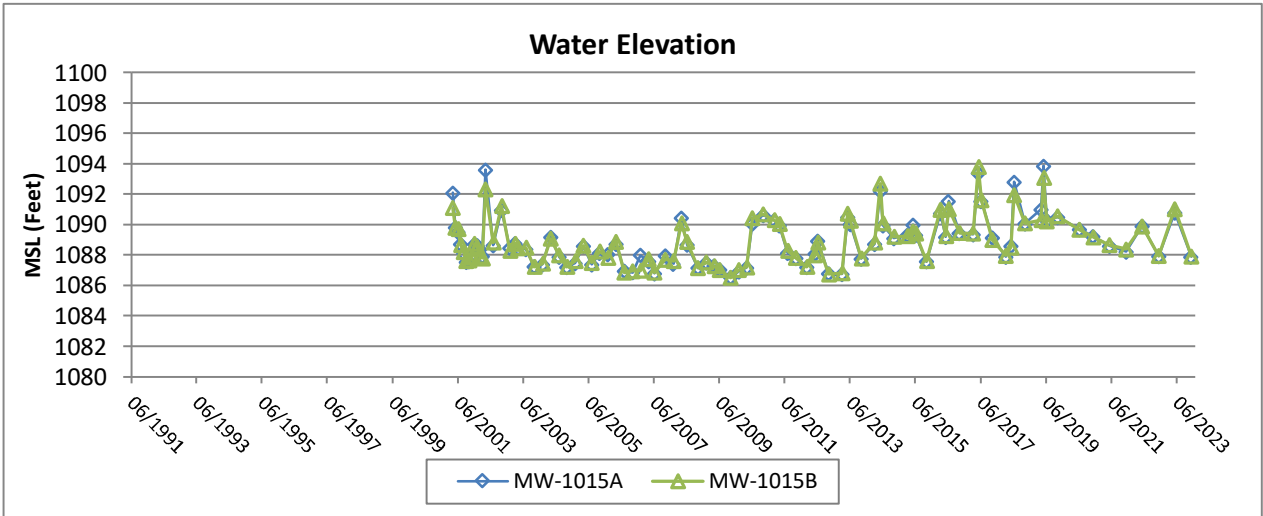
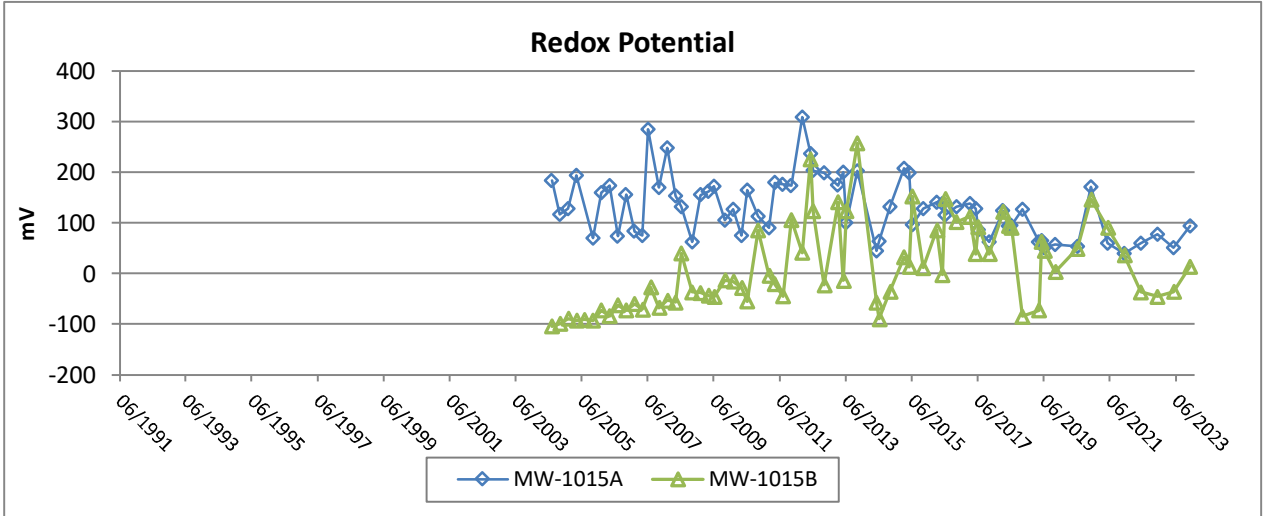
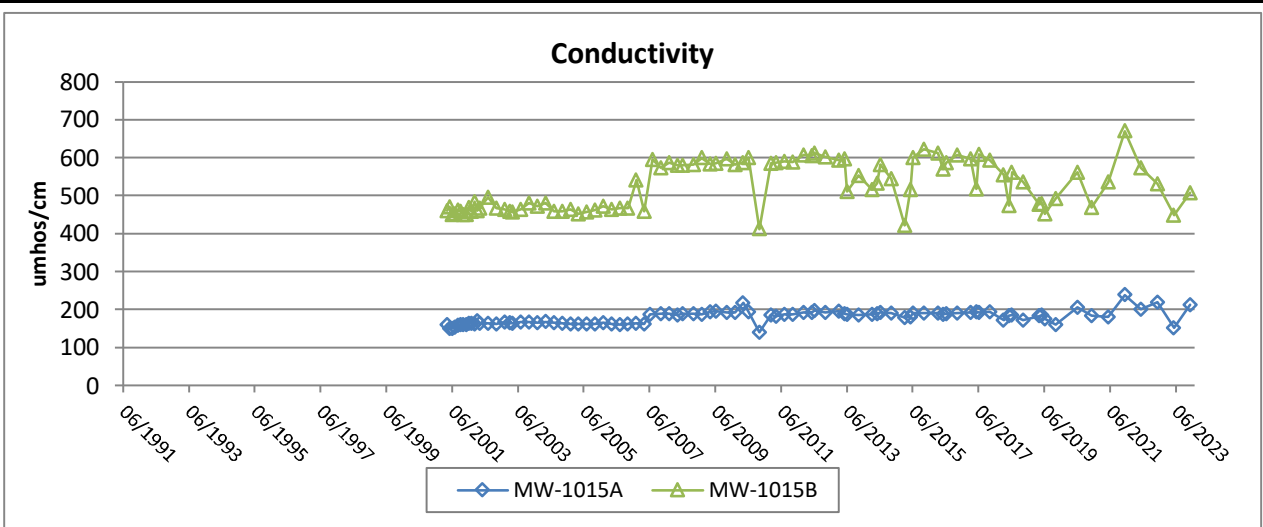
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Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

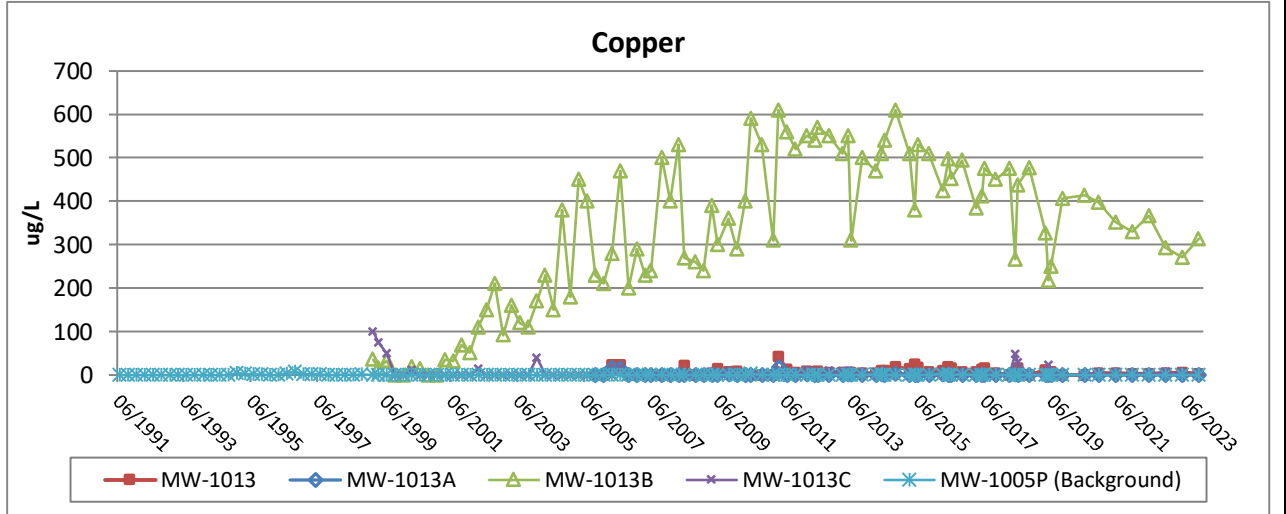
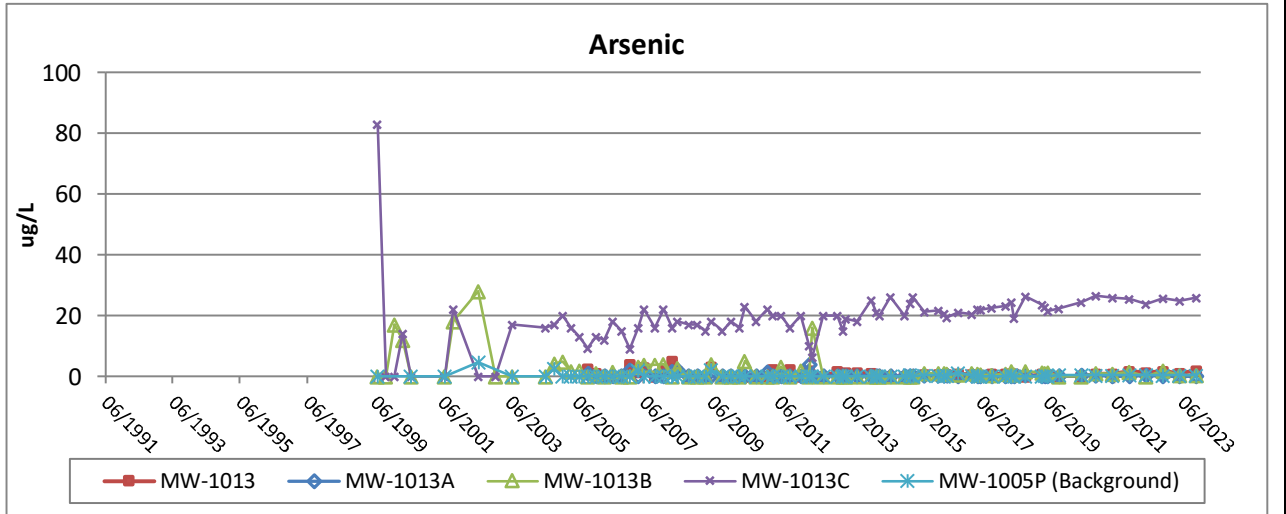
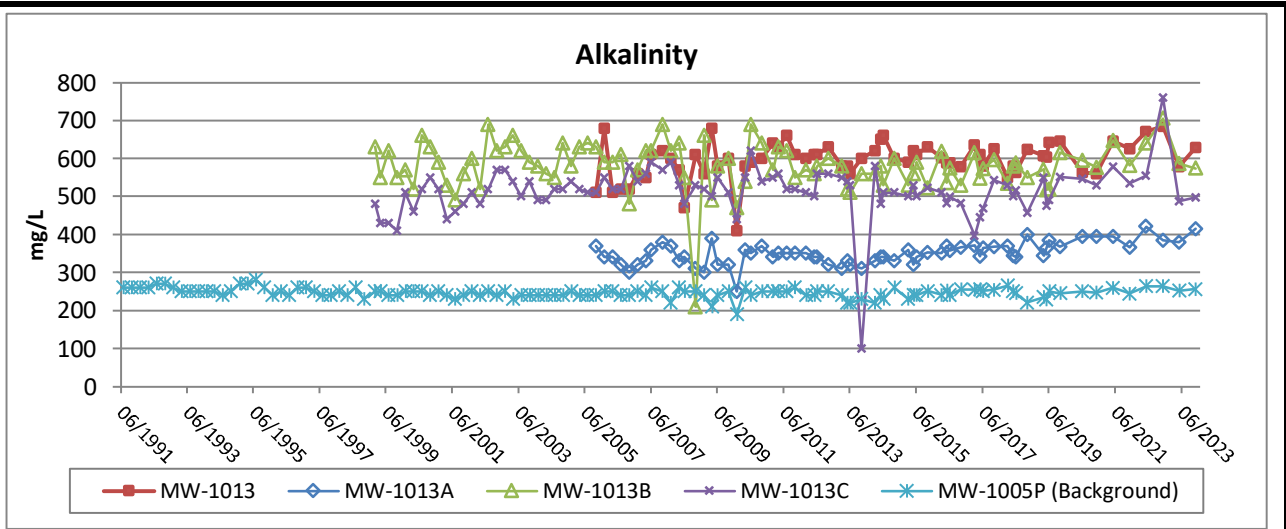
		
FLAMBEAU MINING COMPANY		
Figure B-5c Groundwater Trend Graphs - Semi-Annual Results MW-1015A/MW-1015B		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

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Foth		
FLAMBEAU MINING COMPANY		
Figure B-5d Groundwater Trend Graphs - Semi-Annual Results MW-1015A/MW-1015B		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

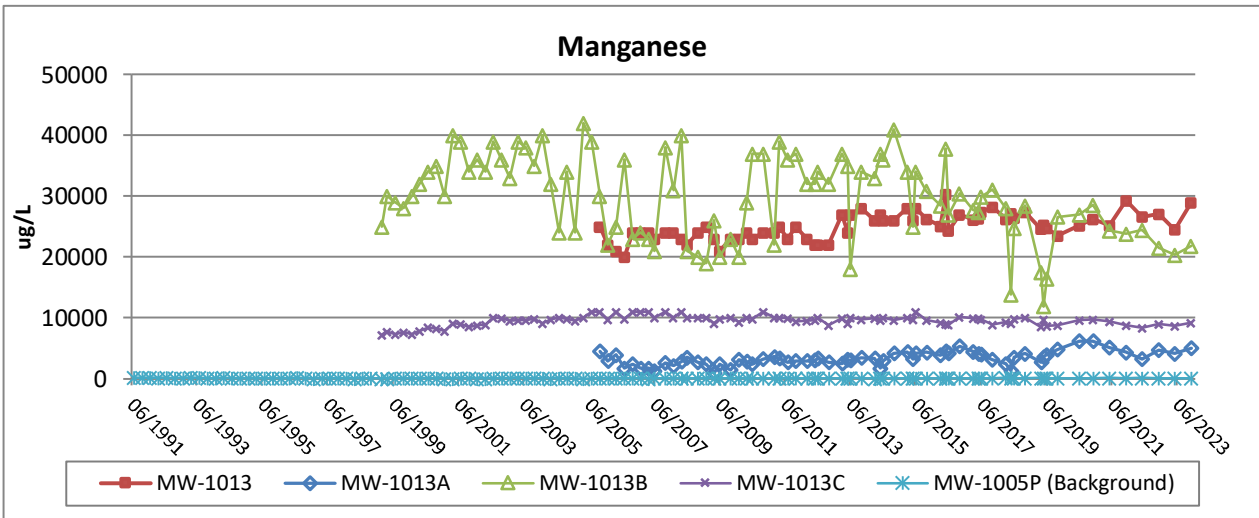
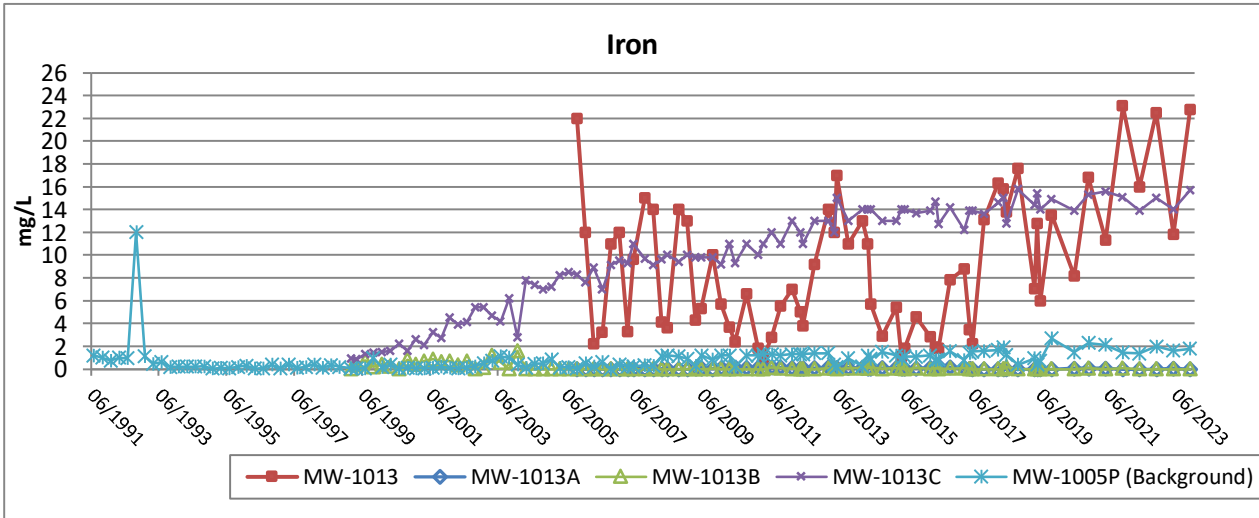
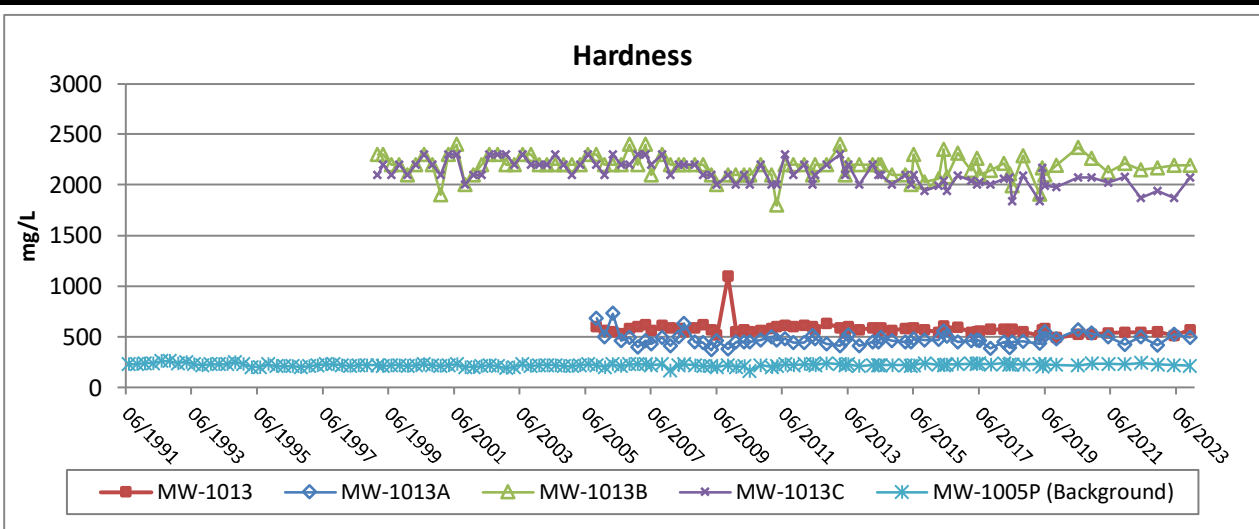
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Note: Fourth quarter 2005 was the first time MW-1013 had sufficient water recovery for sampling.

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Foth		
FLAMBEAU MINING COMPANY		
Figure B-6a		
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)		
MW-1013/MW-1013A/MW-1013B/MW-1013C		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



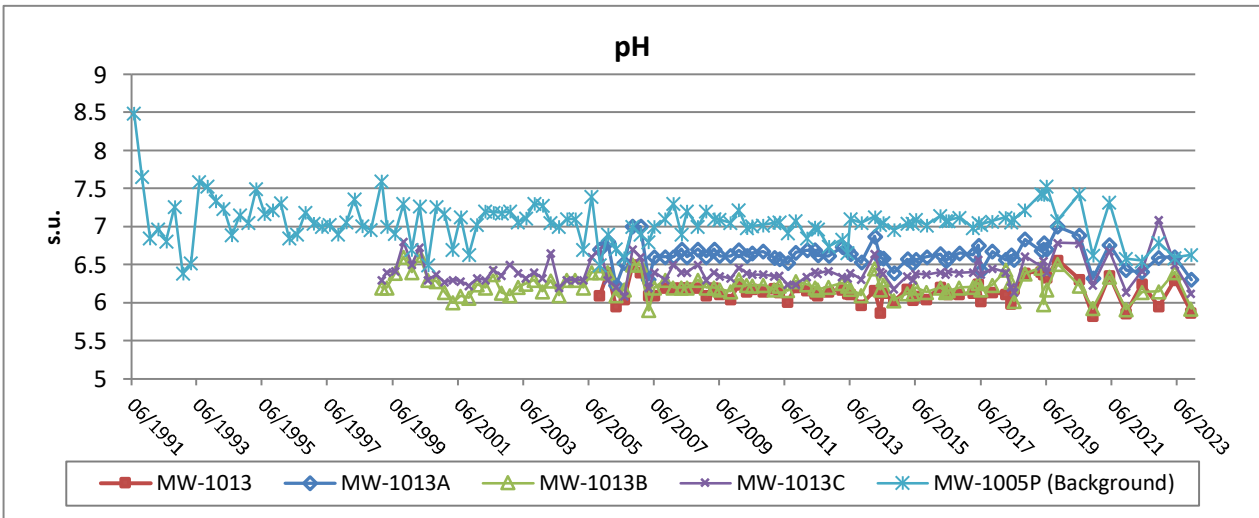
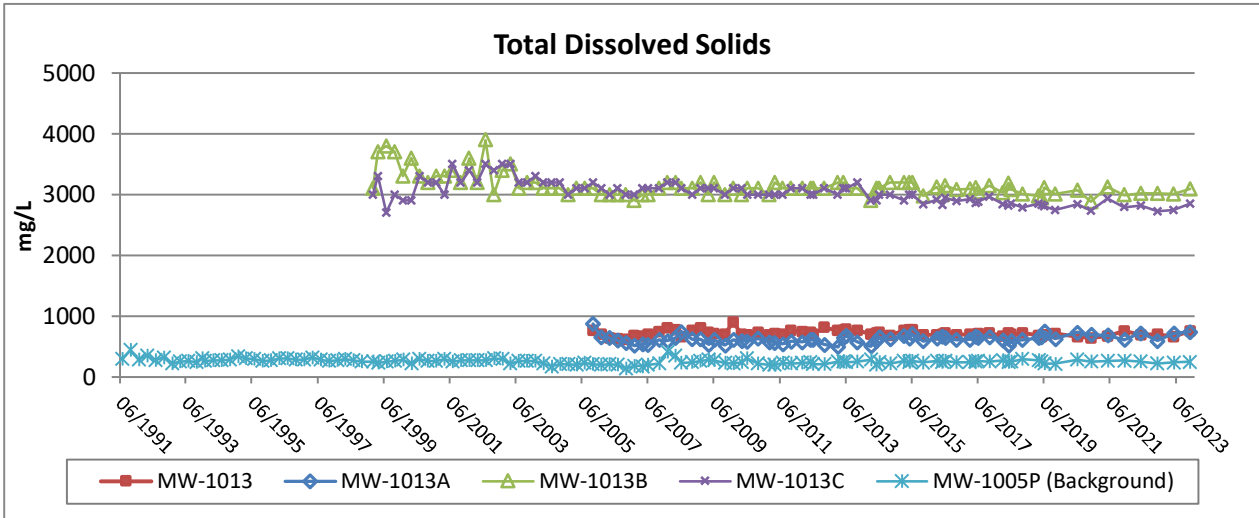
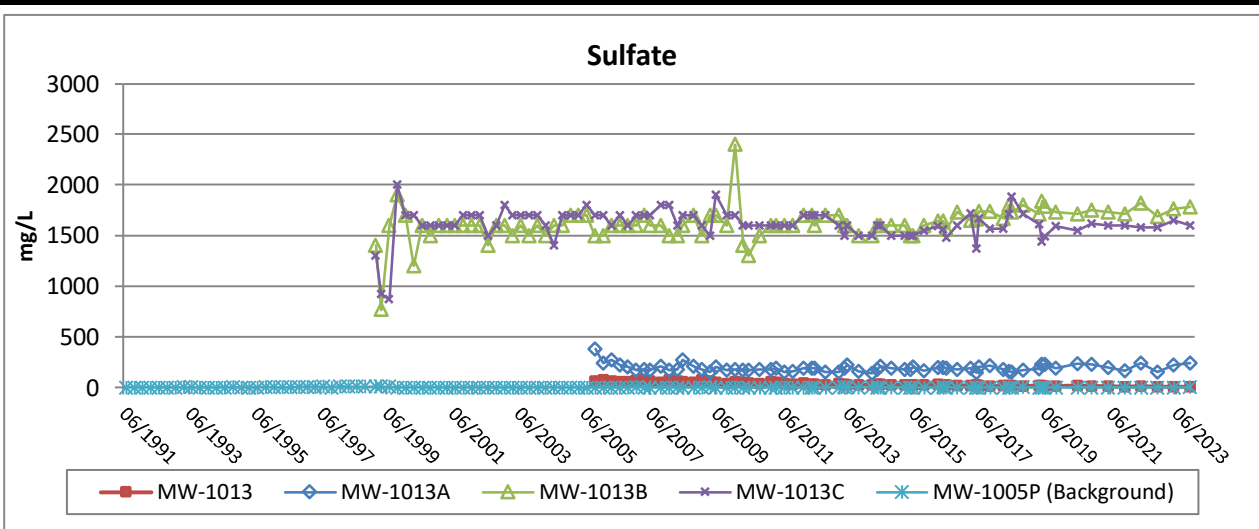


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Figure B-6b
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

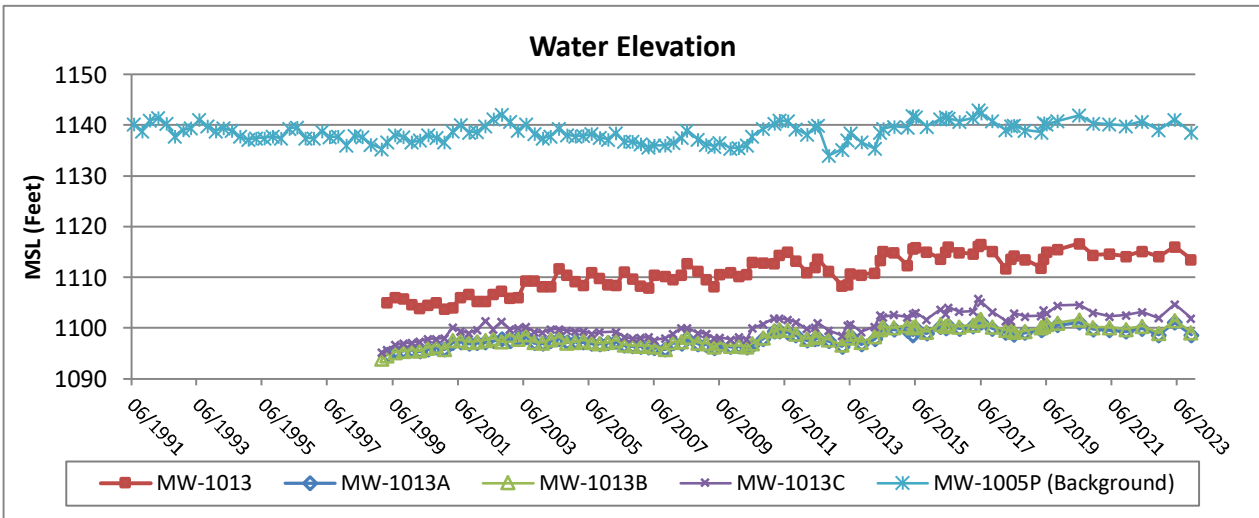
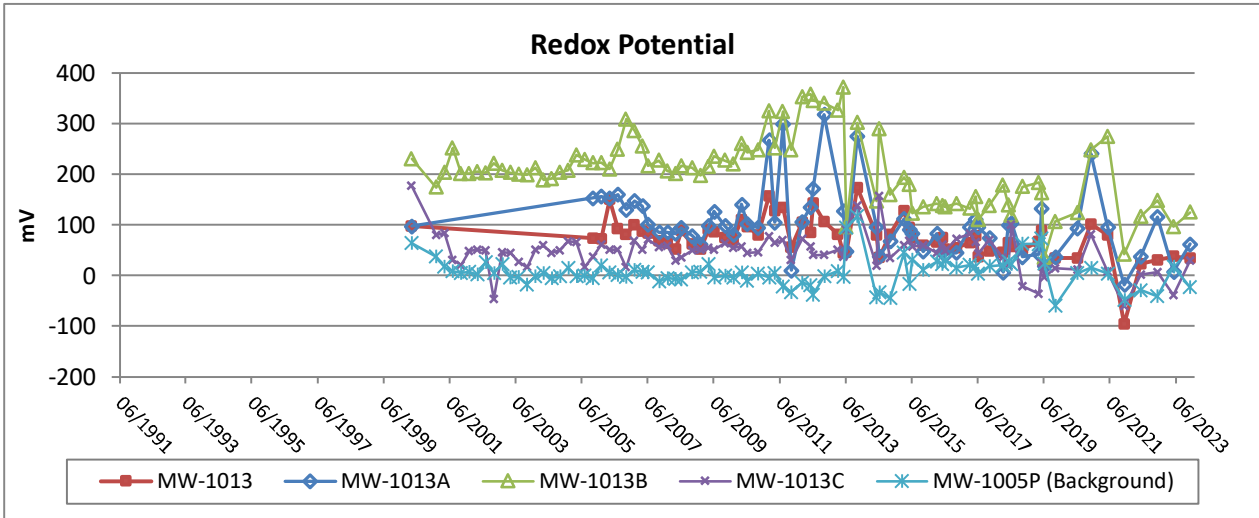
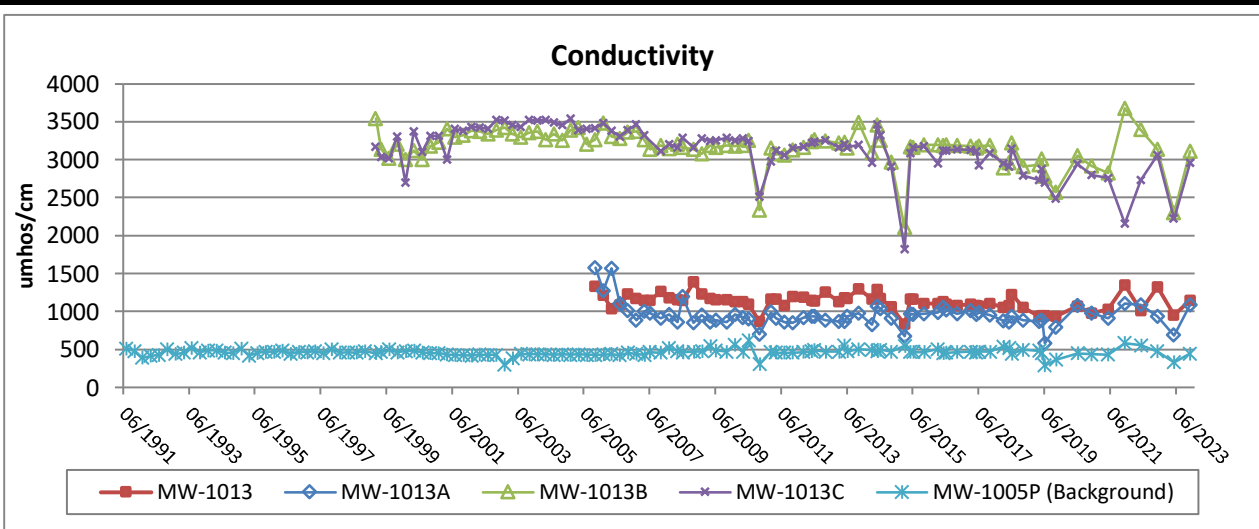
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Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

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Figure B-6c Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells) MW-1013/MW-1013A/MW-1013B/MW-1013C		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



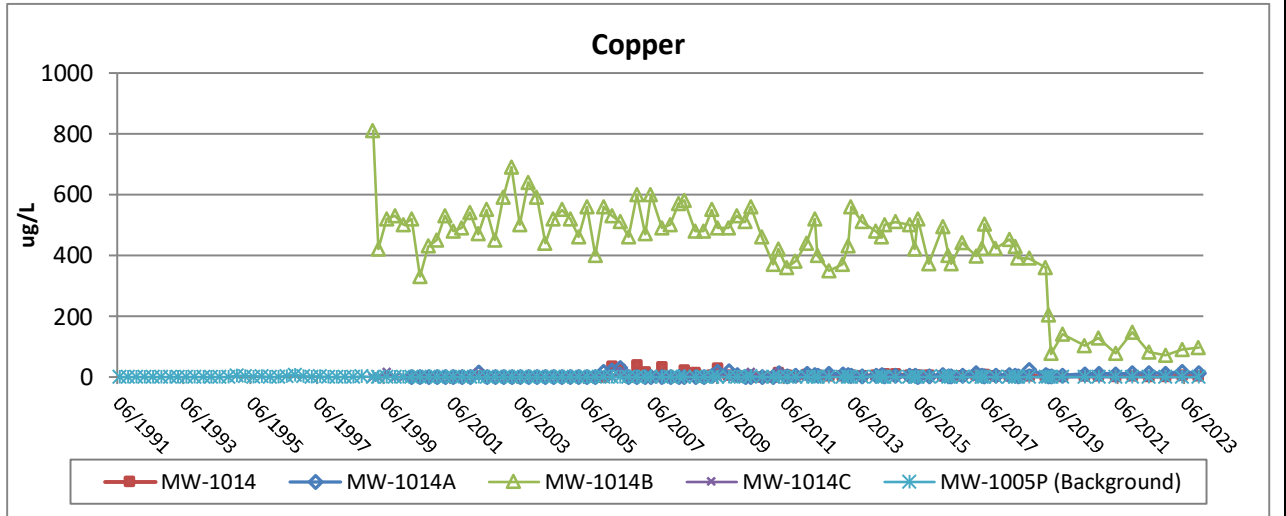
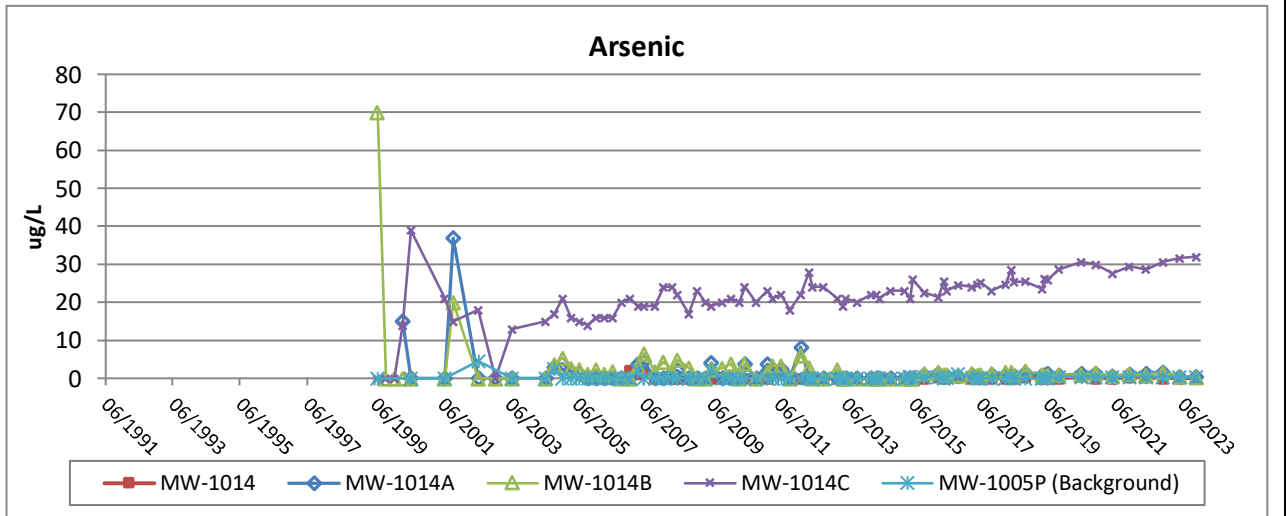
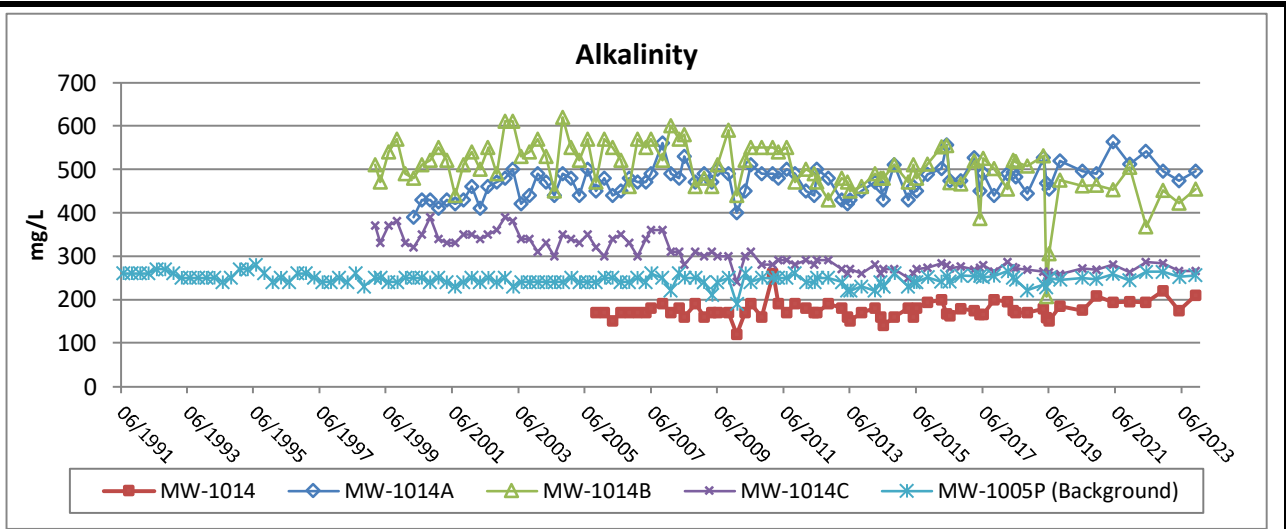


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Figure B-6d
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

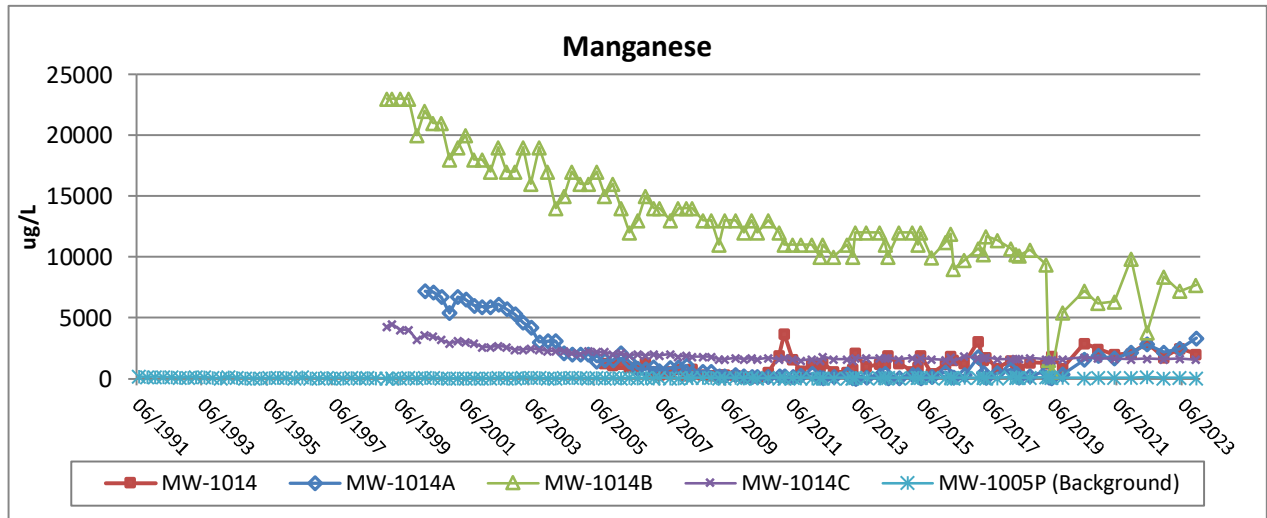
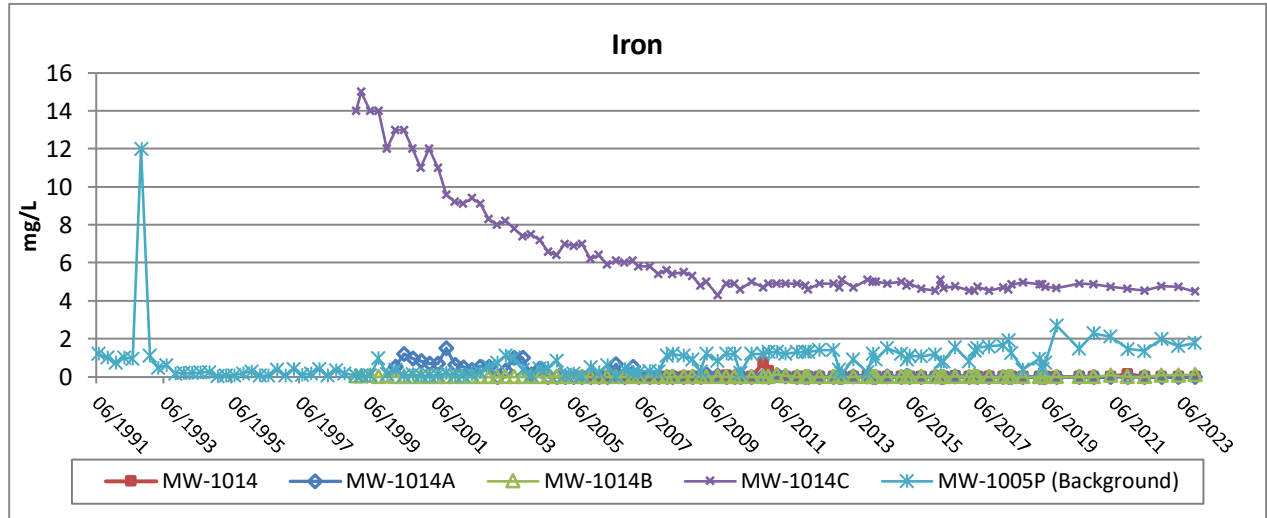
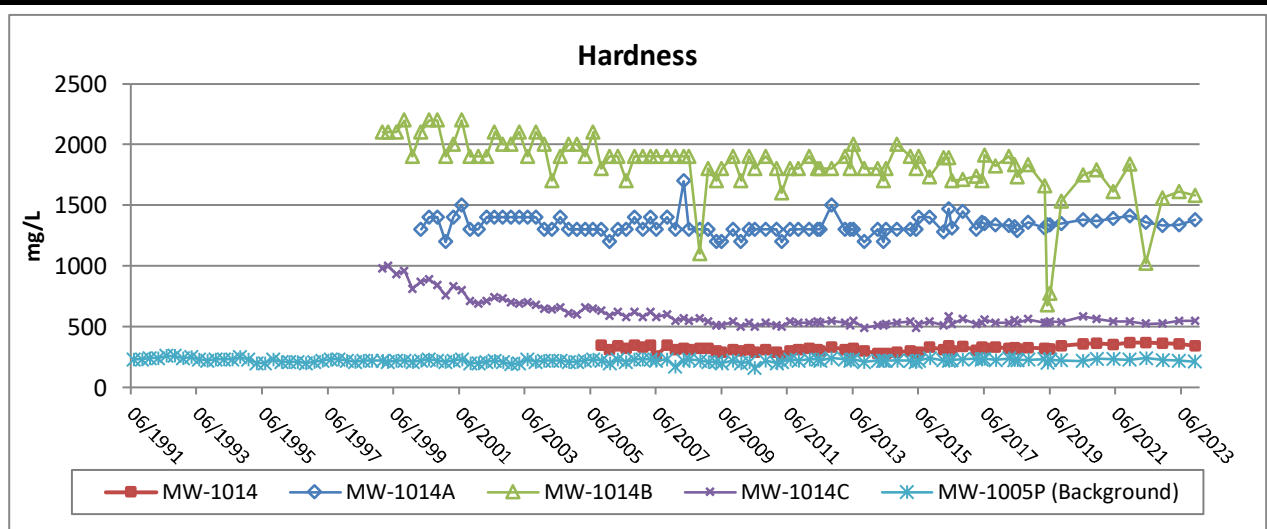
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	


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Foth		
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Figure B-7a		
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)		
MW-1014/MW-1014A/MW-1014B/MW-1014C		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

Flambeau Mining Co.
2023 Annual Summary Memorandum



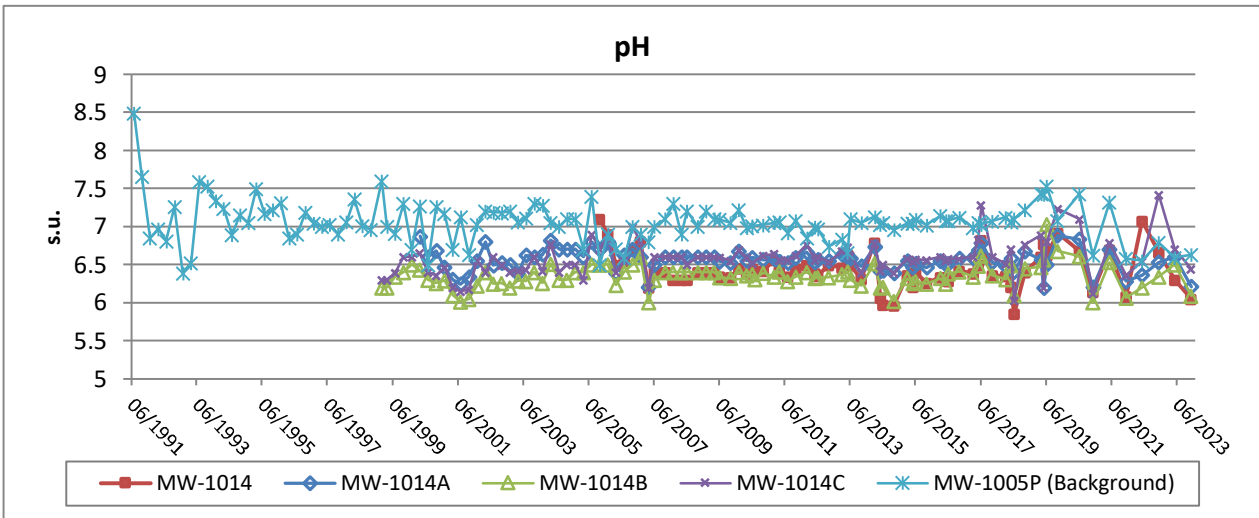
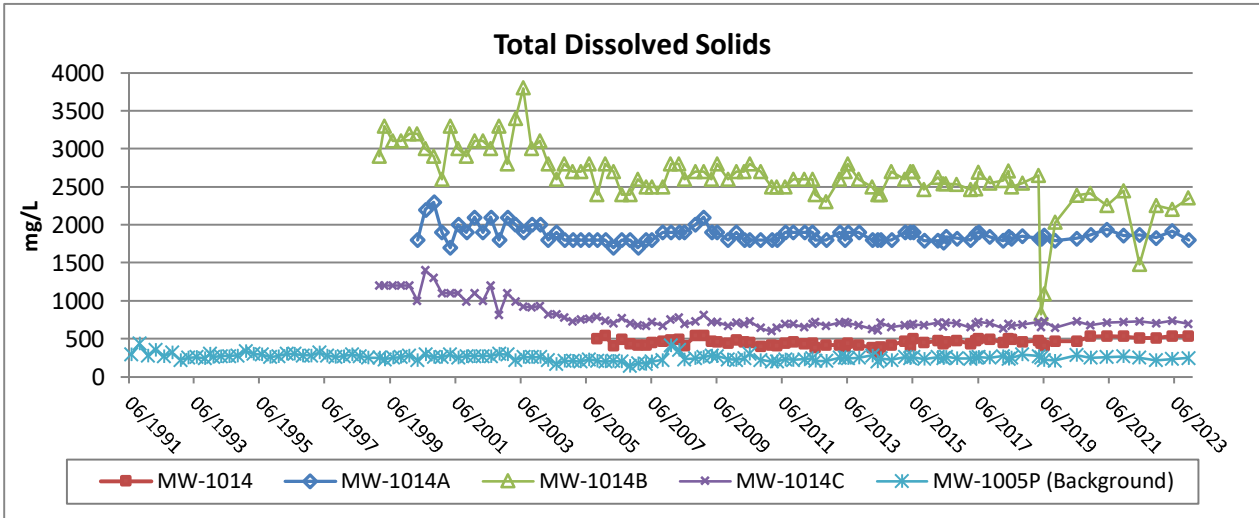
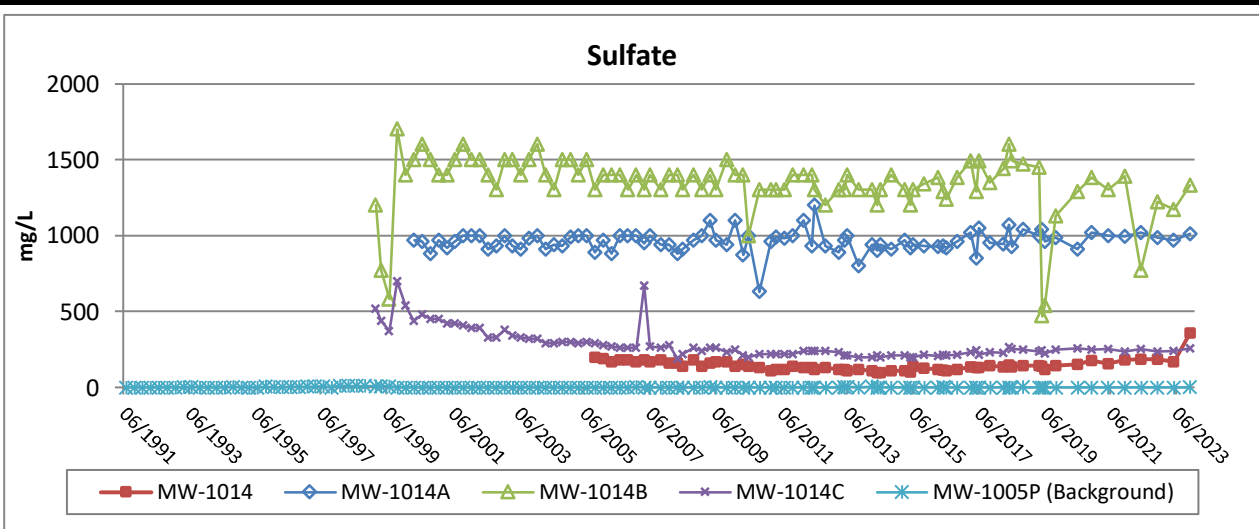


FLAMBEAU MINING COMPANY

Figure B-7b
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C


Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

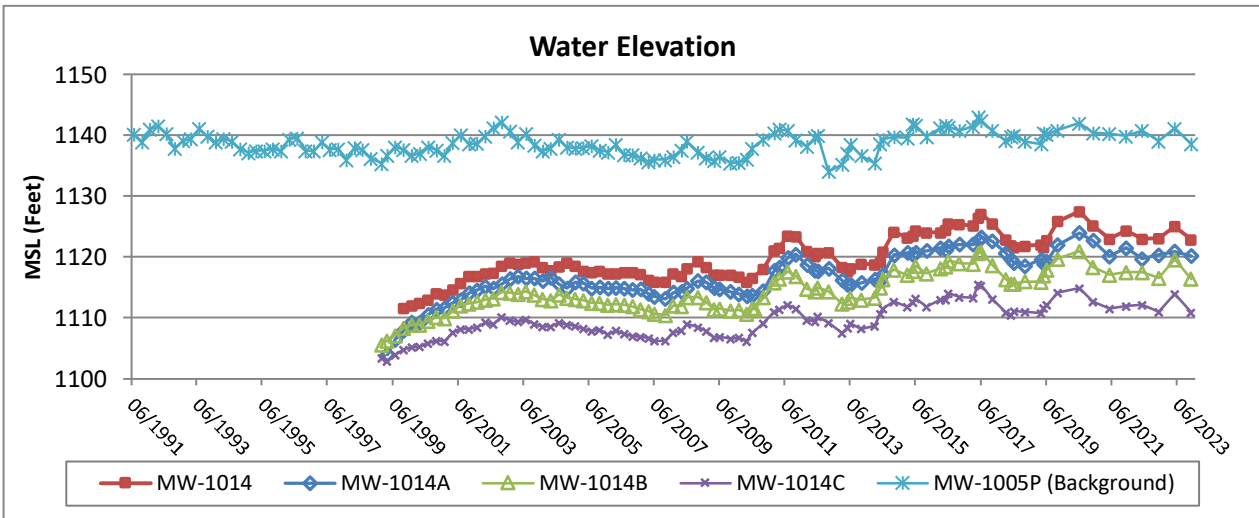
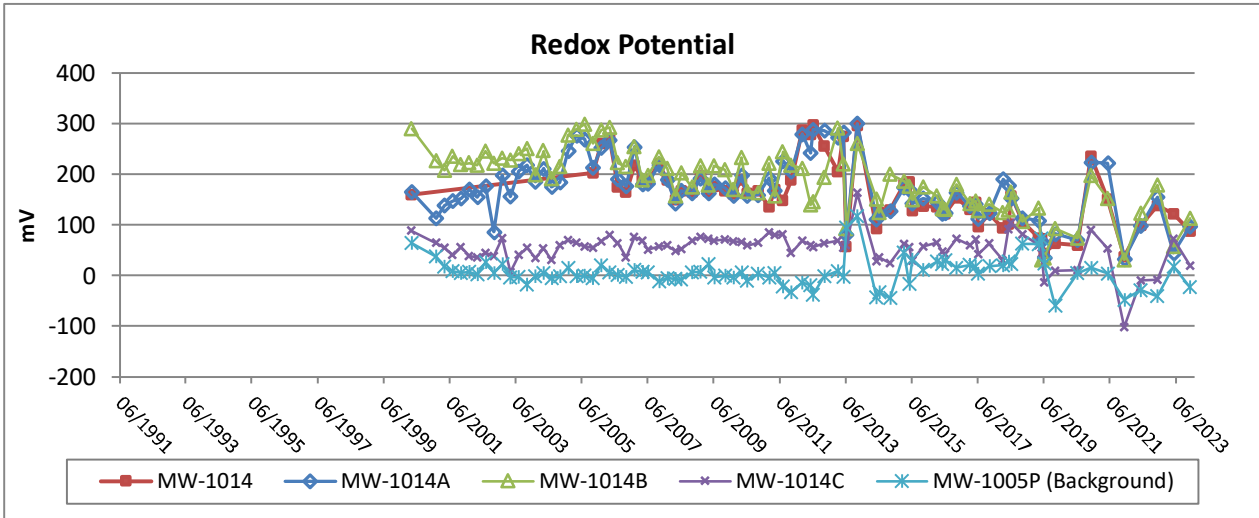
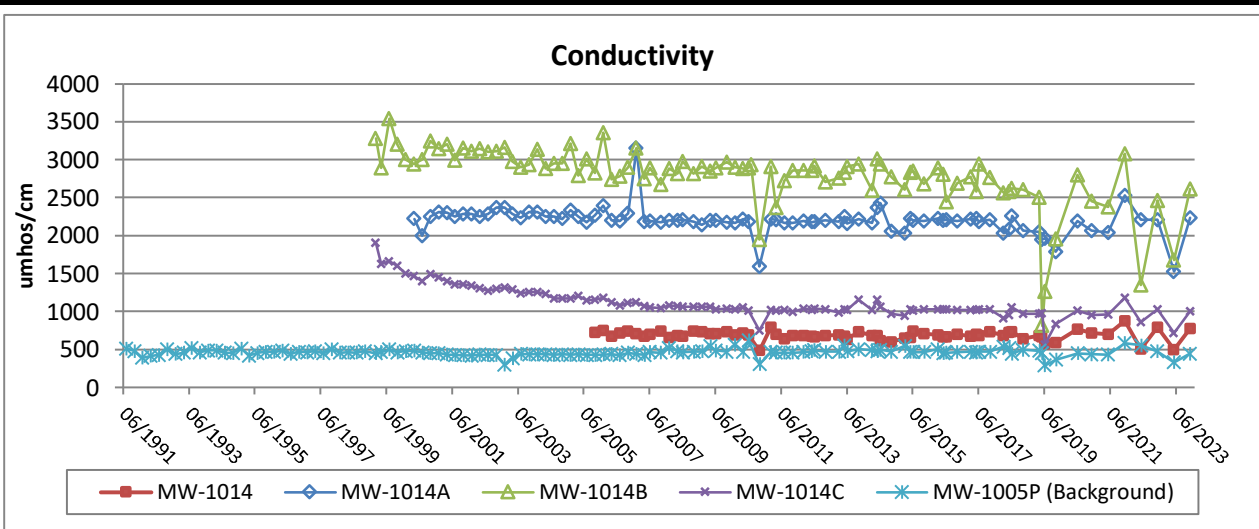
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Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

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Figure B-7c Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells) MW-1014/MW-1014A/MW-1014B/MW-1014C		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



FLAMBEAU MINING COMPANY

Figure B-7d
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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2023 Groundwater Results - Semi-Annual Parameters

Sample Date (yyyy-mm)	Location	Water Elevation ft	Alkalinity as		Copper ug/l	Hardness mg/l	Iron mg/l	Manganese ug/l	Sulfate mg/l	Total Dissolved Solids mg/l	pH s.u.	Conductivity umhos/cm	Redox Potential mV
			CaCO3 mg/l	Arsenic ug/l									
2023-05	MW-1000PR ⁽¹⁾	1089.29	208	17.1	4.4	398	2.39	1890	169	514	6.60	500.00	-24.2
2023-05	MW-1000R ⁽¹⁾	1091.34	52.4	< 0.28	9.1	124	< 0.0580	25.5	52.8	234	6.00	153.00	69.4
2023-05	MW-1002	1096.84	66.9	< 0.28	< 1.9	79.7	< 0.0580	< 1.2	4.8	158	6.70	117.00	39.0
2023-05	MW-1002G	1096.76	128	< 0.28	< 1.9	177	< 0.0580	< 1.2	10.4	288	6.82	291.00	97.2
2023-05	MW-1002G	Dup.	125	< 0.28	< 1.9	180	< 0.0580	< 1.2	10.5	226			
2023-05	MW-1004 ⁽¹⁾	1110.17	23.8	< 0.28	5.6	29.0	0.436	5.2	9.6	62.0	6.80	141.00	48.1
2023-05	MW-1004P ⁽¹⁾	1108.57	167	< 0.28	< 1.9	139	0.123	72.6	3.8	166	7.40	204.00	-2.5
2023-05	MW-1004S ⁽¹⁾	1110.25	42.2	< 0.28	< 1.9	64.1	< 0.0580	< 1.2	26.2	112	6.50	115.00	53.2
2023-05	MW-1005	1141.64	59.6	0.56	< 1.9	518	11.9	498	15.7	1160	5.60	1258.00	55.1
2023-05	MW-1005P	1141.14	252	0.34	< 1.9	219	1.6	75.8	< 2.2	234	6.59	333.00	17.6
2023-05	MW-1005S	1141.92	147	2.5	< 1.9	149	3.78	208	6.4	168	7.09	392.00	-37.0
2023-05	MW-1010P ⁽¹⁾	1088.91	160	19.3	< 1.9	196	< 0.0580	78.4	41.0	264	7.70	266.00	23.5
2023-05	MW-1013 ⁽¹⁾	1116.07	578	1.0	5.5	515	11.8	24500	9.2	656	6.30	952.00	37.5
2023-05	MW-1013A ⁽¹⁾	1101.1	380	< 0.28	< 1.9	527	0.0659	4110	220	710	6.60	687.00	7.7
2023-05	MW-1013B ⁽¹⁾	1101.54	587	0.40	271	2190	< 0.0580	20300	1760	3010	6.40	2302.00	95.7
2023-05	MW-1013C ⁽¹⁾	1104.64	488	24.9	< 1.9	1870	14	8700	1650	2740	6.50	2220.00	-39.4
2023-05	MW-1014 ⁽¹⁾	1125.02	174	< 0.28	5.2	357	< 0.0580	2480	168	534	6.30	500.00	121.0
2023-05	MW-1014A ⁽¹⁾	1120.9	474	0.37	16.7	1340	< 0.0580	2460	967	1920	6.60	1528.00	44.0
2023-05	MW-1014B ⁽¹⁾	1119.56	422	0.43	90.0	1610	0.0789	7200	1170	2200	6.50	1673.00	57.4
2023-05	MW-1014C ⁽¹⁾	1113.96	265	31.6	< 1.9	550	4.72	1650	241	740	6.70	714.00	72.3
2023-05	MW-1014C ⁽¹⁾	Dup.	266	30.9	< 1.9	548	4.68	1640	242	738			
2023-05	MW-1015A ⁽¹⁾	1090.79	94.3	< 0.28	< 1.9	109	< 0.0580	13.3	9.7	190	7.20	152.00	51.0
2023-05	MW-1015B ⁽¹⁾	1091.03	187	< 0.28	< 1.9	149	0.16	60.1	3.2	258	7.80	448.00	-36.4
2023-11	MW-1000PR	1087.81	218	7.0	12.8	370	0.268	1740	175	498	6.18	730.00	63.7
2023-11	MW-1000R	1089	261	< 0.28	20.4	304	< 0.0580	39.4	53.6	472	5.88	362.00	99.4
2023-11	MW-1002	1090.85	56.0	< 0.28	< 1.9	61.3	< 0.0580	< 1.2	3.8	112	6.26	152.00	103.1
2023-11	MW-1002G	1090.71	123	< 0.28	< 1.9	157	< 0.0580	< 1.2	8.6	230	5.91	397.00	107.8
2023-11	MW-1002G	Dup.	128	< 0.28	< 1.9	168	< 0.0580	< 1.2	8.7	226			
2023-11	MW-1004	1107.7	31.6	< 0.28	3.5	43.6	< 0.0580	< 1.2	13.4	64.0	6.67	116.00	135.1
2023-11	MW-1004P	1106.26	171	0.35	< 1.9	147	0.39	131	3.6	158	7.02	363.00	13.4
2023-11	MW-1004S	1107.76	42.6	< 0.28	2.5	61.0	< 0.0580	< 1.2	26.3	108	5.71	157.00	136.2
2023-11	MW-1005	1139.99	58.0	0.95	< 1.9	479	16.1	514	19.3	974	5.74	1692.00	74.2
2023-11	MW-1005P	1138.54	256	0.36	< 1.9	212	1.77	61.5	0.68	246	6.63	444.00	-23.5
2023-11	MW-1005S	1139.37	145	2.3	< 1.9	130	3.52	187	4.9	178	6.99	305.00	-24.2
2023-11	MW-1010P	1087.73	165	18.3	< 1.9	185	< 0.0580	72.1	39.5	228	7.14	368.00	65.8
2023-11	MW-1013	1113.47	628	1.8	2.4	567	22.8	29000	8.4	748	5.87	1142.00	33.9
2023-11	MW-1013A	1098.58	415	< 0.28	< 1.9	496	< 0.0580	5010	242	738	6.30	1090.00	61.7
2023-11	MW-1013B	1099.09	574	0.38	314	2190	< 5.8	21800	1780	3090	5.92	3109.00	124.7
2023-11	MW-1013C	1101.92	497	25.8	< 1.9	2070	15.7	9170	1600	2850	6.12	2954.00	29.2
2023-11	MW-1014	1122.84	210	< 0.28	3.1	340	< 0.0580	2040	359	534	6.05	775.00	87.1
2023-11	MW-1014A	1120.14	495	0.31	12.8	1380	< 0.0580	3320	1010	1800	6.21	2229.00	97.0
2023-11	MW-1014B	1116.39	454	0.33	96.2	1580	0.101	7690	1330	2350	6.09	2615.00	112.9
2023-11	MW-1014C	1110.88	265	32.0	< 1.9	546	4.48	1570	257	698	6.44	1001.00	19.4
2023-11	MW-1014C	Dup.	268	30.8	< 1.9	518	4.28	1510	251	730			
2023-11	MW-1015A	1087.9	97.6	< 0.28	< 1.9	101	< 0.0580	13.7	10.5	148	6.99	212.00	93.8
2023-11	MW-1015B	1087.91	187	< 0.28	< 1.9	143	0.0711	44.0	3.3	264	7.10	508.00	13.8

⁽¹⁾Note: May 2023 pH result is from lab analysis since a malfunction occurred with the pH field meter.

Attachment 2
Groundwater - Annual Parameters

Trend Analysis
Trend Graphs
2023 Data

**Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2023**

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1000PR						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-7	-5	0	2	0	4
p-Level	0.159	0.359	1.000	0.816	1.000	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	29	29	21	37
Mann-Kendall S	-327	-52	47	-330	-46	-447
p-Level	0.000	0.180	0.392	0.000	0.176	0.000
Trend	-			-		-
MW-1000R						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-6	-2	-2	-6	-6	0
p-Level	0.234	0.816	0.816	0.234	0.234	1
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	13	13	13	13	13	13
Mann-Kendall S	-30	34	-5	-32	-39	-6
p-Level	0.076	0.042	0.812	0.058	0.018	0.766
Trend						
MW-1010P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	8	0	6	3	0
p-Level	0.484	0.084	1.000	0.234	0.650	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	29	29	21	37
Mann-Kendall S	296	130	27	290	12	57
p-Level	0.000	0.000	0.629	0.000	0.742	0.466
Trend	+	+		+		
MW-1002						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	3	6	0	-1	6	0
p-Level	0.650	0.234	1.000	1.000	0.234	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	24	20	25	24	20	35
Mann-Kendall S	90	128	2	93	44	0
p-Level	0.026	0.000	0.982	0.021	0.164	1.000
Trend		+				
MW-1002G						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	7	8	0	8	10	0
p-Level	0.159	0.084	1.000	0.084	0.016	1.000
Trend					+	
Trend Results for All Data Since Oct. 1997						
Sample Size	24	20	25	24	20	35
Mann-Kendall S	196	148	0	199	53	-24
p-Level	0.000	0.000	1.000	0.000	0.092	0.746
Trend	+	+		+		

**Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2023**

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1004						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	3	0	-4	-2	0
p-Level	0.484	0.65	1	0.484	0.816	1
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	13	13	13	13	13	13
Mann-Kendall S	-37	39	-2	-42	5	-2
p-Level	0.026	0.018	0.952	0.01	0.812	0.952
Trend				-		
MW-1004S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	3	0	-6	4	0
p-Level	0.484	0.650	1.000	0.234	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	27	21	27	27	21	36
Mann-Kendall S	61	-118	7	27	-38	0
p-Level	0.214	0.000	0.902	0.592	0.268	1.000
Trend		-				
MW-1004P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-10	6	0	-10	-2	0
p-Level	0.016	0.234	1.000	0.016	0.816	1.000
Trend	-			-		
Trend Results for All Data Since Oct. 1997						
Sample Size	27	21	27	27	21	36
Mann-Kendall S	120	85	0	85	35	1
p-Level	0.012	0.010	1.000	0.080	0.309	0.995
Trend		+				
MW-1005						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	4	0	-2	4	0
p-Level	0.816	0.484	1.000	0.816	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	24	20	25	24	20	35
Mann-Kendall S	132	119	-1	137	128	20
p-Level	0.000	0.000	0.991	0.000	0.000	0.789
Trend	+	+		+	+	
MW-1005S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	9	0	2	-2	0
p-Level	1.000	0.050	1.000	0.816	0.816	1.000
Trend		+				
Trend Results for All Data Since Oct. 1997						
Sample Size	24	20	25	24	20	35
Mann-Kendall S	-89	65	13	-69	-67	0
p-Level	0.028	0.037	0.782	0.092	0.031	1.000
Trend						

**Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2023**

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1005P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	4	4	-2	-4	-4
p-Level	0.816	0.484	0.484	0.816	0.484	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	25	20	25	25	20	35
Mann-Kendall S	55	66	30	58	17	25
p-Level	0.210	0.034	0.502	0.186	0.608	0.736
Trend						
MW-1015A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	8	0	7	10	0
p-Level	0.234	0.084	1.000	0.159	0.016	1.000
Trend					+	
Trend Results for All Data Since Oct. 1997						
Sample Size	24	19	34	24	19	39
Mann-Kendall S	123	86	18	151	-12	0
p-Level	0.002	0.002	0.803	0.000	0.704	1.000
Trend	+	+		+		
MW-1015B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	-10	0	-8	2	0
p-Level	0.484	0.016	1.000	0.084	0.816	1.000
Trend		-				
Trend Results for All Data Since Oct. 1997						
Sample Size	24	19	34	24	19	39
Mann-Kendall S	126	26	13	130	0	0
p-Level	0.002	0.387	0.860	0.000	1.000	1.000
Trend	+			+		
MW-1013						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-6	-6	0	-4	-2	0
p-Level	0.234	0.234	1.000	0.484	0.816	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	19	19	19	19	18	19
Mann-Kendall S	-36	-139	-59	-7	-43	2
p-Level	0.224	0.000	0.042	0.836	0.112	0.973
Trend		-				
MW-1013A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	10	0	-2	2	-4
p-Level	0.484	0.016	1.000	0.816	0.816	0.484
Trend		+				
Trend Results for All Data Since Oct. 1997						
Sample Size	19	19	19	19	18	19
Mann-Kendall S	21	6	-23	31	-6	-9
p-Level	0.490	0.863	0.446	0.298	0.852	0.782
Trend						

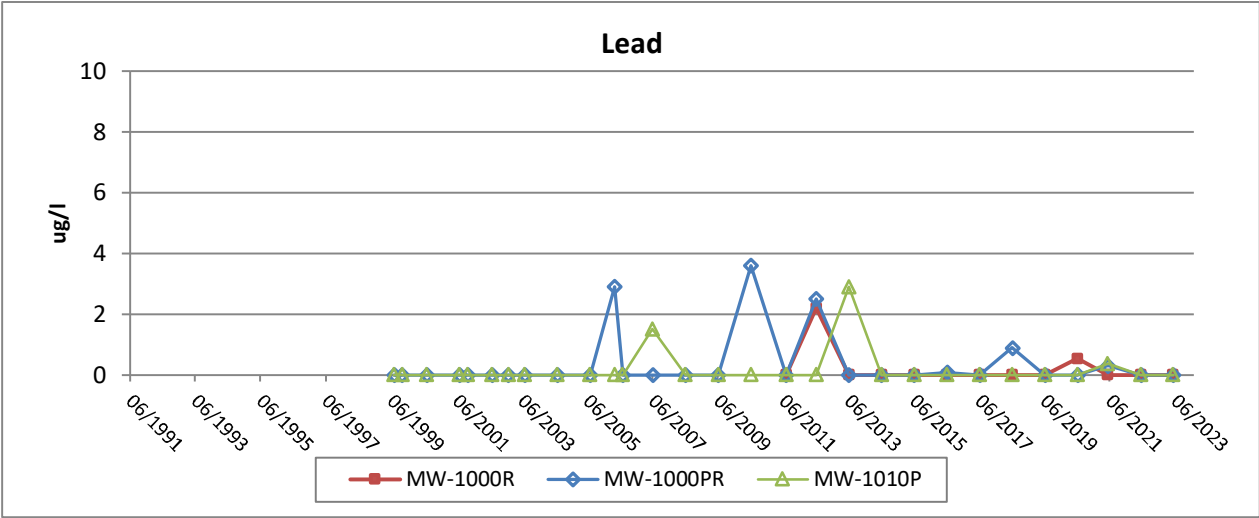
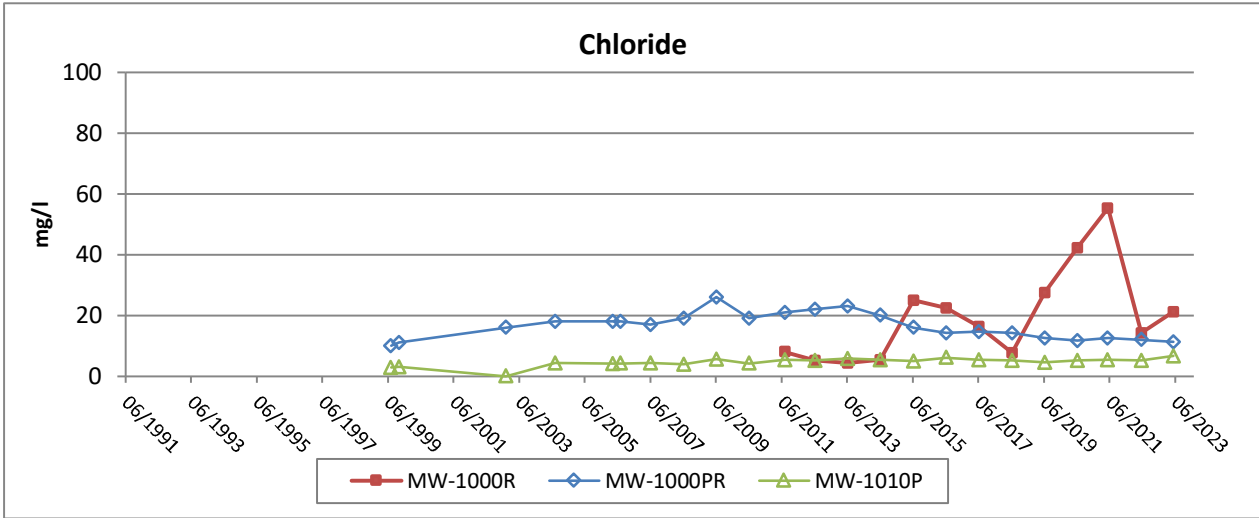
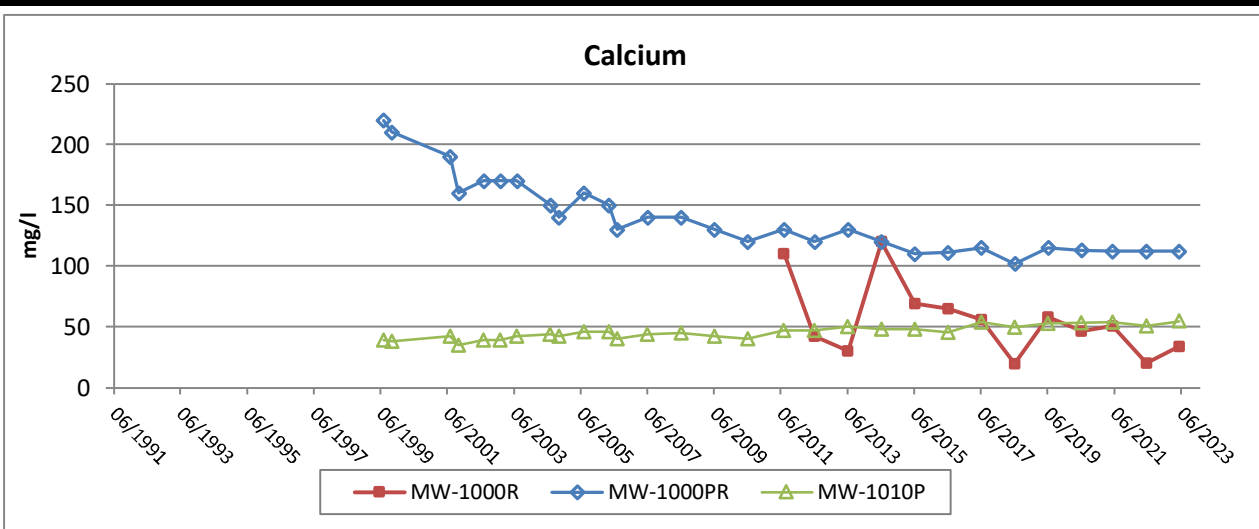
**Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2023**


	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1013B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	3	0	0	4	-6
p-Level	1.000	0.650	1.000	1.000	0.484	0.234
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	32	26	31	32	24	39
Mann-Kendall S	-117	38	16	-72	-110	192
p-Level	0.060	0.419	0.801	0.252	0.006	0.020
Trend					-	
MW-1013C						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-3	0	0	-6	-4	-8
p-Level	0.650	1.000	1.000	0.234	0.484	0.084
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	32	26	31	32	24	39
Mann-Kendall S	-91	-19	51	-278	-77	-399
p-Level	0.145	0.694	0.398	0.000	0.059	0.000
Trend				-		-
MW-1014						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	-9	0	6	4	-4
p-Level	0.816	0.050	1.000	0.234	0.484	0.484
Trend		-				
Trend Results for All Data Since Oct. 1997						
Sample Size	19	19	19	19	18	19
Mann-Kendall S	57	86	-4	68	-4	-51
p-Level	0.050	0.002	0.918	0.018	0.911	0.080
Trend		+				
MW-1014A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	2	0	2	-4	10
p-Level	0.816	0.816	1.000	0.816	0.484	0.016
Trend						+
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	28	29	21	36
Mann-Kendall S	-29	30	19	2	-62	271
p-Level	0.603	0.448	0.725	0.986	0.064	0.000
Trend						+
MW-1014B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	0	0	2	2	2
p-Level	1.000	1.000	1.000	0.816	0.816	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	32	25	31	32	24	39
Mann-Kendall S	-277	6	40	-339	-132	-541
p-Level	0.000	0.908	0.511	0.000	0.000	0.000
Trend	-			-	-	-

**Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2023**

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1014C						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-1	1	0	-3	-2	-6
p-Level	1.000	1.000	1.000	0.650	0.816	0.234
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	32	26	31	32	24	39
Mann-Kendall S	-297	195	-5	-376	-116	-705
p-Level	0.000	0.000	0.946	0.000	0.004	0.000
Trend	-	+		-	-	-

Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-".
Long term trend tests performed at a Type I (two-tailed) error rate of 0.01.
5-Year Trend tests performed at a Type I (two-tailed) error rate of 0.05.
N/A - No trend test performed due to insufficient data.



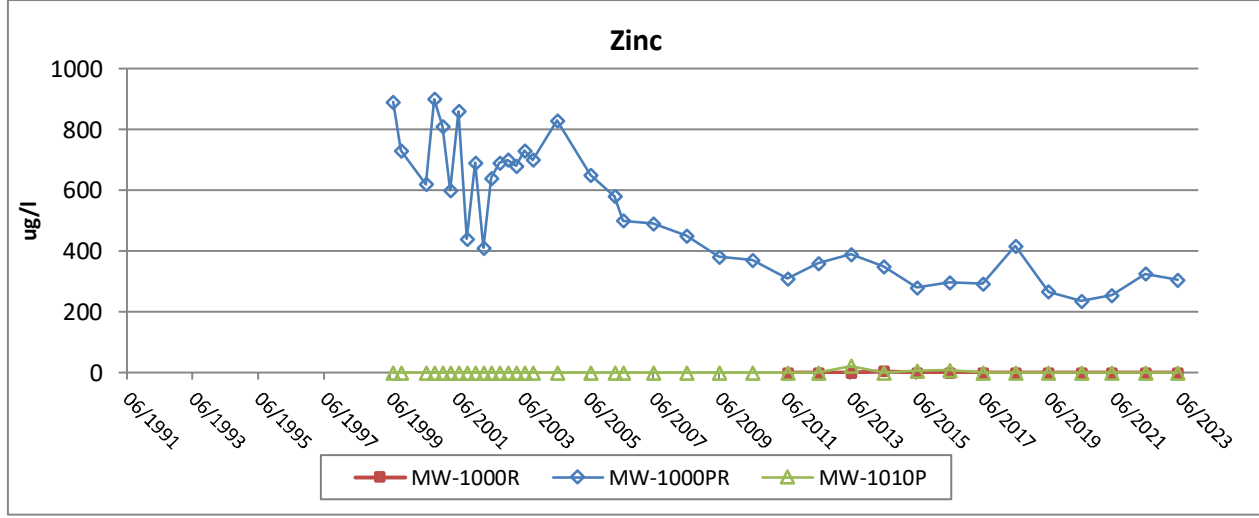
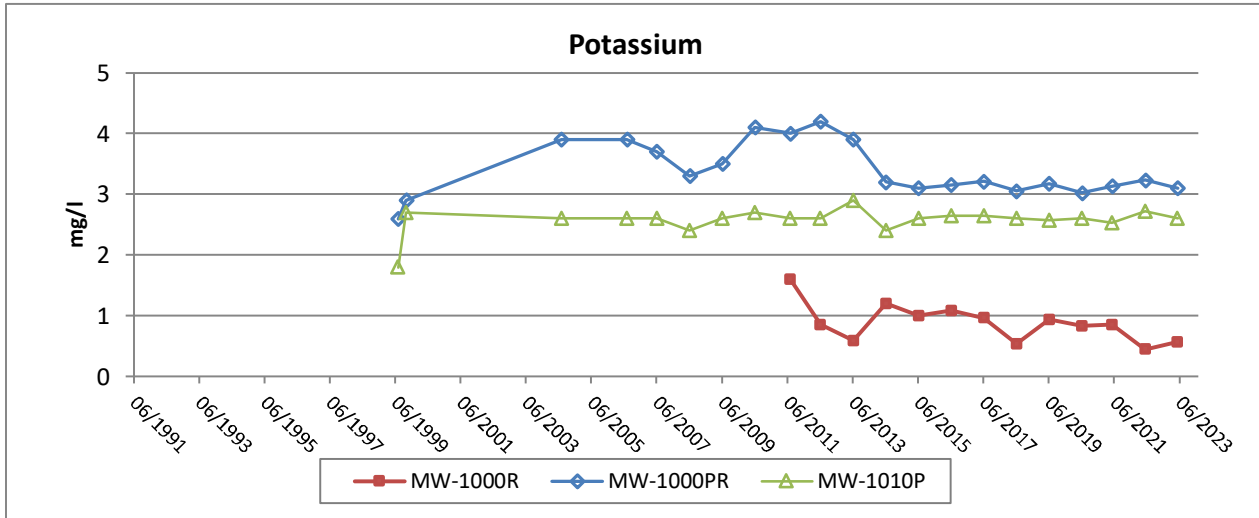
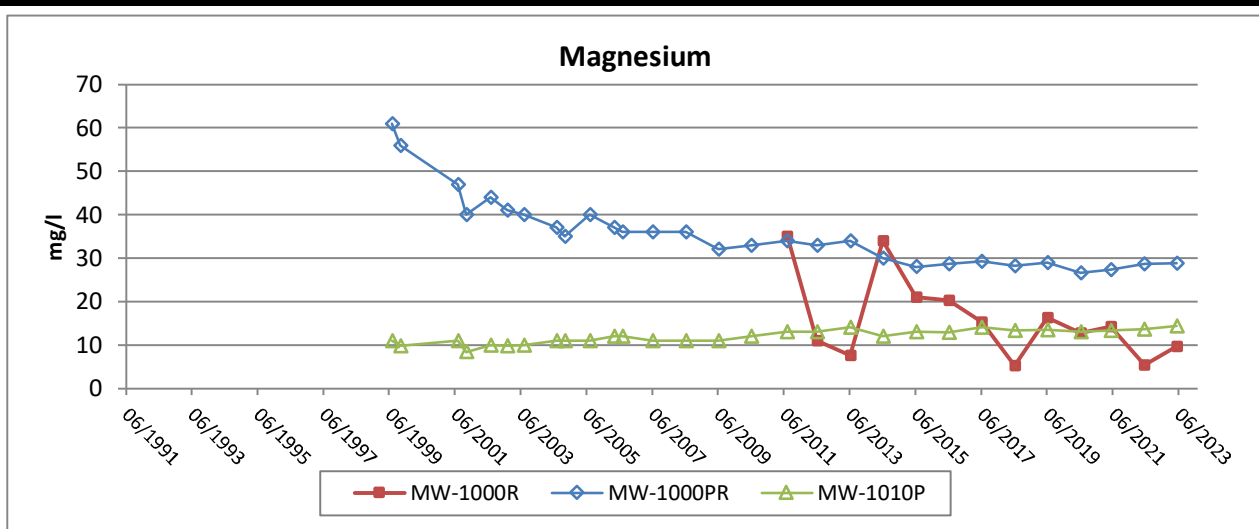



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Figure B-8a
Groundwater Trend Graphs - Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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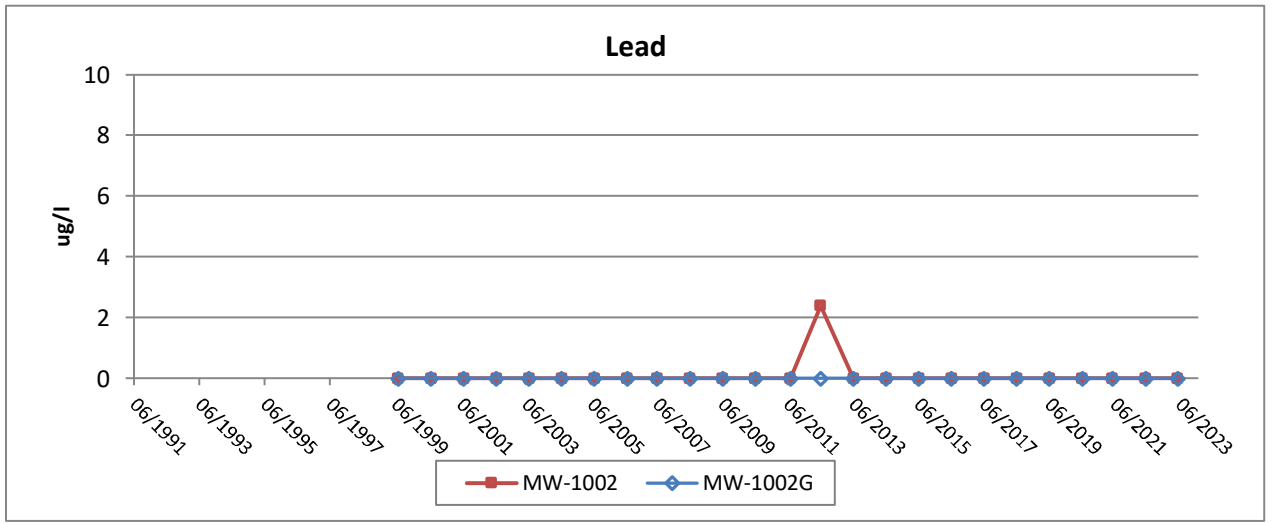
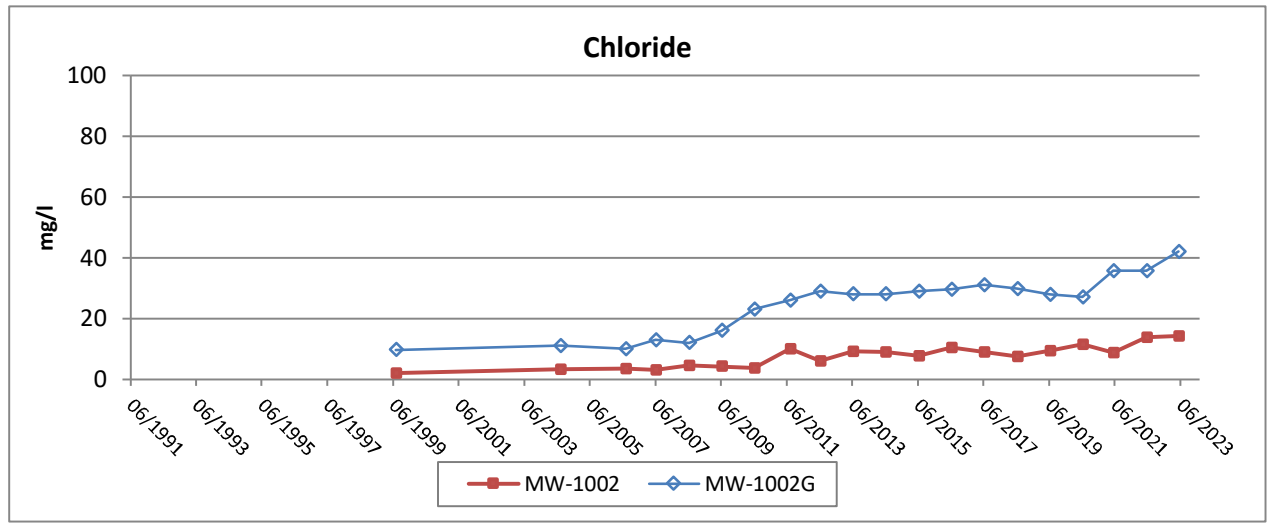
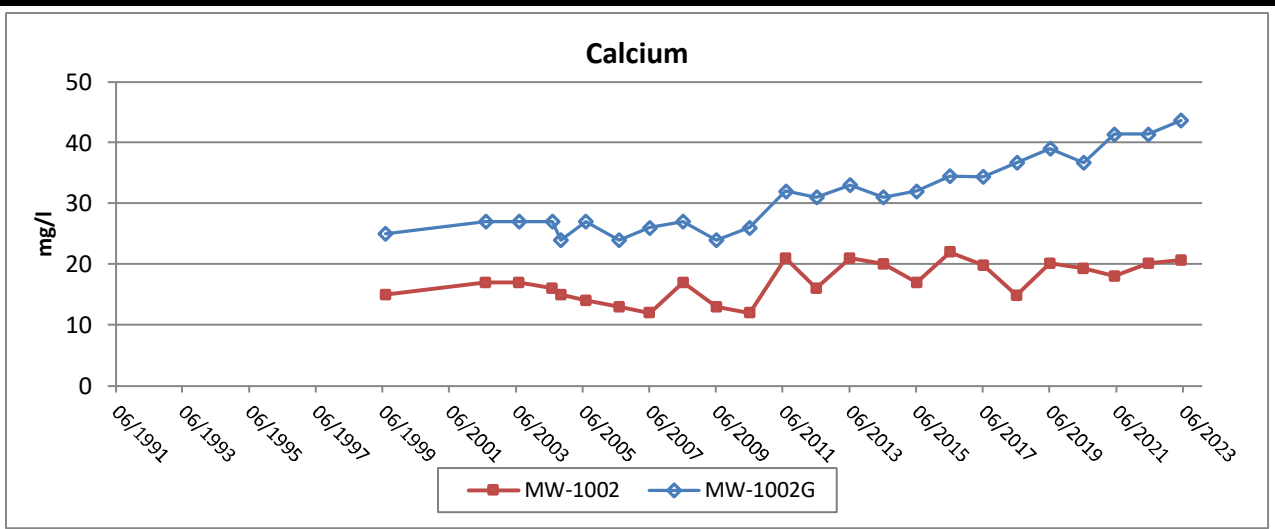



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Figure B-8b
Groundwater Trend Graphs - Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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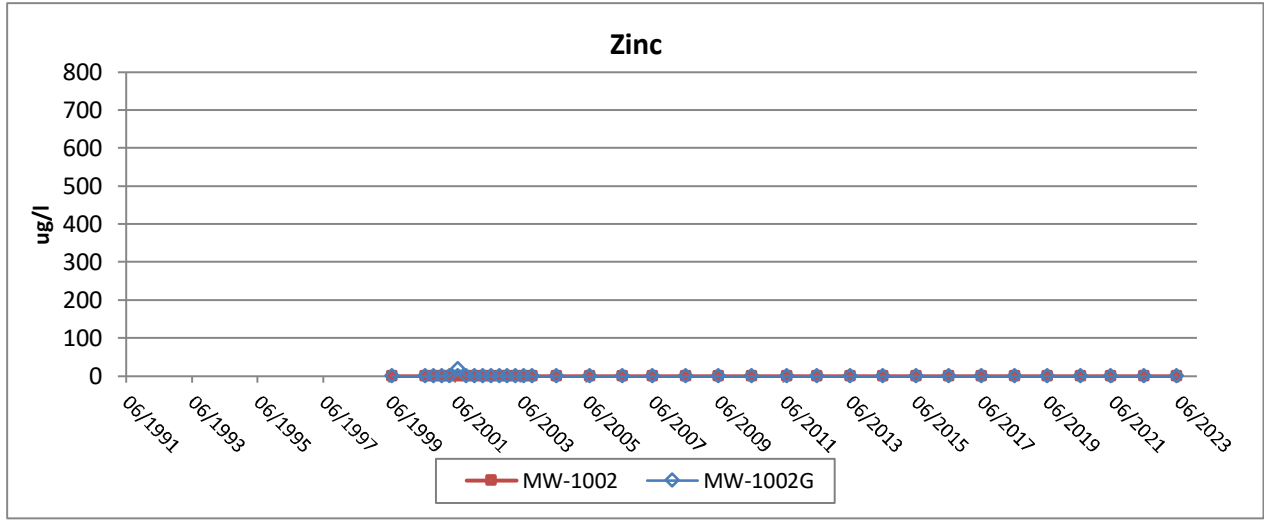
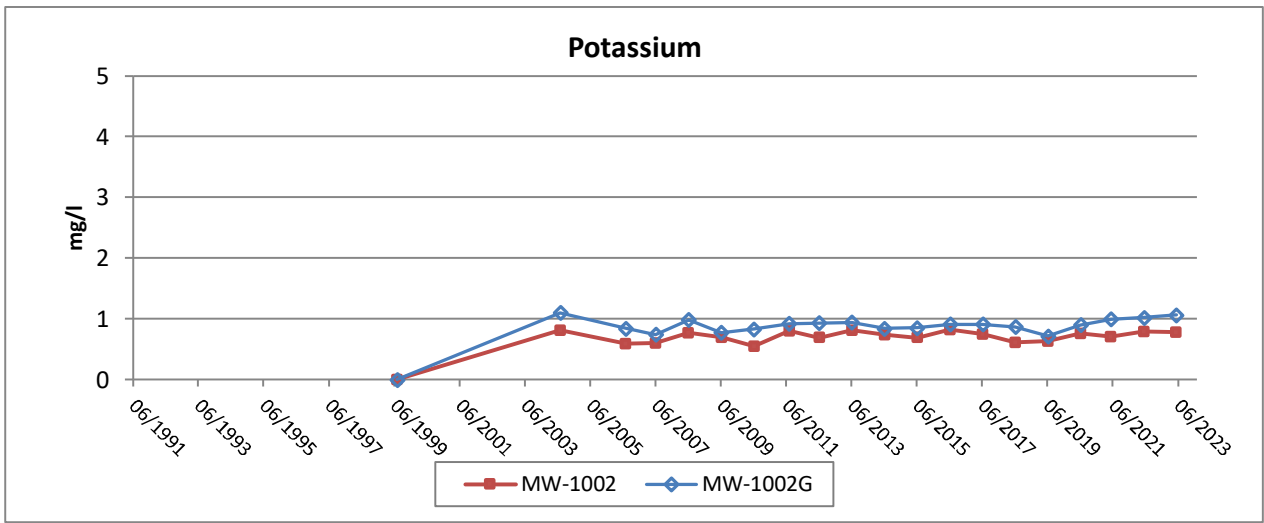
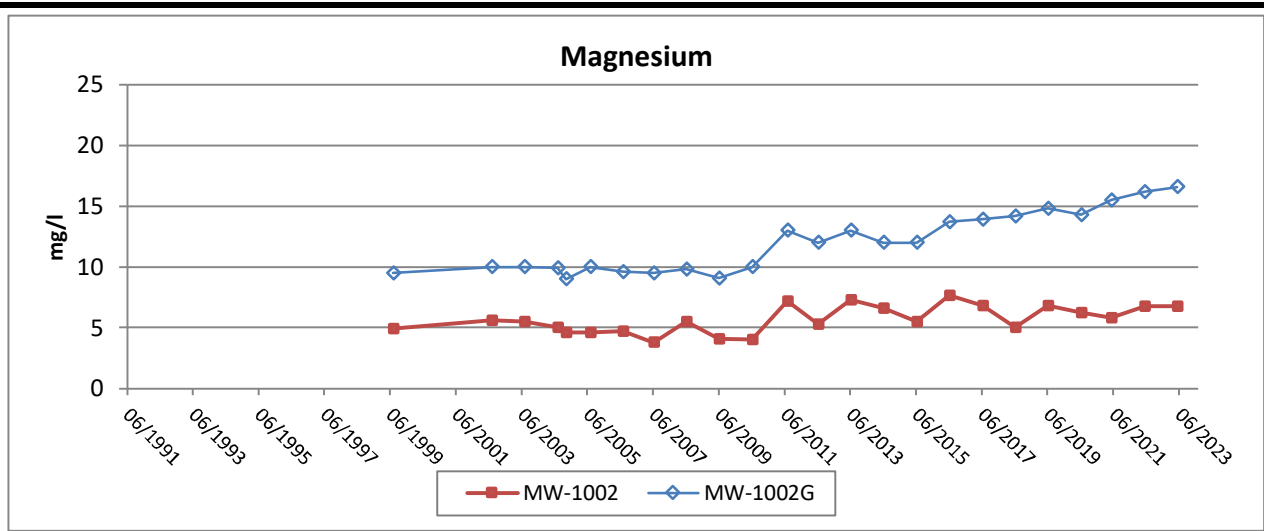



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Figure B-9a
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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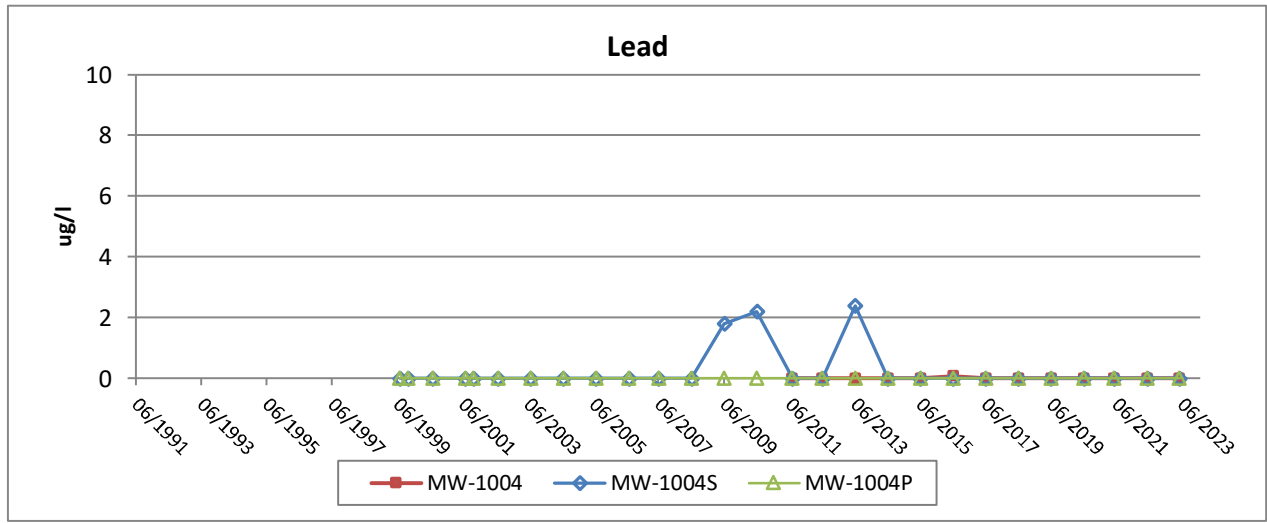
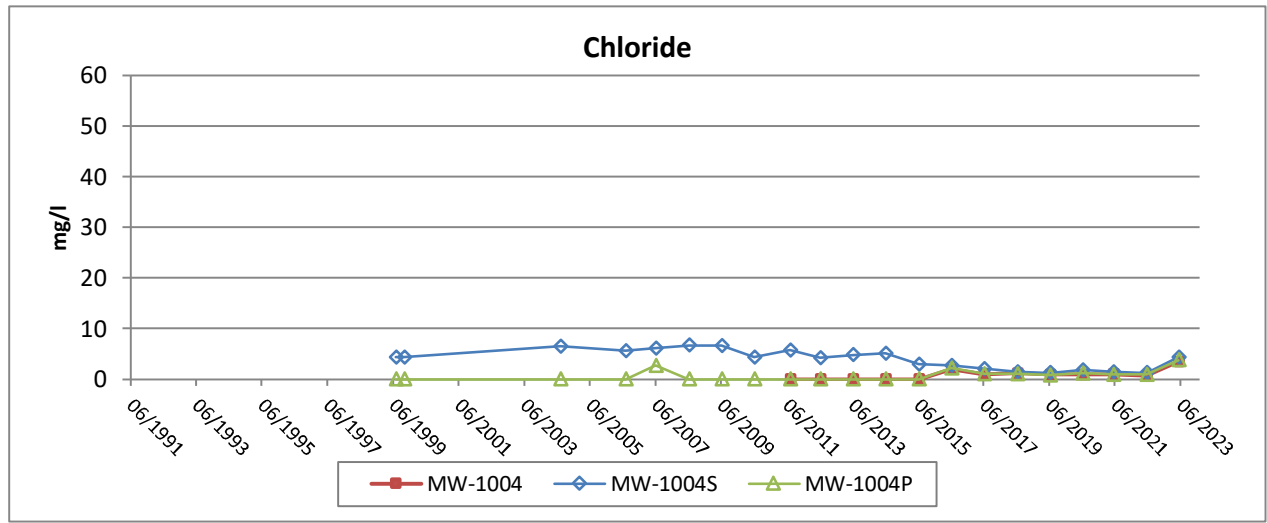
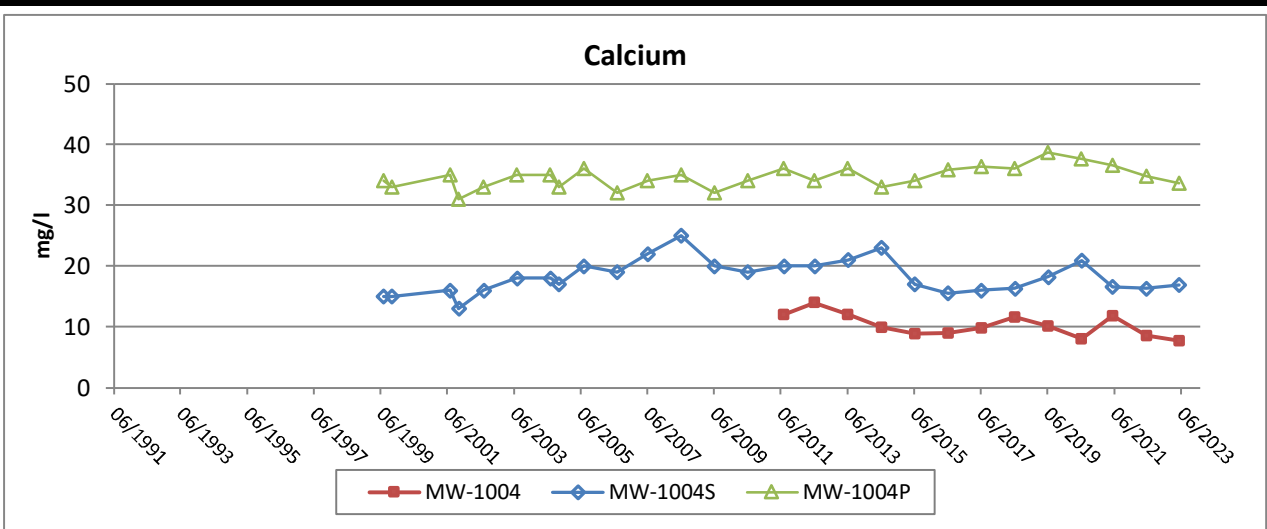



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Figure B-9b
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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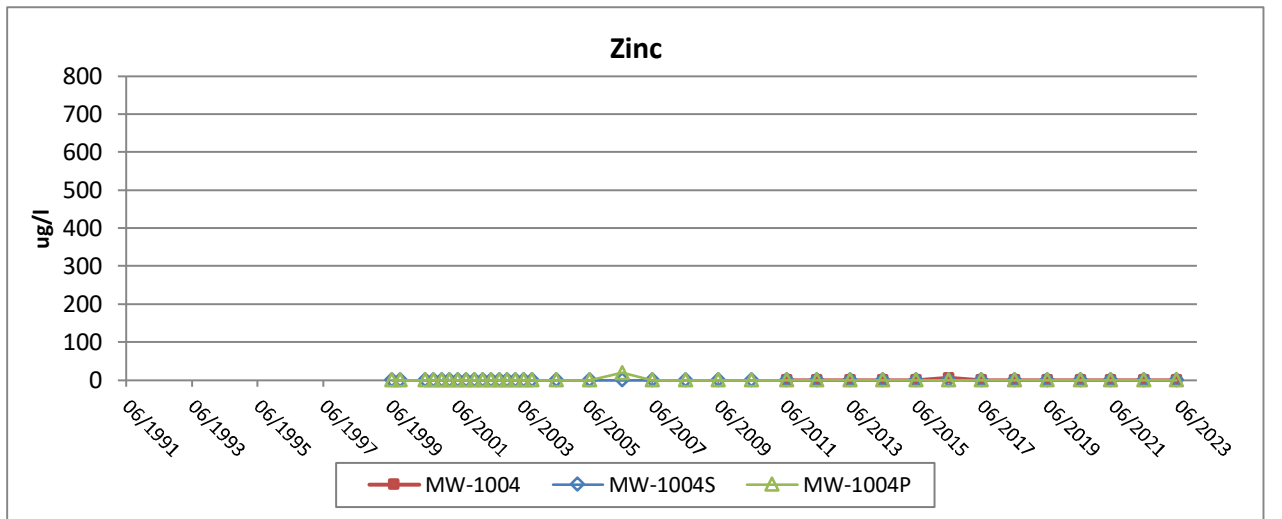
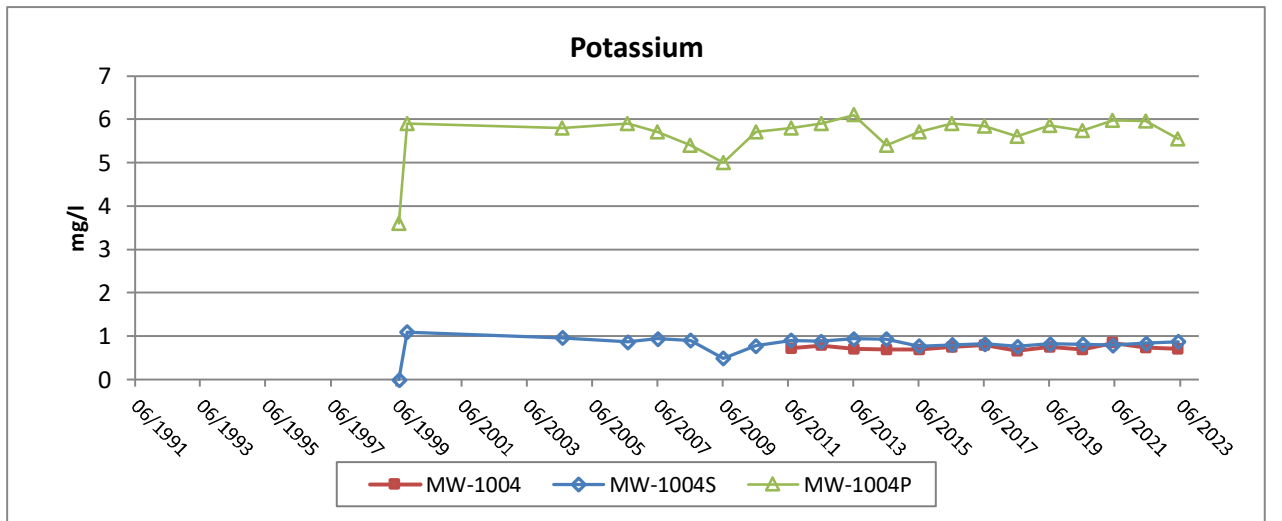
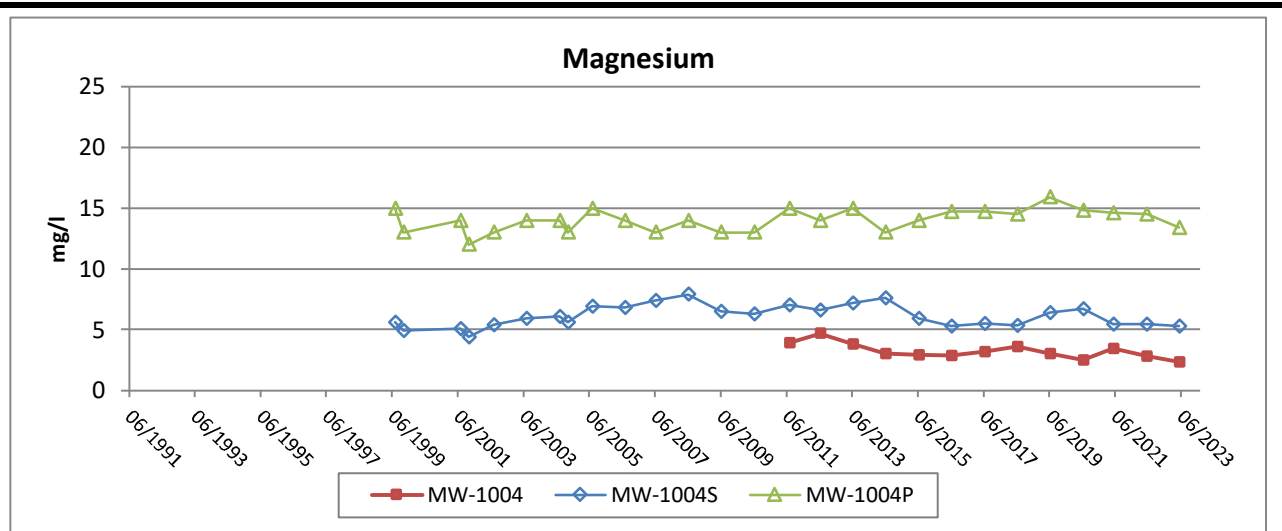



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Figure B-10a
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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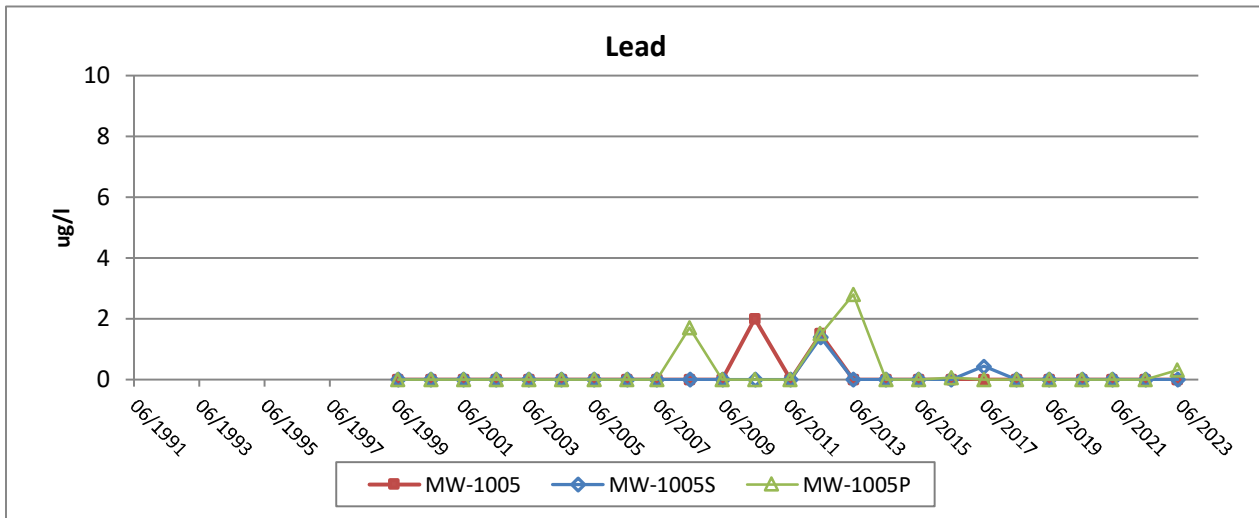
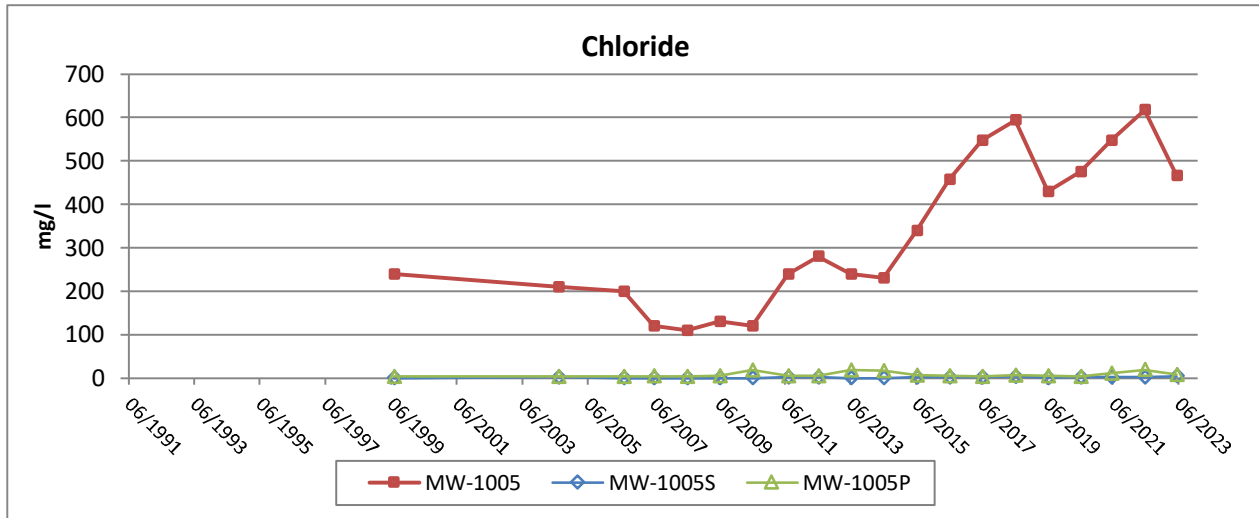
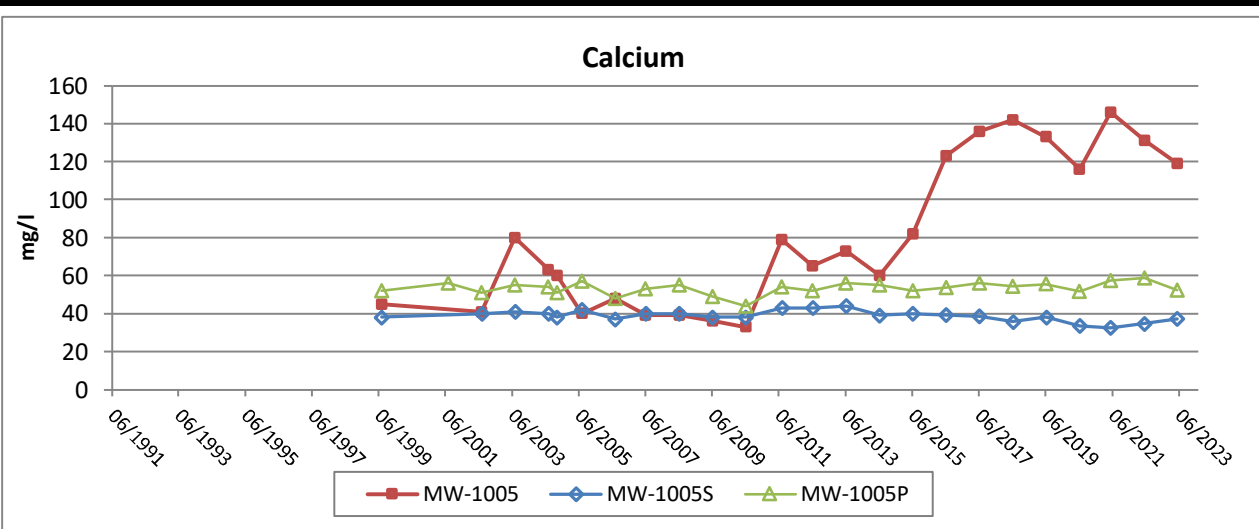





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Figure B-10b
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	



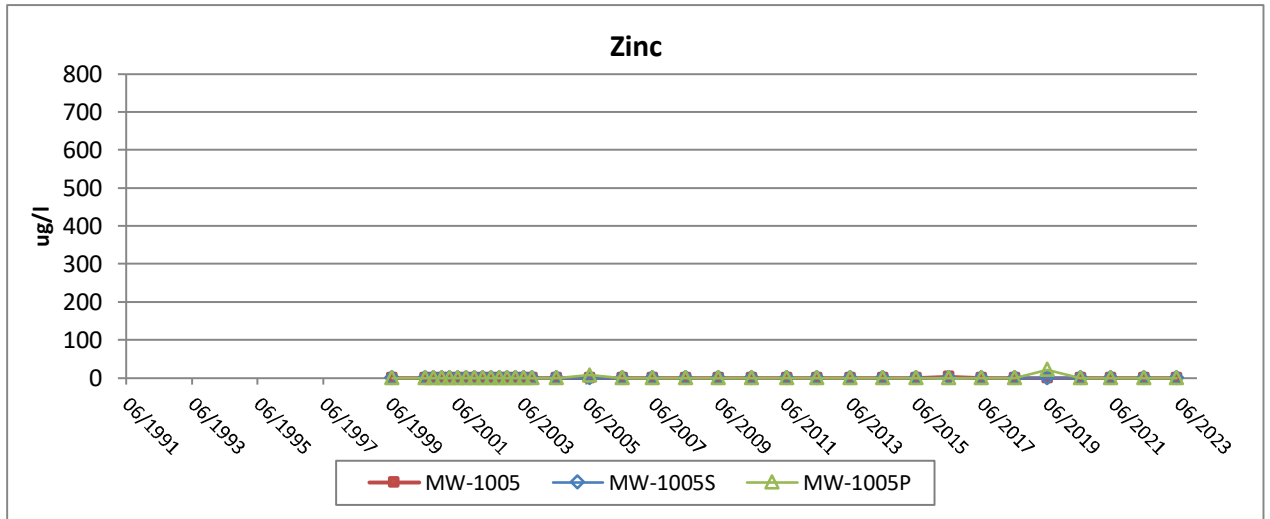
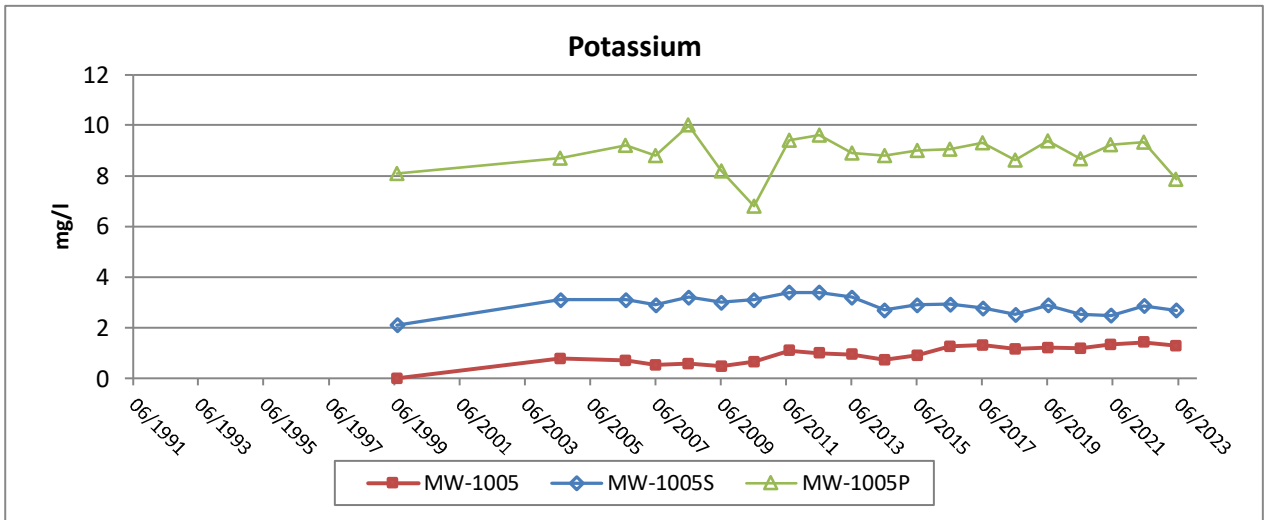
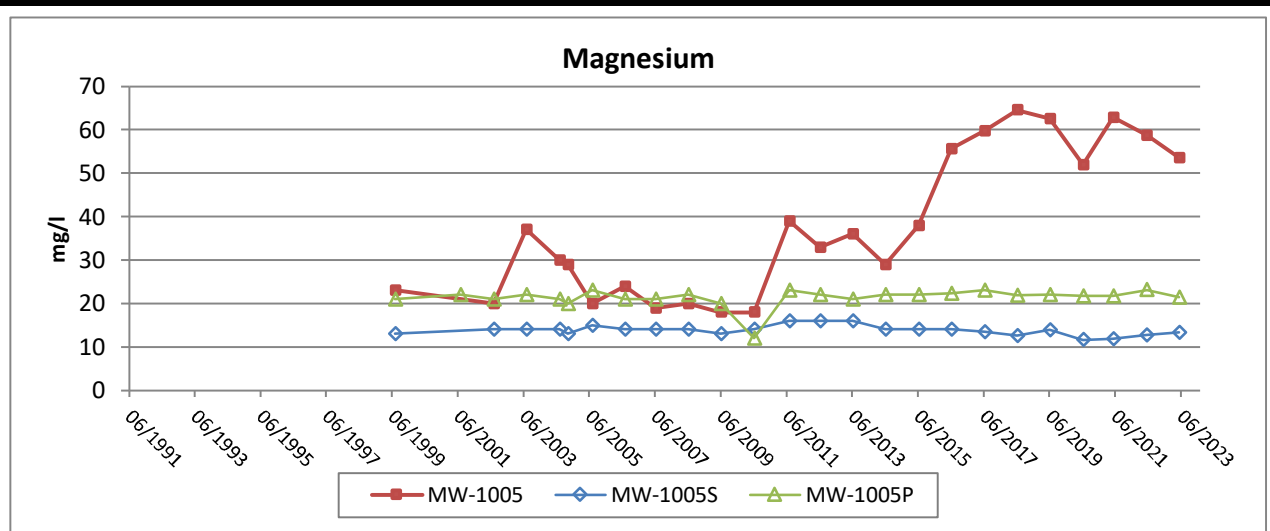



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Figure B-11a
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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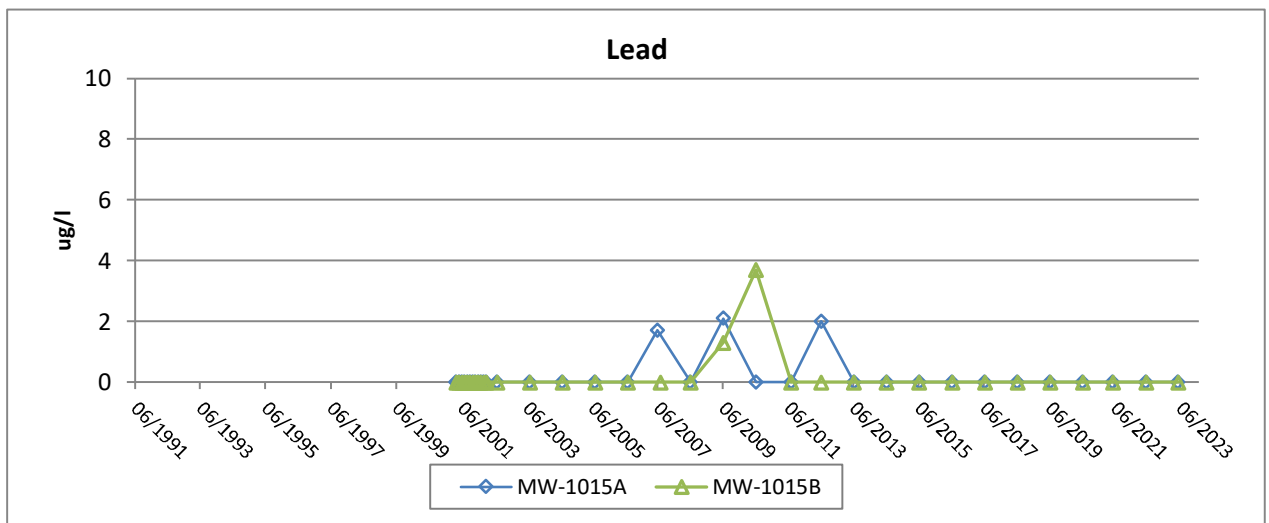
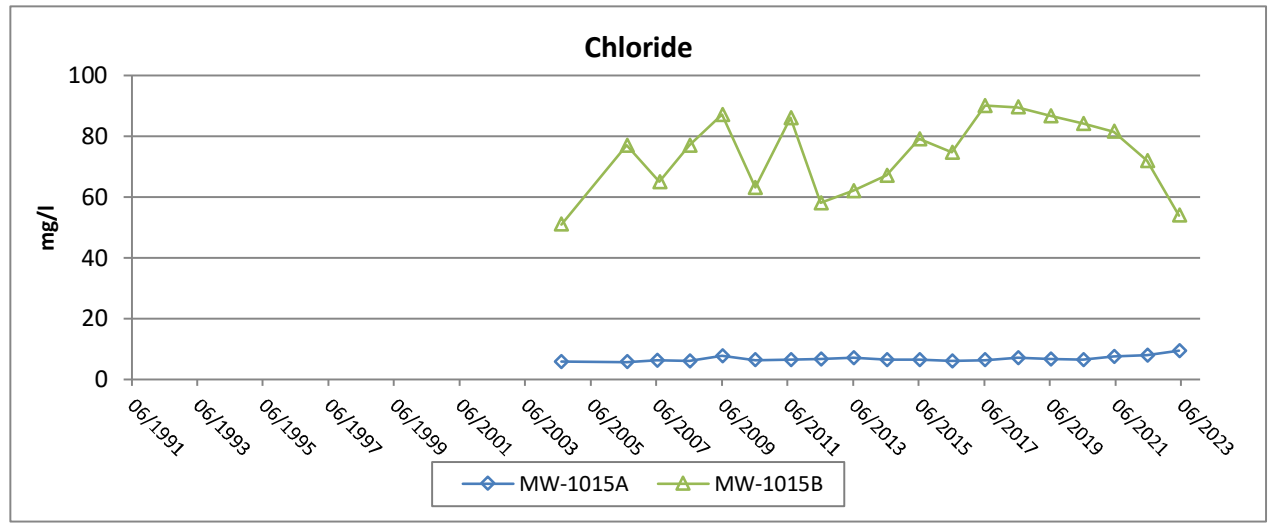
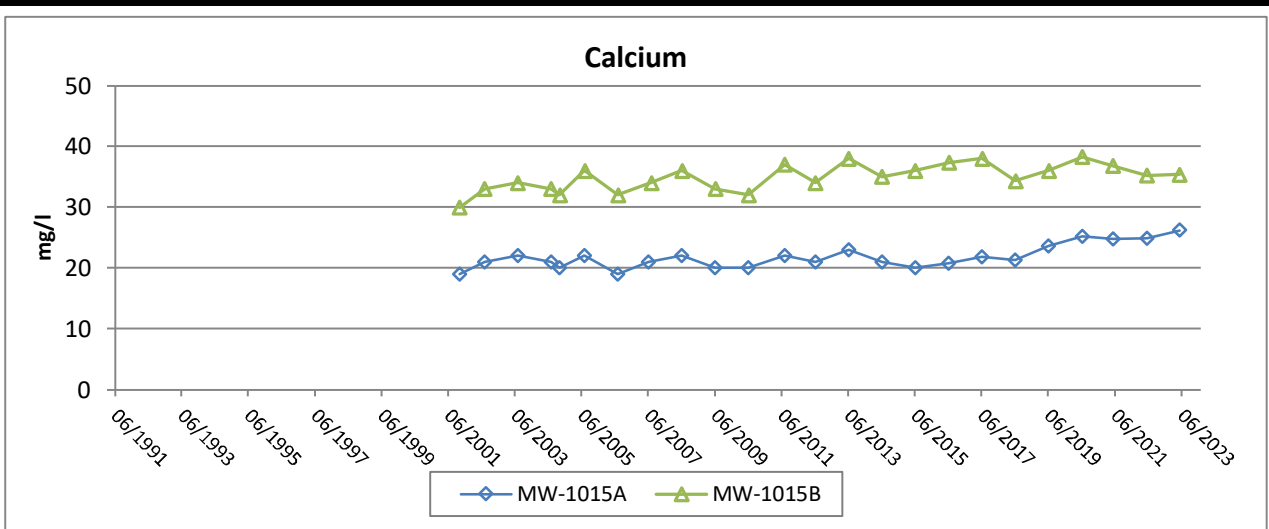




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Figure B-11b
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

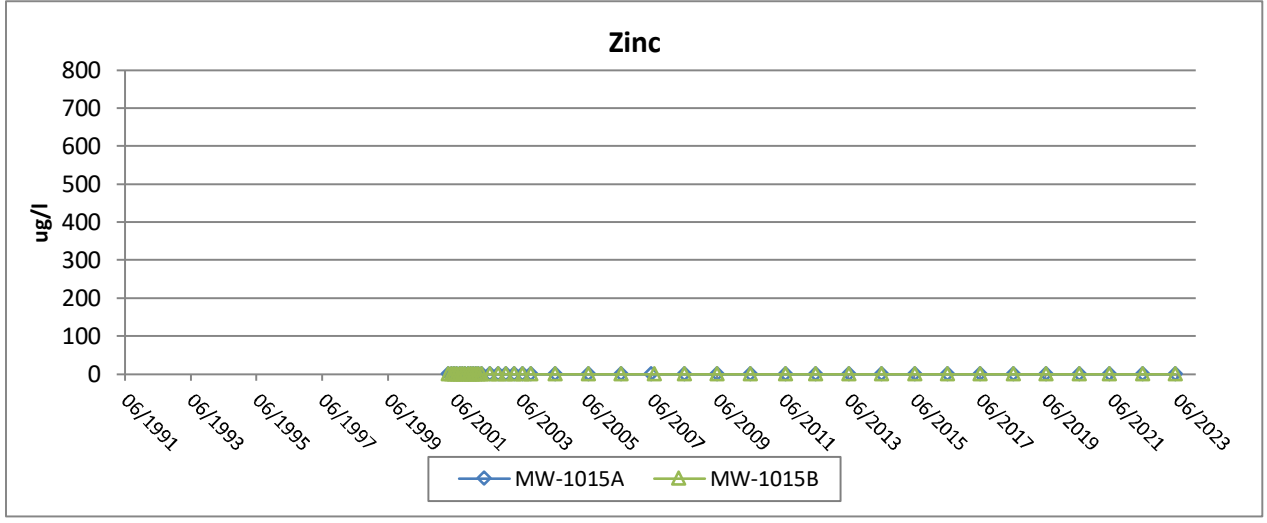
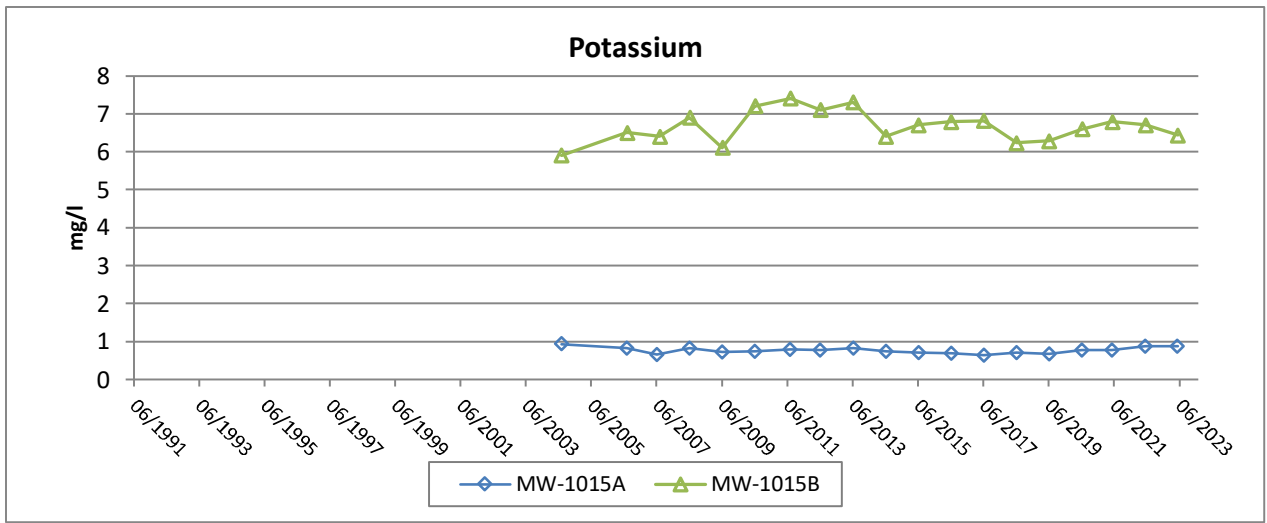
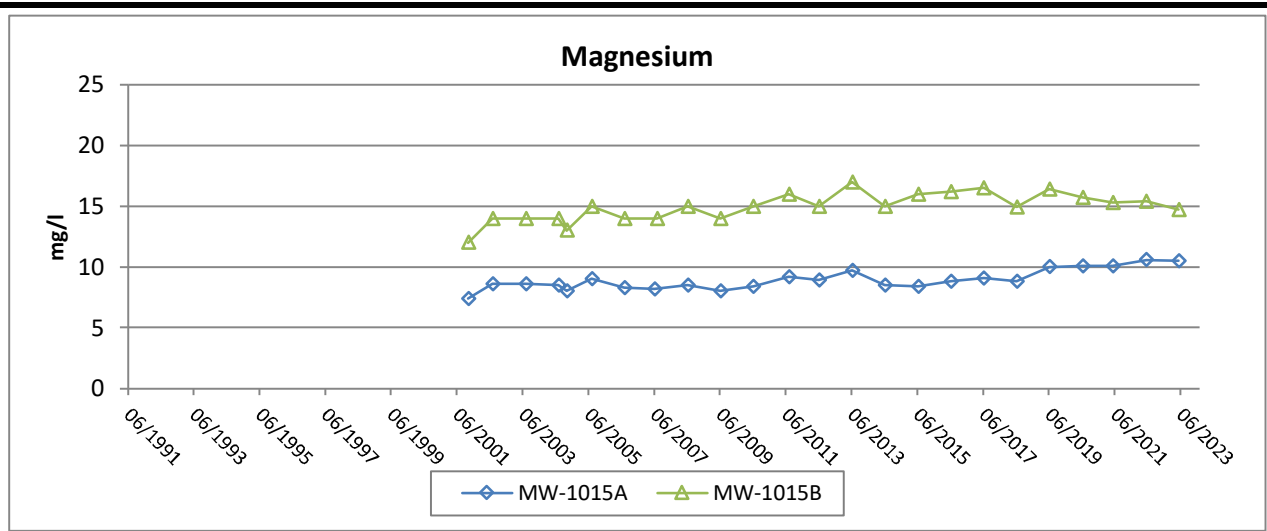



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Figure B-12a
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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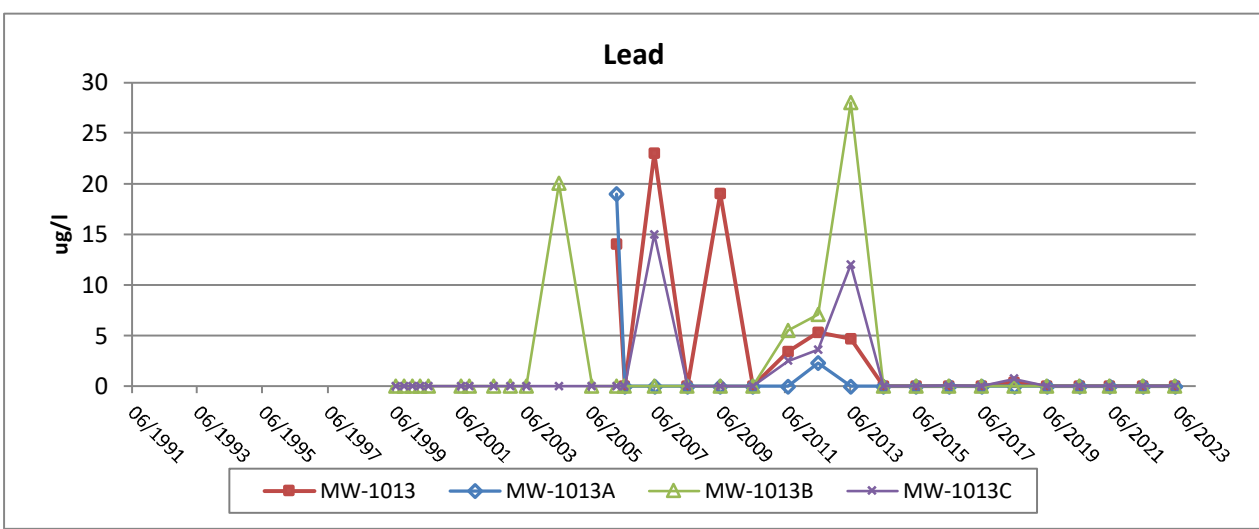
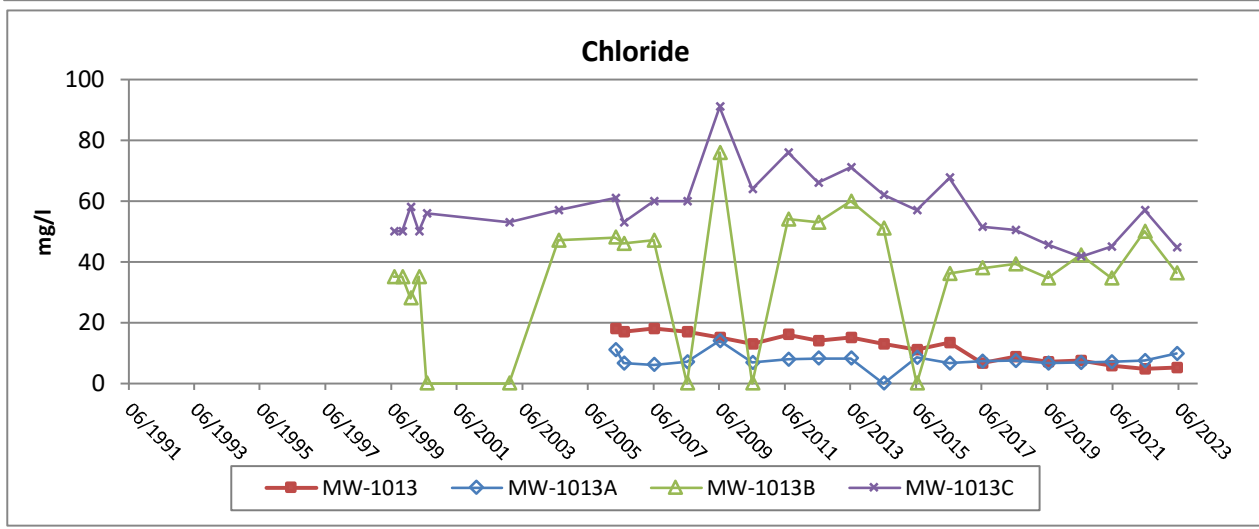
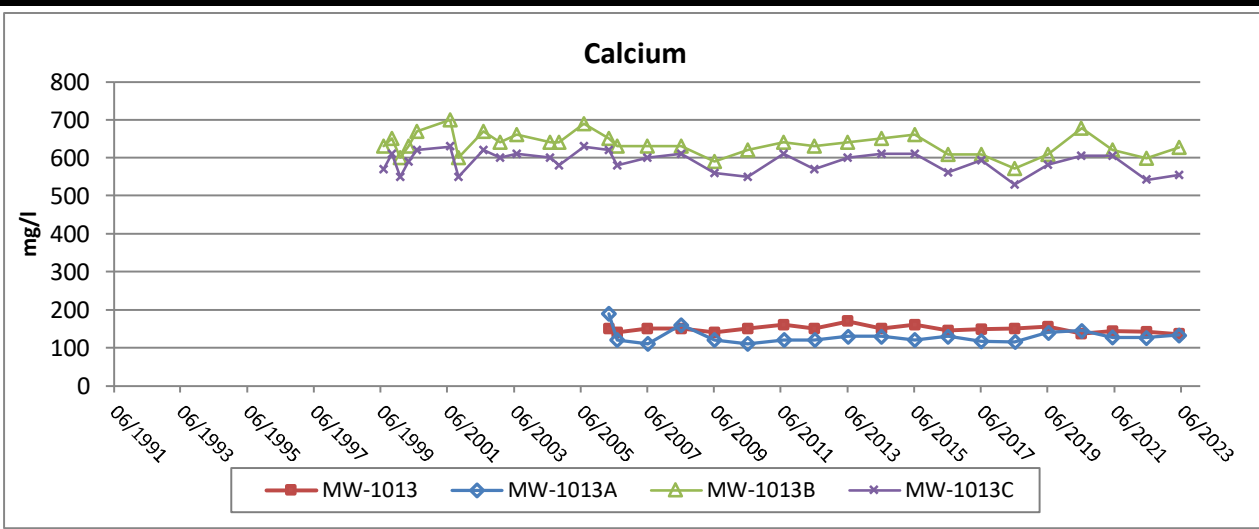



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Figure B-12b
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	



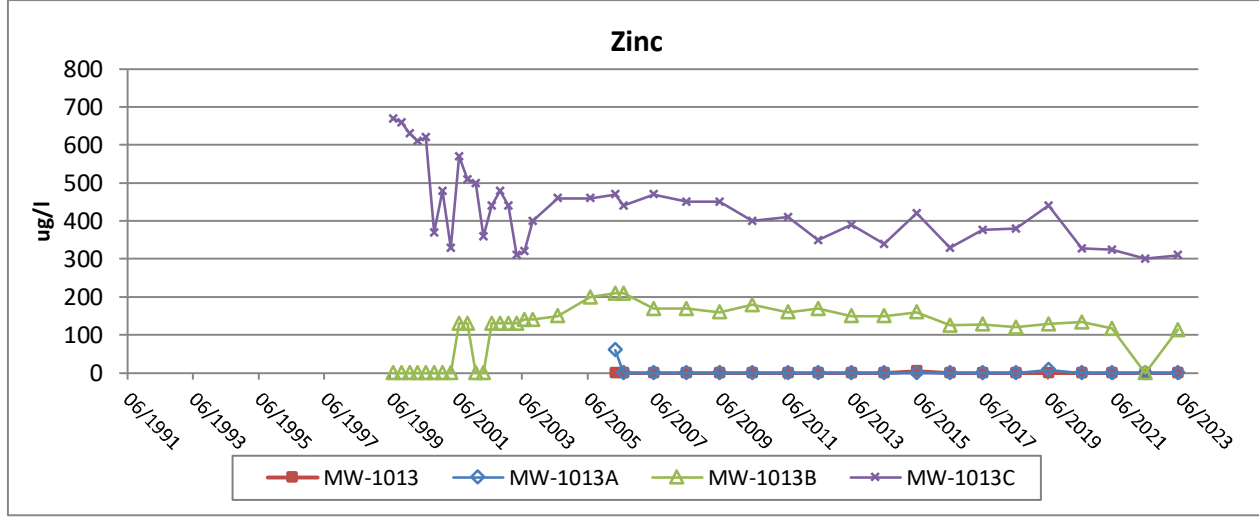
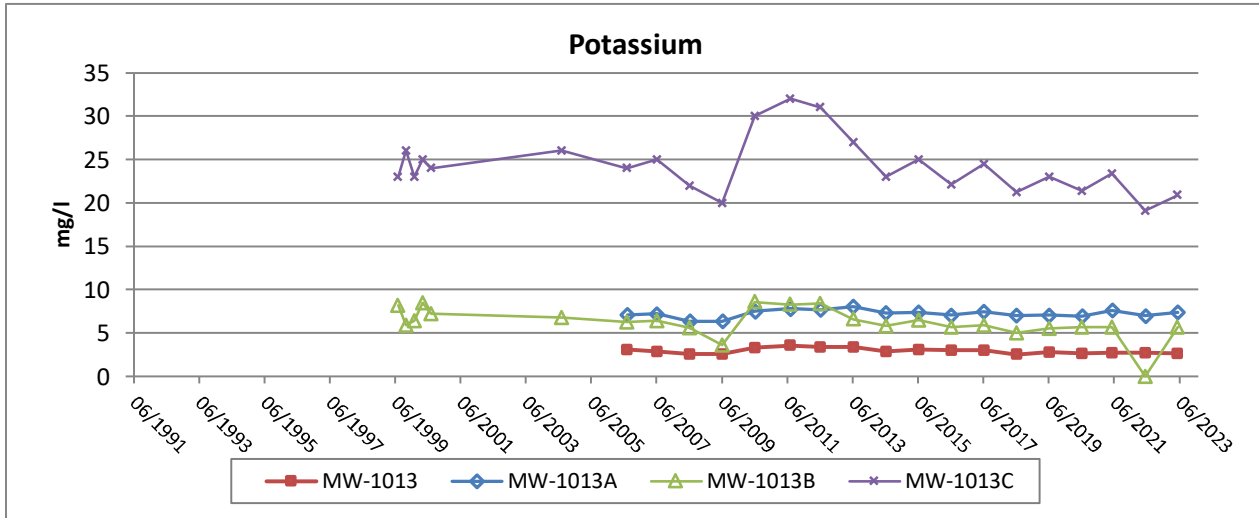
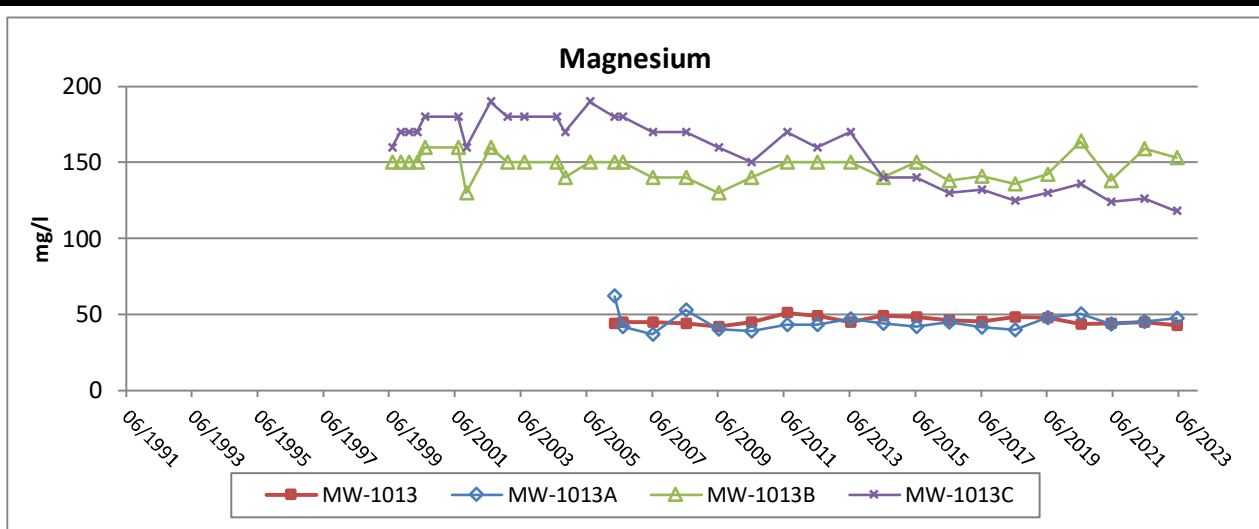



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Figure B-13a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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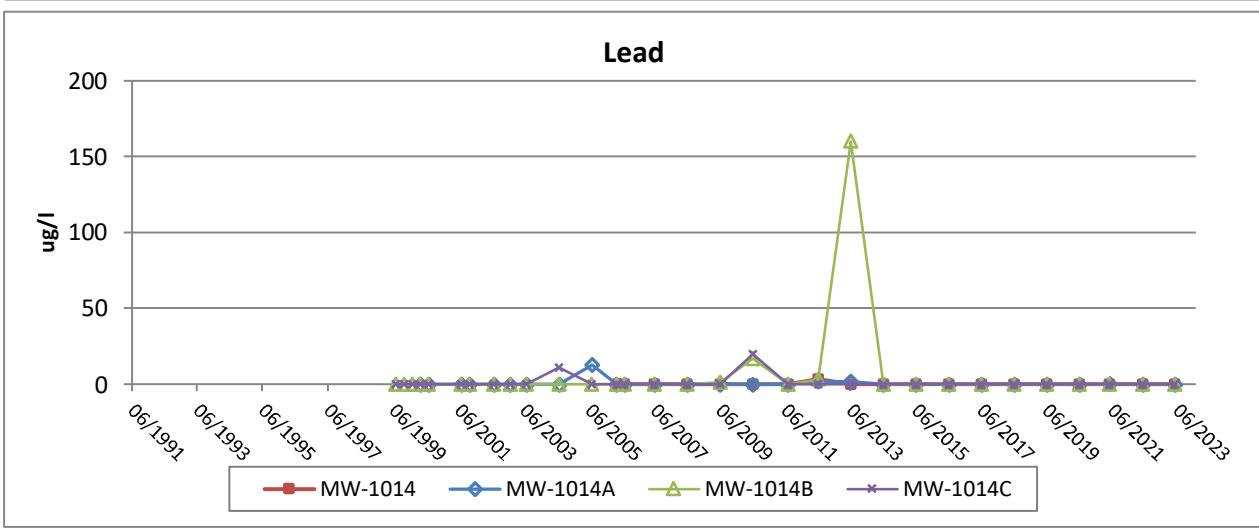
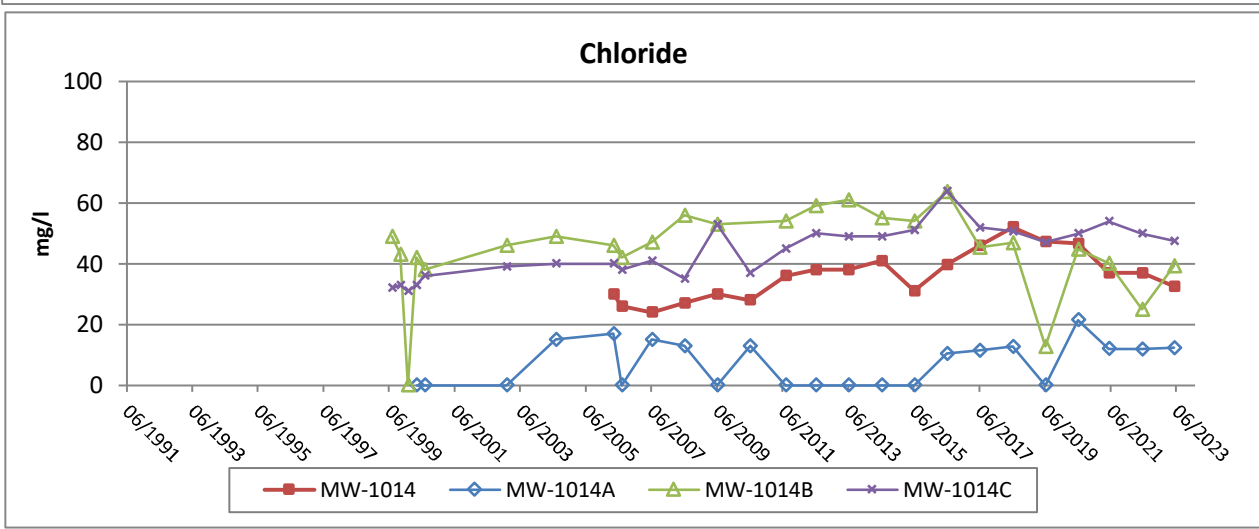
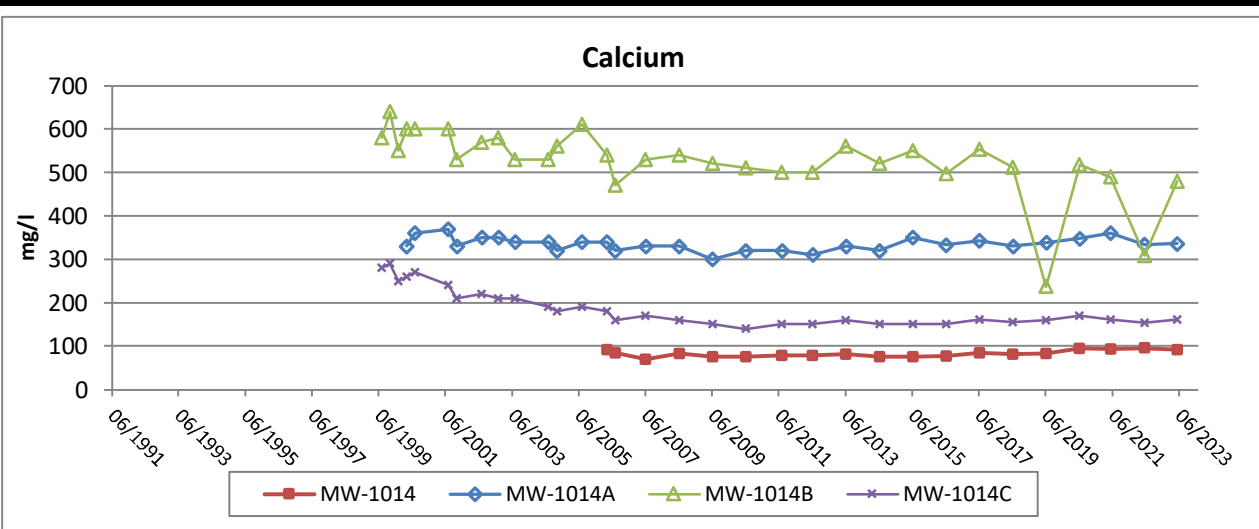



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Figure B-13b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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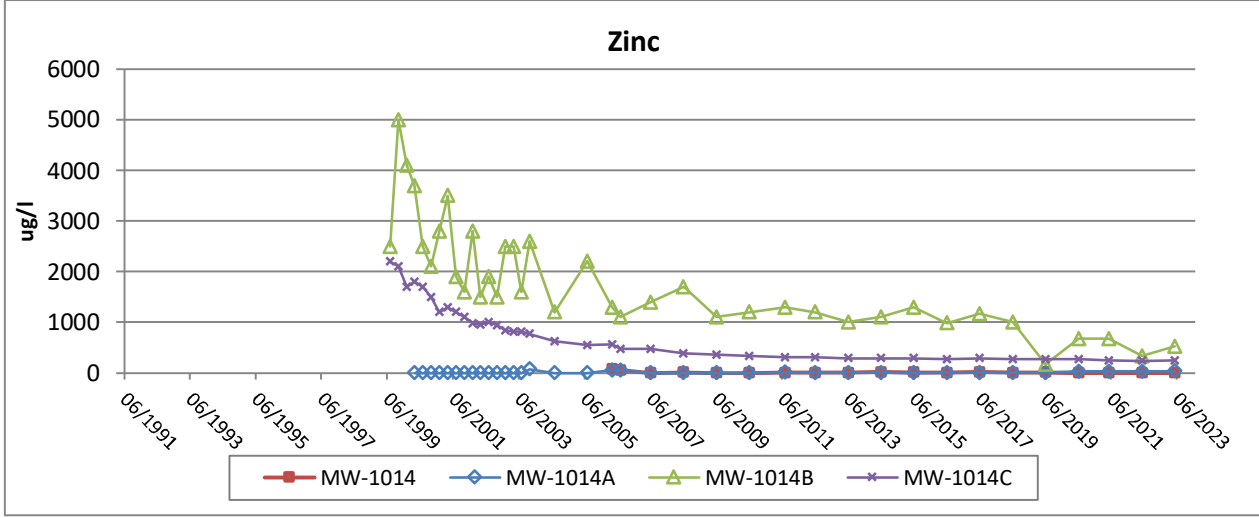
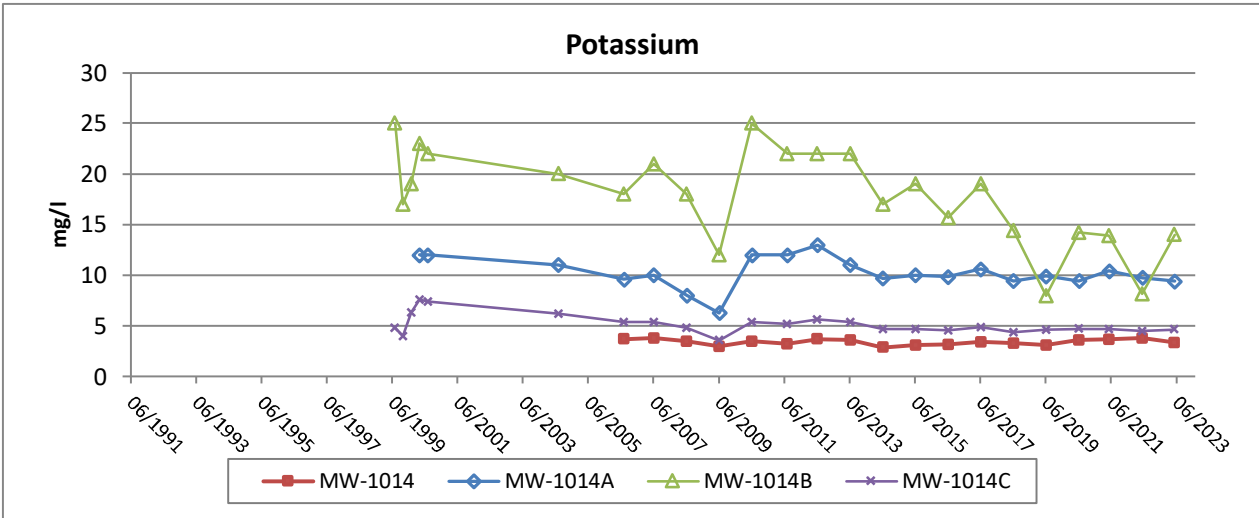
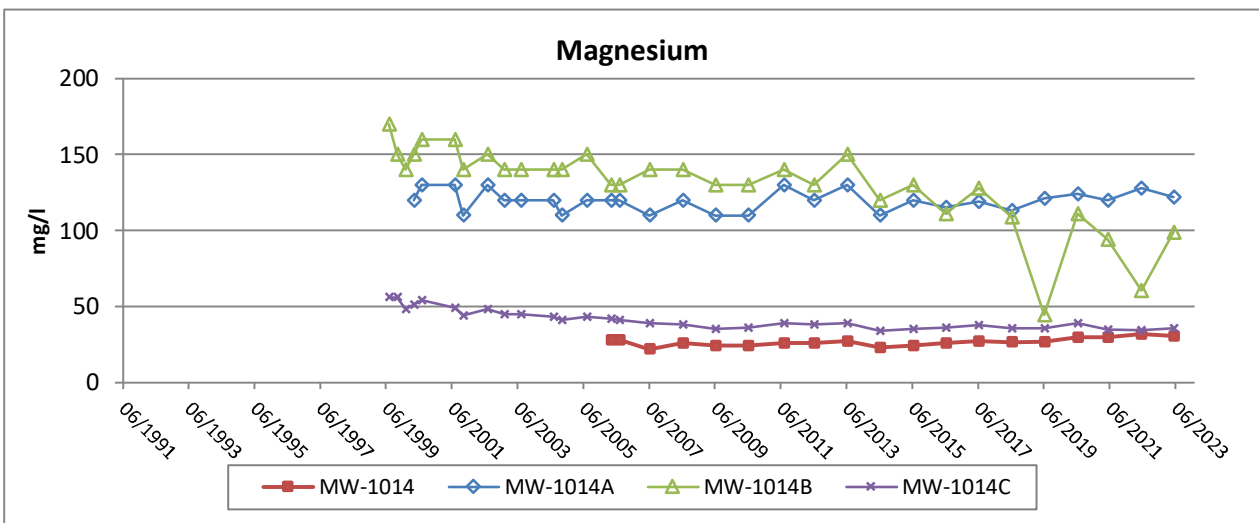




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Figure B-14a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	



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Figure B-14b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

2023 Groundwater Results - Annual Parameters

Sample Date (yyyy-mm)	Location		Calcium mg/l	Chloride mg/l	Lead ug/l	Magnesium mg/l	Potassium mg/l	Zinc ug/l
2023-05	MW-1000PR		112	11.2	< 0.24	28.8	3.1	305
2023-05	MW-1000R		34	21.1	< 0.24	9.63	0.571	< 10.3
2023-05	MW-1002		20.7	14.3	< 0.24	6.78	0.776	< 10.3
2023-05	MW-1002G		43.7	42.0	< 0.24	16.6	1.06	< 10.3
2023-05	MW-1002G	Dup.	44.5	41.8	< 0.24	16.9	1.08	< 10.3
2023-05	MW-1004		7.73	3.5	< 0.24	2.35	0.715	< 10.3
2023-05	MW-1004P		33.6	3.8	< 0.24	13.4	5.55	< 10.3
2023-05	MW-1004S		16.9	4.4	< 0.24	5.31	0.871	< 10.3
2023-05	MW-1005		119	466	< 0.24	53.6	1.3	< 10.3
2023-05	MW-1005P		52.4	7.7	0.32	21.4	7.86	< 10.3
2023-05	MW-1005S		37.3	4.4	< 0.24	13.4	2.69	< 10.3
2023-05	MW-1010P		54.8	6.7	< 0.24	14.4	2.6	< 10.3
2023-05	MW-1013		136	5.1	< 0.24	42.8	2.66	< 10.3
2023-05	MW-1013A		133	9.8	< 0.24	47.3	7.4	< 10.3
2023-05	MW-1013B		627	36.4	< 0.24	153	5.71	113
2023-05	MW-1013C		555	44.7	< 0.24	118	20.9	310
2023-05	MW-1014		92.2	32.6	< 0.24	30.7	3.38	< 10.3
2023-05	MW-1014A		336	12.4	< 0.24	122	9.4	36.8
2023-05	MW-1014B		480	39.3	< 0.24	98.8	14	524
2023-05	MW-1014C		161	47.4	< 0.24	35.7	4.65	245
2023-05	MW-1014C	Dup.	162	48.5	< 0.24	34.5	4.72	240
2023-05	MW-1015A		26.2	9.4	< 0.24	10.5	0.88	< 10.3
2023-05	MW-1015B		35.4	53.9	< 0.24	14.7	6.43	< 10.3

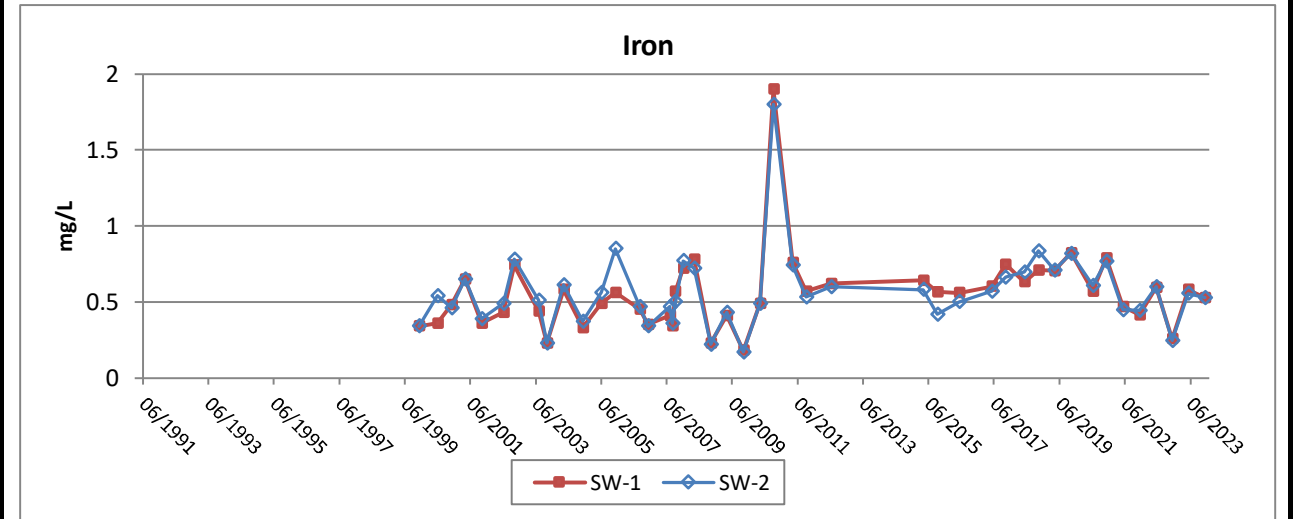
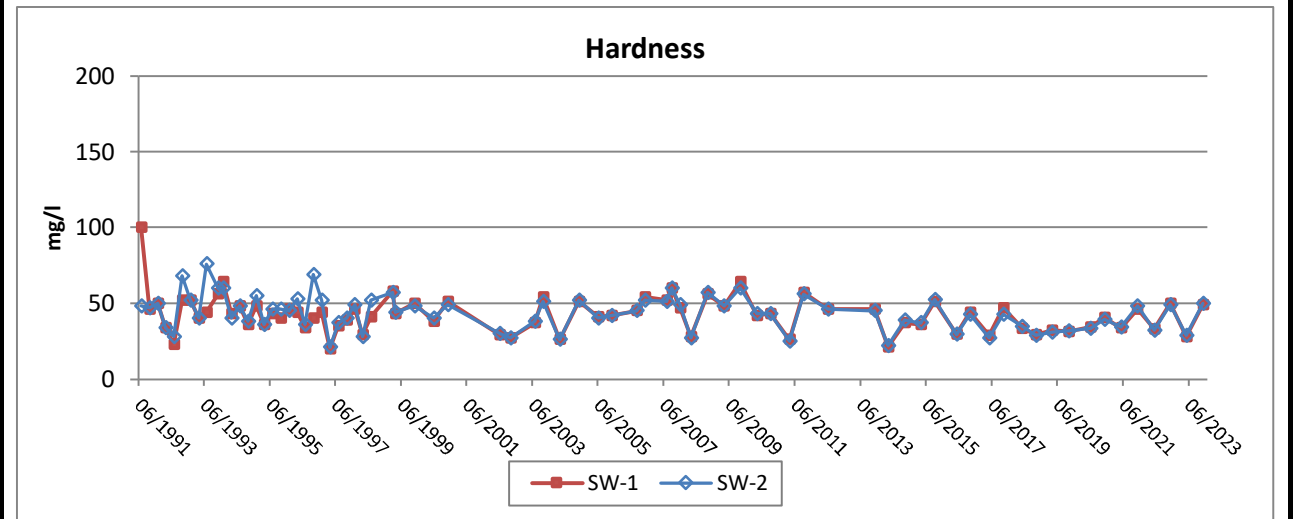
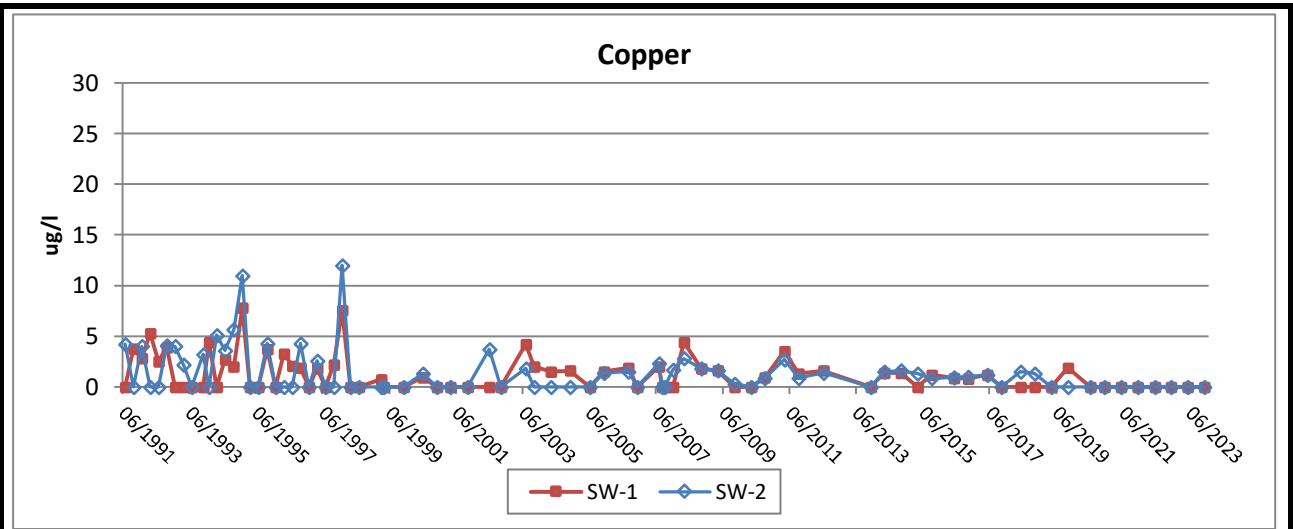
Attachment 3
Surface Water


Trend Analysis
Trend Graphs
2023 Data

**Trend Analysis Results - Surface Water
Year Ending 2023**

	Conductivity (Field) (umhos/cm)	pH(Field) (su)	Copper	Hardness	Iron	Manganese	Zinc	Dissolved Oxygen	Redox Potential	Total Suspended Solids
SW-1										
Trend Results for Most Recent 5 Years										
Sample Size	9	9	10	10	10	10	10	8	9	10
Mann-Kendall S	8	-8	-7	13	-19	17	0	8	4	-14
p-Level	0.476	0.476	0.600	0.292	0.108	0.156	1.000	0.398	0.762	0.254
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	53	52	55	52	45	42	53	26	18	29
Mann-Kendall S	-354	-114	-227	-153	223	-43	-160	77	-7	-83
p-Level	0.007	0.372	0.072	0.230	0.030	0.649	0.132	0.094	0.822	0.125
Trend	-									
SW-2										
Trend Results for Most Recent 5 Years										
Sample Size	9	9	10	10	10	10	10	8	9	10
Mann-Kendall S	10	-14	0	19	-23	11	0	6	2	-11
p-Level	0.358	0.180	1.000	0.108	0.046	0.380	1.000	0.548	0.920	0.380
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	53	52	55	52	45	42	53	26	18	29
Mann-Kendall S	-367	12	-59	-199	136	-104	-84	77	-35	-98
p-Level	0.005	0.931	0.645	0.118	0.187	0.264	0.441	0.094	0.200	0.068
Trend	-									

Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-".
All trend tests performed at a Type I (two-tailed) error rate of 0.01.



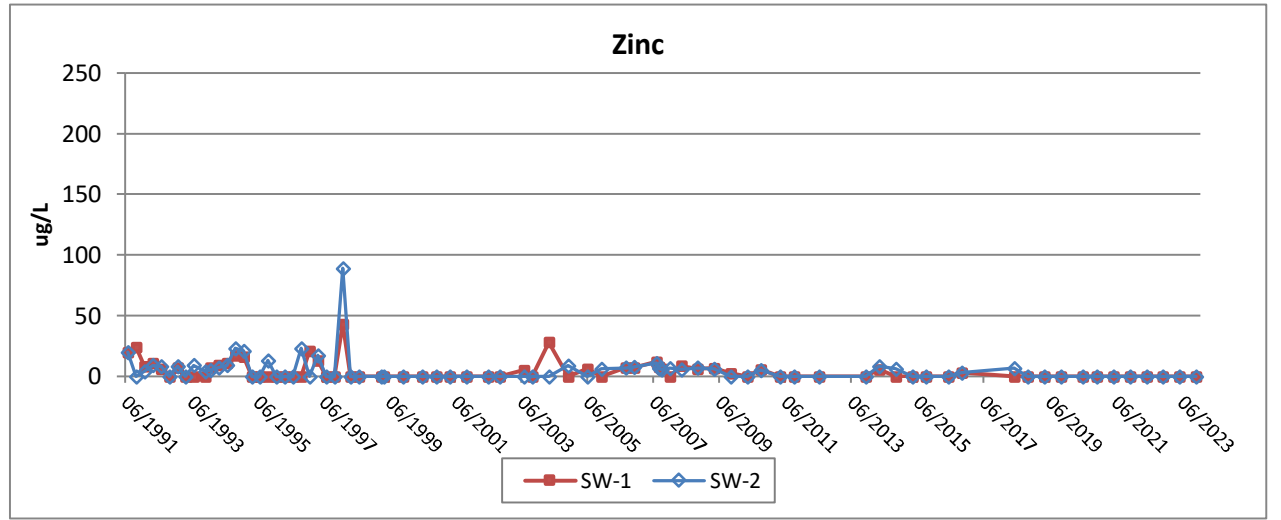
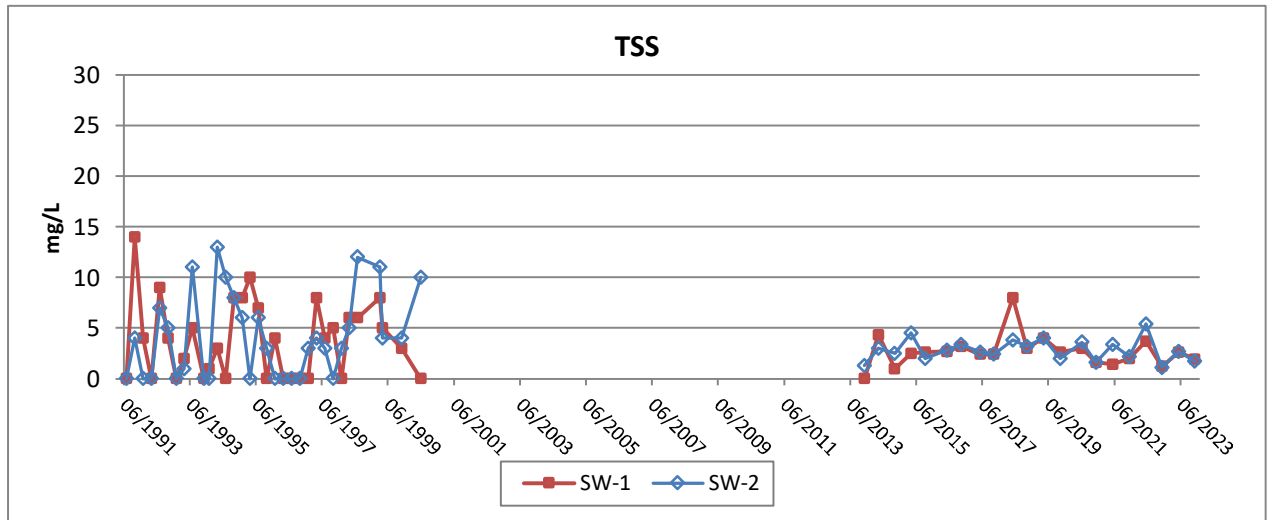
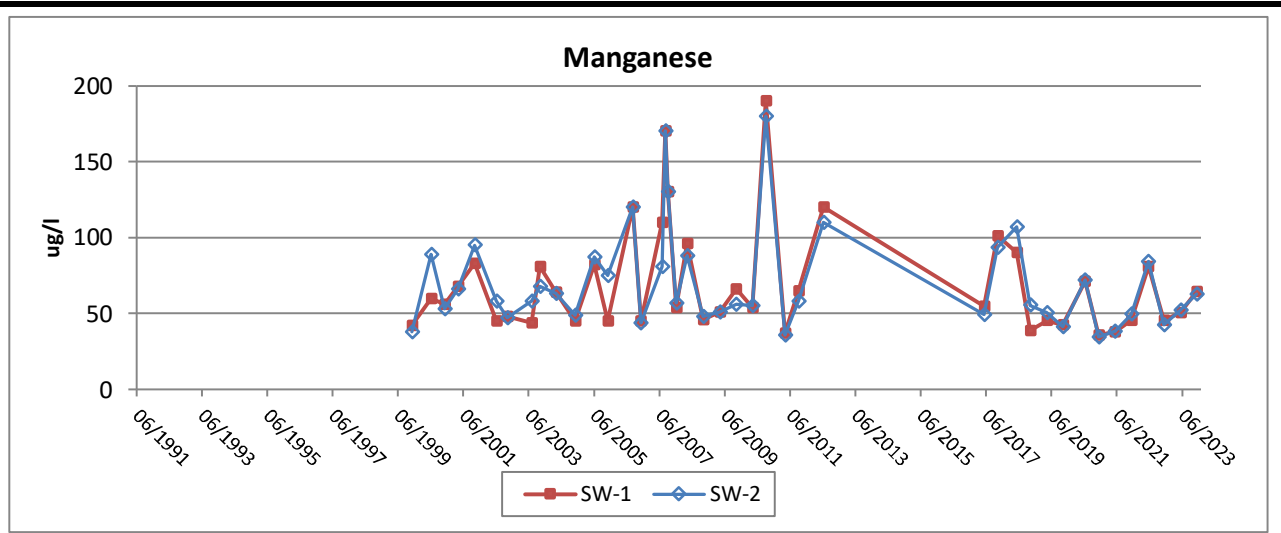



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Figure B-15a
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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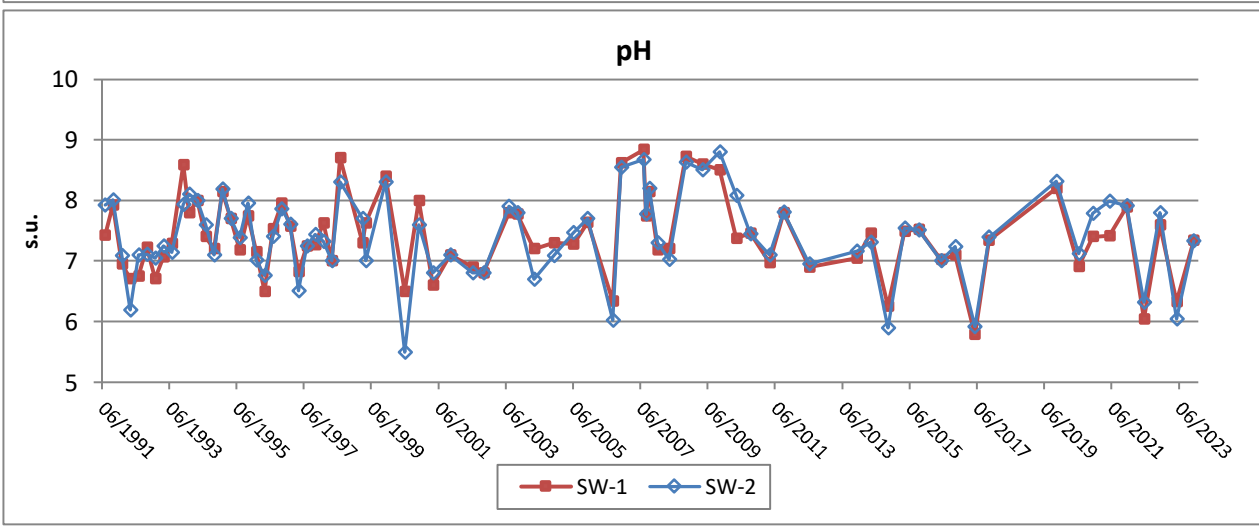
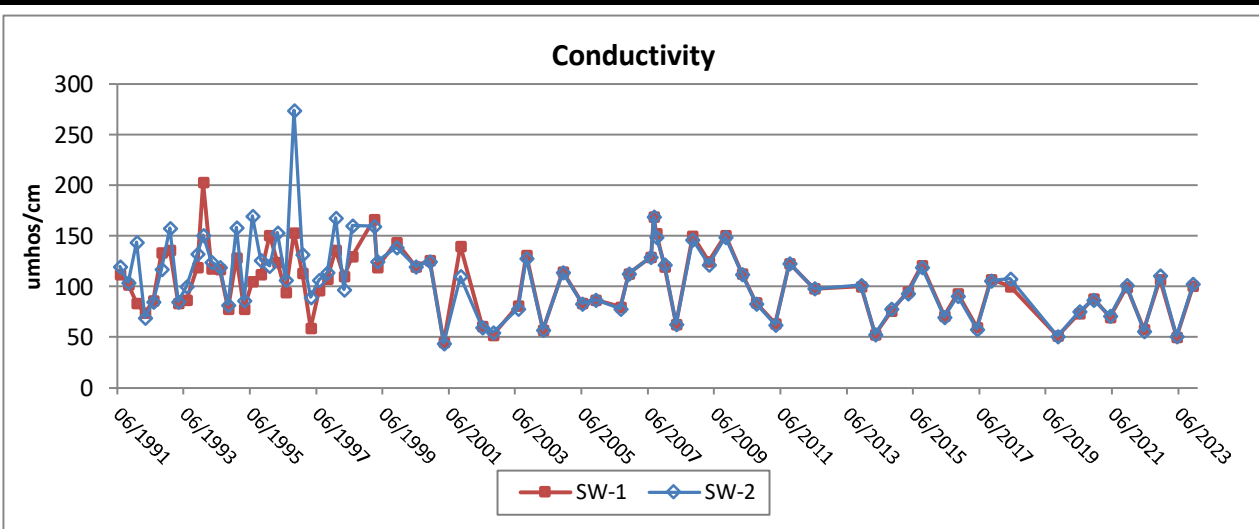





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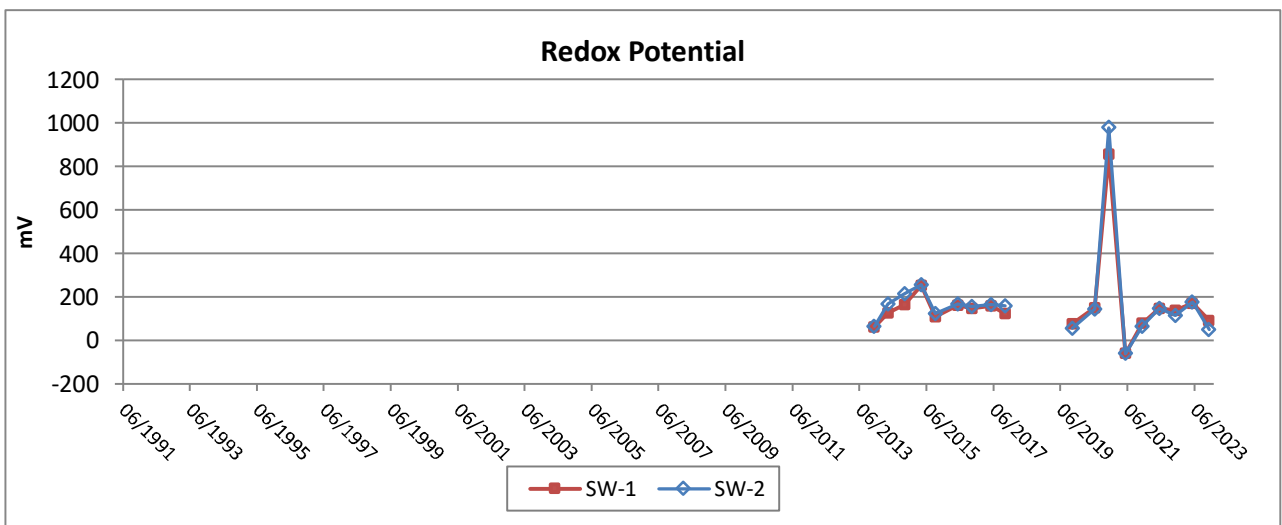
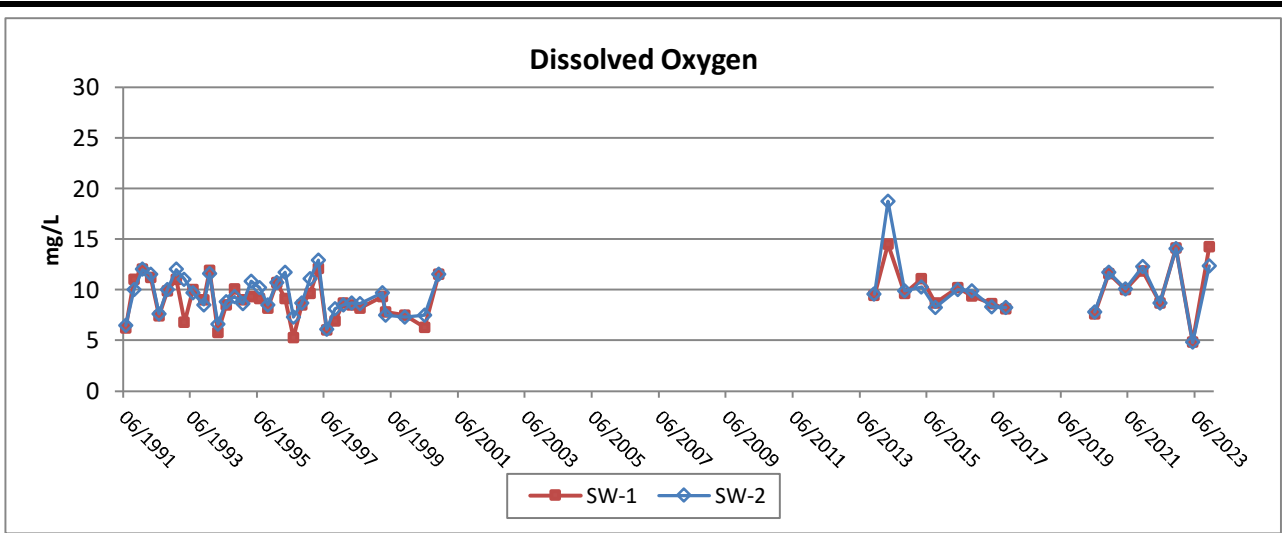
Figure B-15b
Surface Water Trend Graphs
SW-1/SW-2


Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	



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Figure B-15c Surface Water Trend Graphs SW-1/SW-2		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24



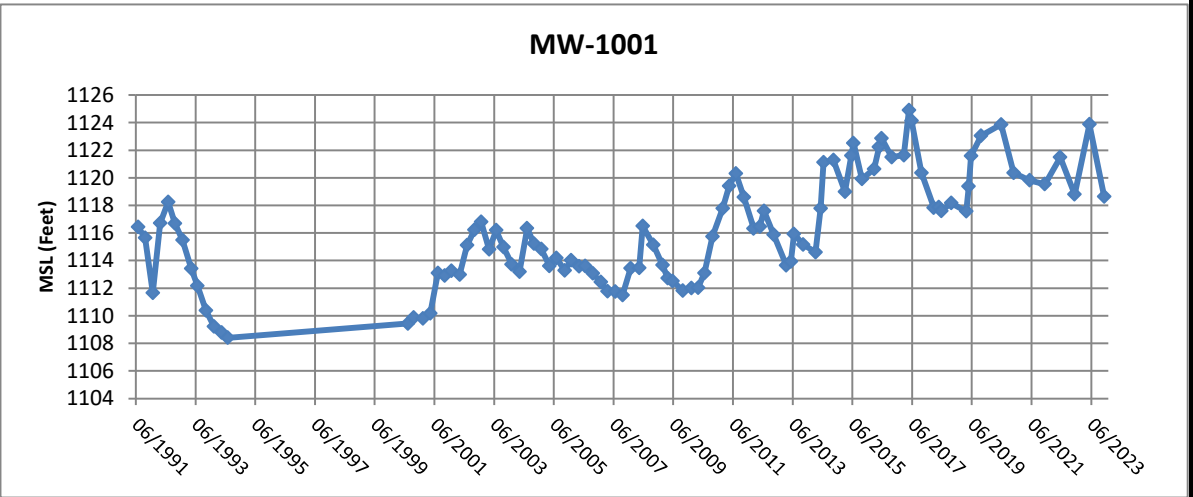
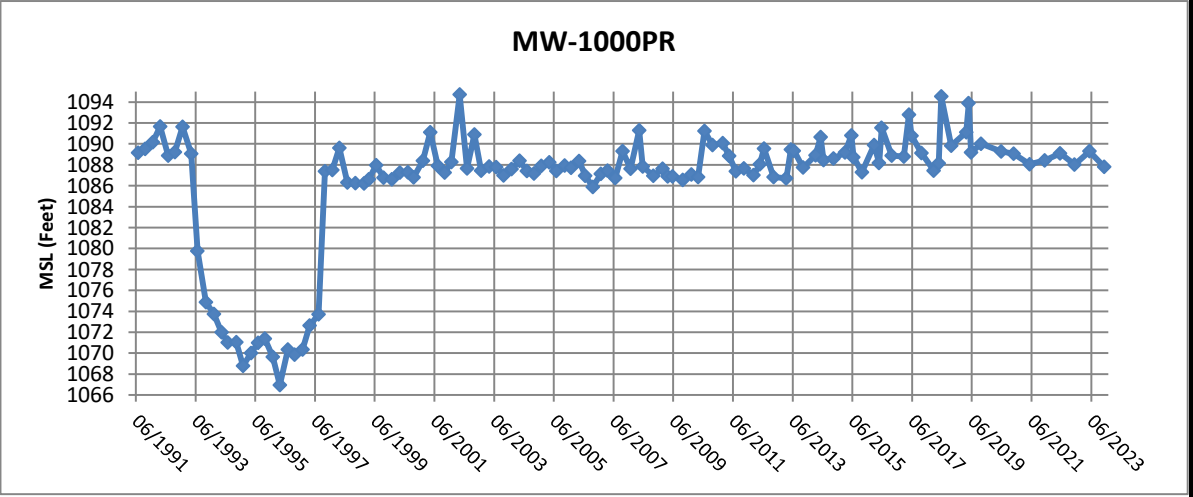
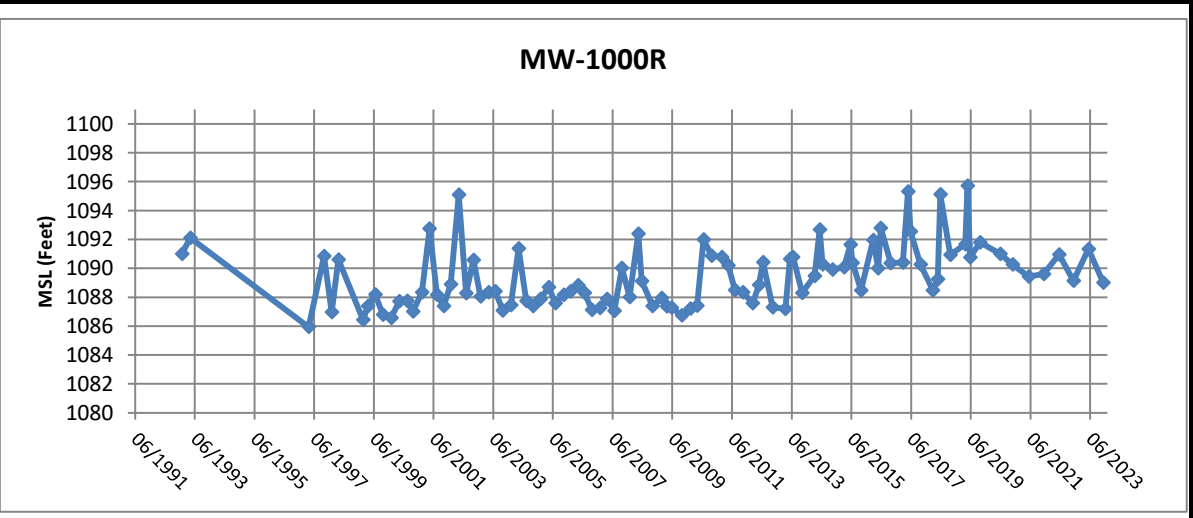
		
FLAMBEAU MINING COMPANY		
Figure B-15d Surface Water Trend Graphs SW-1/SW-2		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24


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2023 Surface Water Results

Sample Date (yyyy-mm)	Location		Conductivity (Field) umhos/cm	pH (Field) s.u.	Copper ug/l	Hardness mg/l	Iron mg/l	Manganese ug/l	Zinc ug/l	Dissolved Oxygen mg/l	Redox Potential mV	Total Suspended Solids mg/l
2023-05	SW-1		50	6.33	< 1.9	27.9	0.58	50.4	< 10.3	4.85	170.8	2.6
2023-05	SW-1	Dup.			< 1.9	27.6	0.534	45.8	< 10.3			2.3
2023-05	SW-2		51	6.04	< 1.9	28.9	0.555	52.4	< 10.3	4.8	174.8	2.7
2023-11	SW-1		101	7.34	< 1.9	49.0	0.527	64.6	< 10.3	14.24	90.4	1.9
2023-11	SW-1	Dup.			< 1.9	48.9	0.546	65.7	< 10.3			1.9
2023-11	SW-2		103	7.33	< 1.9	50.0	0.527	62.6	< 10.3	12.32	49.8	1.7

Attachment 4
Hydrographs and Groundwater Elevation Data



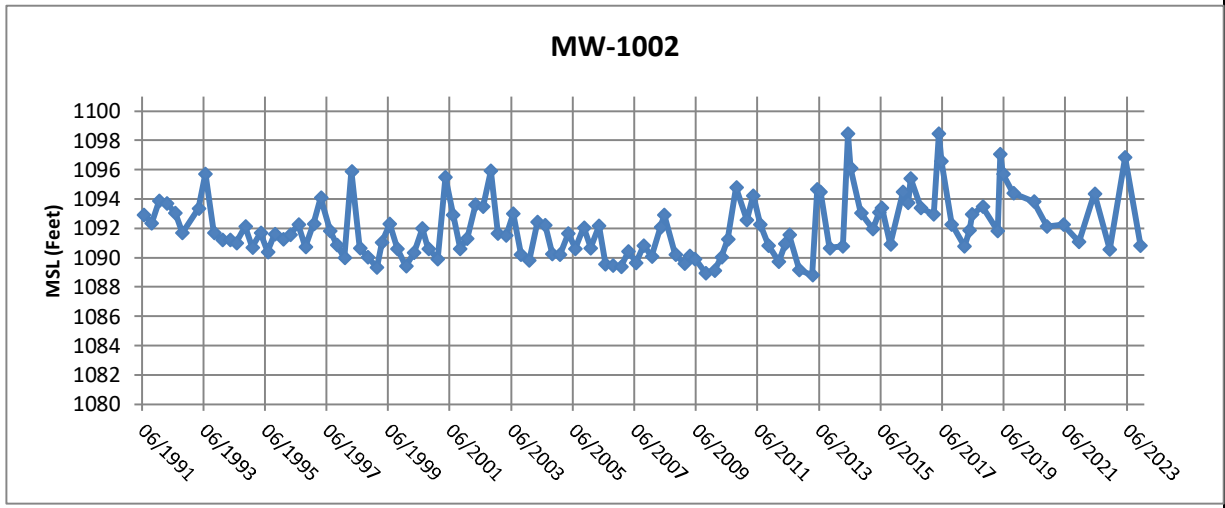
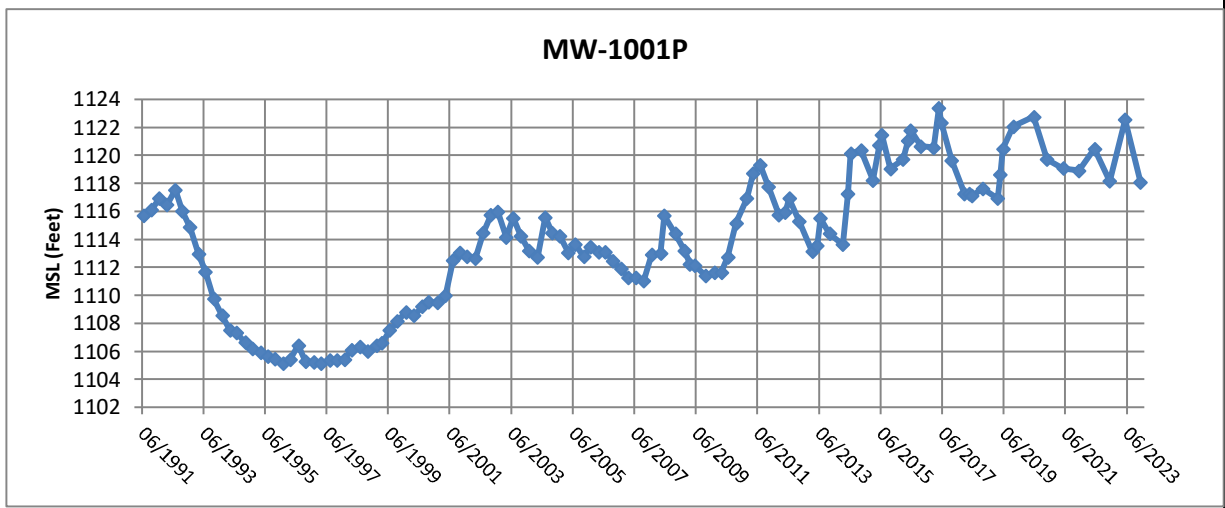
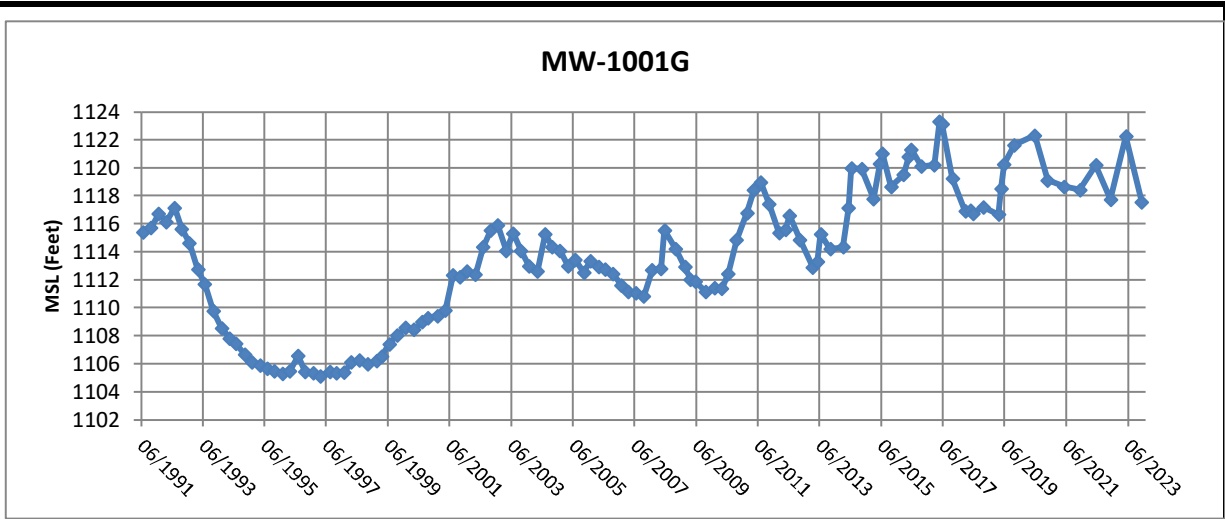


FLAMBEAU MINING COMPANY

Figure B-16a
Hydrographs

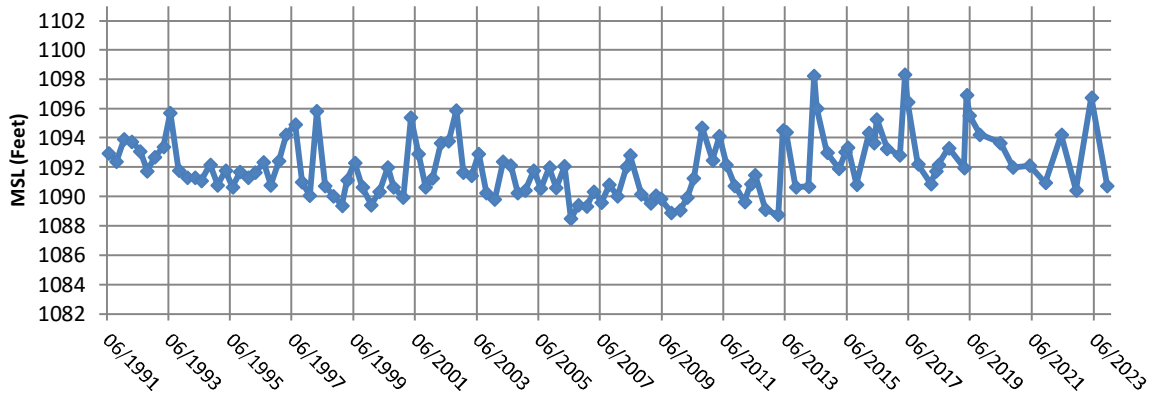
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

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2023 Annual Summary Memorandum
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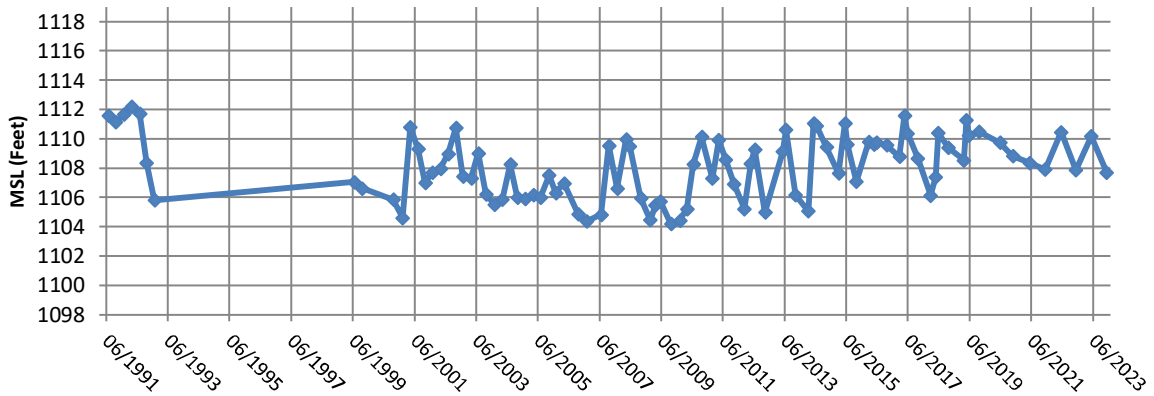


Foth		
FLAMBEAU MINING COMPANY		
Figure B-16b Hydrographs		
Scale: NA	Date: January 2024	
Prepared By: SGL	Checked By: NMG1	Project: 17F777.24

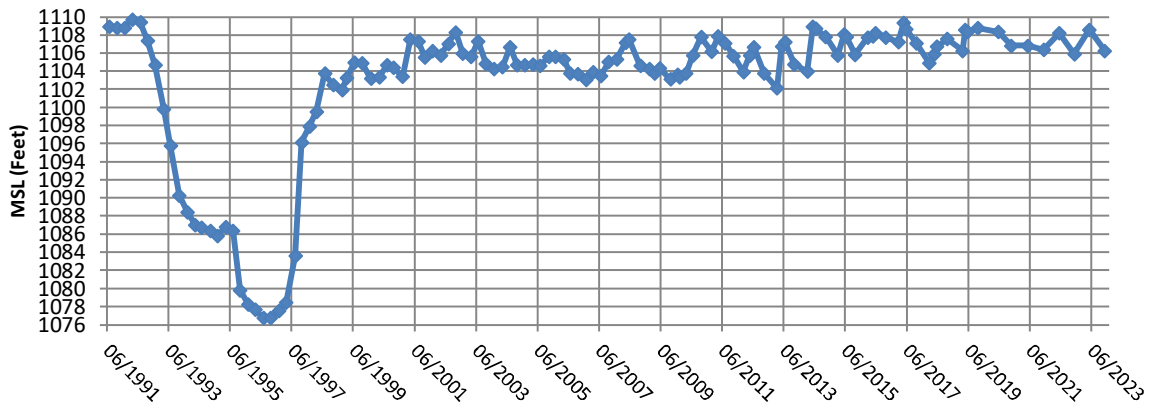
MW-1002G



MW-1004



MW-1004P



FLAMBEAU MINING COMPANY

Figure B-16c
Hydrographs

Scale: NA

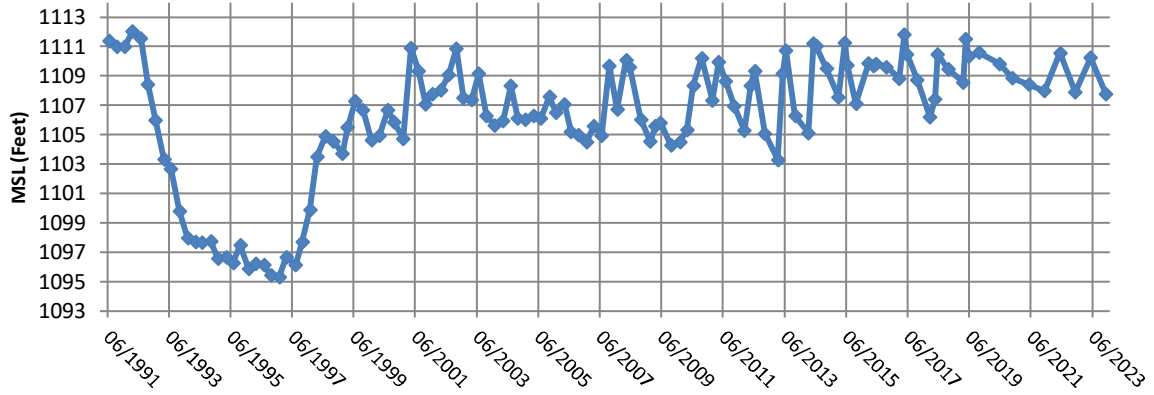
Date: January 2024

Prepared By: SGL

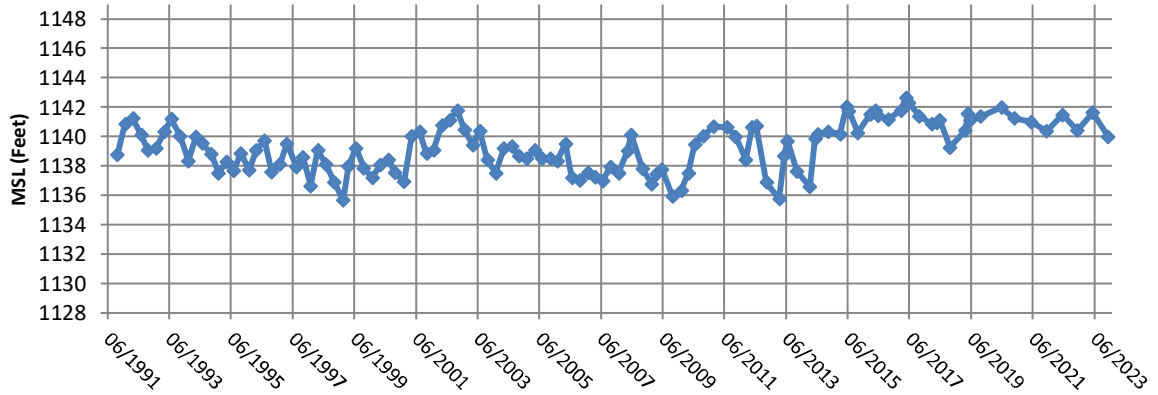
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Project: 17F777.24

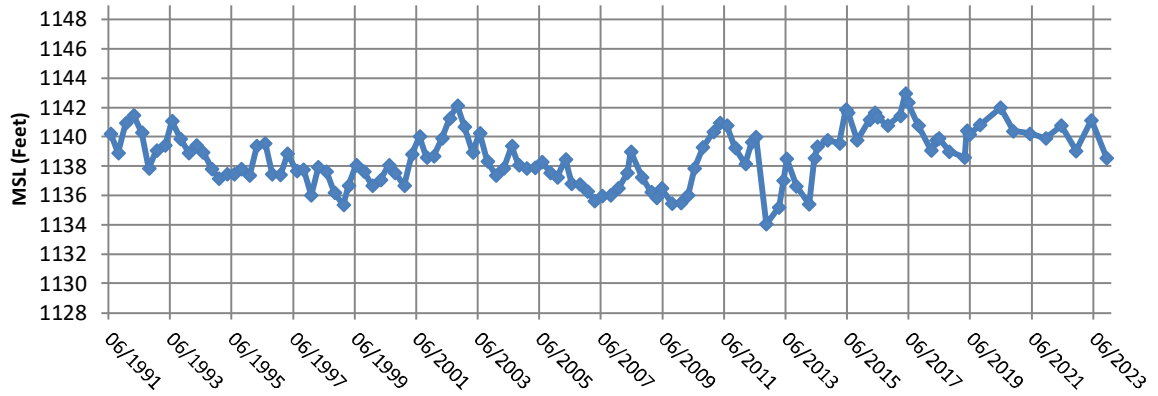
MW-1004S



MW-1005



MW-1005P



FLAMBEAU MINING COMPANY

Figure B-16d
Hydrographs

Scale: NA

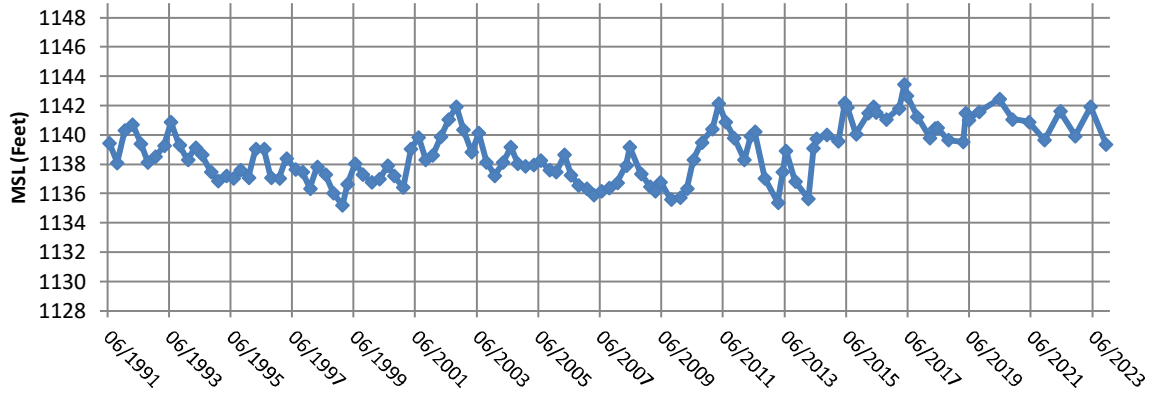
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Prepared By: SGL

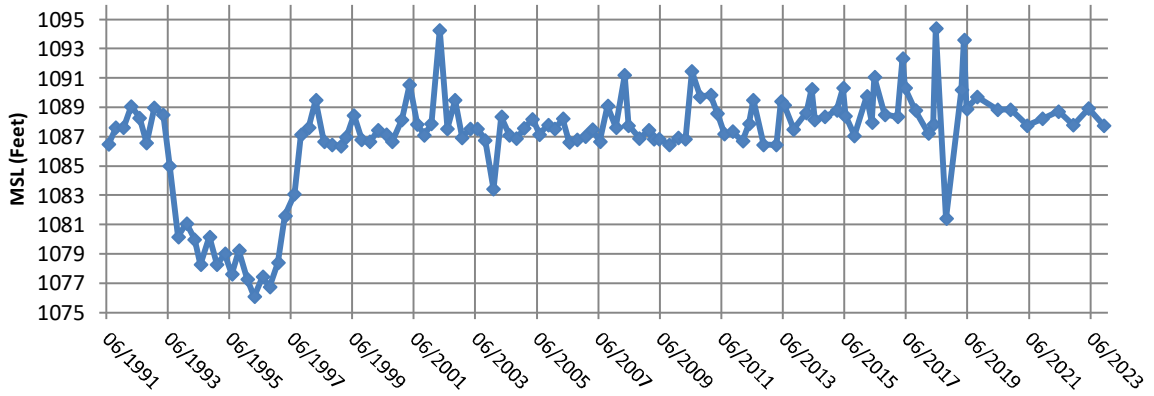
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Project: 17F777.24

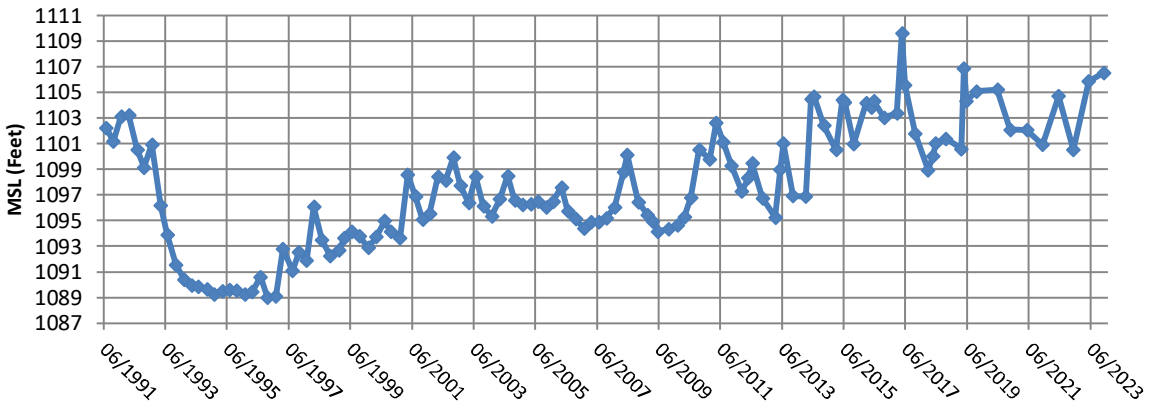
MW-1005S



MW-1010P



OW-39



FLAMBEAU MINING COMPANY

Figure B-16e
Hydrographs

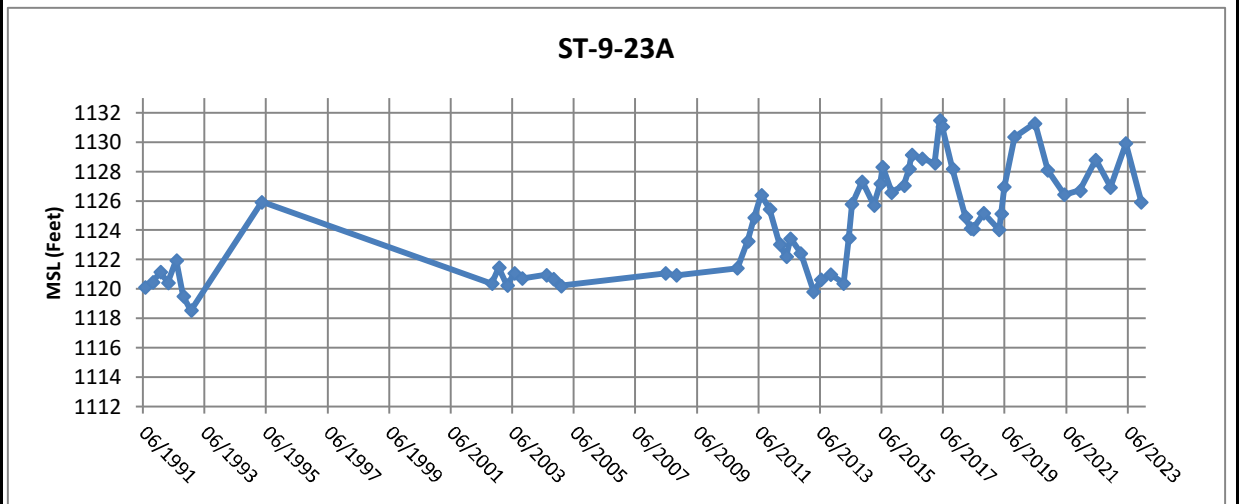
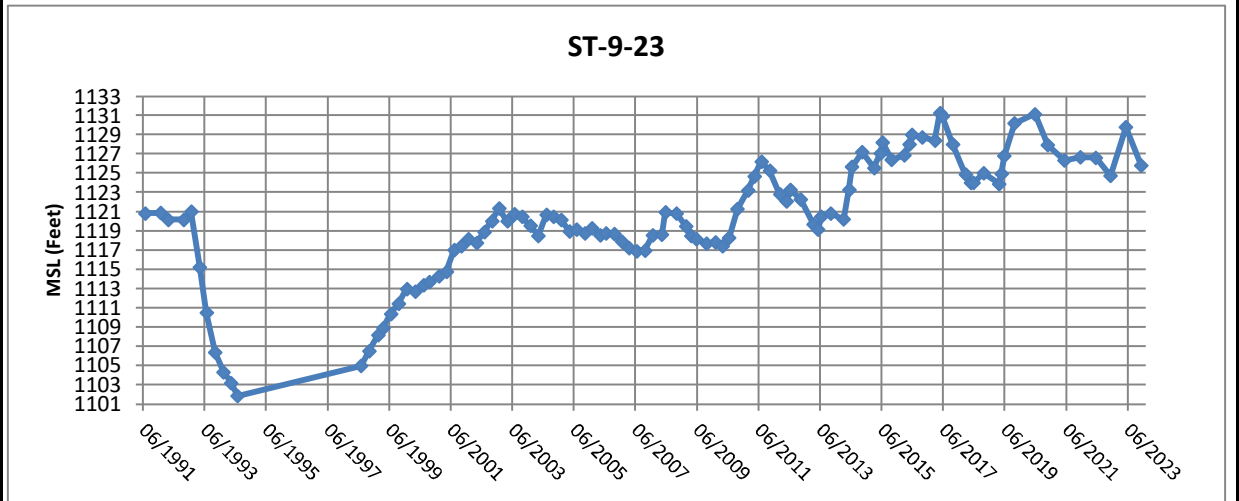
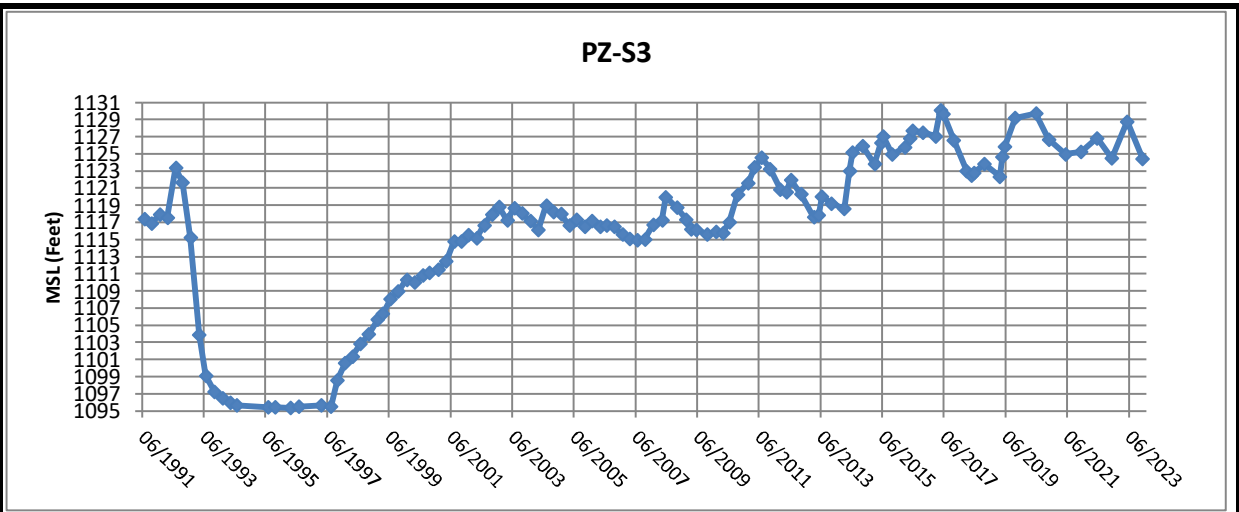
Scale: NA


Date: January 2024

Prepared By: SGL

Checked By: NMG1

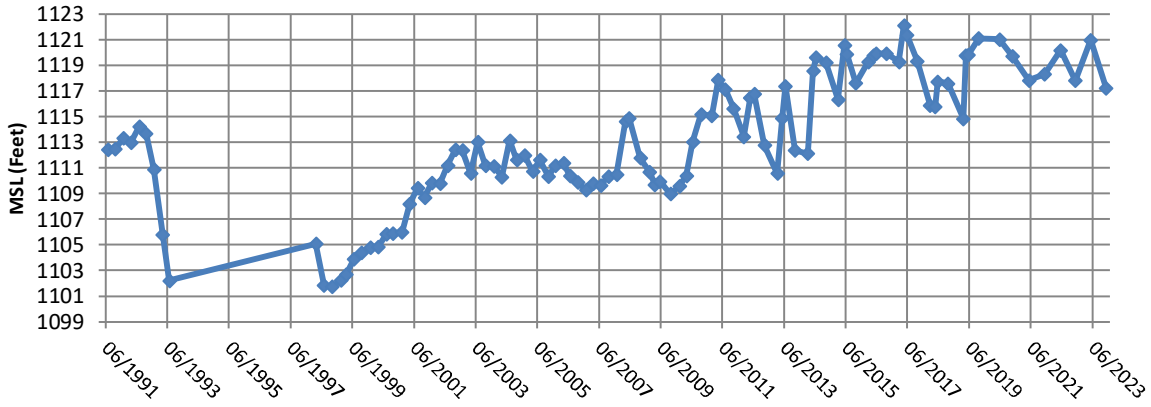
Project: 17F777.24



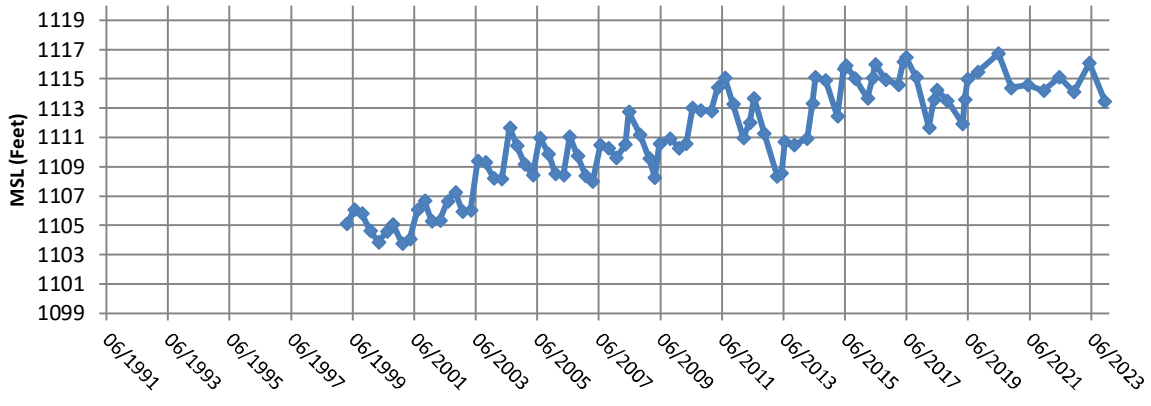
	
FLAMBEAU MINING COMPANY	
Figure B-16f Hydrographs	
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

Flambeau Mining Co.
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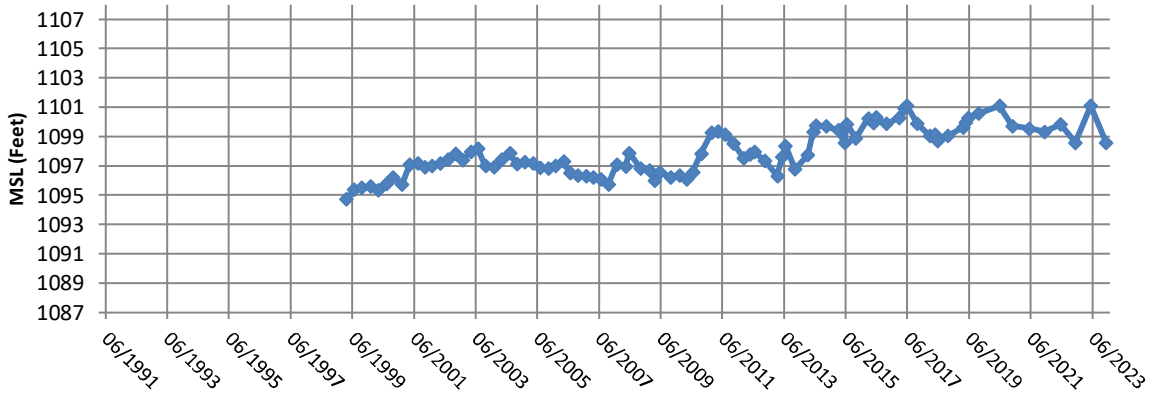
ST-9-26



MW-1013



MW-1013A



FLAMBEAU MINING COMPANY

Figure B-16g
Hydrographs

Scale: NA

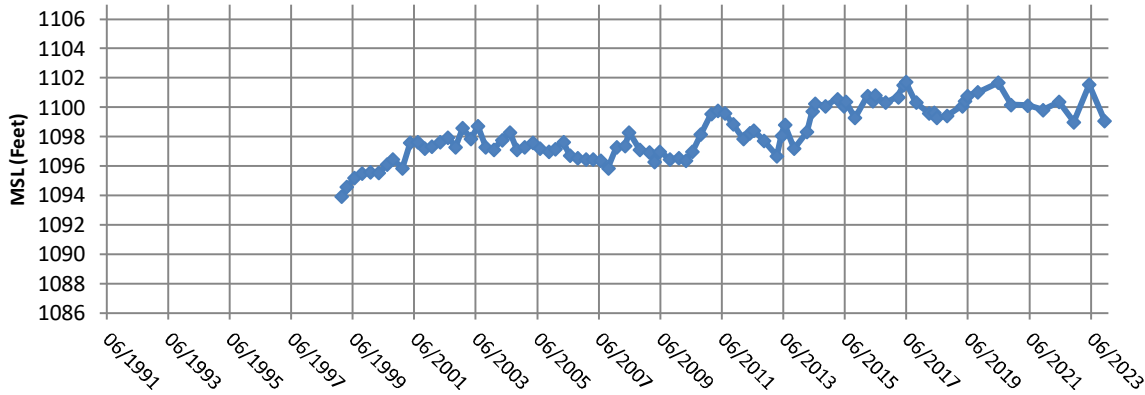
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Prepared By: SGL

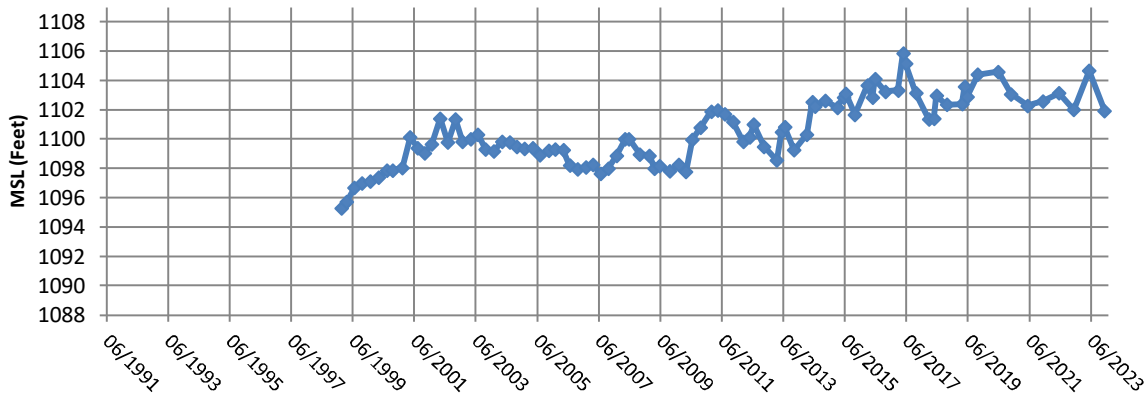
Checked By: NMG1

Project: 17F777.24

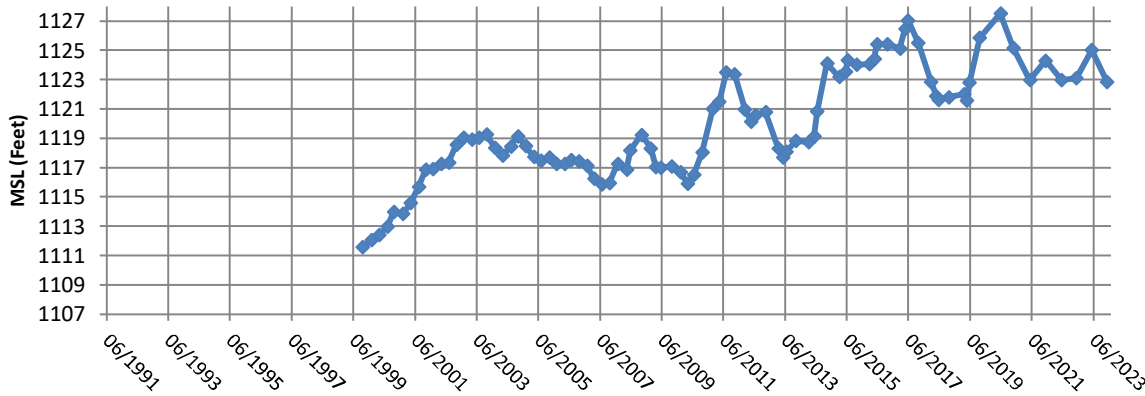
MW-1013B



MW-1013C



MW-1014



FLAMBEAU MINING COMPANY

Figure B-16h
Hydrographs

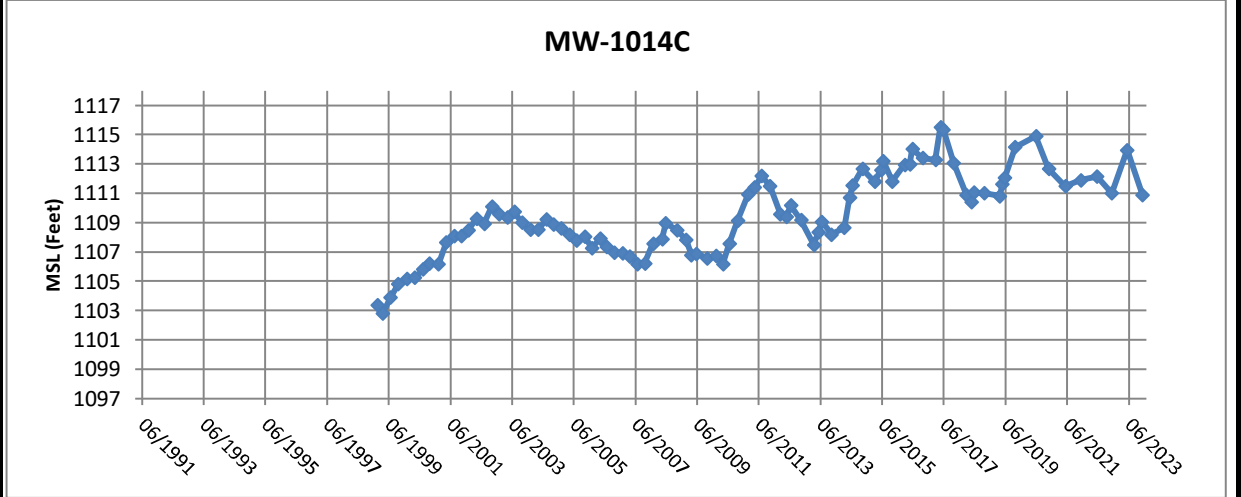
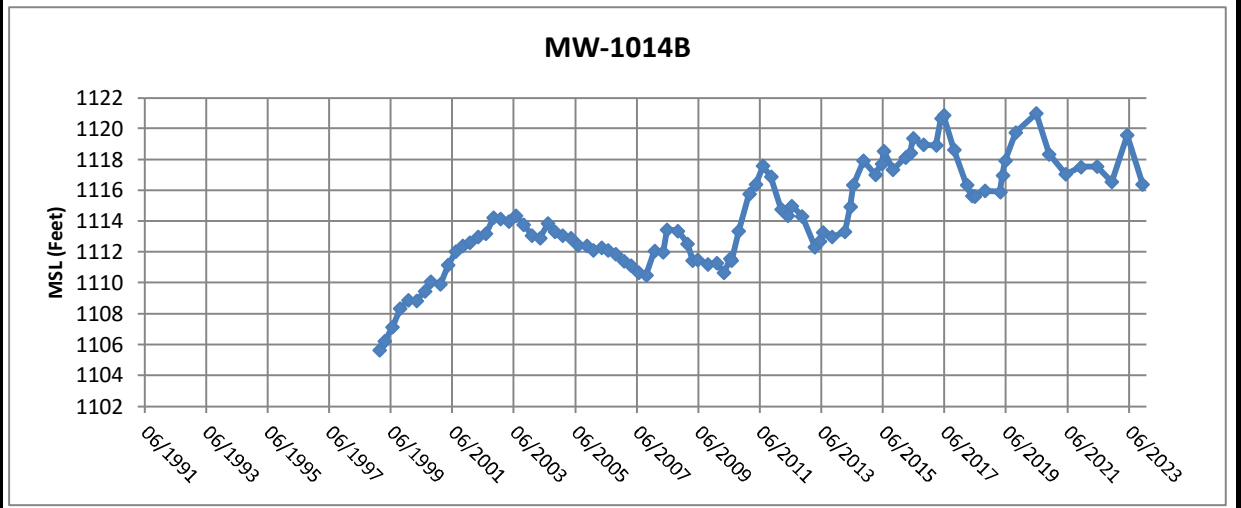
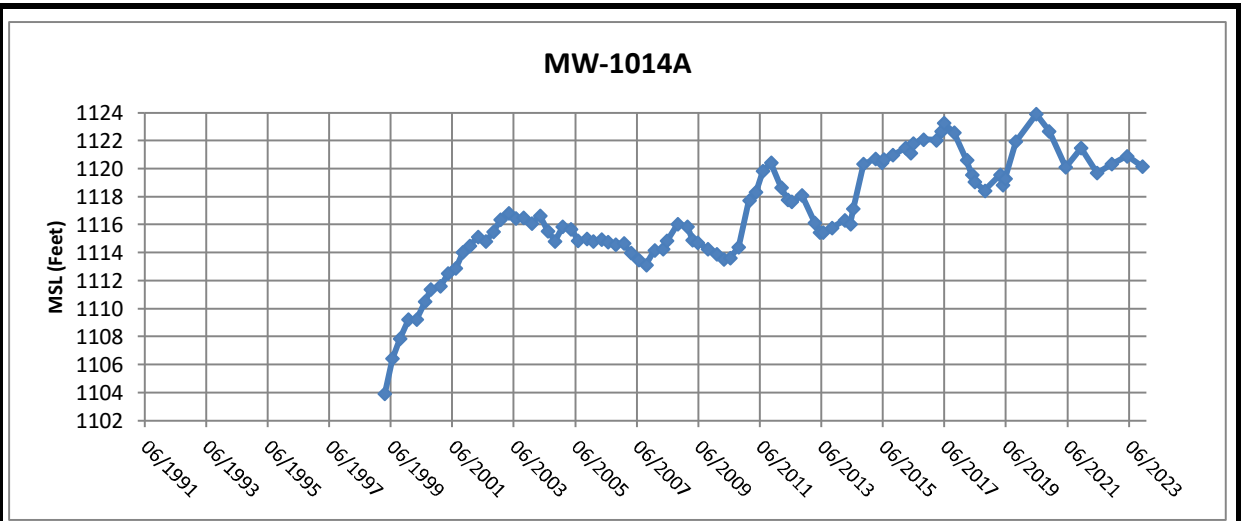
Scale: NA

Date: January 2024

Prepared By: SGL

Checked By: NMG1

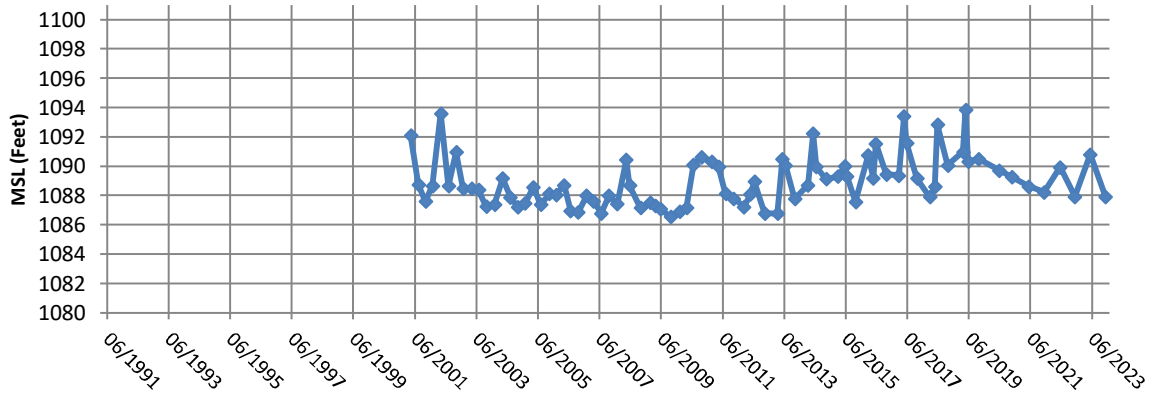
Project: 17F777.24



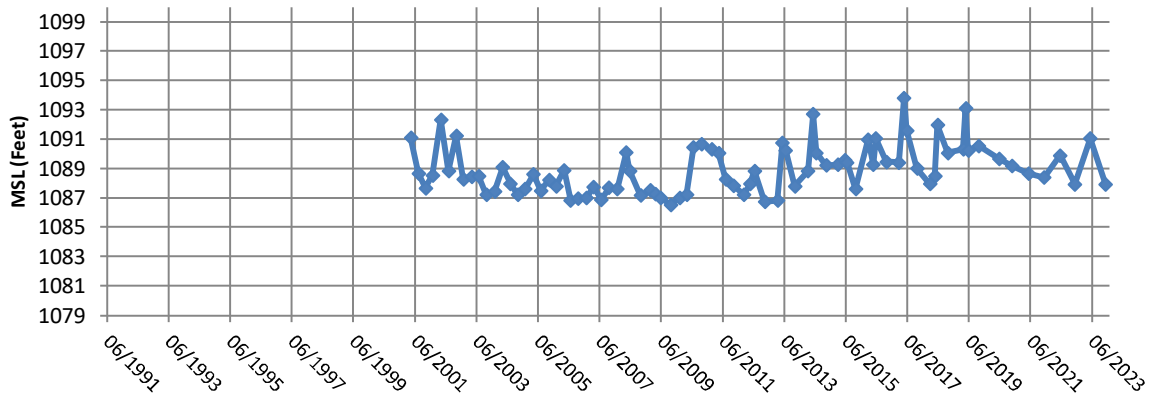
Foth	
FLAMBEAU MINING COMPANY	
Figure B-16i Hydrographs	
Scale: NA	Date: January 2024
Prepared By: SGL	Checked By: NMG1
Project: 17F777.24	

Flambeau Mining Co.
2023 Annual Summary Memorandum

MW-1015A



MW-1015B



FLAMBEAU MINING COMPANY

Figure B-16j
Hydrographs

Scale: NA

Date: January 2024

Prepared By: SGL

Checked By: NMG1

Project: 17F777.24

Flambeau Mining Co.

2023 Annual Summary Memorandum

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2023 Groundwater Elevation Results

Location	Sample Date	Elevation Ft. (MSL)		Sample Date	Elevation Ft. (MSL)
MW-1000PR	5/17/2023	1089.29		11/13/2023	1087.81
MW-1000R	5/17/2023	1091.34		11/13/2023	1089.00
MW-1001	5/17/2023	1123.88		11/13/2023	1118.65
MW-1001G	5/17/2023	1122.24		11/13/2023	1117.56
MW-1001P	5/17/2023	1122.54		11/13/2023	1118.08
MW-1002	5/17/2023	1096.84		11/13/2023	1090.85
MW-1002G	5/17/2023	1096.76		11/13/2023	1090.71
MW-1004	5/17/2023	1110.17		11/13/2023	1107.70
MW-1004P	5/17/2023	1108.57		11/13/2023	1106.26
MW-1004S	5/17/2023	1110.25		11/13/2023	1107.76
MW-1005	5/17/2023	1141.64		11/13/2023	1139.99
MW-1005P	5/17/2023	1141.14		11/13/2023	1138.54
MW-1005S	5/17/2023	1141.92		11/13/2023	1139.37
MW-1010P	5/17/2023	1088.91		11/13/2023	1087.73
MW-1013	5/17/2023	1116.07		11/13/2023	1113.47
MW-1013A	5/17/2023	1101.10		11/13/2023	1098.58
MW-1013B	5/17/2023	1101.54		11/13/2023	1099.09
MW-1013C	5/17/2023	1104.64		11/13/2023	1101.92
MW-1014	5/17/2023	1125.02		11/13/2023	1122.84
MW-1014A	5/17/2023	1120.90		11/13/2023	1120.14
MW-1014B	5/17/2023	1119.56		11/13/2023	1116.39
MW-1014C	5/17/2023	1113.96		11/13/2023	1110.88
MW-1015A	5/17/2023	1090.79		11/13/2023	1087.90
MW-1015B	5/17/2023	1091.03		11/13/2023	1087.91
OW-39	5/17/2023	1105.84		11/13/2023	1106.52
PZ-S3	5/17/2023	1128.78		11/13/2023	1124.43
ST-9-23	5/17/2023	1129.75		11/13/2023	1125.77
ST-9-23A	5/17/2023	1129.91		11/13/2023	1125.92
ST-9-26	5/17/2023	1120.97		11/13/2023	1117.23

Attachment B
SW-3 2023 Data Table

SW-3 2023 Data Table
Flambeau Mining Company

Date	Analyte	Conductivity	Dissolved Oxygen	pH	Redox Potential	Copper	Hardness	Iron	Manganese	Total Suspended Solids	Zinc
	Units	umhos/cm	mg/l	s.u.	mV	ug/l	mg/l	mg/l	ug/l	mg/l	ug/l
	Location	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
5/17/2023		51.0	4.69	5.81	185.5	<1.9	29.7	0.6	60.2	2.9	<10.3
11/14/2023		101.0	12.48	7.52	60.9	<1.9	52.4	0.545	62.4	1.8	<10.3

mg/l - milligrams per liter

mV = millivolts

s.u. = standard units

ug/l = micrograms per liter

umhos/cm - micromohs per centimeter

Prepared by: NMG1

Checked by: MCC2