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

January 29, 2021

Mr. Greg Pils
Bureau Director
Wisconsin Department of Natural Resources
101 S. Webster Street, GEF2
Madison, WI 53707-7921

Dear Mr. Pils:

The Flambeau Mining Company (Flambeau) is submitting 5 copies of the attached 2020 Annual Summary Memorandum pursuant to Parts 1-8 of the Flambeau Mine Permit (Docket No. IH-89-14). This submittal also addresses other requirements of the Mining Permit and associated approvals.

Monitoring and evaluations conducted during 2020 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 me at stephen.bourn@riotinto.com.

Sincerely,

Digitally signed by Stephen Bourn
Date: 2021.01.26 10:48:14 -07'00'

Stephen Bourn
President – Flambeau Mining Company

attachments

cc: Terry DuSell, Rusk County Board of Supervisors
Tom Riegel, Town of Grant
Al Christianson, City of Ladysmith
Yvonne Johnson, Rusk County Zoning
Leland Roberts, Flambeau Mining Company
Steve Donohue, Foth Infrastructure & Environment, LLC
Foth File: 17F777.21\4000

Memorandum

Foth Infrastructure & Environment, LLC

2121 Innovation Court, Suite 300
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January 29, 2021

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

CC: Steve Donohue, Foth Infrastructure & Environment, LLC
Foth Project #: 17F777.20

FR: Sharon Kozicki, Foth Infrastructure & Environment, LLC
Steve Lehrke, Foth Infrastructure & Environment, LLC
Nick Glander, Foth Infrastructure & Environment, LLC

RE: 2020 Annual Summary Memorandum – Reclaimed Flambeau Mine
Flambeau Mining Company

1 Purpose and Need

This 2020 Annual Summary Memorandum documents the work that was completed by Flambeau Mining Company (Flambeau) at the Reclaimed Flambeau Mine Site, Ladysmith, Wisconsin, in 2020, 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
MP, Part 1, Cond. 8	Section 2	*"Submit a report annually to the Department summarizing the activities which took place on the mining site during the year and shall include other additional information specified in this permit and associated plan approvals."*

Condition Number	Location of Information	Condition Requirement
MP, Part 2, Cond. 4	Section 1	*"Include discussion of all modifications received during the previous year and shall include an inventory of all modifications received subsequent to permit issuance. The annual report shall also discuss deviations from the approved Mining Plan as a result of final engineering refinements of subsequent plan approvals if these deviations do not require modifications, under Part 2, Conditions 2 and 3."*
MP, Part 2, Cond. 6	There were no reportable or recordable incidents in 2020.	*"A summary of incidents subject to various Department reporting requirements shall be included in the annual report required under sec. 144.89, Stats."*
MP, Part 2, Cond 7	There were no exploration activities conducted in 2020.	*"The annual report required under sec. 144.89, Stats, shall include a summary of all exploration drilling activities conducted on the mining site during the previous year."*
MP, Part 4, Cond. 9	Section 2 and Attachment A	*"The annual report required in this permit shall summarize the year's monitoring activities and any observed trends in the monitoring data."*

Since 2018, the annual summary is presented in memorandum format as approved by the Wisconsin Department of Natural Resources (Department) in a letter received on December 7, 2018.

In the Request to Modify the Updated Monitoring Plan (November 2018), the monitoring frequency, number of wells, and number of parameters sampled was requested to be reduced. A public informational hearing was conducted by the Department at its service center in Ladysmith, WI on June 20, 2019. After the allotted comment and response period, the request was approved by the Department on October 4, 2019. Subsequent to the approval there was a 30-day review period. There were no requests for review. The 2020 monitoring reflected the new monitoring plan. An Updated Monitoring Plan (August 2020) and Quality Assurance Project Plan (QAPP) (August 2020) were amended and submitted to the Department in August 2020.

2 2020 Site Monitoring

Environmental monitoring at the Reclaimed Flambeau Mine, during 2020, 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.

2.1 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 2020 monitoring were submitted to the Department's Mine Reclamation Unit on August 25, 2020 and January 5, 2021. Those reports are incorporated by reference.

Figure 1 shows the groundwater potentiometric surface using data obtained during 2020. 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.

2.1.1 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 Attachment A. In general, the number of more notable concentration trends as observed in previous Annual Reports have reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. A number of the trends, noted through the Mann-Kendall nonparametric test, 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, copper, manganese, and conductivity continue a decreasing trend in MW-1000R (near the immediate southwest boundary and hydraulically downgradient of the reclaimed mine pit). A statistically increasing trend for alkalinity and hardness is noted in MW-1002G (northwest and hydraulically side-gradient to the former

mine pit); however, concentrations observed during 2020 are not as high as those observed during 2018 and 2019, indicating this trend may be stabilizing or reversing.

In MW-1005 (hydraulically upgradient of the former mine pit), calcium, chloride, and magnesium had increased concentrations from 2016 through 2018, potentially due to application of road salt on State Highway 27 along with rising water levels and evaporative concentration effects. However, during 2019 and 2020, concentration reversals in these parameters were observed.

For the MW-1013 in-pit well nest, iron at MW-1013, which previously had an increasing trend and historically exhibited a large degree of variation, currently has no statistical trend. The decreasing trend previously observed for copper and manganese at MW-1013B has stabilized. Also, while sulfate in MW-1013B and arsenic in MW-1013C have statistically increasing trends, concentrations observed during 2019 and 2020 have stabilized or decreased.

For the in-pit well nest at MW-1014, copper, hardness, manganese, sulfate, total dissolved solids (TDS), and conductivity in MW-1014B all illustrated significantly reduced concentrations during May and June 2019, with concentrations of hardness, sulfate, and TDS generally rebounding in 2020 to previously observed levels. A decreasing trend remains for copper and manganese. Single point decreases in MW-1014B were also observed during 2019 for calcium, chloride, magnesium, potassium, and zinc, which rebounded in 2020 to previously observed levels.

No statistical trends were noted for surface water during 2020. As noted, oxidation reduction potential (ORP) increased in the samples collected during 2020 at both SW-1 (upstream of the mine footprint) and SW-2 (center of the mine footprint). While this single data point does not constitute a statistical trend, continued data collection will identify whether this trend continues or if this is an anomaly potentially related to calibration or the specific instrument used during the sampling event.

2.2 Monitoring Well Abandonment

Based on the Department's October 4, 2019 decision, a series of monitoring wells were abandoned in 2020. On August 17, 2020, the Reclaimed Flambeau Mine Well Abandonment Work Plan was submitted to the Department outlining the well abandonment plan in accordance with s. NR 141.25 Wisconsin Administrative Code. The Department approved the Work Plan in a letter dated September 15, 2020, and well abandonment activities were completed on September 21 and 22, 2020.

Russ Thompson Excavating was contracted to clear access to several monitoring well locations which included cutting trees, low hanging branches, and clearing brush to provide access and safe work environments. SGS Environmental Contracting, LLC (SGS) completed the well abandonments utilizing two different techniques depending on the depth of the well and the water column. The two well abandonment methods included:

- Abandonment using 3/8-inch bentonite chips poured from the surface; and
- Abandonment using a tremmie pipe and pump.

Table 2 summarizes the monitoring well abandonment details, and Figure 4 provides the locations of the abandoned monitoring wells. The only exception to the Work Plan was monitoring well OW-42 which was abandoned, but the protective casing and riser were not cut-off due to being located in a flooded (approximately 3 feet in depth) constructed wetland area. The well was sealed utilizing 3/8-inch bentonite chips.

Table 2

Abandoned Groundwater Monitoring Well Summary

Well ID	Date Installed	Date Abandoned	Static Depth to Water	Protective Surface Casing Amount Removed	PVC well Length Removed	Sealing Method
			ft bmp	inches bgs	inches bgs	
MW-1003	Sept 1987	9/21/2020	21.57	All	60	3/8" chips
MW-1003P	Sept 1987	9/22/2020	21.69	All	32	Grout
PZ-1006	Sept 1987	9/21/2020	11.05	All	All	3/8" chips
PZ-1006G	Sept 1987	9/21/2020	11.48	All	32	3/8" chips
PZ-1006S	Sept 1987	9/22/2020	11.5	All	36	Grout
PZ-1007S	Nov 1988	9/21/2020	36.01	All	33	3/8" chips
PZ-1008	Nov 1988	9/21/2020	8.34	All	All	3/8" chips
PZ-1008G	Nov 1988	9/22/2020	7.20	All	33	Grout
PZ-1009	Nov 1988	9/21/2020	8.4	All	All	3/8" chips
PZ-1009G	Nov 1988	9/22/2020	8.3	All	96	Grout
PZ-1011	Apr 1991	9/22/2020	6.68	30	30	Grout
PZ-1012	Apr 1991	9/21/2020	28.67	All	30	3/8" chips
PZ-R1	Jan 1988	9/22/2020	13.61	30	30	Grout
PZ-S1	Dec 1987	9/22/2020	8.82	All	30	Grout
OW-07	Jul 1970	9/21/2020	15.55	36	N / A	3/8" chips
OW-10	Jul 1970	9/21/2020	15.03	30	N / A	3/8" chips
OW-42	Sept 1972	9/21/2020	6.8	0	0	3/8" chips
OW-43	Sept 1972	9/21/2020	13.7	33	N / A	3/8" chips
Sandpoint	N/A	9/21/2020	N / A	All	N / A	3/8" chips

bgs = below ground surface
bmp = below measuring point
ft = foot/feet
N/A = Not Applicable
PVC = polyvinyl chloride
3/8" chips = 3/8 inch bentonite chips placed from surface
Grout = grouted from the base of well to surface

Prepared by: NMG1
Checked by: JRK3

The well abandonment summary and well abandonment forms (form 3300-005) were submitted to the Department on November 20, 2020.

2.3 Wetland Monitoring

The wetland staff gauge, WT-5, located in Wetland 1, was removed on September 22, 2020, as stipulated in the Department's decision dated October 4, 2019. The staff gauge was disassembled and removed from site. The abandonment notification was submitted to the Department in a letter dated November 20, 2020.

2.4 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 2020 calculation, updated using the current gradient and concentrations, is incorporated by reference. The results of the 2020 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, 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 2020 Flambeau River analytical results are summarized in Attachment A.

2.5 Annual Site Inspection

The site was inspected during the 2020 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, first observed in 2019, had expanded and was impeding drainage to the weir causing flooding in the local area. A plan was prepared to remove the beavers. Beaver removal activities began in 2020 and are presented in Section 2.5.1.

2.5.1 Beaver Removal Activities

Prior to commencement of the beaver removal activities, a courtesy notification was made to the Ladysmith Chamber of Commerce (for placement on the City's website), the local newspaper, and caution signs placed at each entry to the property along with warning signs around the immediate trapping area. Animal Logistics Wildlife Management, a state certified trapper, was contracted to remove the beavers from the constructed wetland area. Beaver removal followed the guidelines of the Beaver Removal Work Plan submitted to the Department on August 20, 2020 via electronic mail as a courtesy.

Site orientation and active beaver trapping began on August 17, 2020 and lasted for approximately 10 days. Five beavers were removed from the wetland area and disposed in accordance with regulations. Russ Thompson Excavating was contracted to break the berm

after the beavers were removed to restore drainage to the weir and lower the water levels in the constructed wetland area to historical levels. Beaver activity was monitored during September 2020 while the wetland area drained with no activity being noted. The beaver hut was scheduled to be demolished in mid-October 2020 once the ground hardened; however, weather postponed access and is now planned for 2021. The trapper will continue to conduct routine site inspections for beaver activities until the beaver hut is removed. The trapper will provide notification of any activity.

Grading and site restoration is expected to happen during the removal of the beaver hut.

2.6 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. The results indicate that the Flambeau River remains protected.

3 References

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

4 Submittal Summary

Document	Date	Submittee
2019 Annual Summary Memorandum	January 2020	Greg Pils[1]
Environmental Groundwater Monitoring (First half 2020)	August 2020	Greg Pils[1]
Environmental Groundwater Monitoring (Second half 2020)	January 2021	Greg Pils[1]

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

Attachments:

Figure 1 October 2020 Potentiometric Surface, Shallow Groundwater Levels
Figure 2 October 2020 Potentiometric Surface, Wells Screened at Mid-Depths
Figure 3 2020 Mine Pit Cross Section A-A' with In-Pit Groundwater Monitoring Wells

Attachment A Groundwater Quality & Elevation/Surface Water Quality Trends

Figures

38,000 E | 39,000 E | 40,000 E | 41,000 E | 42,000 E | 43,000 E

43,000 N | 42,000 N | 41,000 N | 40,000 N | 39,000 N

1092.12 *
MW-1002
MW-1002G
1091.98

1089.24 *
MW-1015A
MW-1015B
1089.17

MW-1014 1125.18 *
MW-1014A 1122.68
MW-1014B 1118.35
MW-1014C 1112.67

MW-1004 1108.81 *
MW-1004S 1108.86
MW-1004P 1106.80

ST-9-23
1127.90 *
ST-9-23A
1128.07

MW-1005 1141.23 *
MW-1005P 1140.39
MW-1005S 1141.06

MW-1013 1114.39 *
MW-1013A 1099.72
MW-1013B 1100.18
MW-1013C 1103.05

PZ-S3
1126.70

ST-9-26
1119.71

MW-1010P
1088.85 *

MW-1000PR
1089.07

MW-1000R
1090.26

OW-39
1102.08 *

MW-1001 1120.36 *
MW-1001P 1119.71
MW-1001G 1119.11

1090 | 1095 | 1100 | 1105 | 1110 | 1115 | 1120 | 1125 | 1130 | 1135 | 1140

N

LEGEND

- 1125 — POTENTIOMETRIC SURFACE CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR BASED ON HISTORICAL DATA
- MW-1001 1120.36 — GROUNDWATER MONITORING WELL AND MEASURED GROUNDWATER ELEVATION (FT MSL) (NOVEMBER 17, 2020)
- 1120.36 * — 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.

Flambeau Mining Company
2020 Annual Summary Memorandum

Foth

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	NMG1	DATE:	JAN. '21
REVIEWED BY:	MAN	DATE:	JAN. '21
APPROVED BY:	SVF	DATE:	JAN. '21

FLAMBEAU MINING COMPANY

FIGURE 1
NOVEMBER, 2020
POTENTIOMETRIC SURFACE,
SHALLOW GROUNDWATER LEVELS

Scale: 0 250' 500'
Date: JANUARY 2021
Drafted By: JOW
Project No. 17F777.20

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43,000 N
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MW-1002
MW-1002G
1091.98

MW-1014
MW-1014A
MW-1014B 1118.35
MW-1014C

MW-1015A
MW-1015B
1089.17

MW-1004
MW-1004S
MW-1004P 1106.80

ST-9-23
ST-9-23A
1128.07

MW-1013
MW-1013A
MW-1013B 1100.18
MW-1013C

PZ-S3
1126.70

MW-1005
MW-1005P 1140.39
MW-1005S

MW-1010P
1088.85 *

MW-1000PR
1089.07

MW-1000R
1090.26

ST-9-26
1119.71

OW-39
1102.08*

MW-1001
MW-1001P 1119.71
MW-1001G

1090
1095
1100
1105
1110
1115
1120
1125
1130
1135
1140

N

LEGEND

1120 — POTENTIOMETRIC SURFACE CONTOUR

INFERRED POTENTIOMETRIC SURFACE CONTOUR BASED ON HISTORICAL DATA

MW-1002G 1091.98 — GROUNDWATER MONITORING WELL AND MEASURED GROUNDWATER ELEVATION (FT MSL) (NOVEMBER 17, 2020)

SLURRY WALL LOCATION

APPROXIMATE LIMITS OF FORMER MINE PIT

NOTE:

1. "B-WELLS" IN THE BACKFILLED PIT AND DEEPER WELLS IN AREAS WITH WELL NESTS OUTSIDE OF THE BACKFILLED PIT WERE USED.

Flambeau Mining Company
2020 Annual Summary Memorandum

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Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	NMG1	DATE:	JAN. '21
REVIEWED BY:	MAN	DATE:	JAN. '21
APPROVED BY:	SVF	DATE:	JAN. '21

FLAMBEAU MINING COMPANY

FIGURE 2

NOVEMBER, 2020 POTENTIOMETRIC SURFACE
WELLS SCREENED AT MID-DEPTHS

Scale: 0 250' 500'		Date:	JANUARY 2021
Drafted By:	JOW	Project No.	17F777.20

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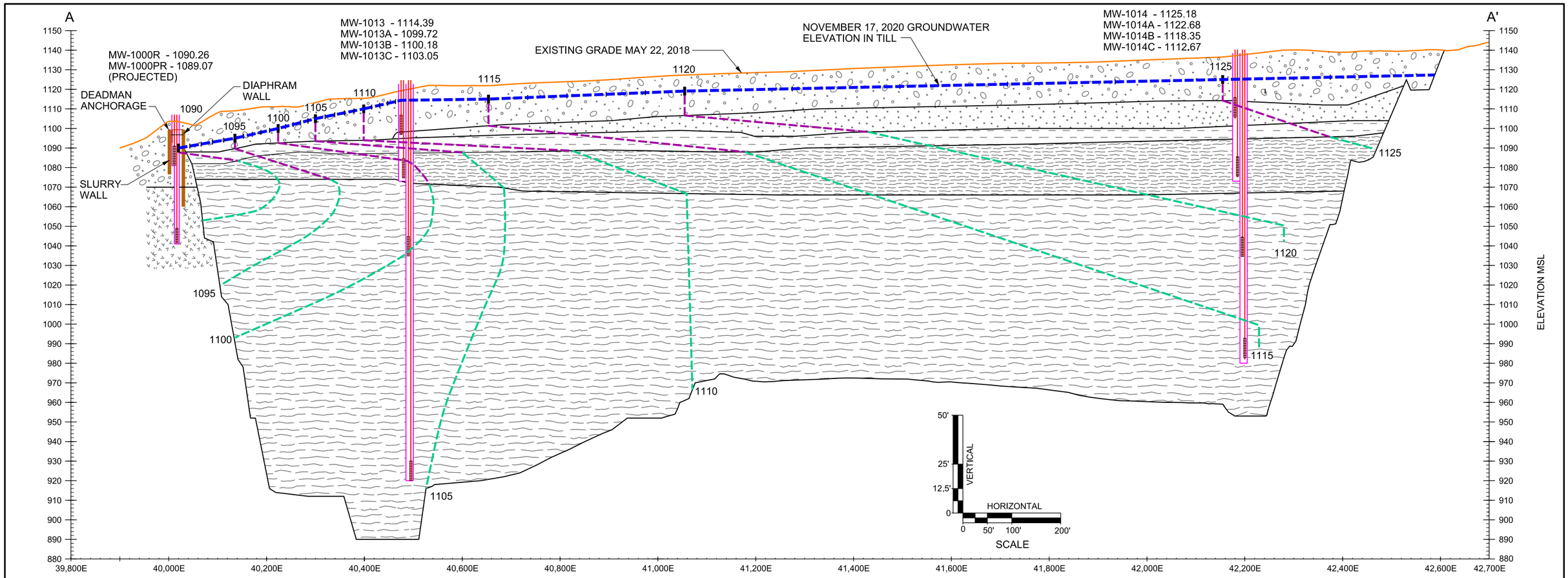

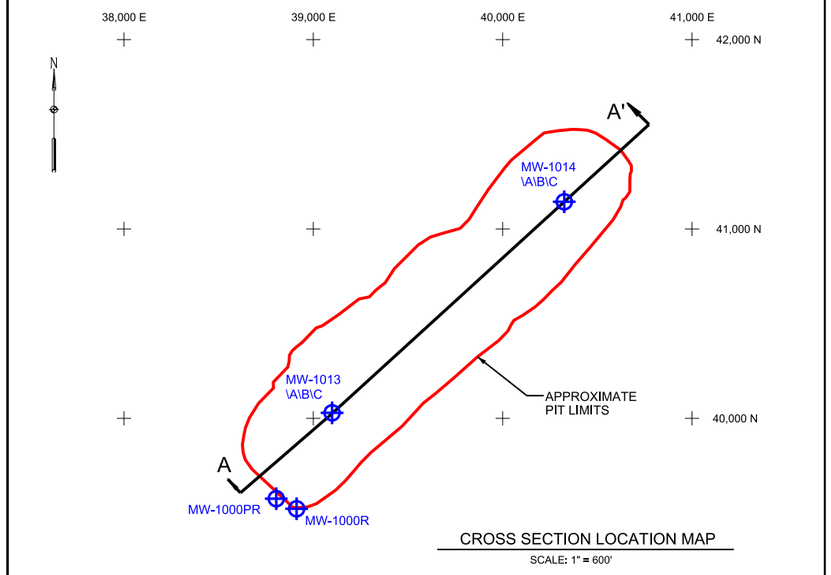

Flambeau Mining Company
2020 Annual Summary Memorandum

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

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	NMG1	DATE:	JAN. '21
REVIEWED BY:	MAN	DATE:	JAN. '21
APPROVED BY:	SVF	DATE:	JAN. '21

FLAMBEAU MINING COMPANY

FIGURE 3
2020 MINE PIT CROSS SECTION A - A'
WITH IN-PIT GROUNDWATER
MONITORING WELLS

Scale:	SEE BAR SCALE	Date:	JANUARY 2021
Drafted By:	JOW	Project No.	17F777.20

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PZ-1012
PZ-1007S
PZ-1011
MW-1002
MW-1002G
MW-1003
MW-1003P
MW-1014
MW-1014A
MW-1014B
MW-1014C
PZ-1006G
PZ-1006
PZ-1006S
PZ-1009G
PZ-1009
OW-10
MW-1015A
MW-1015B
WT-5
OW-43
MW-1004
MW-1004S
MW-1004P
ST-9-23
ST-9-23A
OW-42
MW-1013
MW-1013A
MW-1013B
MW-1013C
PZ-S3
MW-1005
MW-1005P
MW-1005S
PZ-S1
PZ-R1
MW-1010P
ST-9-26
OW-39
MW-1000PR
MW-1000R
OW-7
MW-1001
MW-1001P
MW-1001G
PZ-1008
PZ-1008G

N

LEGEND

PZ-1011	GROUNDWATER MONITORING WELL ABANDONED SEPTEMBER 2020
WT-5	SANDPOINT ABANDONED SEPTEMBER 2020
MW-1002G	GROUNDWATER MONITORING WELL
	SLURRY WALL LOCATION
	APPROXIMATE LIMITS OF FORMER MINE PIT

NOTE:

1. "B-WELLS" IN THE BACKFILLED PIT AND DEEPER WELLS IN AREAS WITH WELL NESTS OUTSIDE OF THE BACKFILLED PIT WERE USED.

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2020 Annual Summary Memorandum

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PREPARED BY:	NMG1	DATE:	JAN. '21
REVIEWED BY:	MAN	DATE:	JAN. '21
APPROVED BY:	SVF	DATE:	JAN. '21

FLAMBEAU MINING COMPANY

FIGURE 4

MONITORING WELL ABANDONMENT LOCATIONS COMPLETED IN SEPTEMBER 2020

Scale: 0 250' 500'
Date: JANUARY 2021
Drafted By: JOW
Project No. 17F777.20

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Attachment A

Groundwater Quality & Elevation/Surface Water Quality Trends

Memorandum

Foth Infrastructure & Environment, LLC

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January 15, 2021

TO: Stephen Bourn, Flambeau Mining Company
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CC: Steve Donohue, Foth Infrastructure & Environment, LLC
Sharon Kozicki, P.G., Foth Infrastructure & Environment, LLC

FR: Stephen Lehrke, Ph.D., Foth Infrastructure & Environment, LLC
Allison Haus, Ph.D., P.G. Foth Infrastructure & Environment, LLC

RE: 2020 Annual Report Groundwater and Surface Water Trends

1 Background

Groundwater and surface water sample results collected during the 2020 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 2020 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.

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

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, 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 2016 through 2020, 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 2020.

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 from 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 2016 through 2020.

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-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 certain 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 time series graphs. The discussion below is therefore limited to 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 Previous Annual Report:
  None to report.

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

[3]USEPA, 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.

Continuing Trends from Previous Annual Report:
Copper, manganese, and conductivity in MW-1000R, and conductivity in MW-1000PR, illustrate decreasing trends in the recent five-year dataset, continuing the trends observed in the long-term data.

- **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 Previous Annual Report:
  None to report.

  Continuing Trends from Previous Annual Report:
  Alkalinity and hardness in MW-1002G continue to have statistically increasing trends indicated in the five-year data. However, concentrations observed during 2020 are not as high as those observed during 2018 and 2019, suggesting this trend may be stabilizing or reversing.

- **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 Previous Annual Report:
  Sulfate in MW-1004S has a statistically increasing trend in the five-year dataset due in most part to increased concentrations observed during October 2019 and June 2020. However, the October 2019 and June 2020 concentrations were still below the maximum observed back in 2014, and the latest sample result in November of 2020 is significantly lower at 21.3 milligrams per liter (mg/L).

  Continuing Trends from Previous Annual Report:
  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 Previous Annual Report:
  None to report.

  Continuing Trends from Previous Annual Report:
  Statistically decreasing trends are observed in MW-1005S for alkalinity, hardness, iron, manganese, TDS, and conductivity; however, these are slower trends and reflect smaller changes in actual concentration.

- **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 Previous Annual Report:
  None to report.

  Continuing Trends from Previous Annual Report:
  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 Previous Annual Report:
  - Iron at MW-1013 previously had an increasing trend reported for the five-year dataset. Iron in this well 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. However, they did not increase in 2020, and currently, no increasing trend is reported.

  - The decreasing trend previously reported for copper and manganese in MW-1013B has stabilized.

  Continuing Trends from Previous Annual Report:
  - Arsenic in MW-1013C and sulfate in MW-1013B have statistically increasing trends indicated in the five-year data. However, concentrations observed during 2019 and 2020 have stabilized or decreased.

  - MW-1013B has a smaller decreasing trend in conductivity, and MW-1013C has smaller decreasing trends of TDS and conductivity.

- **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 Previous Annual Report:
  None to report.

  Continuing Trends from Previous Annual Report:
  - Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

- Decreasing trends of copper and manganese are observed in MW-1014B, with concentrations being particularly lower during 2019. Copper, hardness, manganese, sulfate, TDS, and conductivity in MW-1014B all illustrated significantly reduced concentrations during May and June of 2019, with concentrations of hardness, sulfate, TDS, and conductivity, for the most part, rebounding in 2020 to previously observed levels.

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 Previous Annual Report:

- The single point decreases observed during 2019 in MW-1014B for calcium, chloride, magnesium, potassium, and zinc rebounded in 2020 to previously observed levels.

- Calcium, chloride, and magnesium had small increases in concentrations 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, a concentration reversal in these parameters was observed during 2019 and 2020.

Continuing Trends from Previous Annual Report:
None to report.

3.3 Surface Water (Attachment 3)

Flambeau voluntarily continued surface water sampling of the Flambeau River in 2020. 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. As a note, the ORP readings collected at both SW-1 (upstream of the mine footprint) and SW-2 (center of the mine footprint) observed a substantial increase in 2020. Typical ORP values for surface water are expected to be generally positive, which might range up to 500 or maybe 600 millivolts. The values of ORP in excess of 1000 mV are not problematic, and may be instrument-related or calibration-related. While this is only a single data point and not yet constituting a statistical trend, continued data collection will identify whether this trend continues.

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 but tapering elevations during 2020.

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 above. In general, the number of more notable concentration trends as observed in previous Annual Reports has reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. A number of the trends noted through the Mann-Kendall nonparametric test 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, copper, manganese, and conductivity continue a decreasing trend in MW-1000R (near the immediate southwest boundary and hydraulically downgradient of the reclaimed mine pit). A statistically increasing trend for alkalinity and hardness is noted in MW-1002G (northwest and hydraulically side-gradient to the former mine pit), however, concentrations observed during 2020 are not as high as those observed during 2018 and 2019, indicating this trend may be stabilizing or reversing.

In MW-1005 (hydraulically upgradient of the former mine pit), calcium, chloride, and magnesium had increased concentrations from 2016 through 2018, potentially due to application of road salt on State Highway 27 along with rising water levels and evaporative concentration effects. However, during 2019 and 2020, concentration reversals in these parameters were observed.

For the MW-1013 in-pit well nest, iron at MW-1013, which previously had an increasing trend and historically exhibited a large degree of variation, currently has no statistical trend.

The decreasing trend previously observed for copper and manganese at MW-1013B has stabilized. Also, while sulfate in MW-1013B and arsenic in MW-1013C and have statistically increasing trends, concentrations observed during 2019 and 2020 have stabilized or decreased.

For the in-pit well nest at MW-1014, copper, hardness, manganese, sulfate, TDS, and conductivity in MW-1014B all illustrated significantly reduced concentrations during May and June 2019, with concentrations of hardness, sulfate, TDS, and conductivity generally rebounding in 2020 to previously observed levels. A decreasing trend remains for copper and manganese. Single point decreases in MW-1014B were also observed during 2019 for calcium, chloride, magnesium, potassium, and zinc, which rebounded in 2020 to previously observed levels.

No statistical trends were noted for surface water.

Attachment 1

Groundwater – Semi-Annual Parameters

Trend Analysis
Trend Graphs
2020 Data

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2020

	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	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-25	56	1	-48	51	-42	14	-62	44	-101	-55	9
p-Level	0.368	0.036	1.000	0.075	0.058	0.122	0.627	0.020	0.104	0.000	0.040	0.766
Trend										-		
Trend Results for All Data Since Oct. 1997												
Sample Size	91	72	91	91	91	91	91	91	91	91	75	91
Mann-Kendall S	1766	1219	-1041	-2895	-252	-2566	-3084	-2851	1292	-3055	-1025	1366
p-Level	0.000	0.000	0.000	0.000	0.389	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	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-63	-32	-95	-63	-27	-89	-52	-60	40	-77	-57	2
p-Level	0.018	0.245	0	0.018	0.33	0	0.053	0.024	0.142	0.002	0.032	0.97
Trend			-			-				-		
Trend Results for All Data Since Oct. 1997												
Sample Size	39	39	39	39	39	39	39	39	39	39	38	90
Mann-Kendall S	-390	30	-339	-353	-165	-298	-117	-347	2	-389	-233	1478
p-Level	0	0.727	0	0	0.046	0	0.162	0	0.990	0	0.004	0.000
Trend	-		-	-		-		-		-	-	+
MW-1010P												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	4	11	-34	46	-11	-47	62	6	0	-42	-45	1
p-Level	0.911	0.708	0.215	0.089	0.708	0.082	0.020	0.852	1.000	0.122	0.096	1.000
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	91	72	91	91	91	91	91	91	91	91	76	91
Mann-Kendall S	1042	965	-889	2943	-1415	-843	3162	1229	858	2444	667	1047
p-Level	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.003	0.000	0.003	0.000
Trend	+	+	-	+	-	-	+	+	+	+	+	+
MW-1002												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-52	0	-30	-37	-10	-51	-65	-37	37	-55	-32	-18
p-Level	0.053	1.000	0.277	0.176	0.737	0.058	0.014	0.176	0.176	0.040	0.245	0.525
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	91	69	91	91	91	91	91	91	91	91	26	91
Mann-Kendall S	1399	-34	98	1433	-511	-223	-1622	128	-240	1054	-92	997
p-Level	0.000	0.672	0.657	0.000	0.028	0.250	0.000	0.663	0.412	0.000	0.044	0.001
Trend	+			+			-			+		+
MW-1002G												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	109	0	-17	78	-42	-69	23	-40	62	-18	-38	-19
p-Level	0.000	1.000	0.550	0.002	0.122	0.008	0.410	0.142	0.020	0.525	0.164	0.500
Trend	+			+		-						
Trend Results for All Data Since Oct. 1997												
Sample Size	91	69	91	91	91	91	91	91	91	91	26	91
Mann-Kendall S	1665	-105	359	2630	-322	126	-679	1270	-377	2158	-72	956
p-Level	0.000	0.063	0.030	0.000	0.135	0.506	0.020	0.000	0.197	0.000	0.119	0.001
Trend	+			+				+		+		+

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2020

	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	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	7	-7	15	13	-15	-32	-21	-18	45	7	-23	-3
p-Level	0.822	0.822	0.6	0.654	0.6	0.245	0.454	0.525	0.096	0.822	0.41	0.94
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	38	38	38	38	38	38	38	38	38	38	37	78
Mann-Kendall S	-194	8	261	-148	-13	-4	-117	89	79	-150	-297	791
p-Level	0.015	0.93	0	0.064	0.88	0.97	0.146	0.27	0.33	0.06	0	0.001
Trend			+								-	+
MW-1004S												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	61	0	-27	64	-11	-50	72	-15	49	-4	-47	-3
p-Level	0.022	1.000	0.330	0.016	0.708	0.063	0.006	0.600	0.068	0.911	0.082	0.940
Trend							+					
Trend Results for All Data Since Oct. 1997												
Sample Size	91	71	91	91	91	91	91	91	91	91	76	91
Mann-Kendall S	260	-33	958	736	-706	-171	1946	-441	288	144	-889	1496
p-Level	0.374	0.648	0.000	0.012	0.001	0.470	0.000	0.130	0.325	0.624	0.000	0.000
Trend			+		-		+				-	+
MW-1004P												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	13	-1	-11	22	-25	-31	-47	-58	-7	-76	13	-2
p-Level	0.654	1.000	0.708	0.432	0.368	0.260	0.082	0.029	0.822	0.003	0.654	0.970
Trend										-		
Trend Results for All Data Since Oct. 1997												
Sample Size	92	72	92	92	92	92	92	92	92	92	72	92
Mann-Kendall S	909	653	-825	1435	2209	2027	334	-154	537	917	-807	1700
p-Level	0.000	0.000	0.000	0.000	0.000	0.000	0.214	0.604	0.070	0.002	0.000	0.000
Trend	+	+	-	+	+	+				+	-	+
MW-1005												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	23	-10	-25	-3	-46	-13	37	-40	34	-29	-43	-33
p-Level	0.410	0.737	0.368	0.940	0.089	0.654	0.176	0.142	0.215	0.294	0.112	0.230
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	91	69	91	91	91	91	91	91	91	91	26	90
Mann-Kendall S	-982	-356	741	1778	-93	785	1324	1757	-665	1834	-44	1423
p-Level	0.001	0.063	0.002	0.000	0.752	0.007	0.000	0.000	0.023	0.000	0.347	0.000
Trend	-		+	+		+	+	+		+		+
MW-1005S												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-108	12	-17	-70	-88	-77	78	-68	16	-114	-12	-27
p-Level	0.000	0.681	0.550	0.007	0.000	0.002	0.002	0.009	0.575	0.000	0.681	0.330
Trend	-			-	-	-	+	-		-		
Trend Results for All Data Since Oct. 1997												
Sample Size	91	69	91	91	91	91	91	91	91	91	26	91
Mann-Kendall S	-33	-70	-19	267	-471	-49	-293	-806	434	30	24	1460
p-Level	0.909	0.719	0.841	0.349	0.105	0.867	0.266	0.006	0.137	0.921	0.616	0.000
Trend								-				+

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2020

	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	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-34	7	-52	-1	27	30	-11	-6	34	-40	-7	-37
p-Level	0.215	0.822	0.053	1.000	0.330	0.277	0.708	0.852	0.215	0.142	0.822	0.176
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	91	69	91	91	91	91	91	91	91	91	78	91
Mann-Kendall S	256	302	-63	845	2099	1021	-414	-189	217	801	237	1176
p-Level	0.366	0.030	0.717	0.003	0.000	0.000	0.024	0.518	0.459	0.006	0.308	0.000
Trend				+	+	+				+		+
MW-1015A												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	91	0	-54	80	-29	37	25	8	3	-38	-73	-1
p-Level	0.000	1.000	0.044	0.002	0.294	0.176	0.368	0.794	0.940	0.164	0.006	1.000
Trend	+			+							-	
Trend Results for All Data Since Oct. 1997												
Sample Size	85	78	85	85	86	86	85	85	86	86	62	86
Mann-Kendall S	1224	-149	199	1270	-51	-1128	-266	112	306	1571	-389	729
p-Level	0.000	0.055	0.196	0.000	0.747	0.000	0.314	0.672	0.255	0.000	0.018	0.007
Trend	+			+		-				+		+
MW-1015B												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-19	-44	1	20	-22	-43	-24	10	-9	-81	-22	-5
p-Level	0.500	0.104	1.000	0.477	0.432	0.112	0.389	0.737	0.766	0.002	0.432	0.882
Trend										-		
Trend Results for All Data Since Oct. 1997												
Sample Size	85	78	85	85	86	86	85	85	86	86	63	86
Mann-Kendall S	-358	80	103	1472	-187	-1274	348	201	534	1362	987	764
p-Level	0.122	0.516	0.225	0.000	0.487	0.000	0.029	0.447	0.047	0.000	0.000	0.004
Trend				+		-				+	+	+
MW-1013												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-2	-2	-66	-33	61	-31	-59	-39	32	-87	-20	-6
p-Level	0.970	0.970	0.012	0.230	0.022	0.260	0.026	0.152	0.245	0.000	0.477	0.852
Trend										-		
Trend Results for All Data Since Oct. 1997												
Sample Size	59	59	59	59	59	59	59	59	59	59	59	86
Mann-Kendall S	247	-70	250	-399	112	732	-1369	-197	-13	-697	-488	2542
p-Level	0.107	0.635	0.097	0.009	0.468	0.000	0.000	0.199	0.937	0.000	0.001	0.000
Trend				-		+	-			-	-	+
MW-1013A												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	40	-32	-49	15	-60	6	33	24	46	-65	9	-5
p-Level	0.142	0.245	0.068	0.600	0.024	0.852	0.230	0.389	0.089	0.014	0.766	0.882
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	59	59	59	59	59	59	59	59	59	59	58	86
Mann-Kendall S	507	20	-18	54	192	715	-34	358	6	-193	-452	2027
p-Level	0.001	0.874	0.895	0.728	0.195	0.000	0.829	0.019	0.974	0.209	0.002	0.000
Trend	+					+					-	+

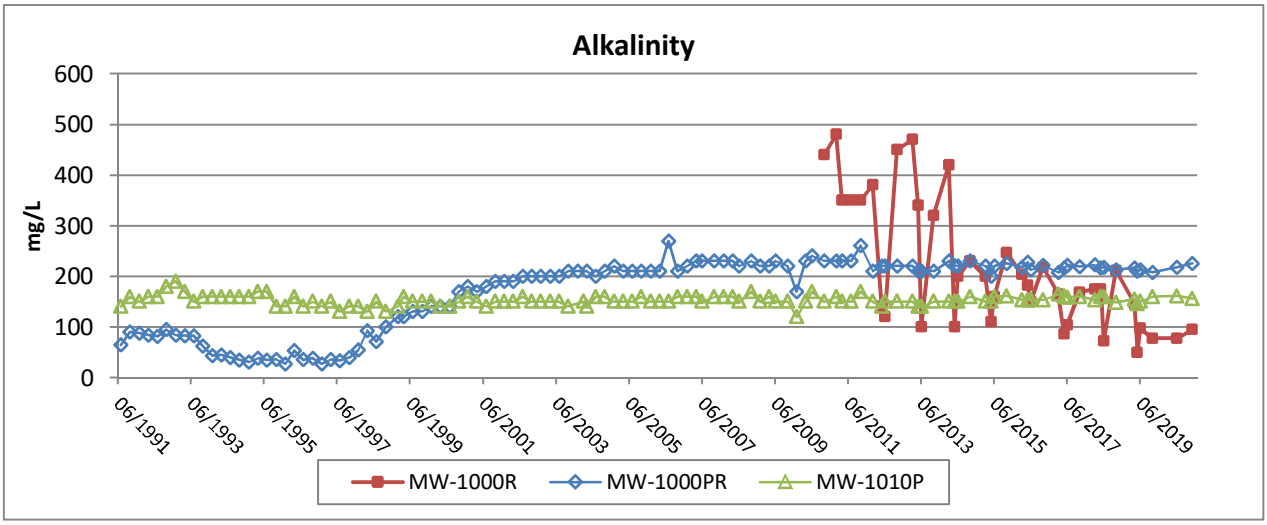
Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2020

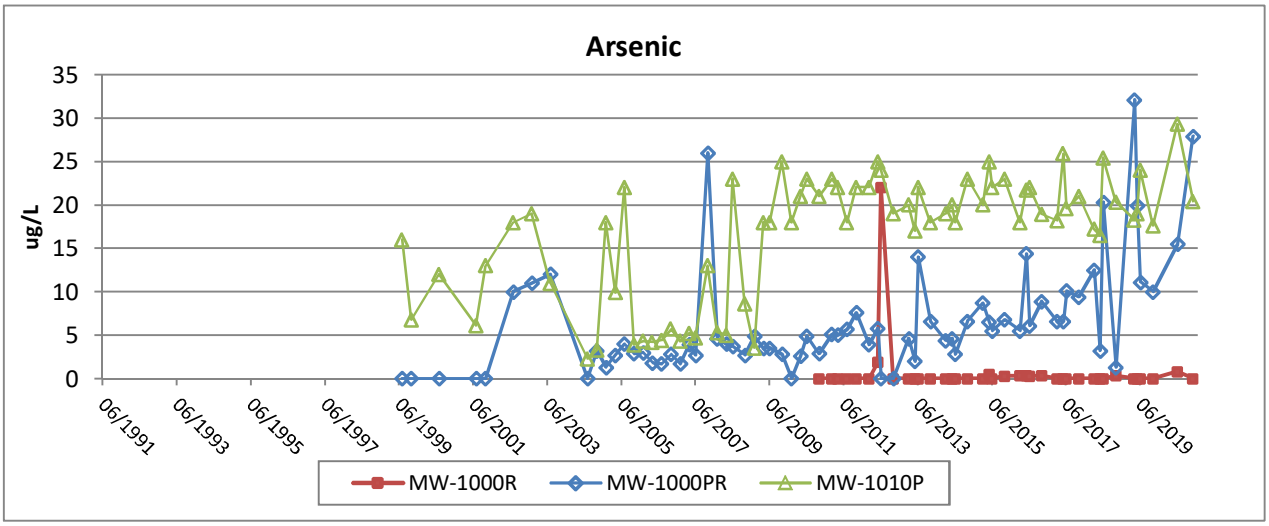
	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1013B												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-6	-8	-53	12	-32	-47	70	-53	21	-84	5	-6
p-Level	0.852	0.794	0.048	0.681	0.245	0.082	0.007	0.048	0.454	0.001	0.882	0.852
Trend							+			-		
Trend Results for All Data Since Oct. 1997												
Sample Size	86	74	86	86	86	86	86	86	86	86	78	86
Mann-Kendall S	-589	-90	1837	-619	-603	-693	1141	-1142	-313	-1281	-517	2055
p-Level	0.028	0.657	0.000	0.017	0.014	0.010	0.000	0.000	0.243	0.000	0.026	0.000
Trend			+			-	+	-		-		+
MW-1013C												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	45	71	18	17	45	-19	6	-84	30	-81	-47	-7
p-Level	0.096	0.006	0.525	0.550	0.096	0.500	0.852	0.001	0.277	0.002	0.082	0.822
Trend		+						-		-		
Trend Results for All Data Since Oct. 1997												
Sample Size	86	74	86	86	86	86	86	86	86	85	78	86
Mann-Kendall S	145	1411	185	-1511	3101	400	-613	-1993	335	-1679	25	2047
p-Level	0.590	0.000	0.377	0.000	0.000	0.134	0.019	0.000	0.212	0.000	0.917	0.000
Trend		+		-	+			-		-		+
MW-1014												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	5	-17	-69	33	-27	1	84	7	37	3	-63	-11
p-Level	0.882	0.550	0.008	0.230	0.330	1.000	0.001	0.822	0.176	0.940	0.018	0.708
Trend			-				+					
Trend Results for All Data Since Oct. 1997												
Sample Size	59	59	59	59	59	59	59	59	59	59	59	83
Mann-Kendall S	110	0	-265	117	-14	532	-540	58	-121	-320	-734	1995
p-Level	0.469	1.000	0.083	0.446	0.886	0.001	0.000	0.709	0.432	0.037	0.000	0.000
Trend						+	-				-	+
MW-1014A												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-11	47	23	21	-57	13	27	25	-1	-72	-41	-11
p-Level	0.708	0.082	0.410	0.454	0.032	0.654	0.330	0.368	1.000	0.006	0.132	0.708
Trend										-		
Trend Results for All Data Since Oct. 1997												
Sample Size	81	71	81	81	81	81	81	81	81	81	78	86
Mann-Kendall S	784	261	1123	-35	-1091	-1883	76	-558	-437	-1219	-601	2216
p-Level	0.001	0.166	0.000	0.883	0.000	0.000	0.759	0.019	0.075	0.000	0.010	0.000
Trend	+		+		-	-				-	-	+
MW-1014B												
Trend Results for Most Recent 5 Years												
Sample Size	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-47	1	-89	-38	-32	-77	-12	-41	47	-62	-53	-9
p-Level	0.082	1.000	0.000	0.164	0.245	0.002	0.681	0.132	0.082	0.020	0.048	0.766
Trend			-			-						
Trend Results for All Data Since Oct. 1997												
Sample Size	86	74	86	86	86	86	86	86	87	87	78	87
Mann-Kendall S	-831	-118	-1355	-1775	-100	-2924	-947	-1859	512	-2065	-1628	2093
p-Level	0.002	0.574	0.000	0.000	0.524	0.000	0.000	0.000	0.060	0.000	0.000	0.000
Trend	-		-	-		-	-	-		-	-	+

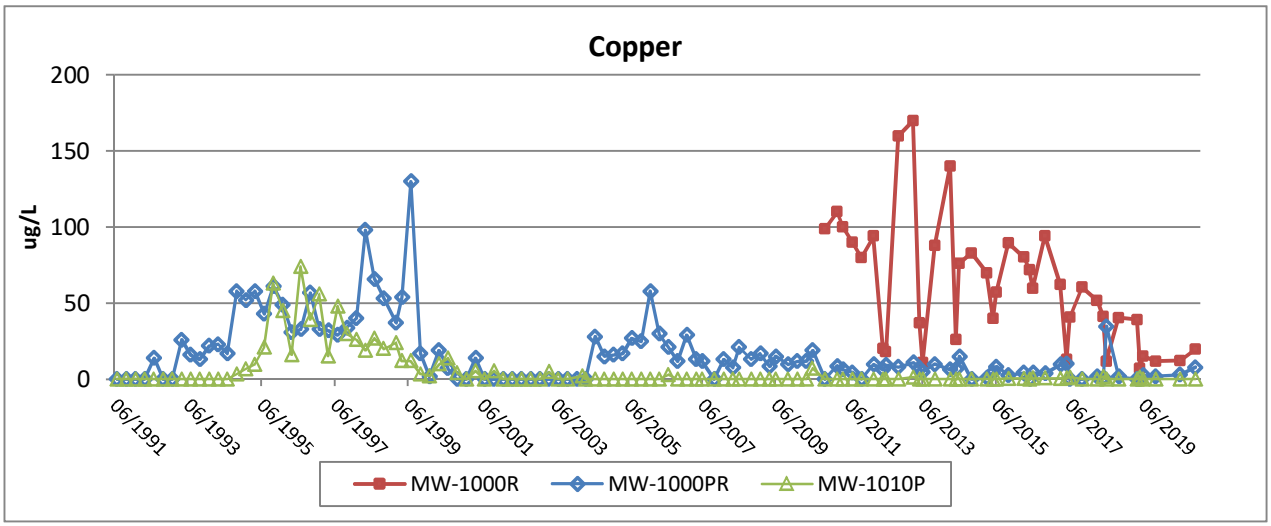
Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2020

	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	18	18	18	18	18	18	18	18	18	18	18	18
Mann-Kendall S	-73	92	-29	46	49	-15	84	-3	25	-66	-21	-15
p-Level	0.006	0.000	0.294	0.089	0.068	0.600	0.001	0.940	0.368	0.012	0.454	0.600
Trend	-	+					+					
Trend Results for All Data Since Oct. 1997												
Sample Size	86	74	86	86	86	86	86	86	86	86	78	86
Mann-Kendall S	-2429	1698	148	-2110	-2716	-2552	-2153	-2134	888	-2784	121	1956
p-Level	0.000	0.000	0.418	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.605	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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Figure B-1a
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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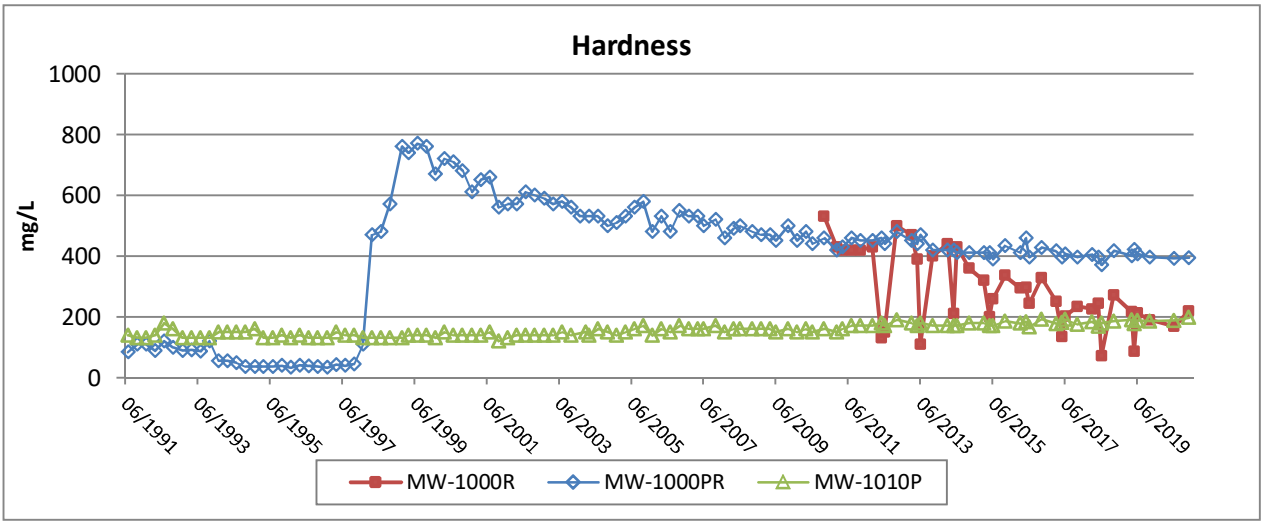
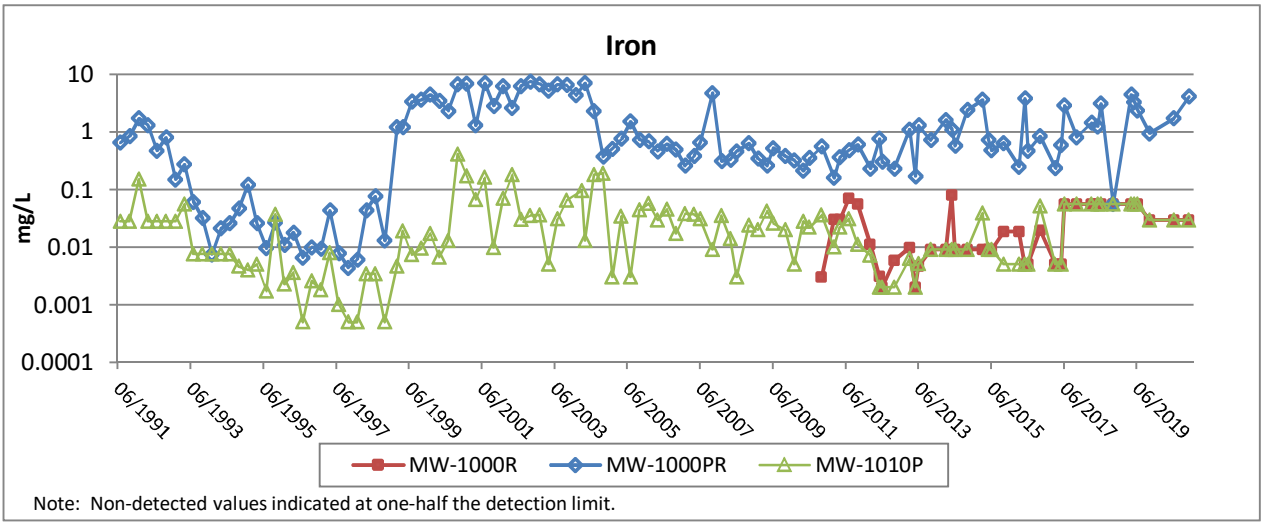
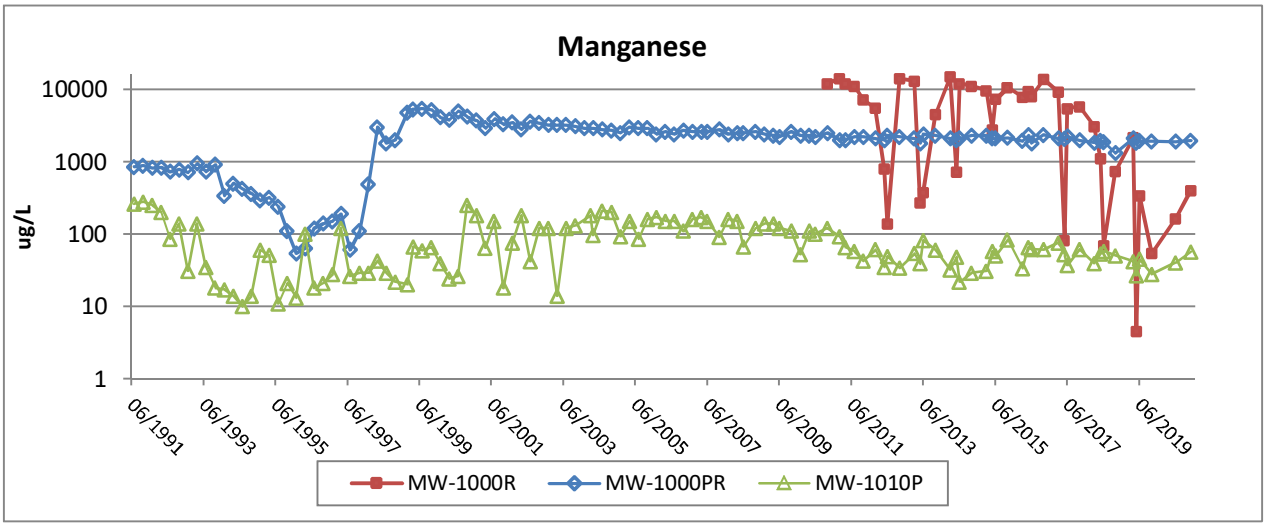




Note: Non-detected values indicated at one-half the detection limit.



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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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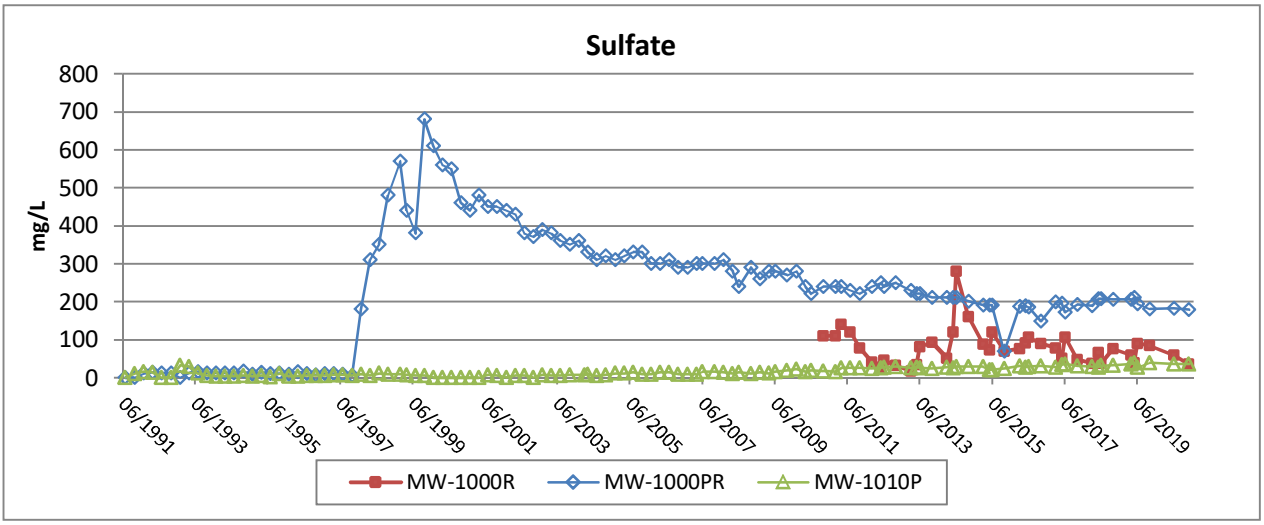

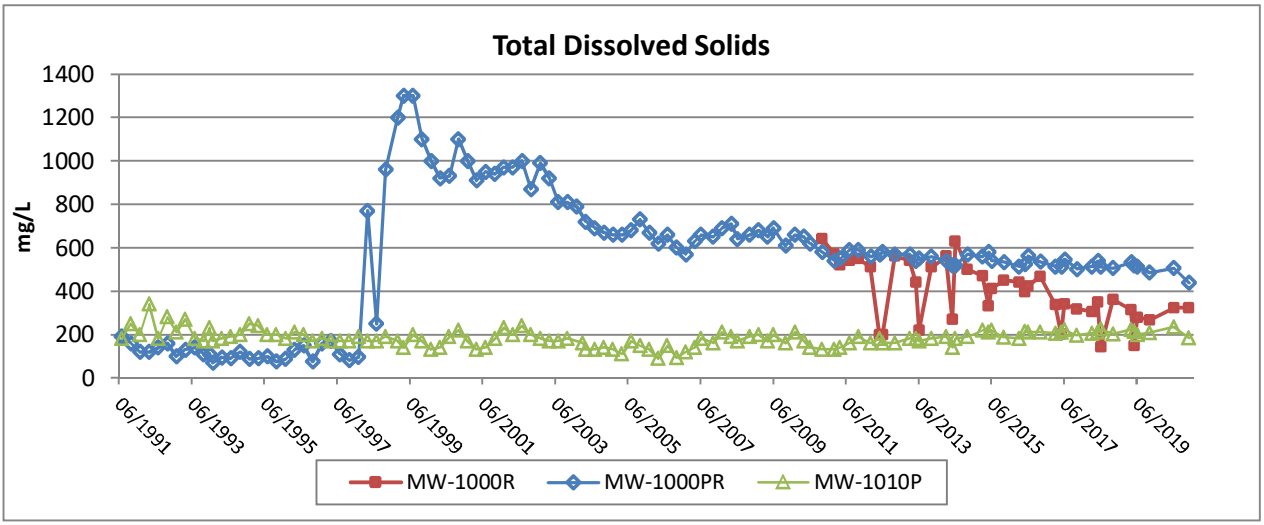

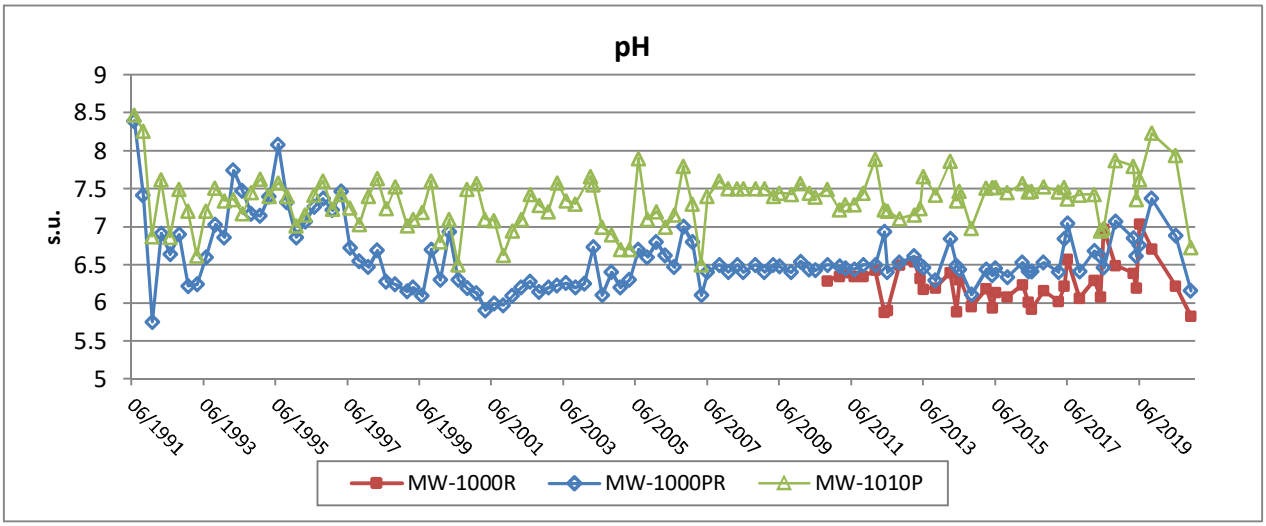

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Figure B-1c
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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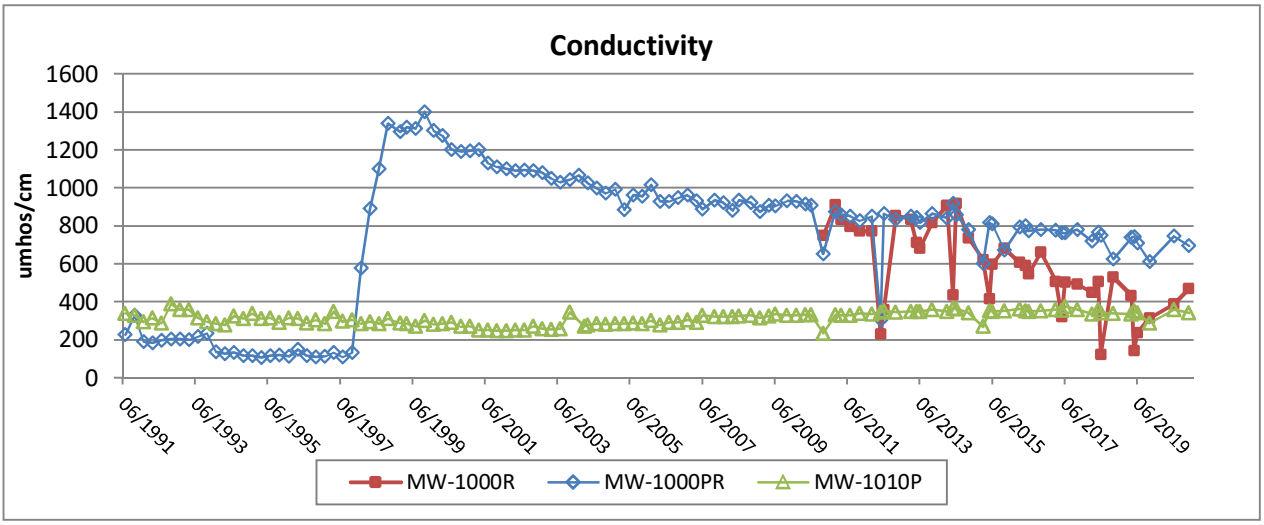

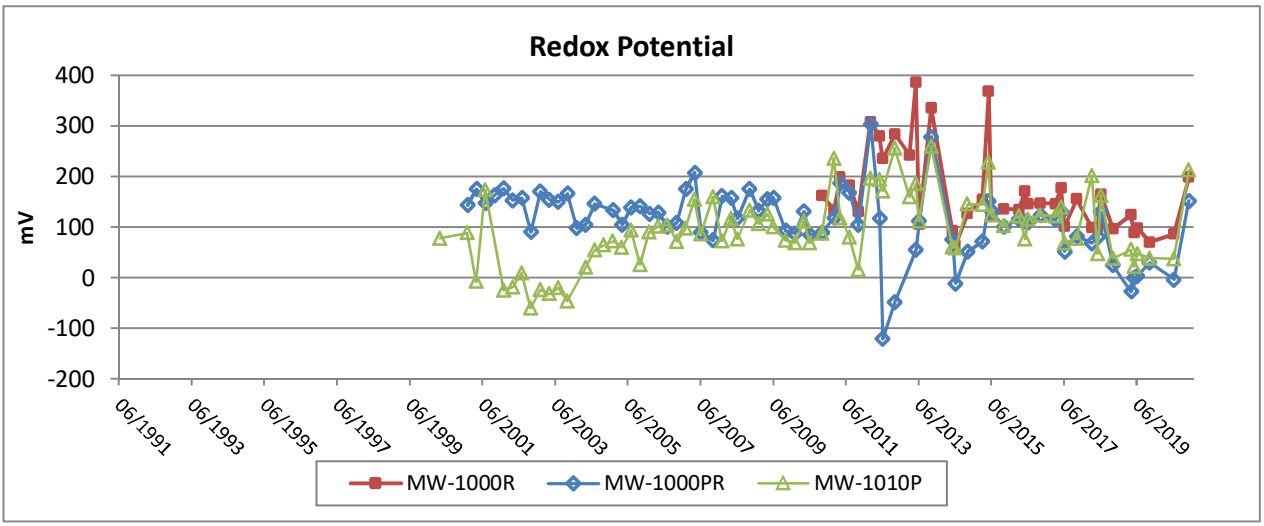

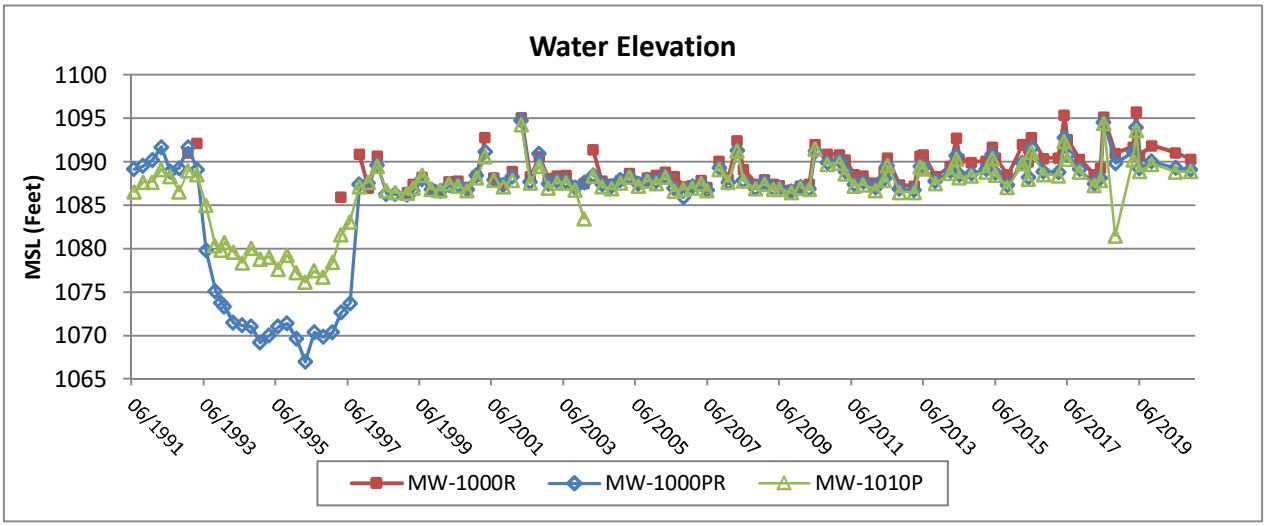

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Figure B-1d
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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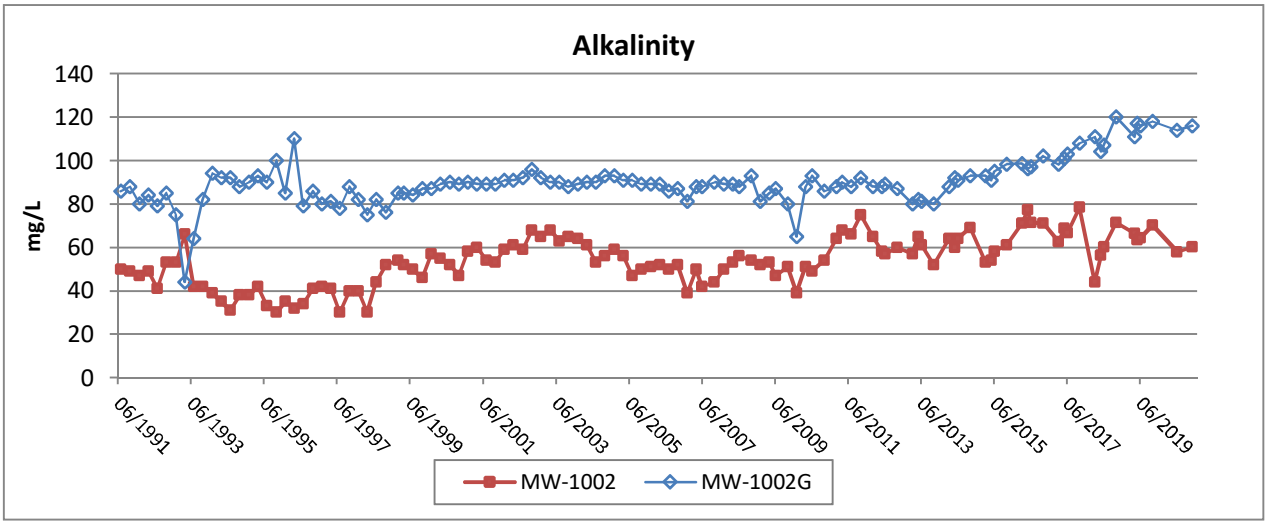

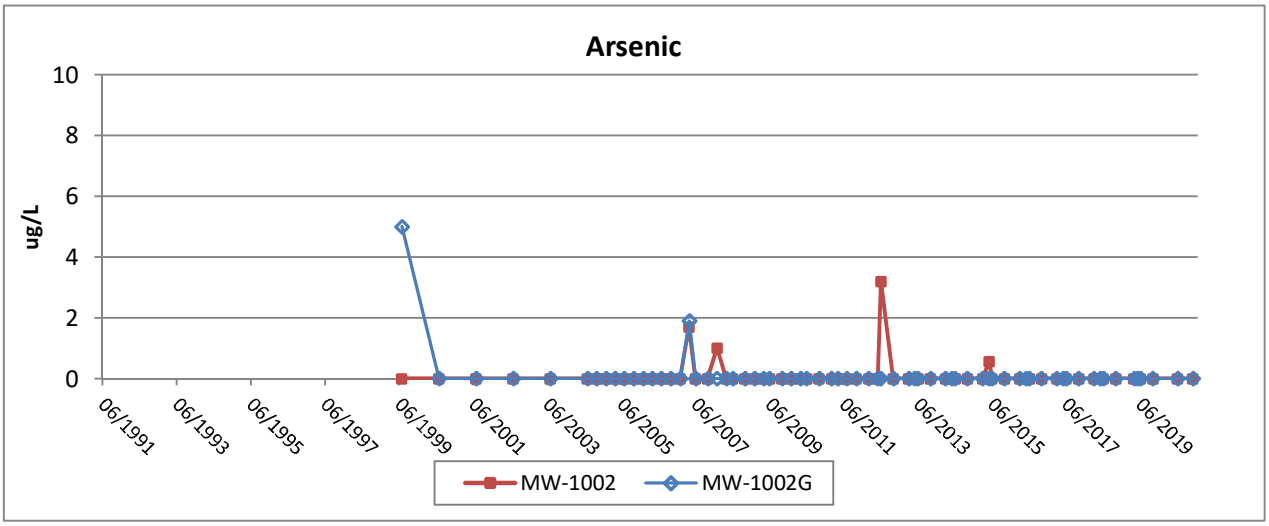

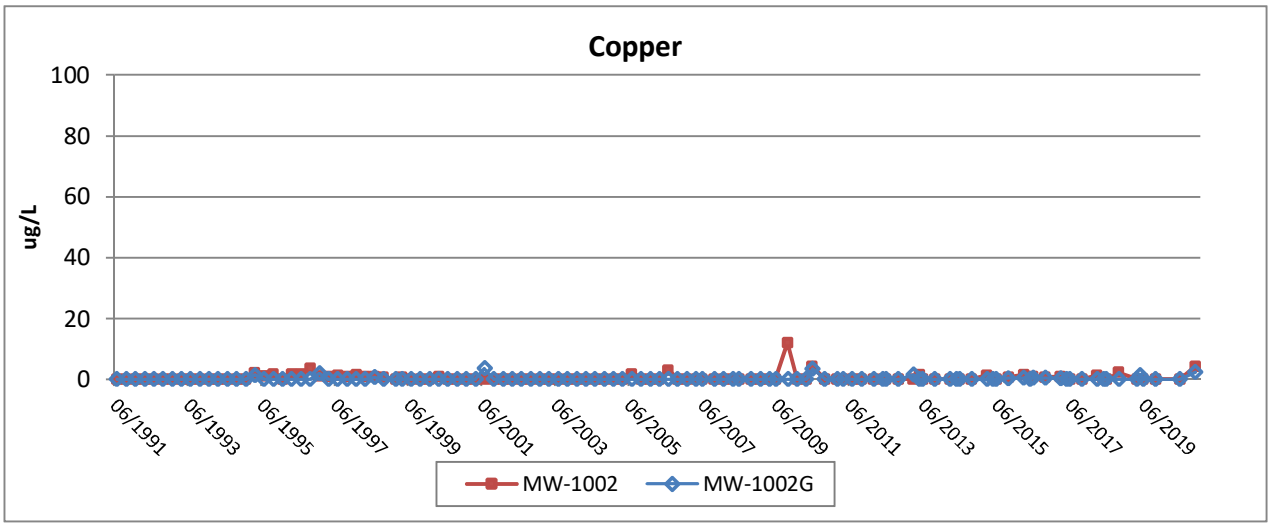

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Figure B-2a
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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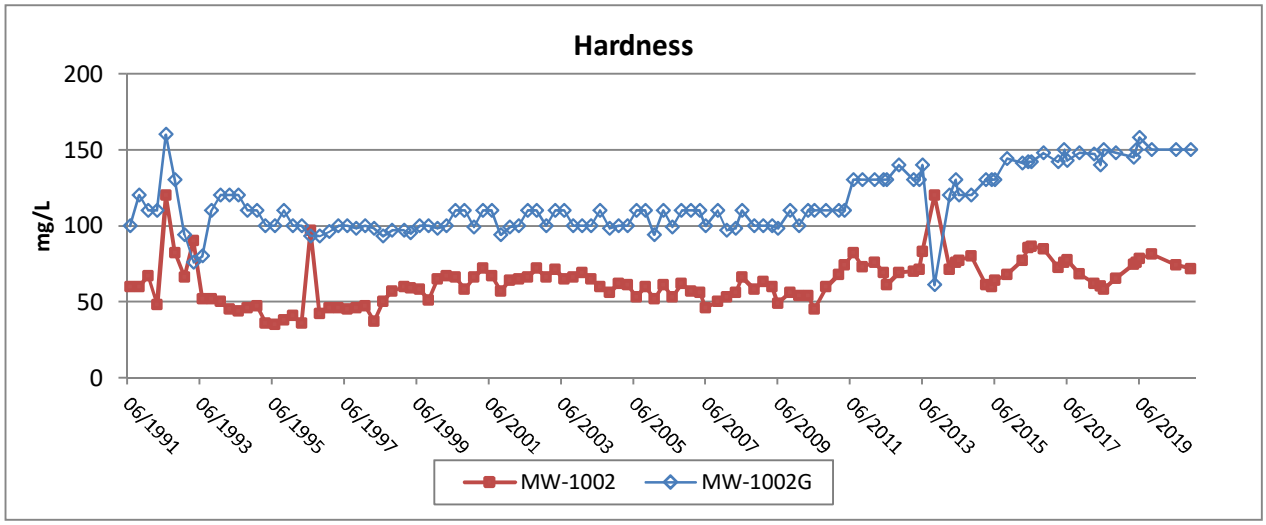

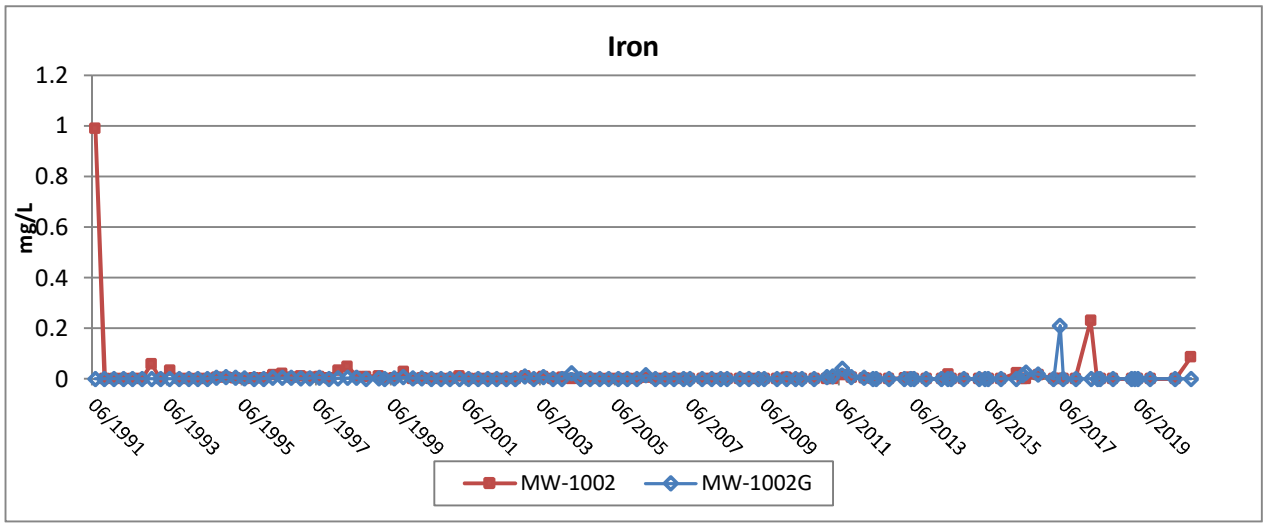

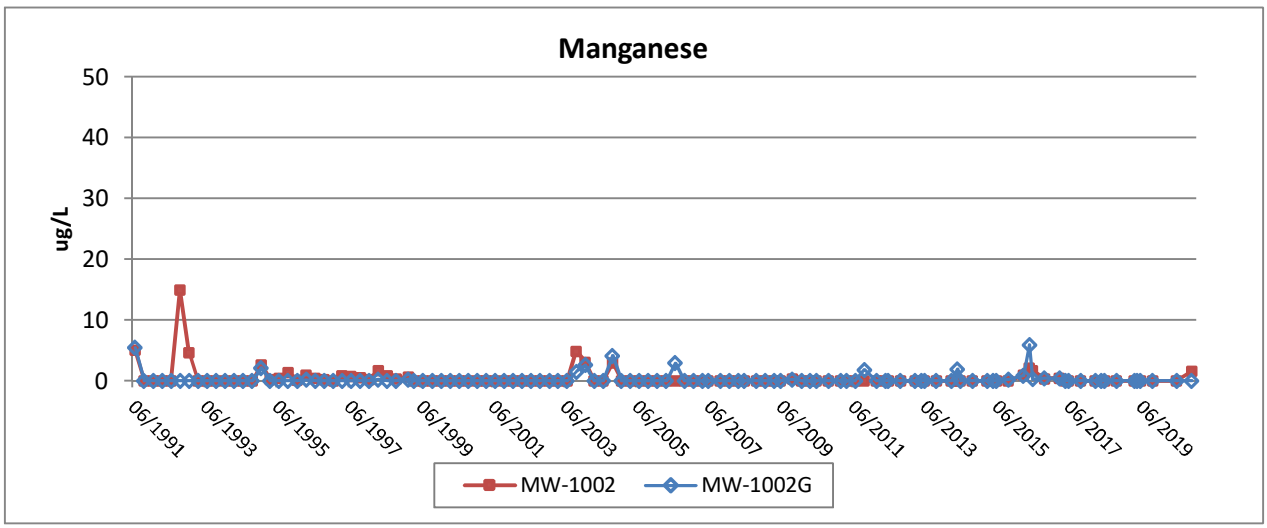

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Figure B-2b
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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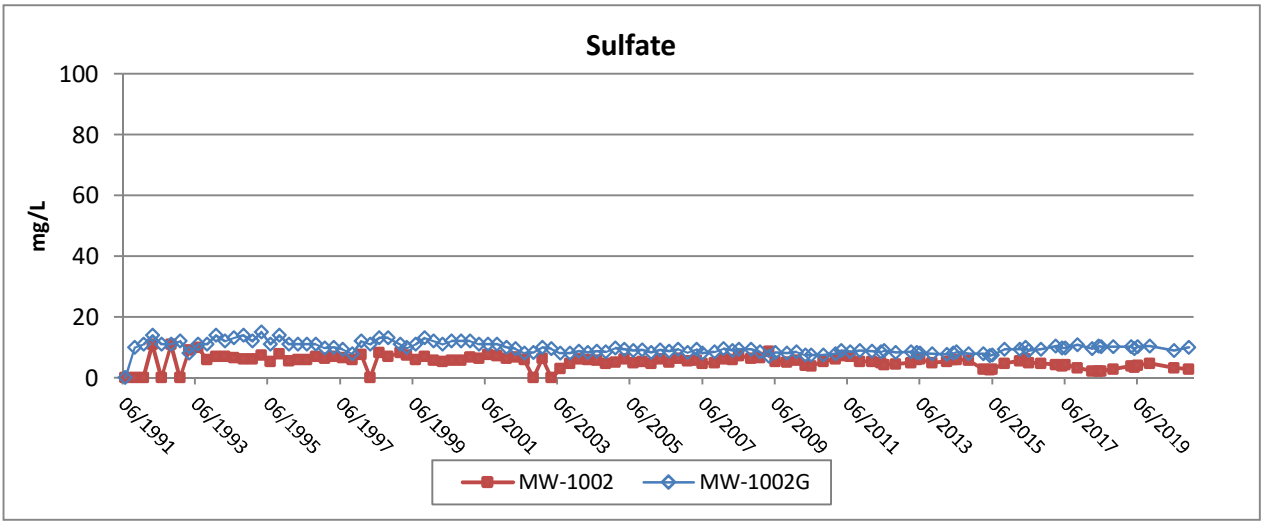

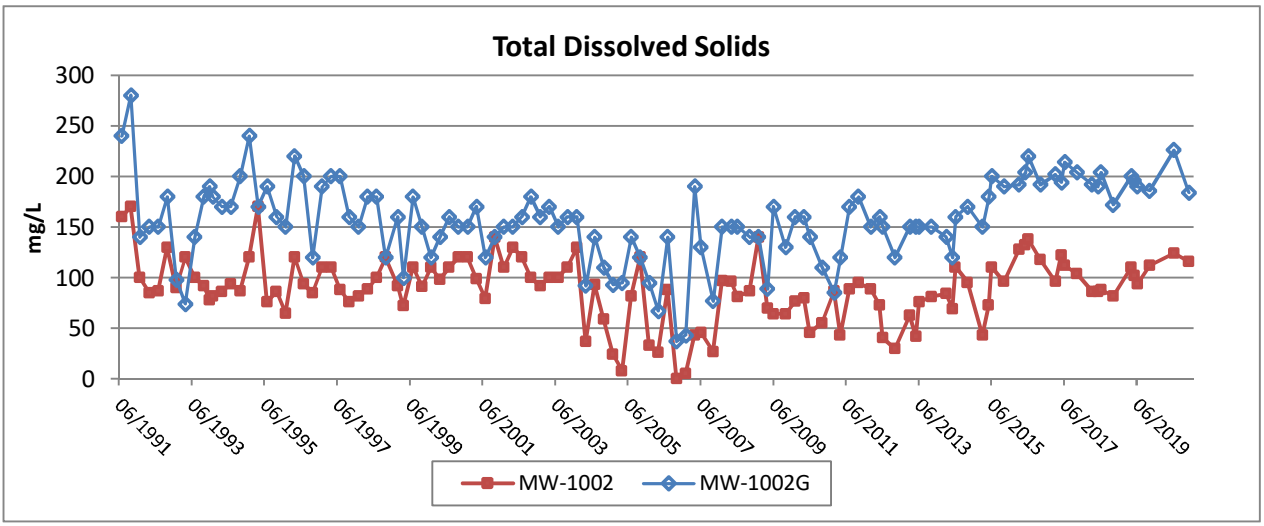

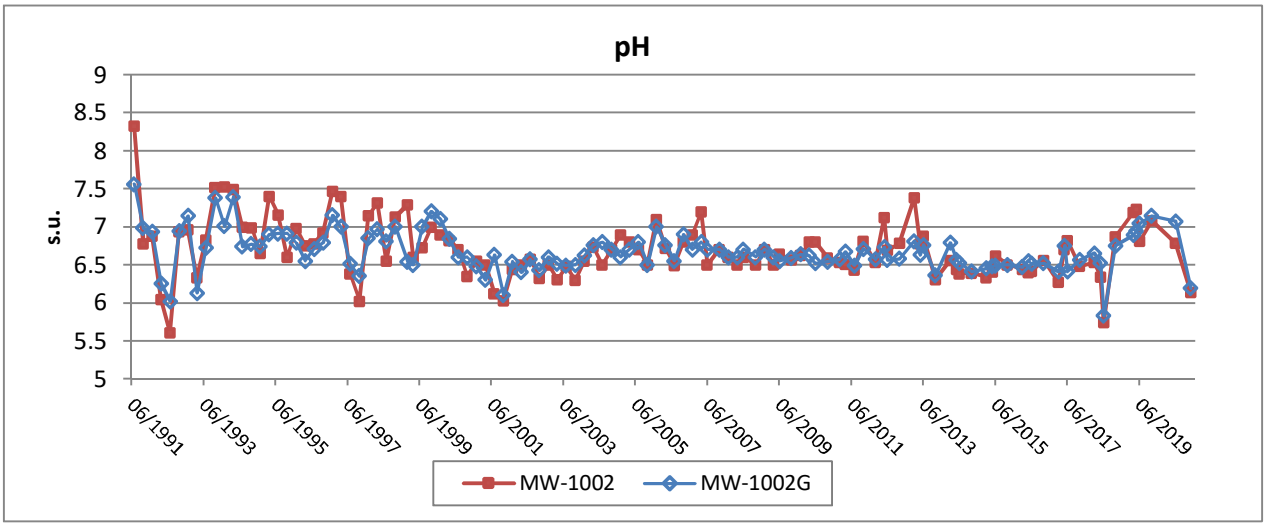

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Figure B-2c
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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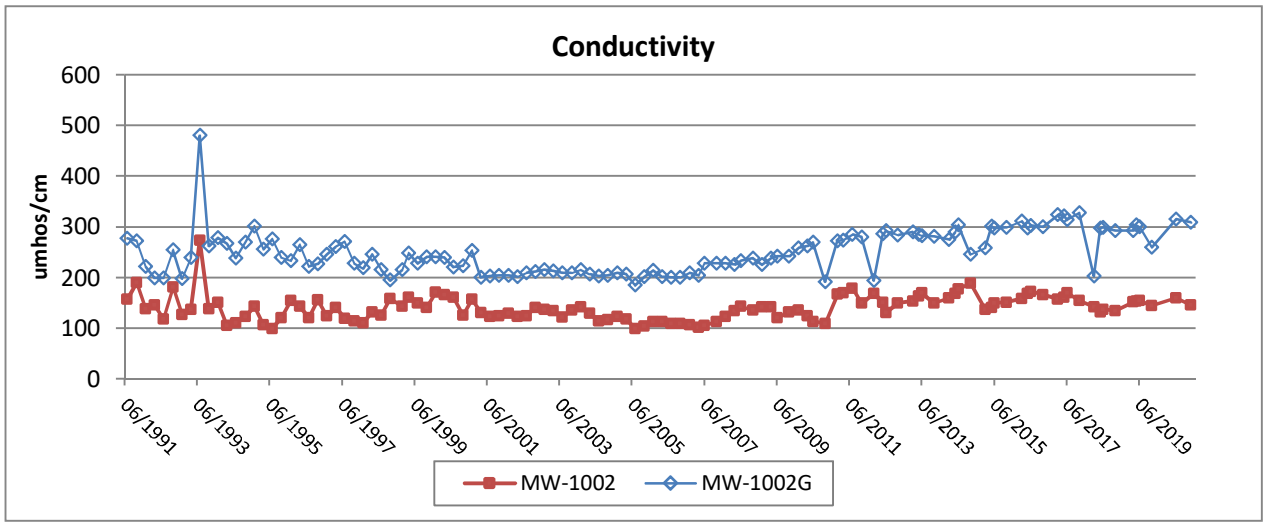

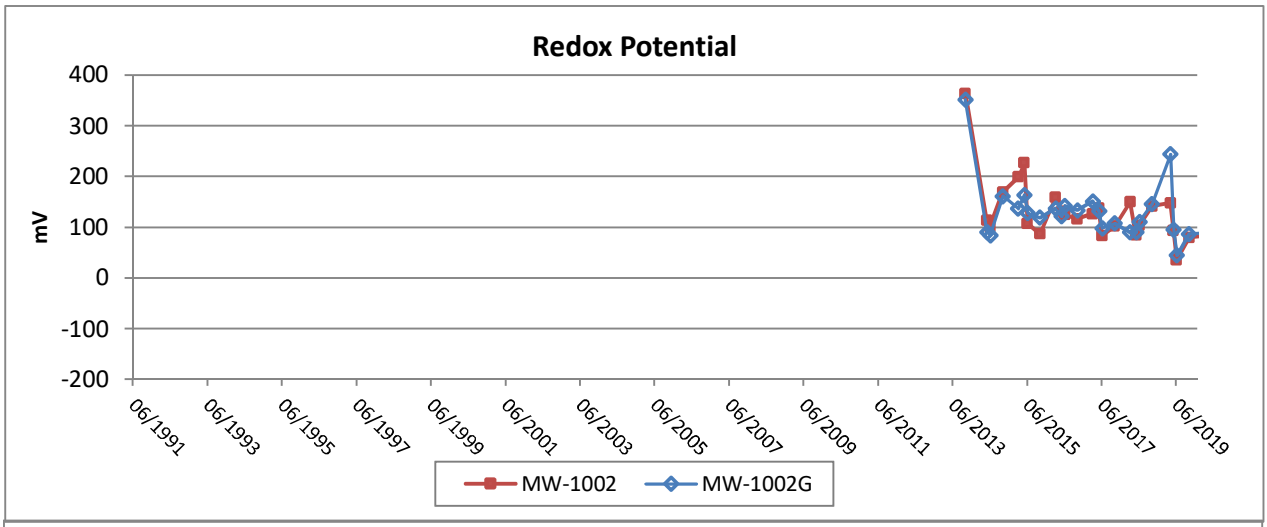

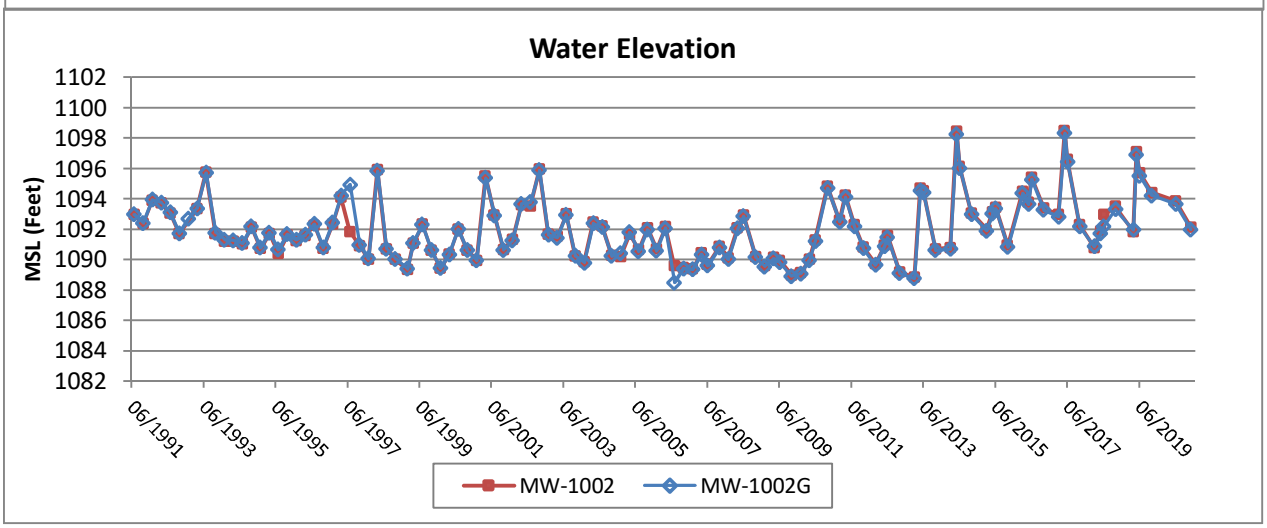

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Figure B-2d
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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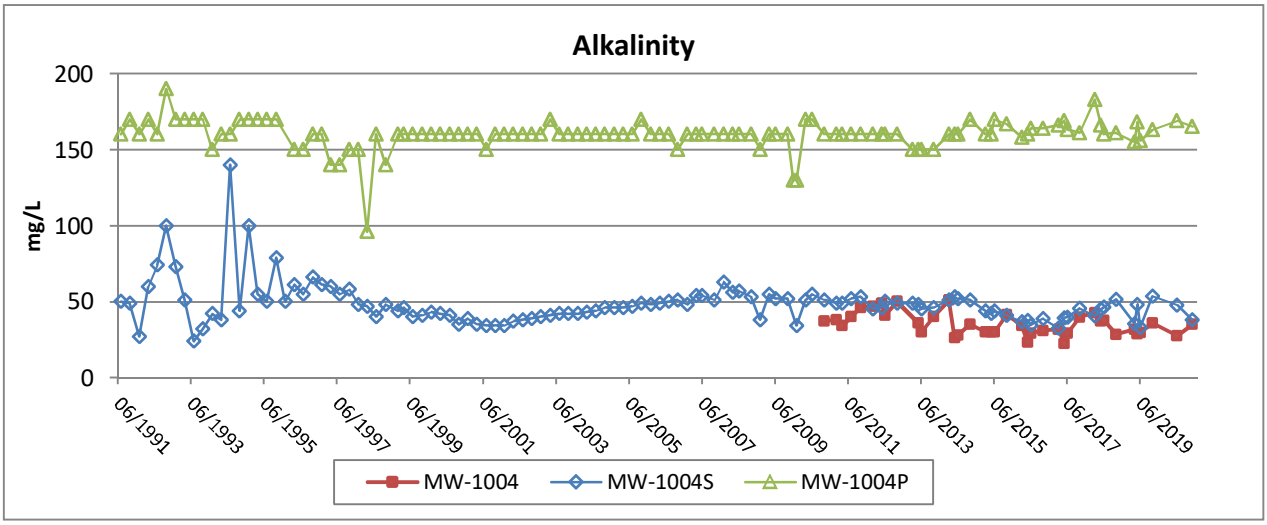

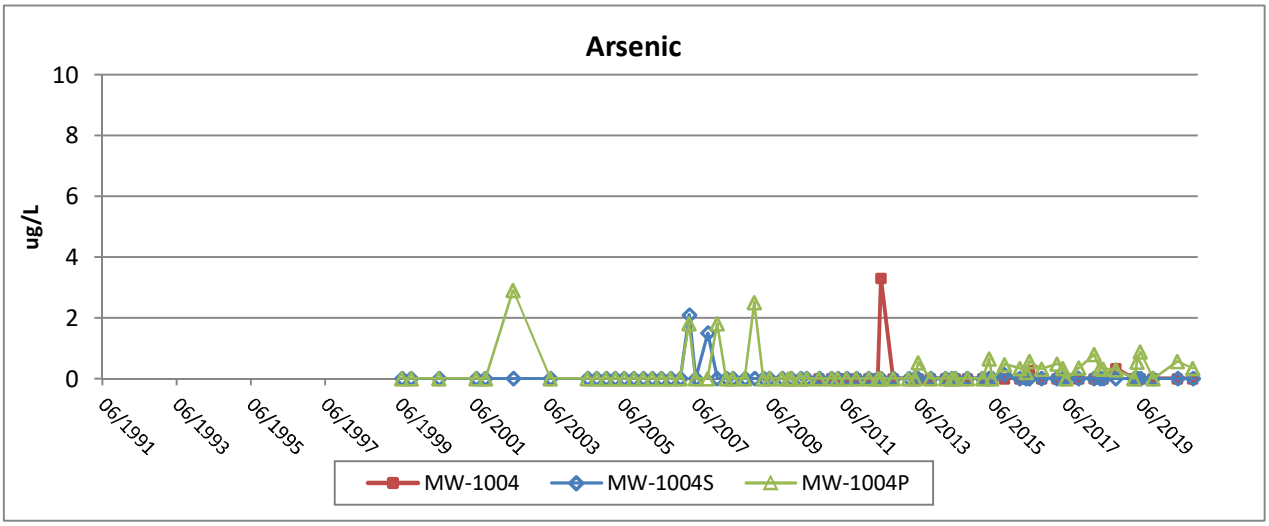

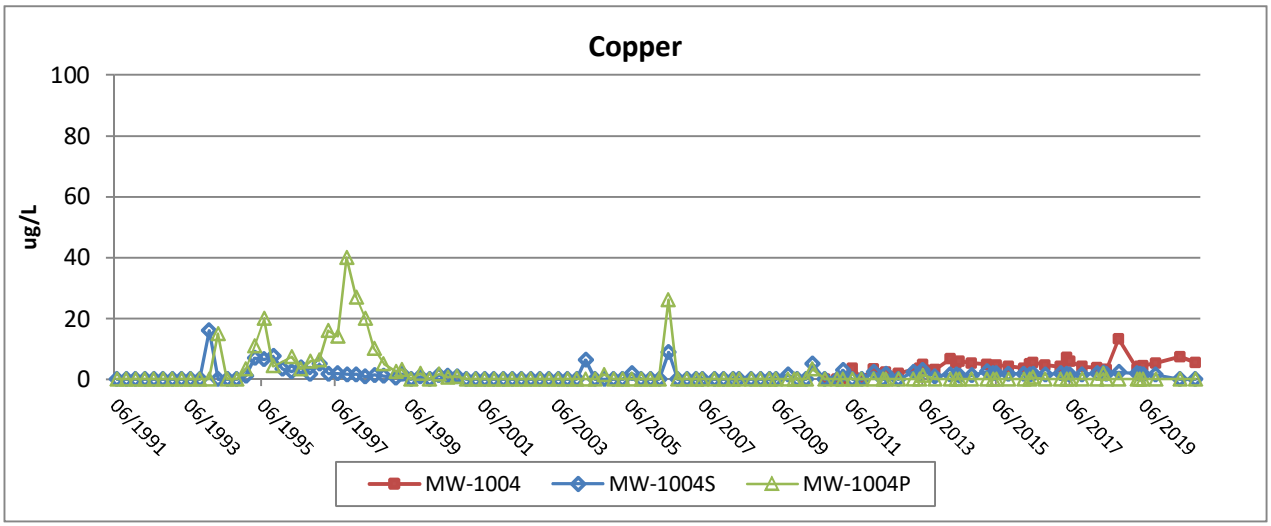

Note: Fourth quarter 2010 was the first time MW-1004 had sufficient water recovery for sampling.

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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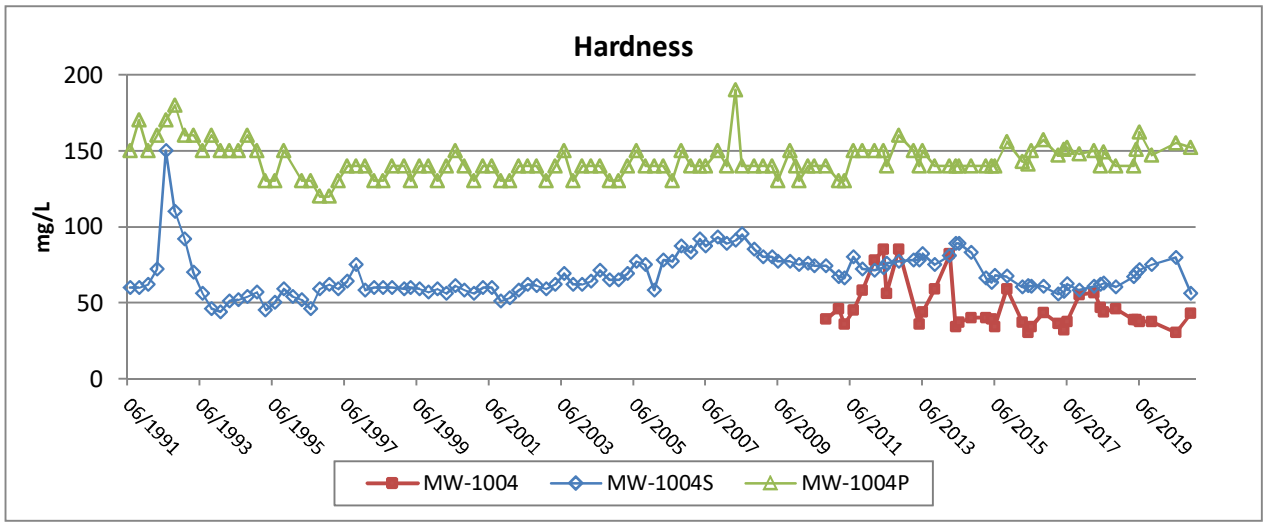

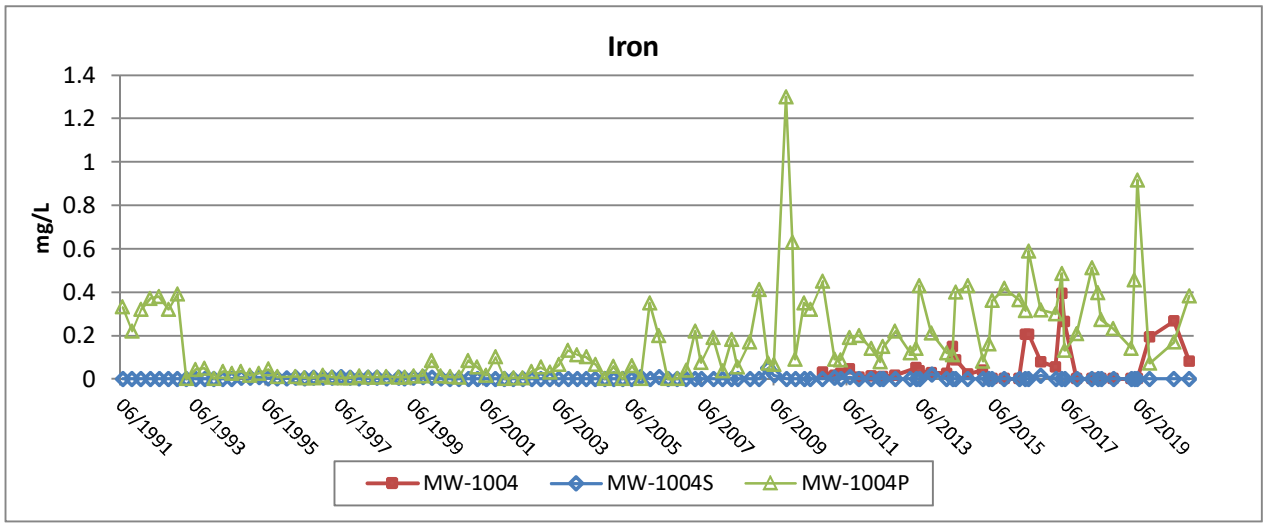

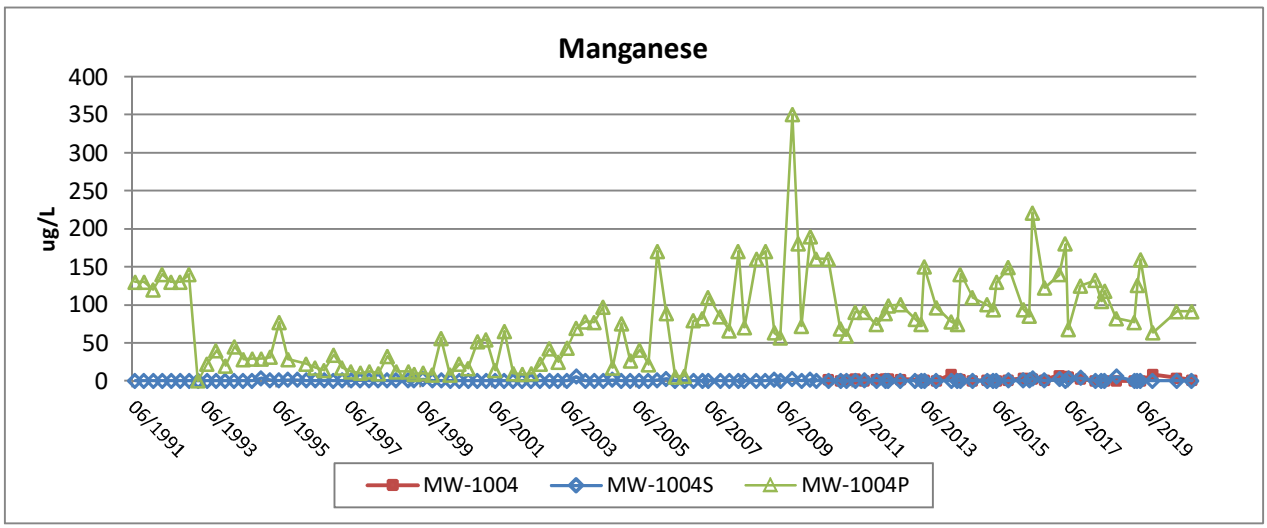

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Figure B-3b
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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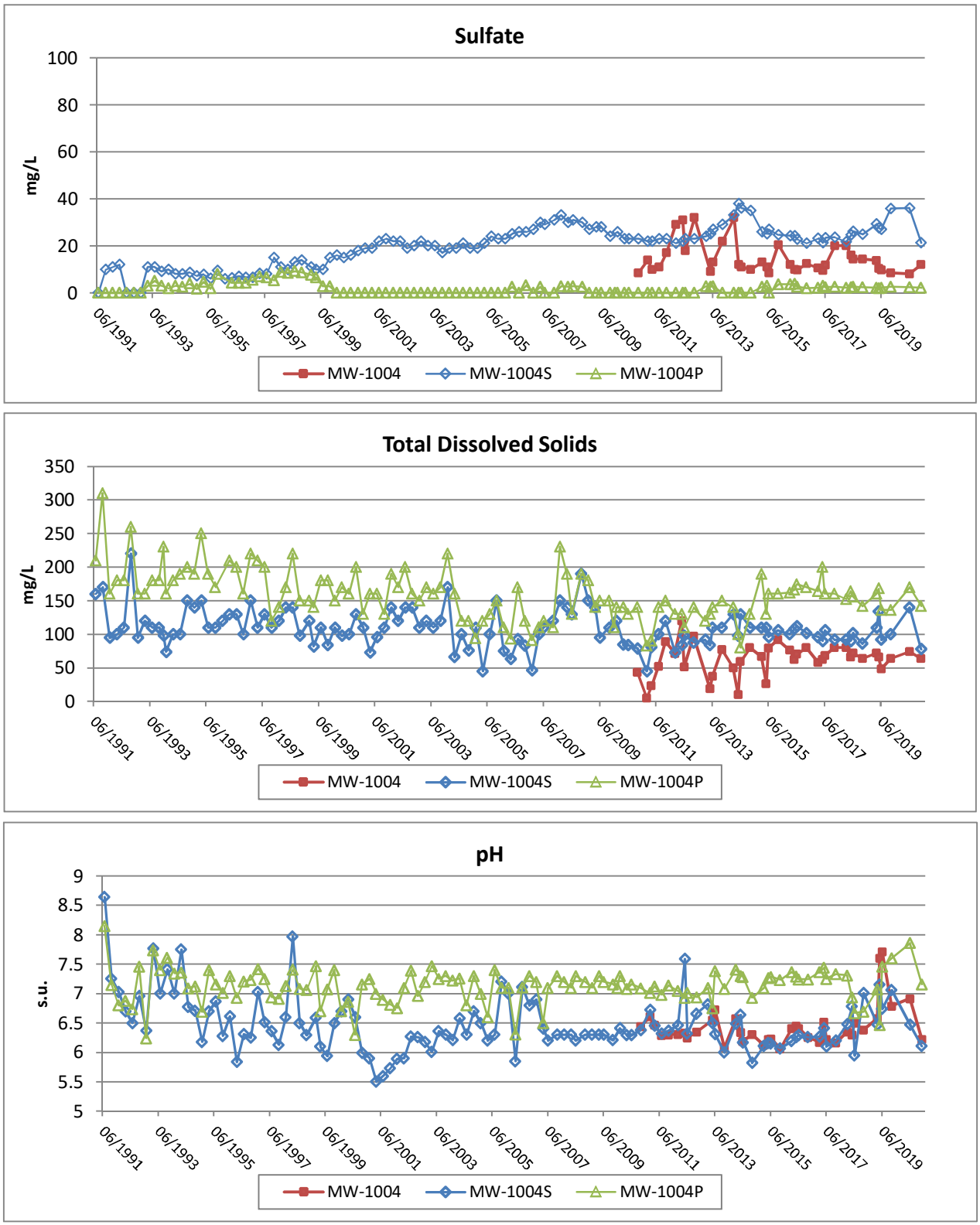

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Figure B-3c
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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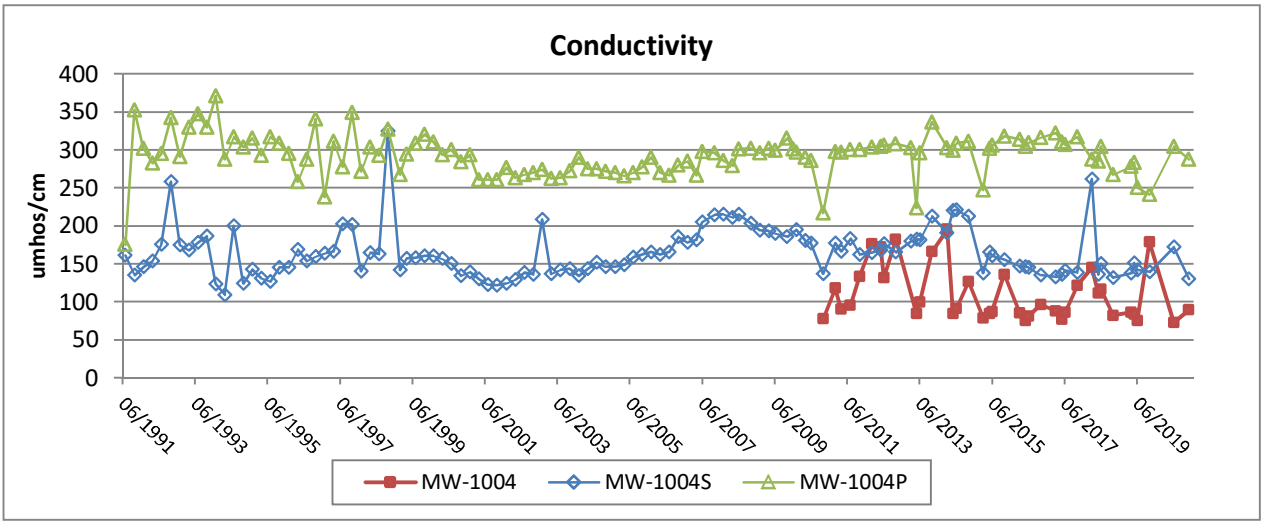

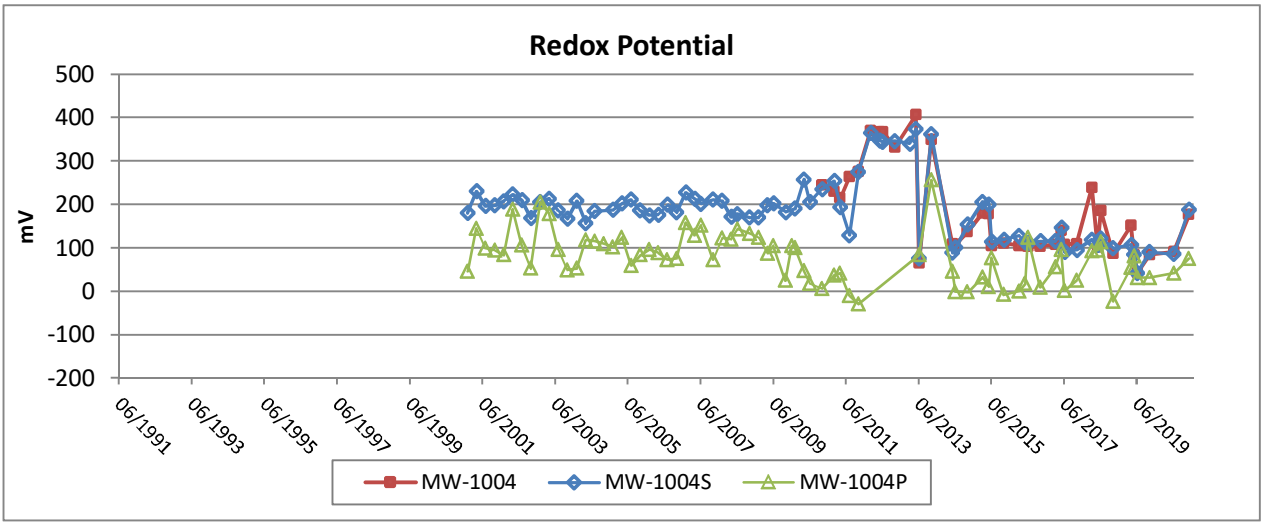

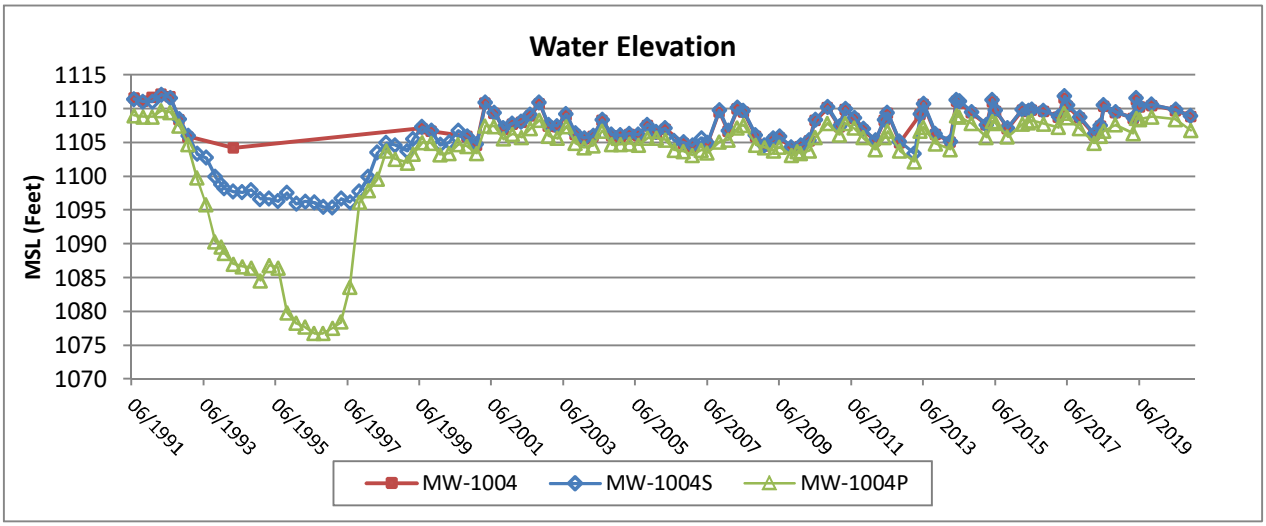

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Figure B-3d
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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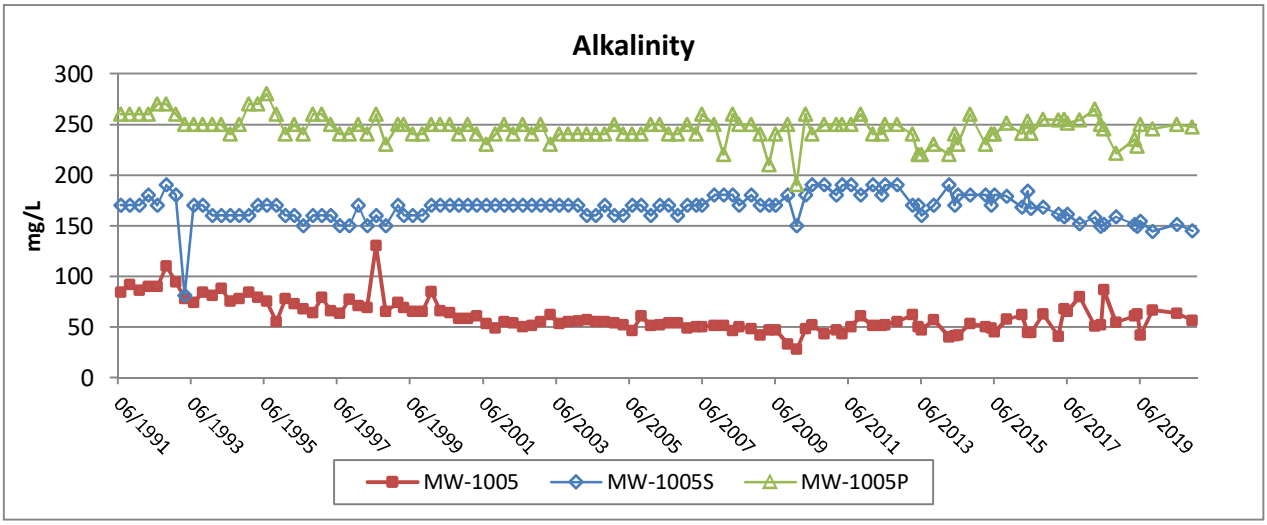

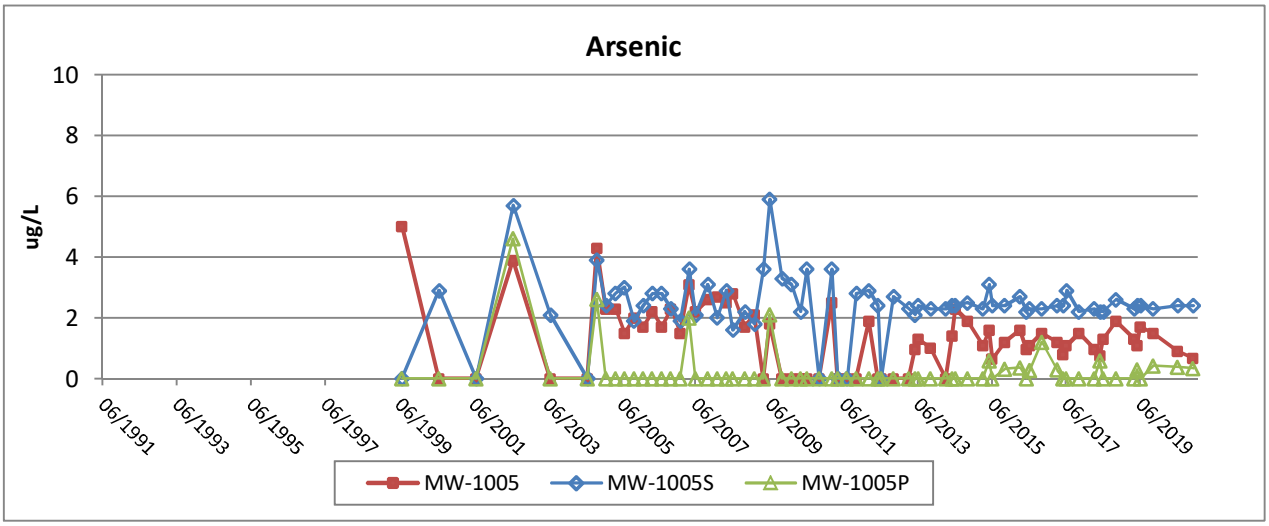

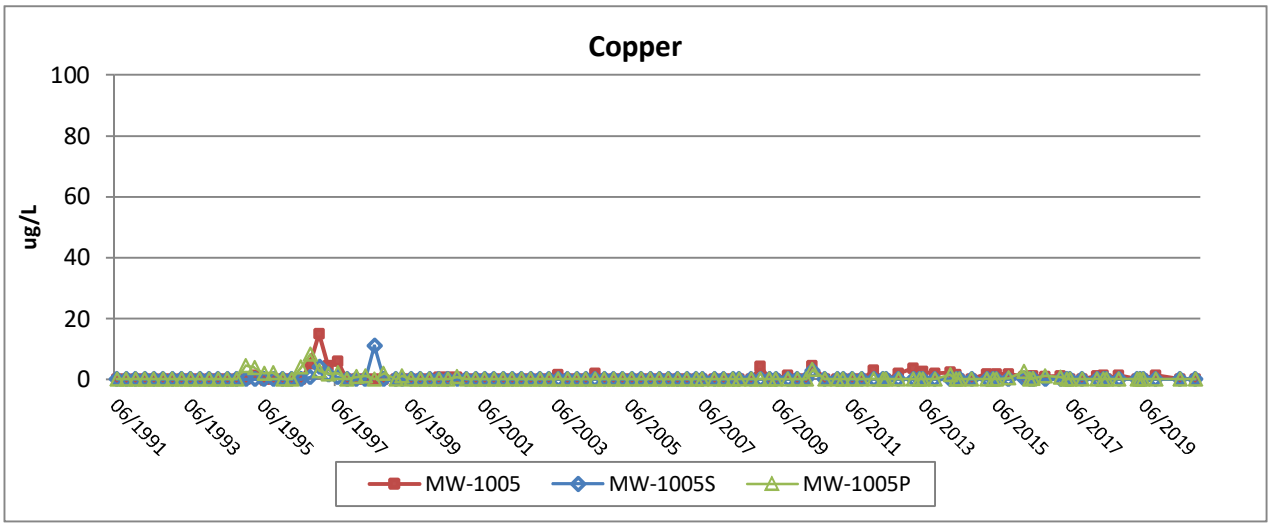

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Figure B-4a
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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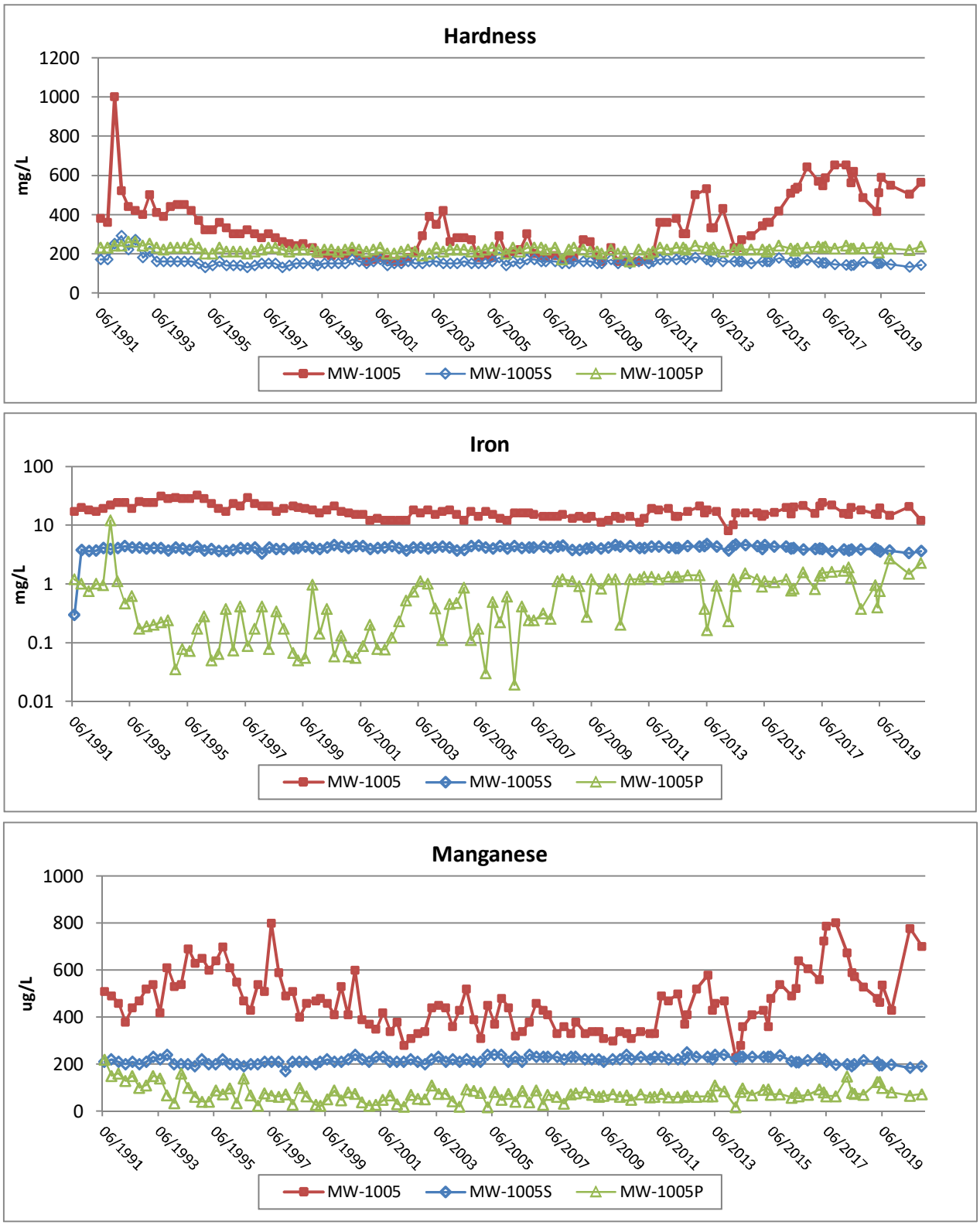

Note: Iron trend graphs are displayed on a logarithmic scale so the trend patterns of MW-1005, MW-1005S and MW-1005P are visible at different concentration scales.

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Figure B-4b
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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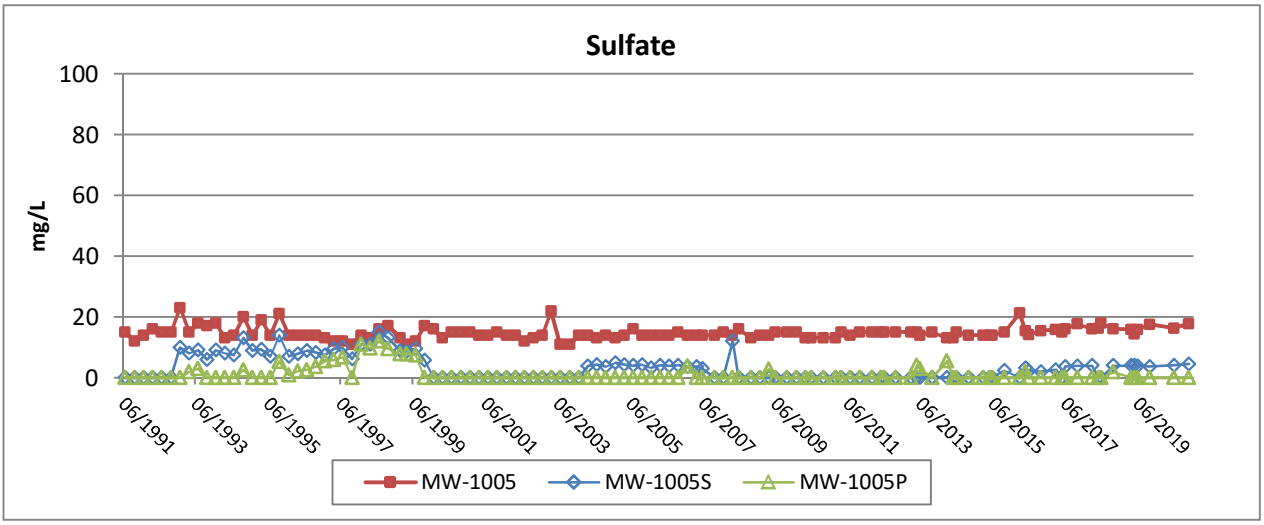

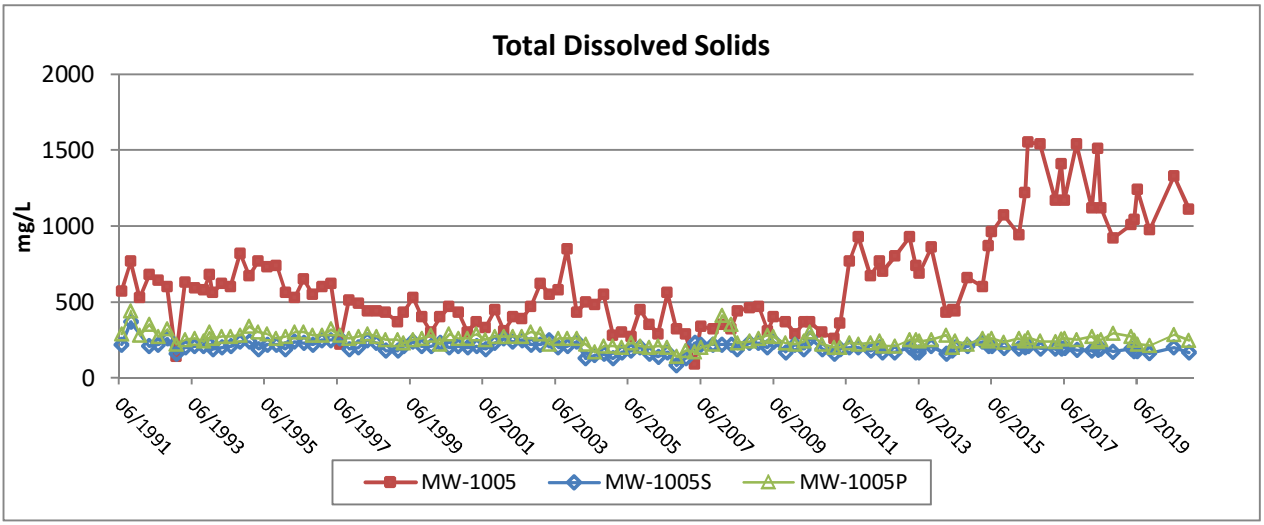

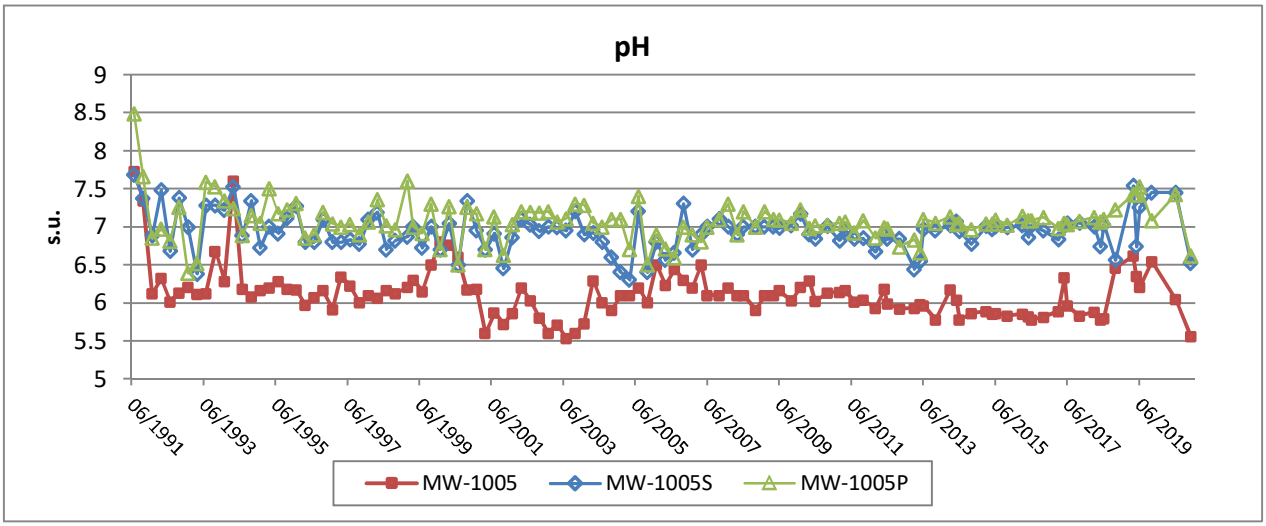

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Figure B-4c
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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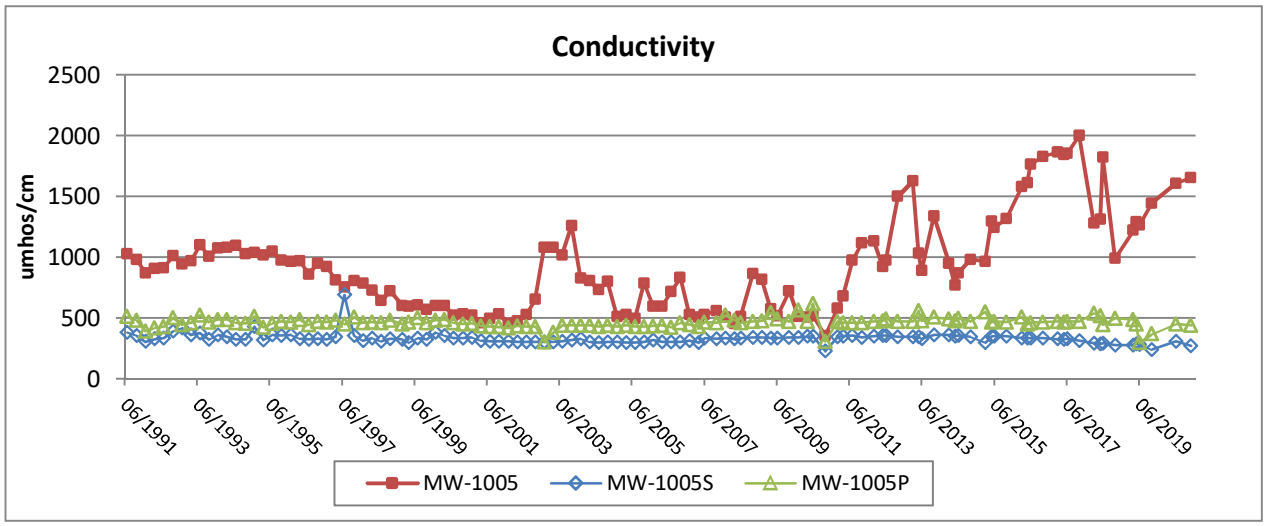

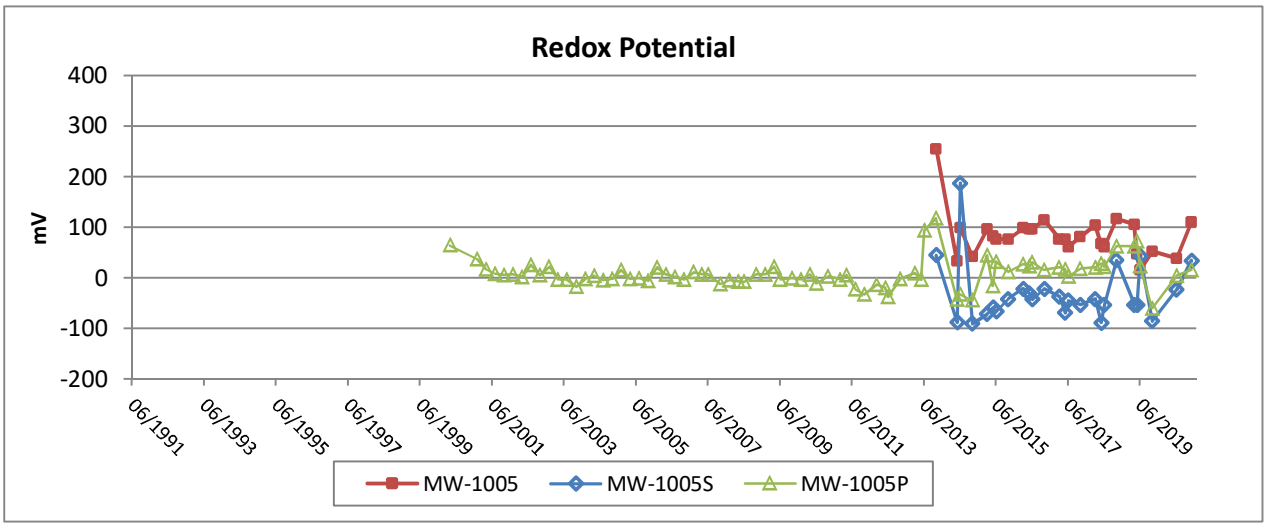

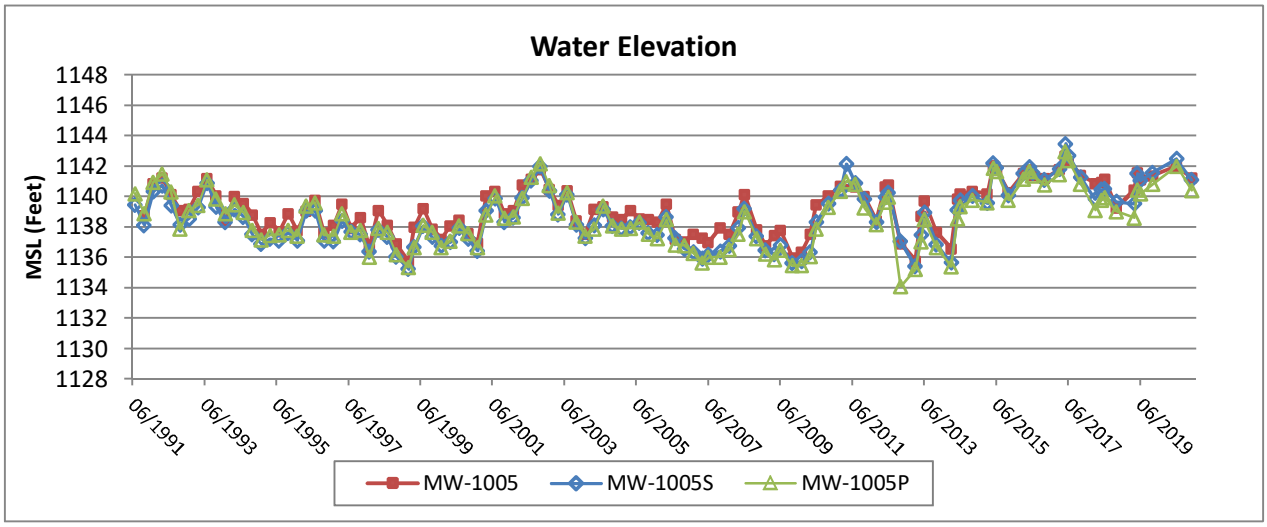

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Figure B-4d
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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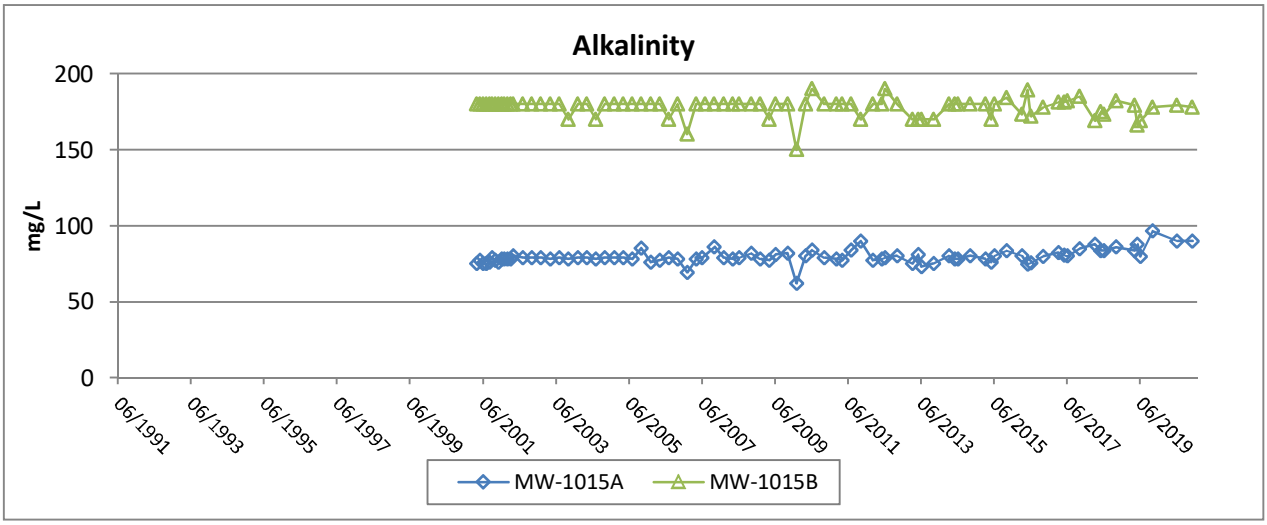

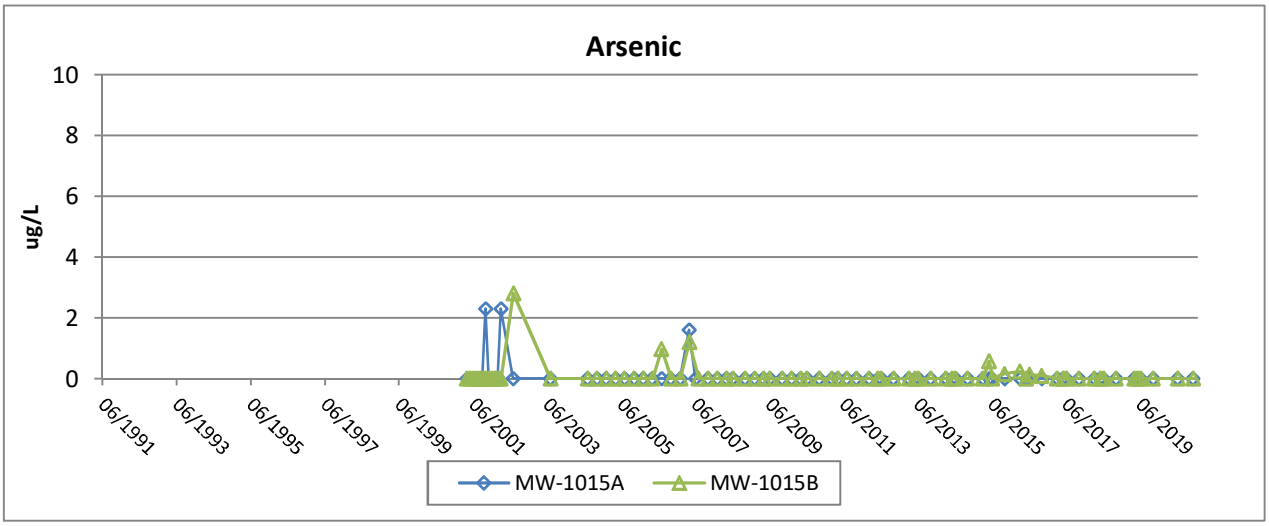

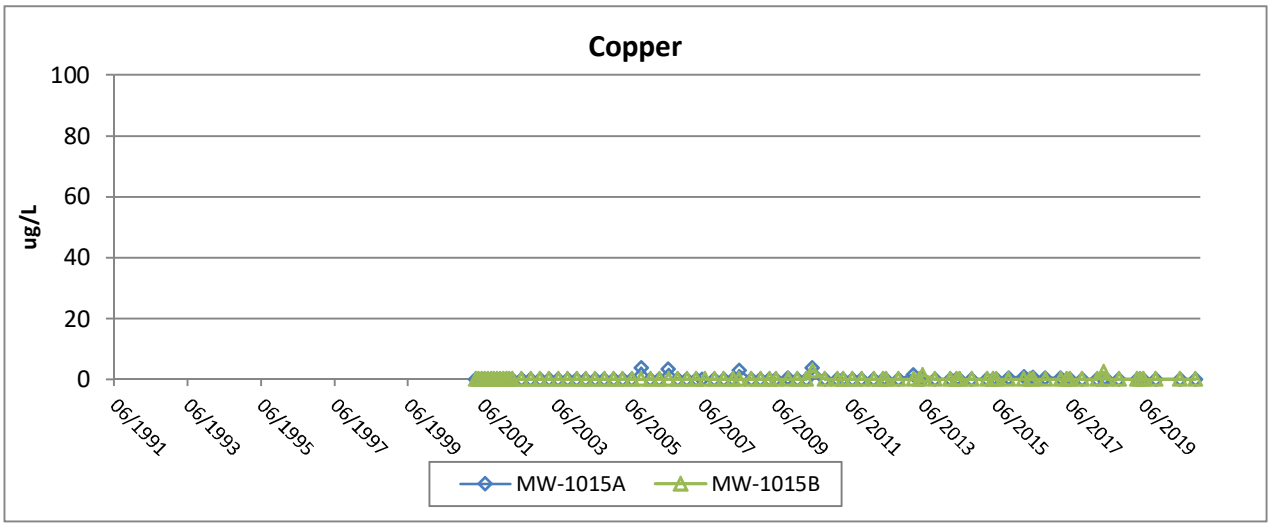

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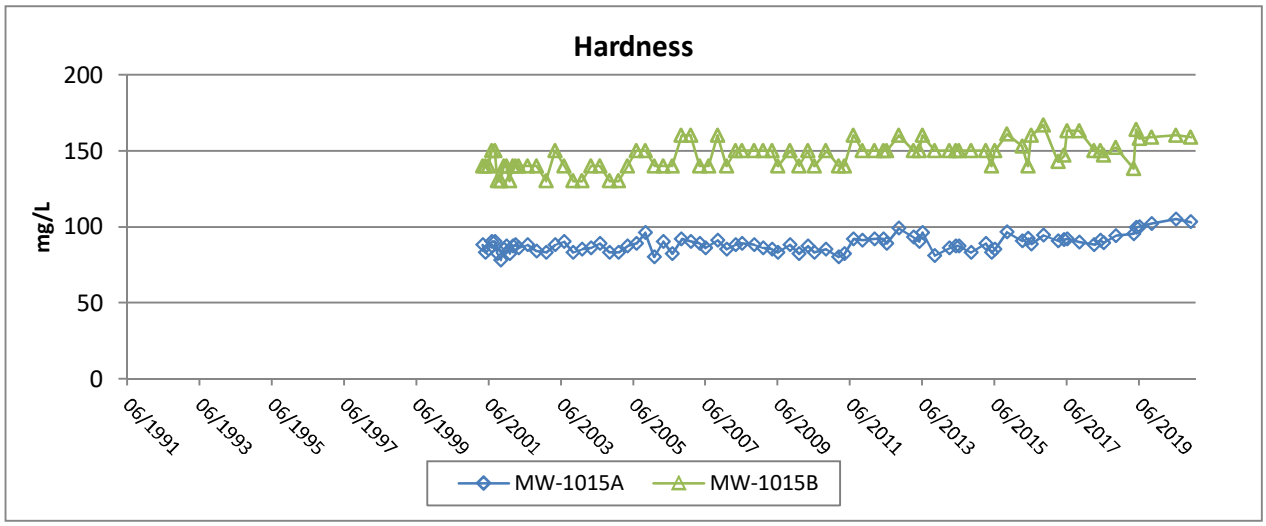
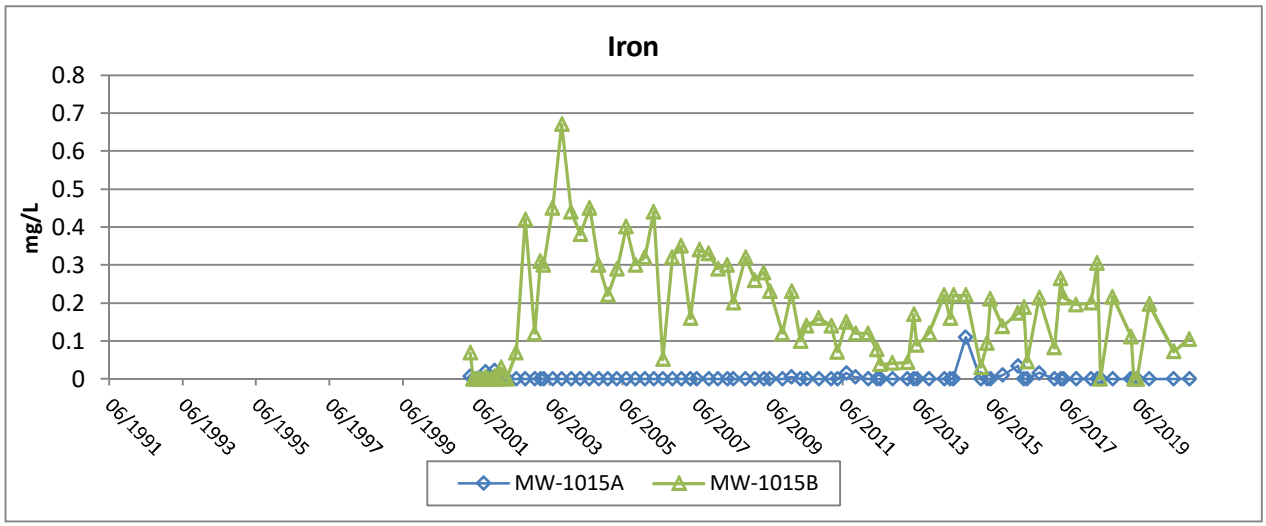
Figure B-5a
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





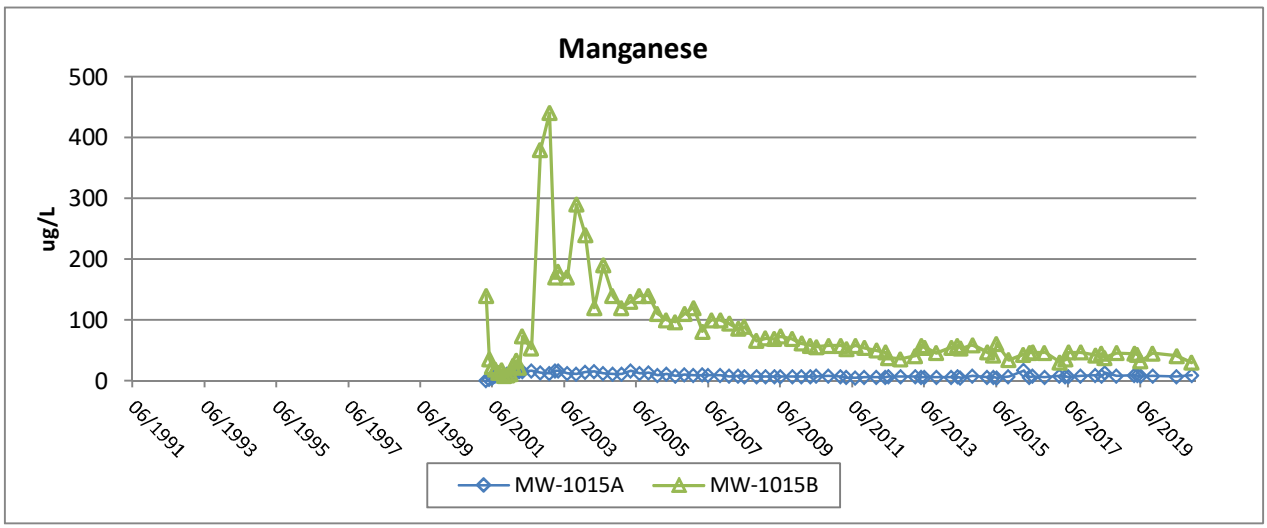


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Figure B-5b
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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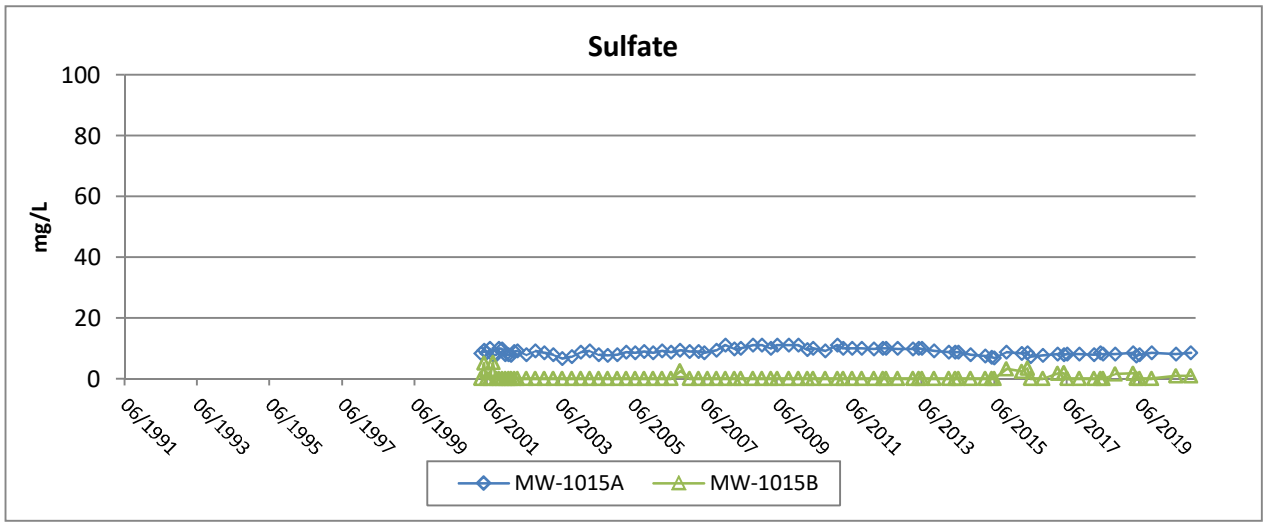

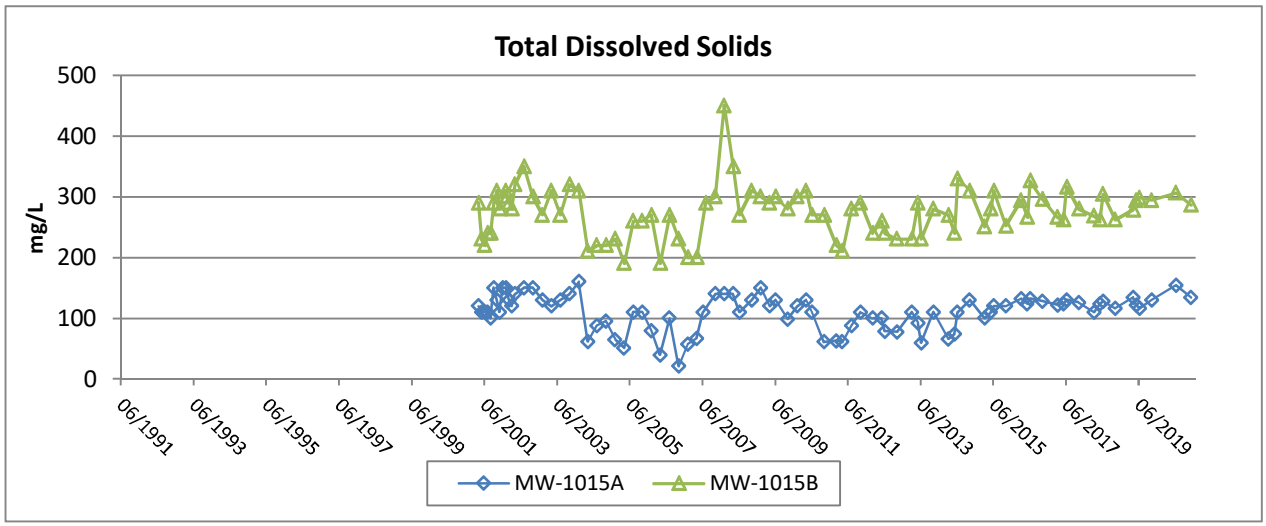

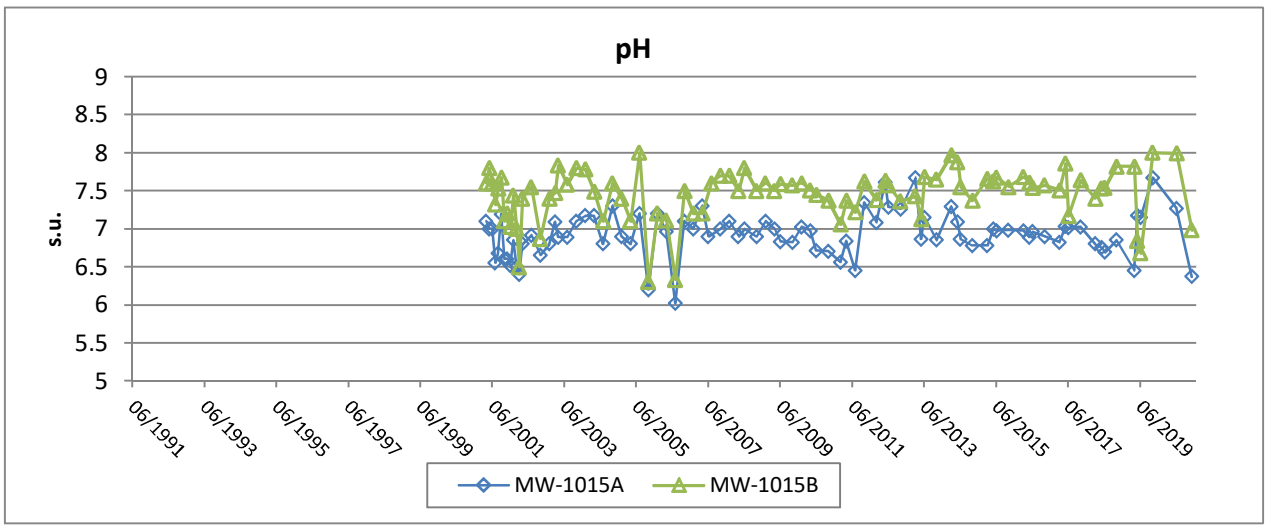

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Figure B-5c
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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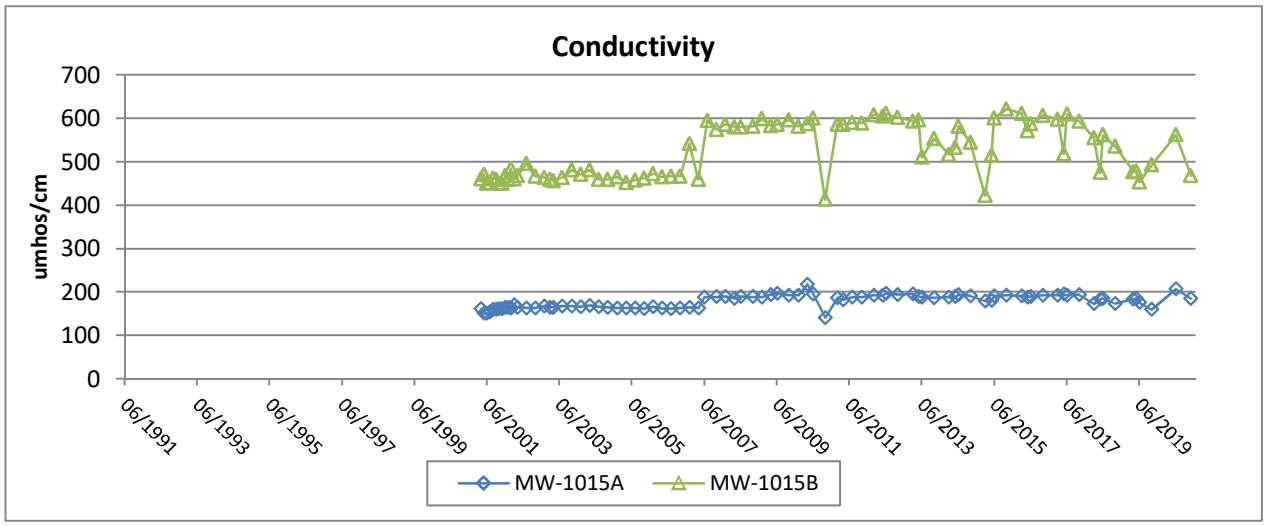

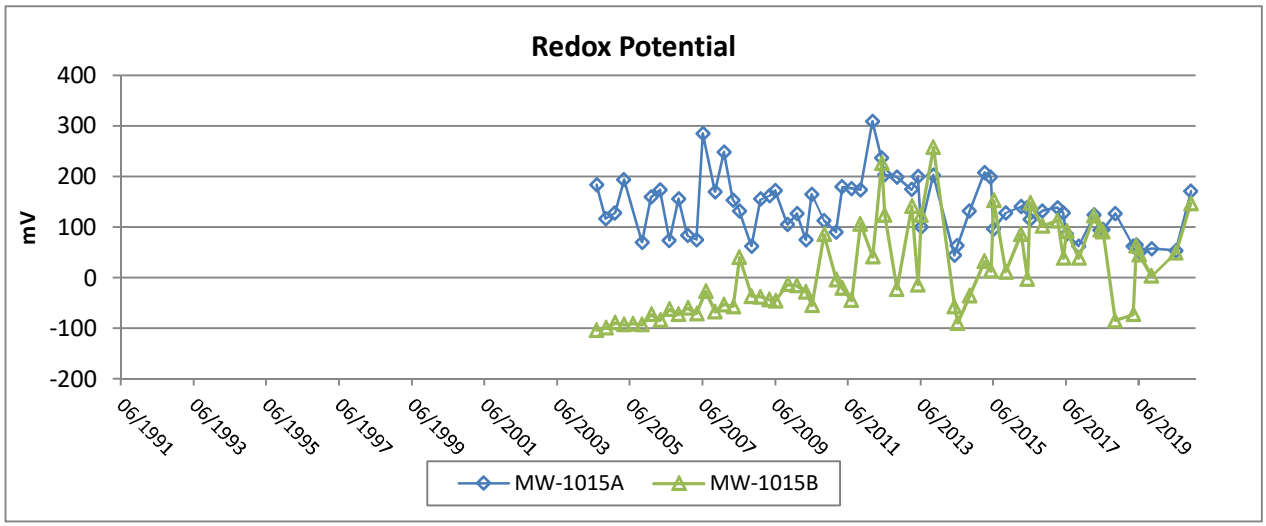

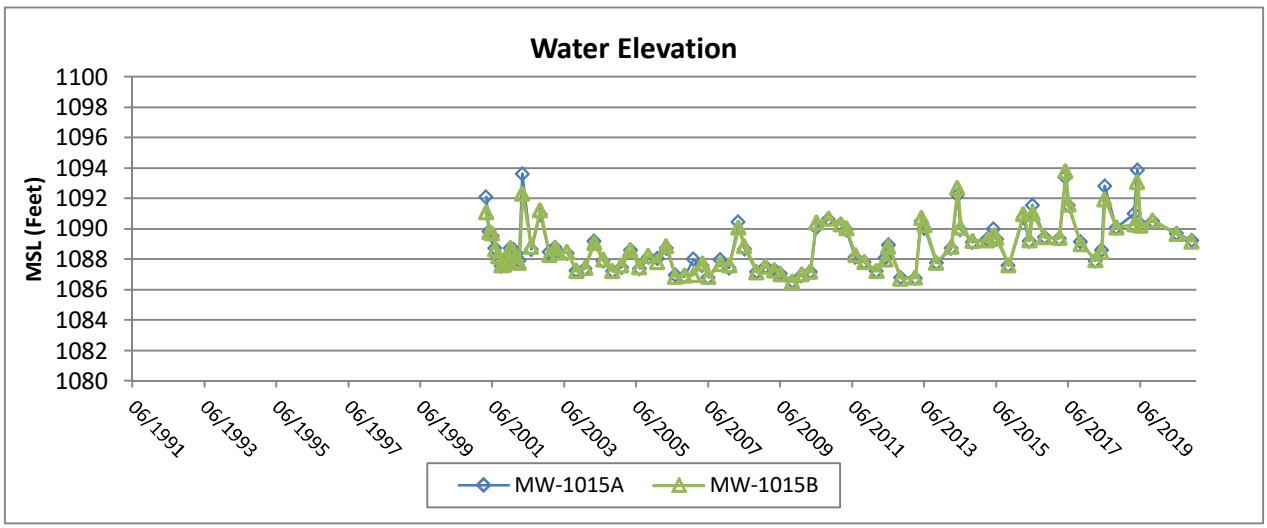

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Figure B-5d
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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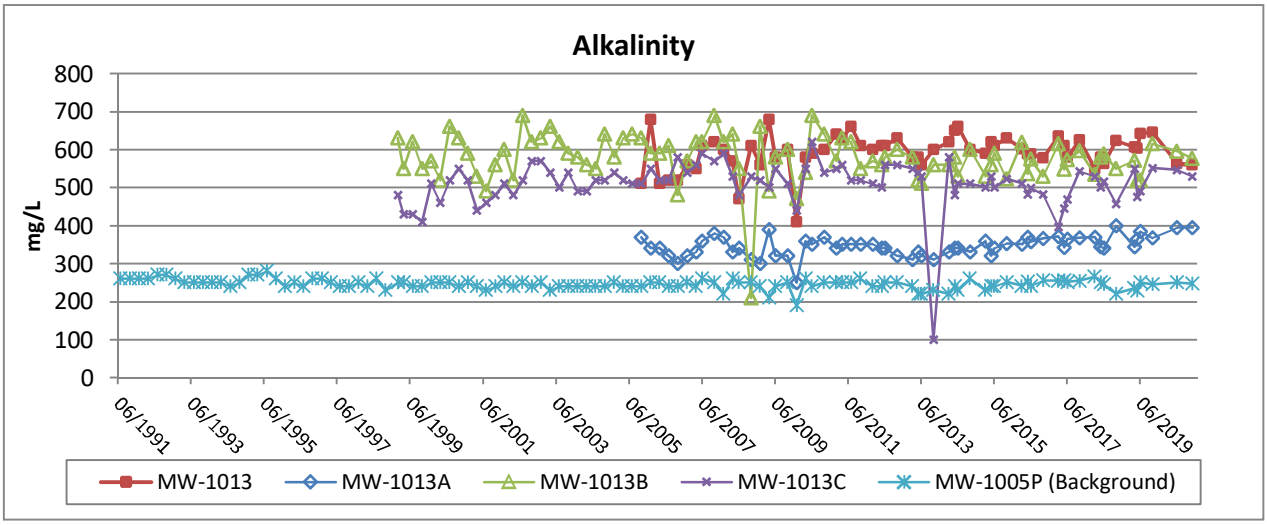

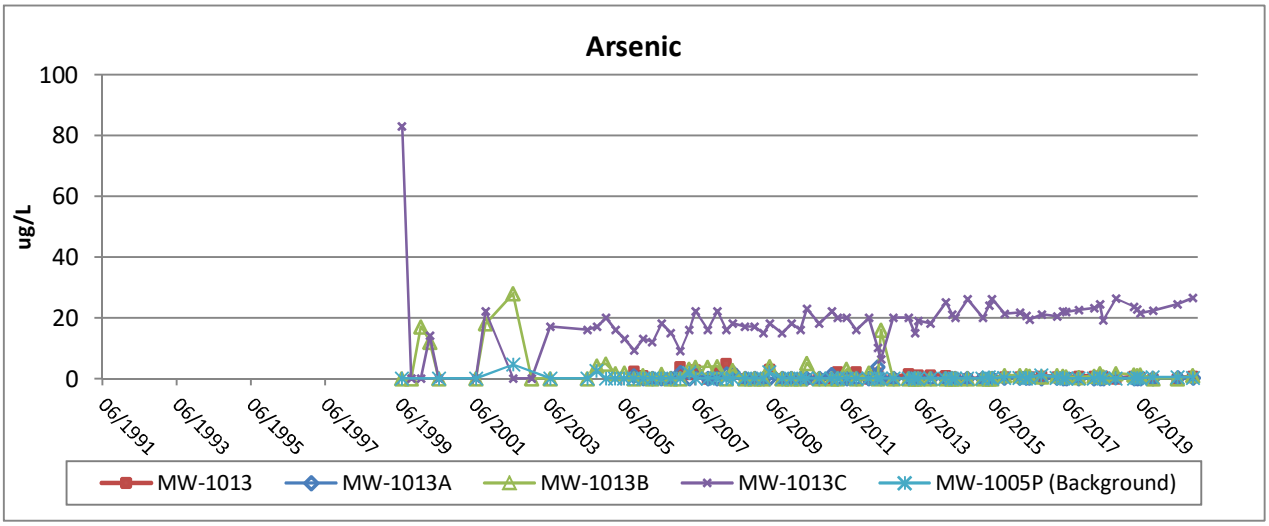

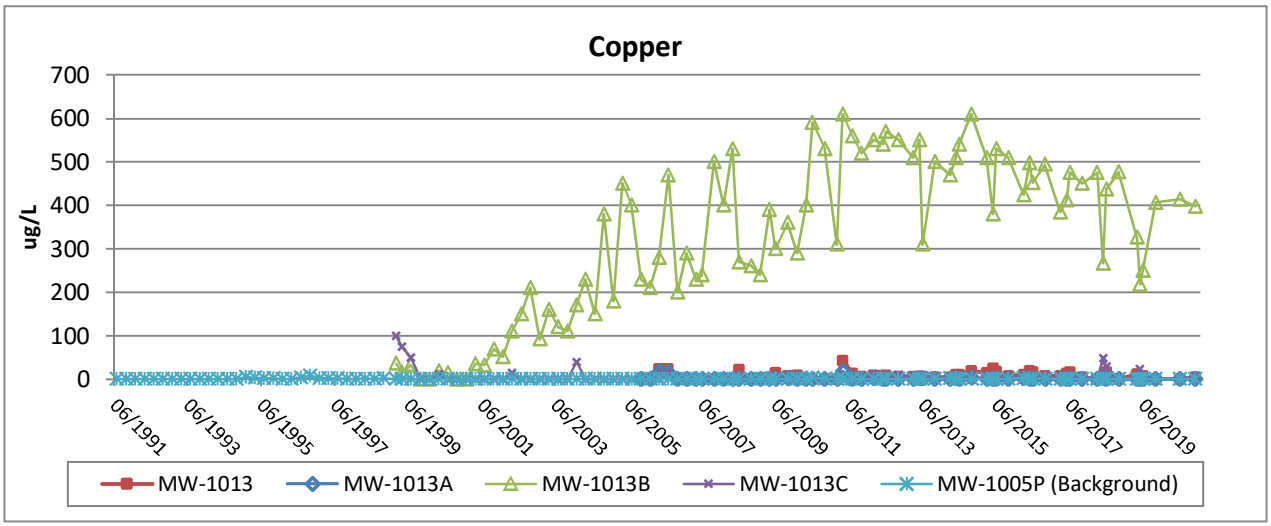

Note: Fourth quarter 2005 was the first time MW-1013 had sufficient water recovery for sampling.

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Figure B-6a

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

Scale: NA	Date: January 2020	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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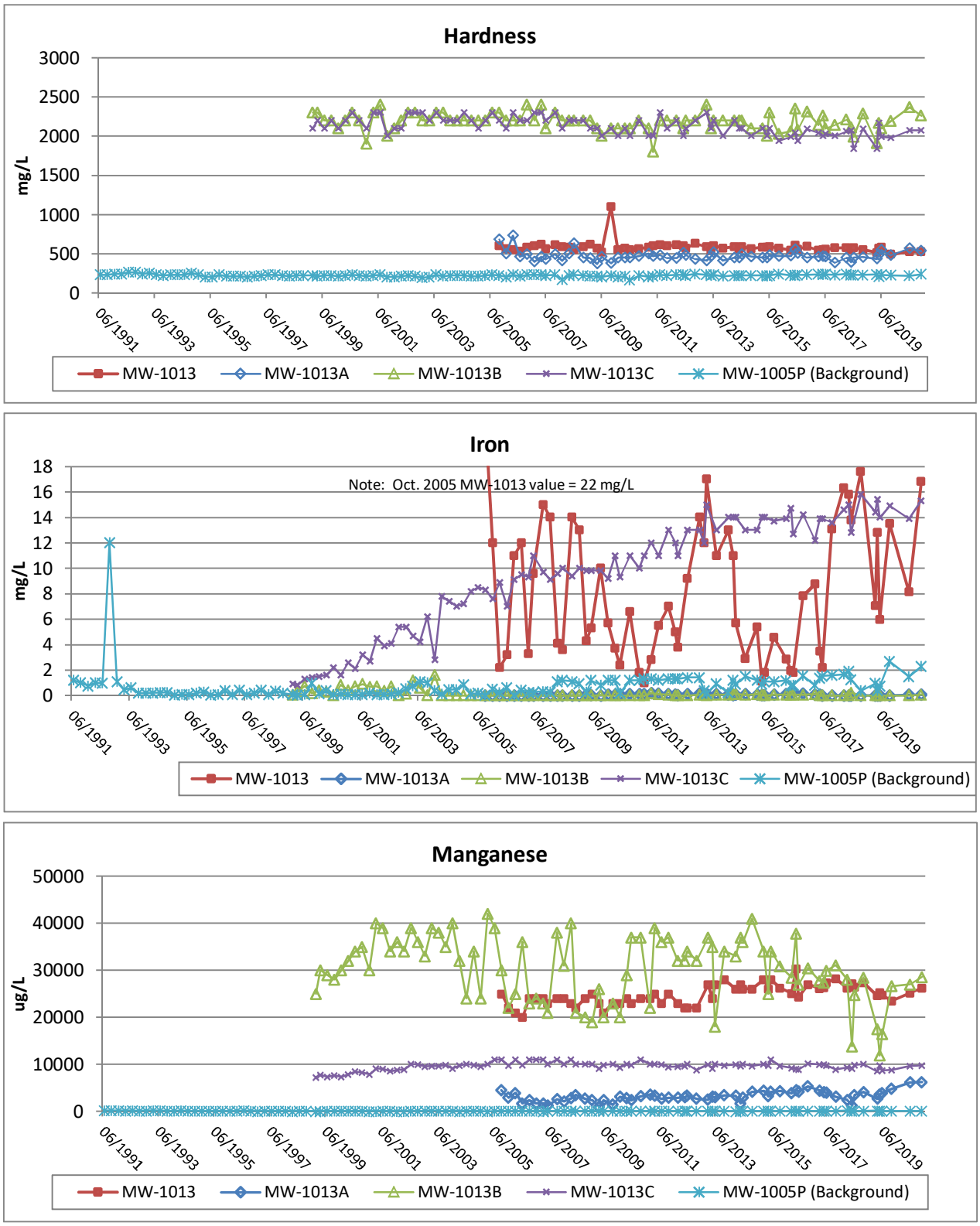

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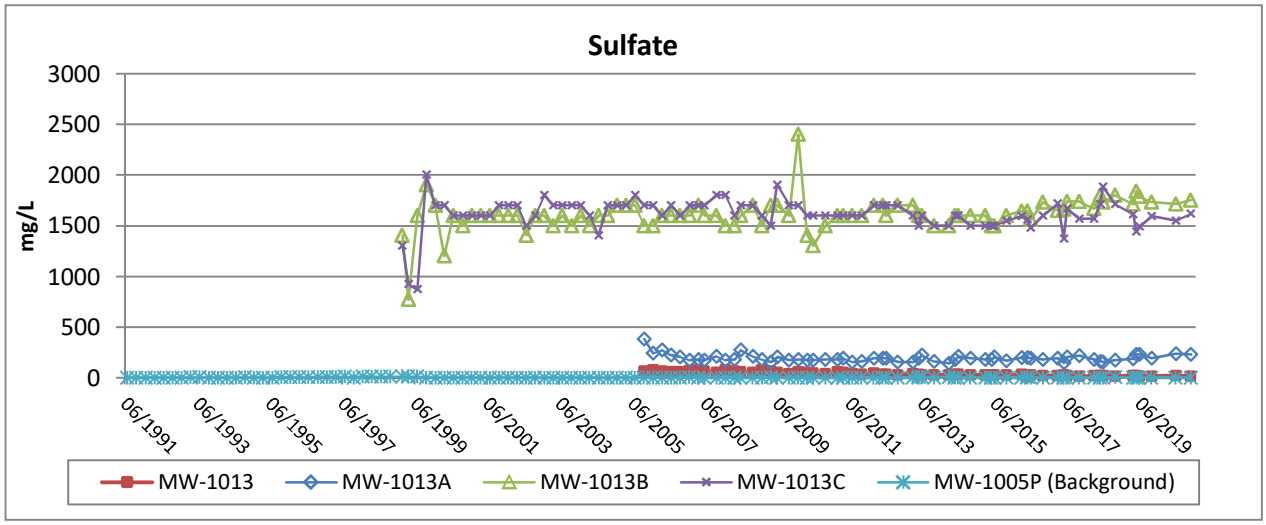
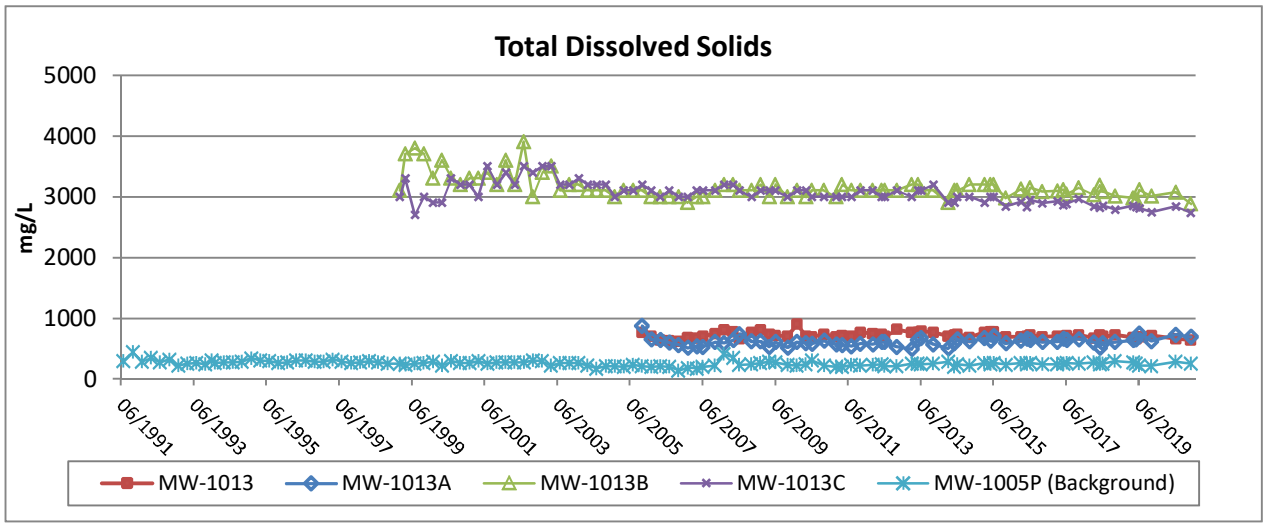
Figure B-6b

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





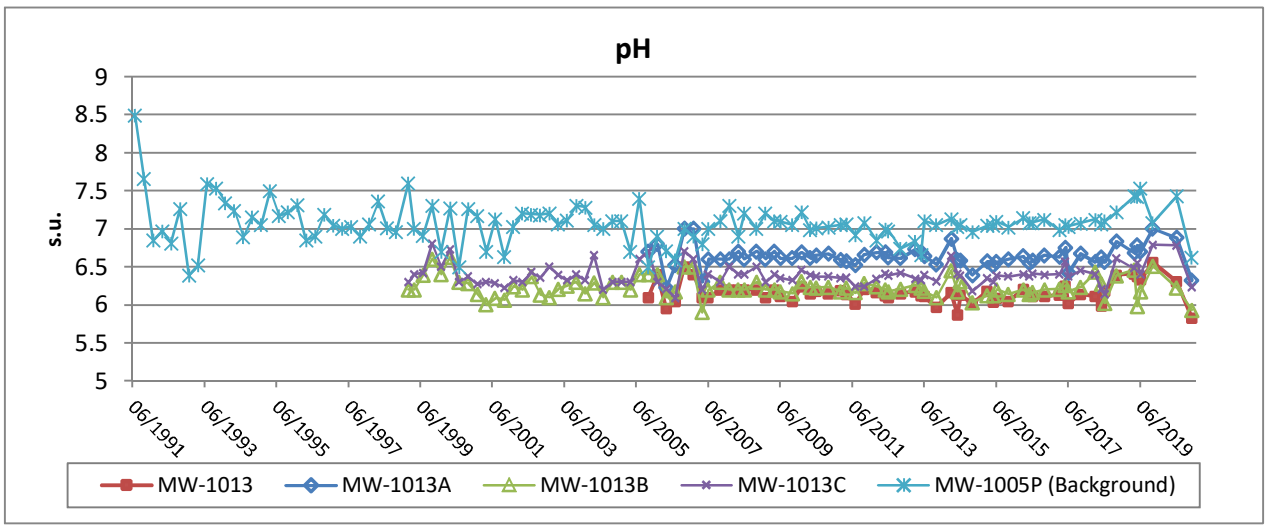


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Figure B-6c

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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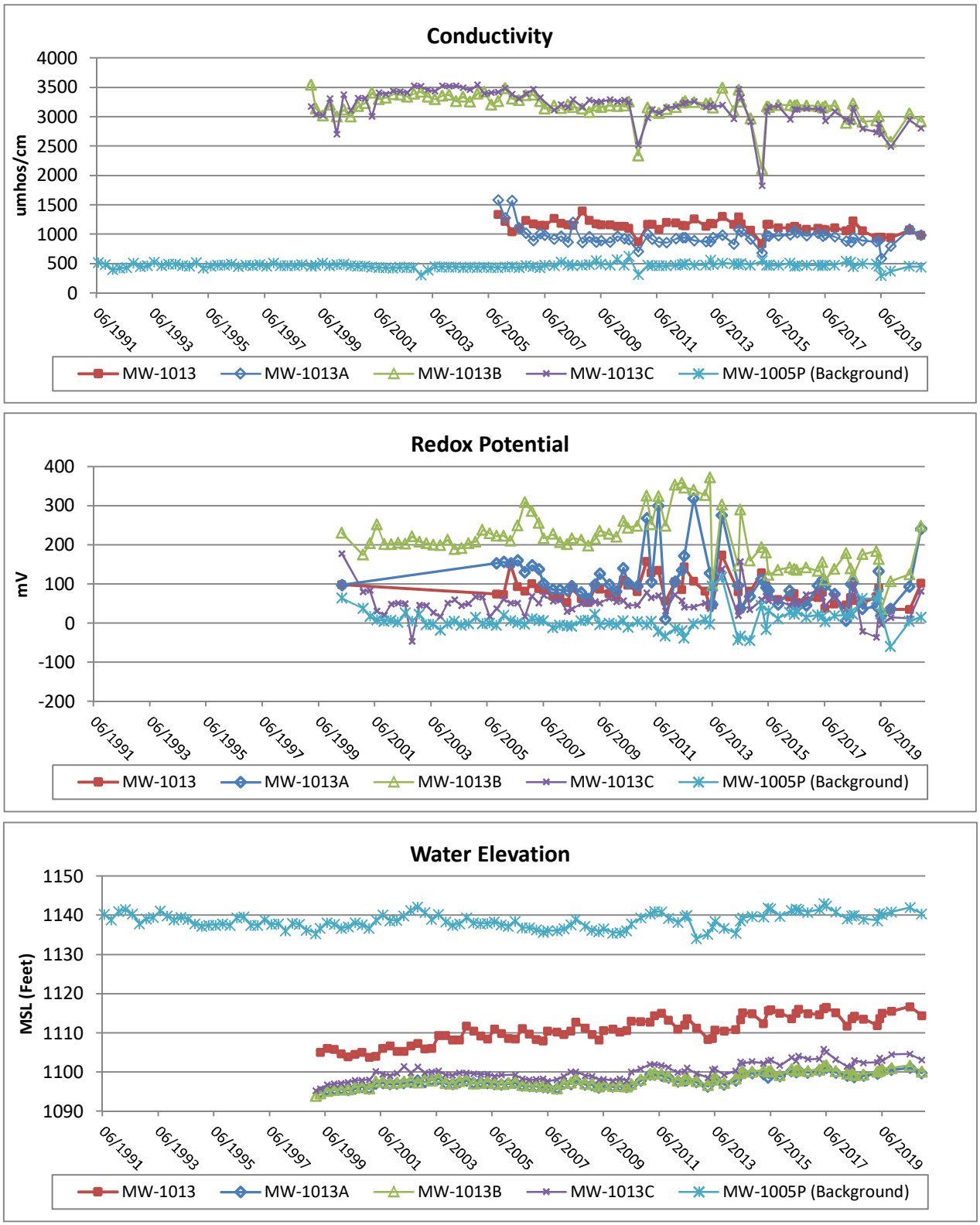

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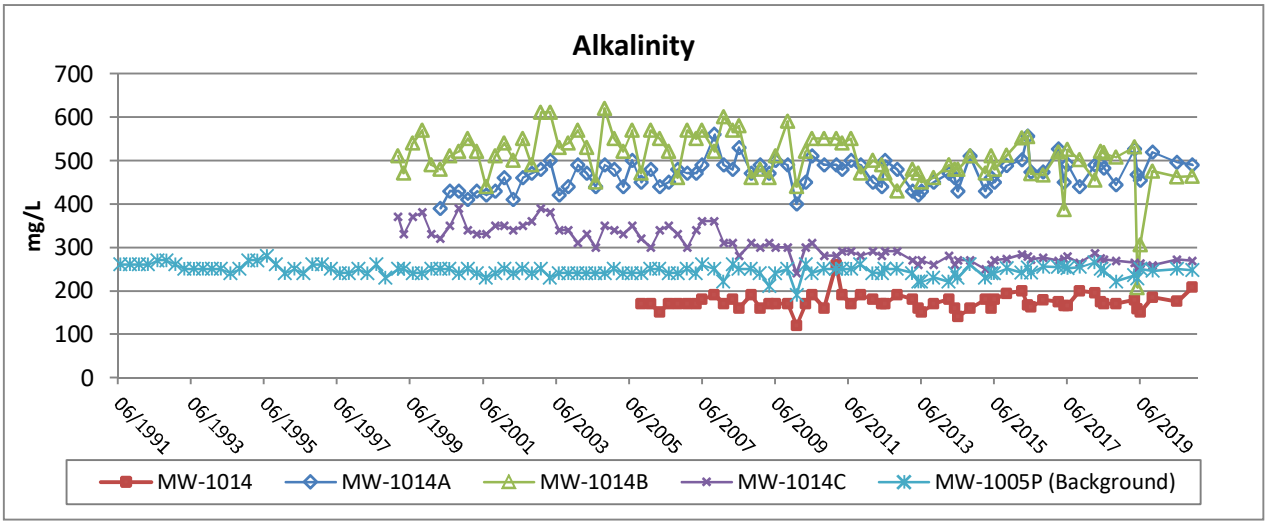
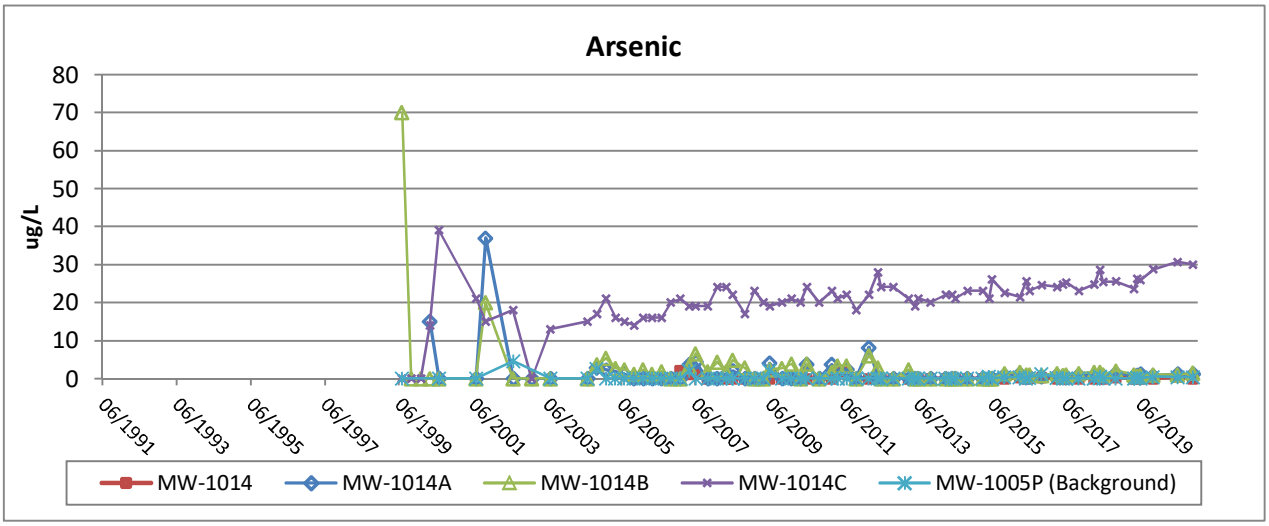
Figure B-6d

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





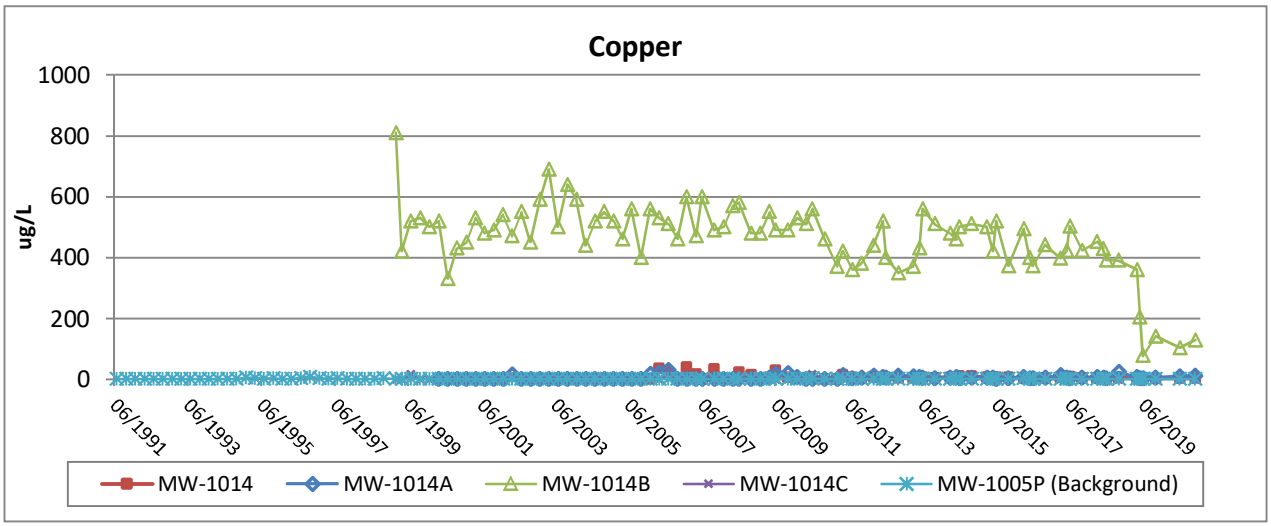


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Figure B-7a

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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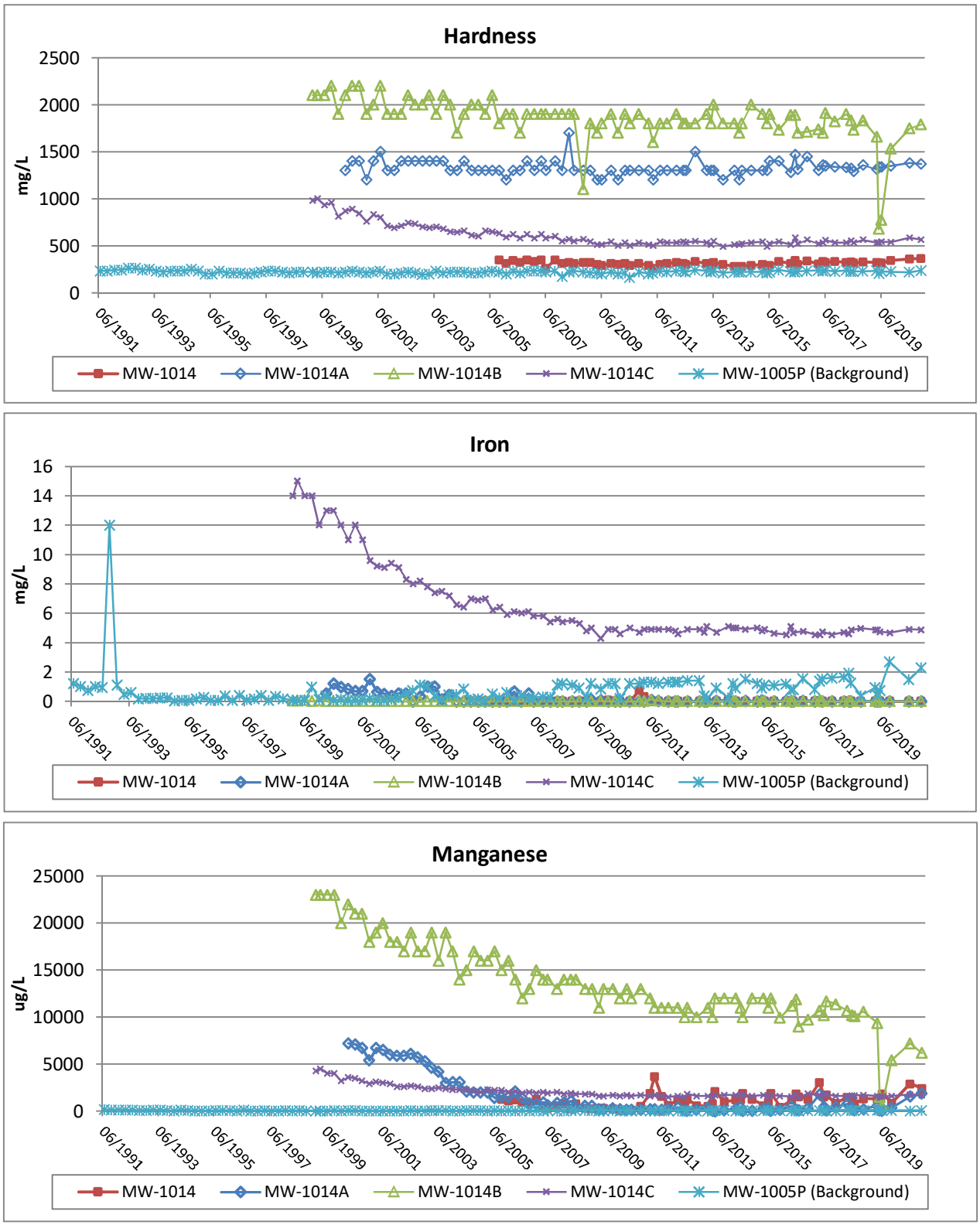

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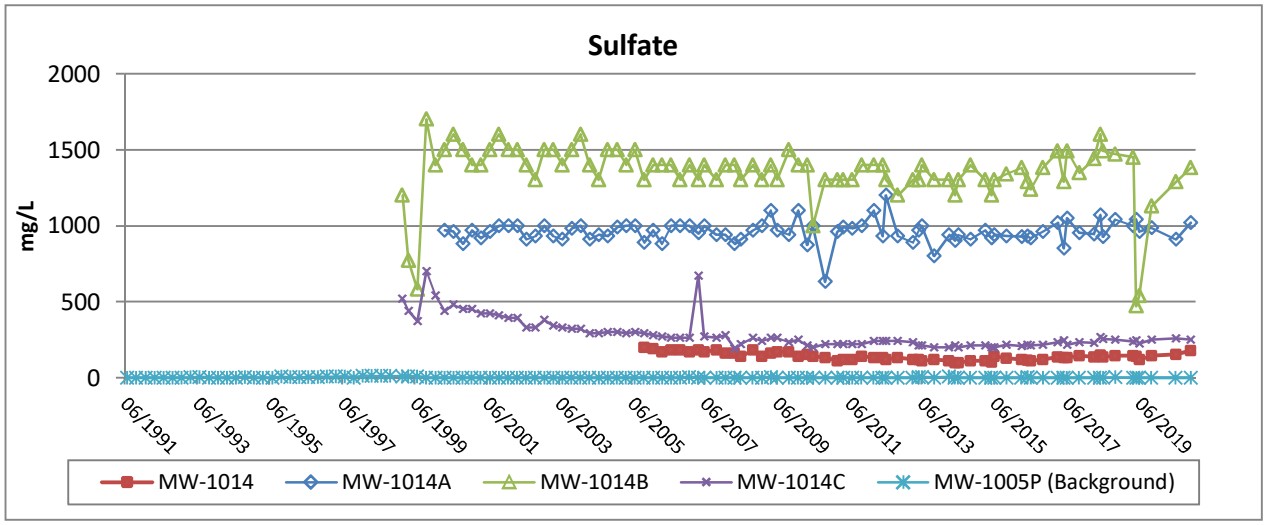
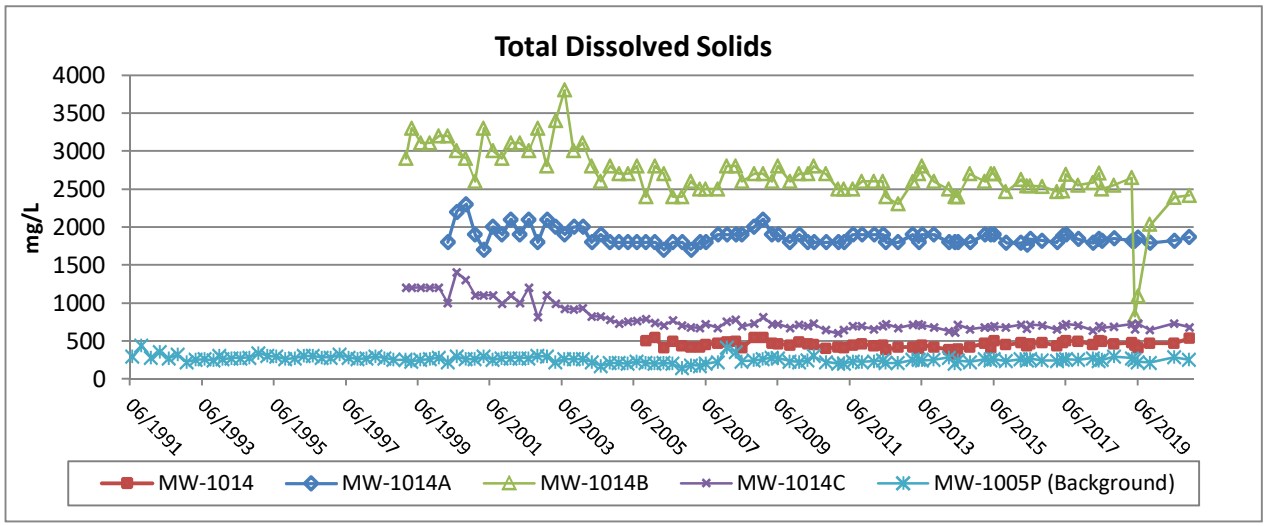
Figure B-7b

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





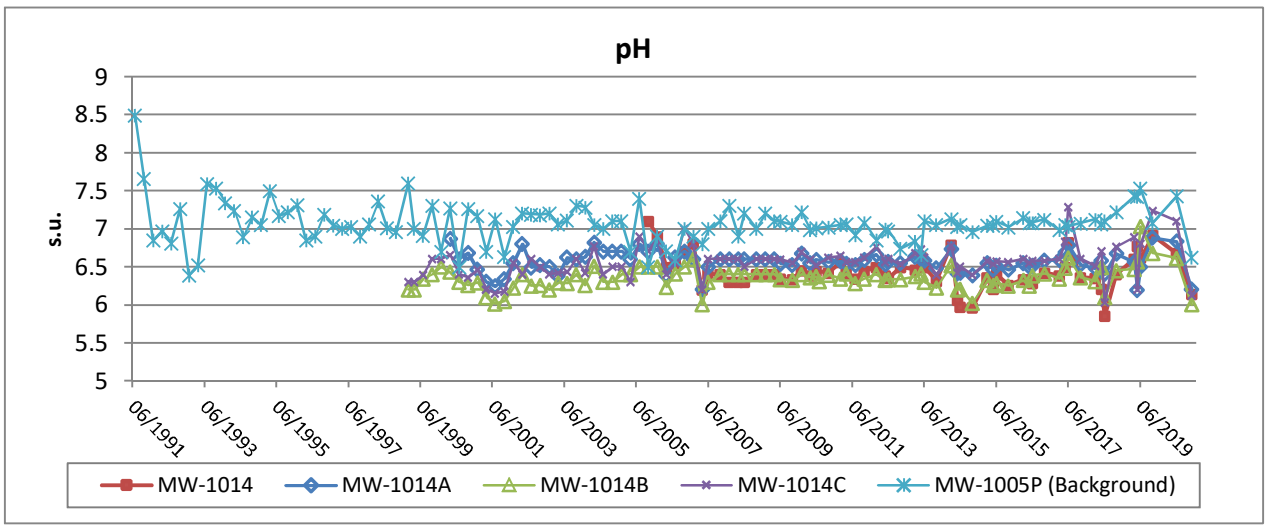


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Figure B-7c

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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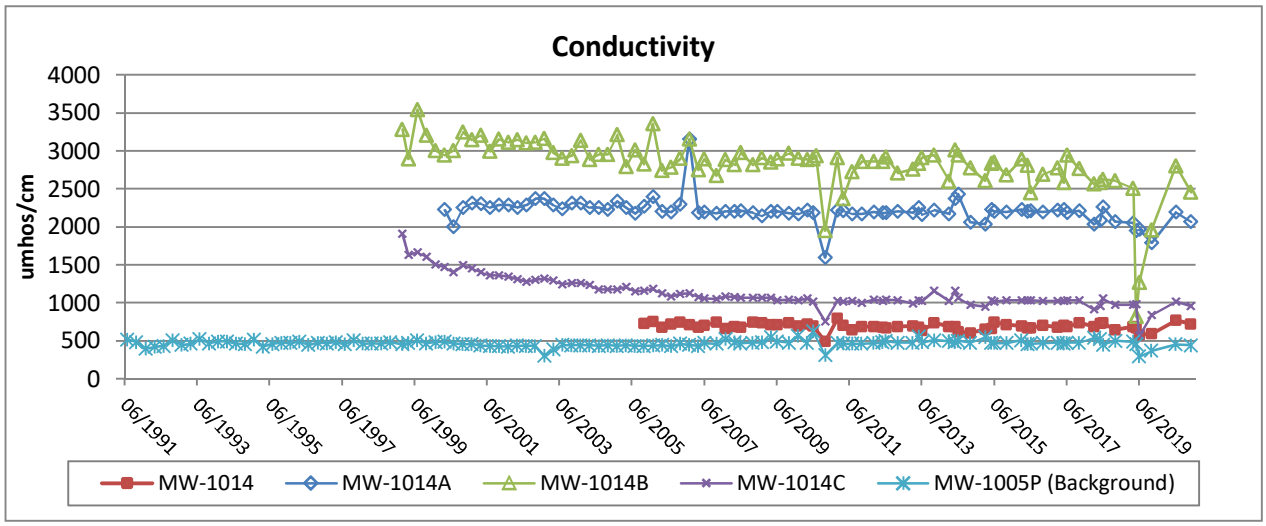

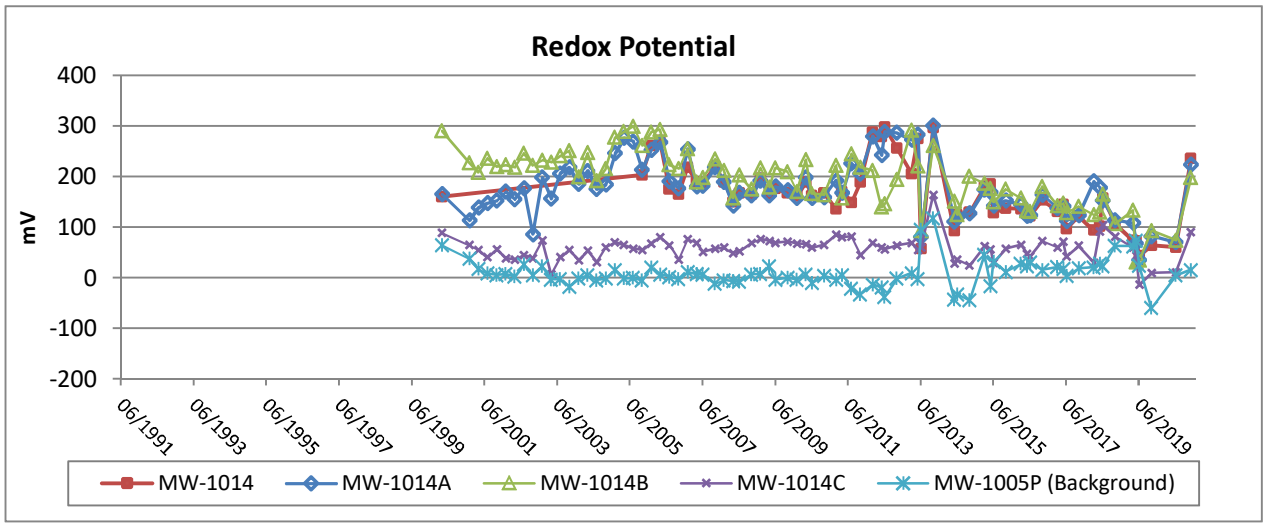

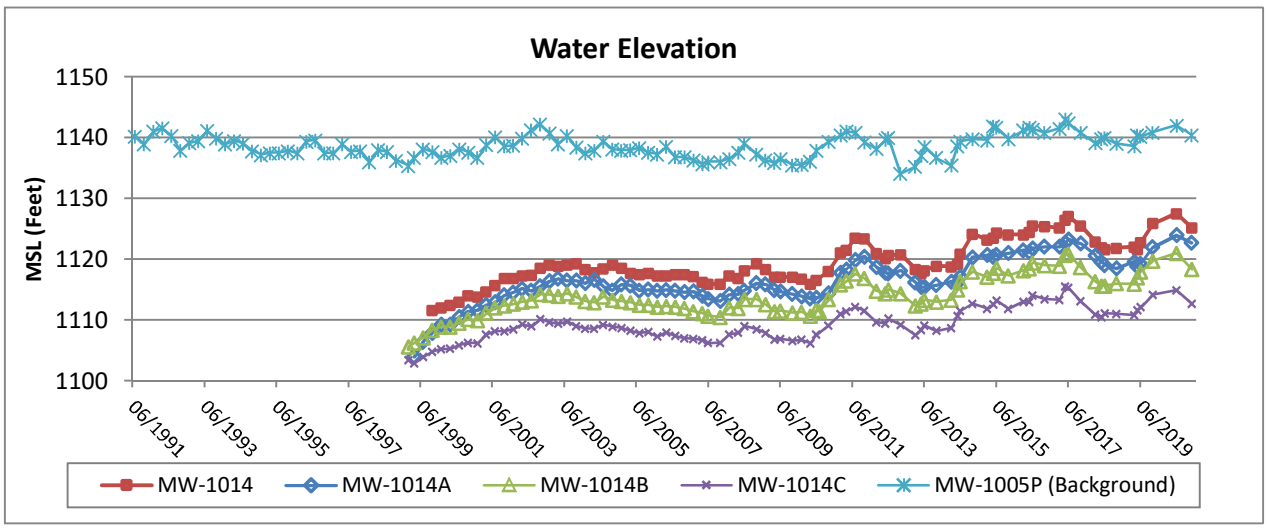

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Figure B-7d

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

Scale: NA	Date: January 2020
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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2020 Groundwater Results - Semi-Annual Parameters

Sample Date (yyyy-mm)	Location		Water Elevation ft	Alkalinity as CaCO3 mg/l	Arsenic ug/l	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
2020-06	MW-1000PR		1089.27	218	15.5	3.0	392	1.72	1890	182	506	6.88	743.80	-3.7
2020-06	MW-1000R		1091.01	77.1	0.77	12.2	168	< 0.0580	163	58.5	322	6.22	386.99	85.5
2020-06	MW-1002		1093.83	57.8	< 0.28	< 1.9	74.1	< 0.0580	< 1.2	3.1	124	6.79	159.67	84.0
2020-06	MW-1002	Dup.		58.5	< 0.28	< 1.9	70.9	< 0.0580	< 1.2	3.1	128			
2020-06	MW-1002G		1093.67	114	< 0.28	< 1.9	150	< 0.0580	< 1.2	8.9	226	7.07	314.72	89.3
2020-06	MW-1004		1109.74	27.3	< 0.28	7.3	30.3	0.267	3.8	8.1	74.0	6.91	72.61	90.4
2020-06	MW-1004P		1108.35	169	0.56	< 1.9	155	0.17	91.2	2.3	170	7.86	304.36	41.6
2020-06	MW-1004S		1109.82	47.6	< 0.28	< 1.9	79.8	< 0.0580	< 1.2	36.1	140	6.47	172.18	85.5
2020-06	MW-1005		1141.98	63.3	0.90	< 1.9	503	20.6	777	16.3	1330	6.05	1606.50	38.4
2020-06	MW-1005P		1141.98	250	0.38	< 1.9	218	1.48	65.4	< 0.44	284	7.43	448.25	4.1
2020-06	MW-1005S		1142.45	151	2.4	< 1.9	132	3.36	185	4.0	202	7.45	303.40	-23.4
2020-06	MW-1010P		1088.84	161	29.3	< 1.9	187	< 0.0580	40.1	35.4	234	7.94	356.41	36.9
2020-06	MW-1013		1116.73	563	< 2.8	< 19.1	522	8.16	25200	17.2	656	6.31	1066.50	34.9
2020-06	MW-1013A		1101.09	394	0.28	< 1.9	568	0.0680	6140	233	728	6.88	1077.20	93.2
2020-06	MW-1013B		1101.67	595	< 2.8	414	2370	< 0.58	27000	1710	3070	6.22	3050.40	123.5
2020-06	MW-1013C		1104.59	547	24.3	< 19.1	2070	13.9	9600	1550	2840	6.78	2937.50	11.7
2020-06	MW-1014		1127.51	175	0.39	3.6	360	< 0.0580	2910	150	464	6.68	764.63	59.2
2020-06	MW-1014A		1123.91	495	1.2	9.9	1380	< 0.116	1560	910	1820	6.83	2186.90	69.7
2020-06	MW-1014B		1120.97	462	1.0	103	1750	< 0.116	7240	1290	2390	6.61	2797.60	73.8
2020-06	MW-1014C		1114.9	272	30.6	< 3.8	585	4.91	1760	257	730	7.10	1007.90	10.1
2020-06	MW-1014C	Dup.		273	29.8	< 1.9	566	4.72	1710	259	732			
2020-06	MW-1015A		1089.71	89.9	< 0.28	< 1.9	105	< 0.0580	7.1	8.1	154	7.27	206.04	53.3
2020-06	MW-1015B		1089.66	179	< 0.28	< 1.9	160	0.0717	41.1	0.76	306	7.99	561.48	49.4
2020-11	MW-1000PR		1089.07	225	27.9	7.9	394	4.09	1960	179	438	6.16	695.37	151.3
2020-11	MW-1000R		1090.26	95.2	< 0.28	19.7	219	< 0.0580	404	35.1	322	5.83	470.00	199.0
2020-11	MW-1002		1092.12	60.2	< 0.28	4.2	71.6	0.0857	1.6	2.8	116	6.14	144.78	184.0
2020-11	MW-1002G		1091.98	116	< 0.28	2.3	150	< 0.0580	< 1.2	9.9	184	6.19	308.31	182.8
2020-11	MW-1002G	Dup.		114	< 0.28	< 1.9	162	< 0.0580	< 1.2	9.9	192			
2020-11	MW-1004		1108.81	34.9	< 0.28	5.4	42.9	0.0800	1.3	12.1	64.0	6.22	89.39	177.1
2020-11	MW-1004P		1106.8	165	0.33	< 1.9	152	0.382	91.4	2.2	142	7.16	287.70	75.2
2020-11	MW-1004S		1108.86	38.0	< 0.28	< 1.9	56.0	< 0.0580	< 1.2	21.3	78.0	6.11	129.94	187.2
2020-11	MW-1005		1141.23	56.3	0.68	< 1.9	563	12	702	17.7	1110	5.56	1650.90	110.7
2020-11	MW-1005P		1140.39	247	0.34	< 1.9	235	2.28	72.2	< 0.44	248	6.62	435.67	15.1
2020-11	MW-1005S		1141.06	145	2.4	< 1.9	141	3.62	190	4.5	168	6.52	268.17	34.0
2020-11	MW-1010P		1088.85	156	20.4	< 1.9	197	< 0.0580	56.6	35.7	184	6.73	340.46	212.0
2020-11	MW-1013		1114.39	560	0.86	4.2	525	16.8	26200	12.3	638	5.83	979.40	101.5
2020-11	MW-1013A		1099.72	394	0.30	< 1.9	534	0.0662	6230	226	692	6.32	978.96	240.6
2020-11	MW-1013B		1100.18	577	1.0	398	2260	0.0697	28500	1750	2880	5.93	2913.1	248.1
2020-11	MW-1013C		1103.05	530	26.5	4.6	2070	15.3	9710	1620	2730	6.23	2799.30	80.8
2020-11	MW-1014		1125.18	208	< 0.28	3.8	366	< 0.0580	2440	177	530	6.14	714.13	235.3
2020-11	MW-1014A		1122.68	490	1.2	11.7	1370	< 0.0580	1860	1020	1870	6.20	2067.90	223.4
2020-11	MW-1014B		1118.35	463	1.4	129	1790	< 0.0580	6200	1380	2410	6.00	2454.70	197.9
2020-11	MW-1014C		1112.67	269	29.9	< 1.9	564	4.87	1680	249	678	6.12	956.12	90.3
2020-11	MW-1014C	Dup.		266	30.2	< 1.9	589	4.96	1730	249	668			
2020-11	MW-1015A		1089.24	89.6	< 0.28	< 1.9	103	< 0.0580	9.2	8.5	134	6.37	184.04	171.2
2020-11	MW-1015B		1089.17	178	< 0.28	< 1.9	159	0.105	29.9	0.87	286	6.98	468.07	146.6

Attachment 2

Groundwater - Annual Parameters

Trend Analysis
Trend Graphs
2020 Data

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2020

	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	1	-7	-3	-4	-4	-6
p-Level	1.000	0.159	0.650	0.484	0.484	0.234
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	26	20	26	26	18	34
Mann-Kendall S	-267	-6	41	-272	-28	-370
p-Level	0.000	0.872	0.382	0.000	0.312	0.000
Trend	-			-		-
MW-1000R						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	4	4	-4	-6	0
p-Level	0.484	0.484	0.484	0.484	0.234	1
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	10	10	10	10	10	10
Mann-Kendall S	-13	23	1	-15	-17	-3
p-Level	0.292	0.046	1	0.216	0.156	0.862
Trend						
MW-1010P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	-7	0	0	-6	-4
p-Level	0.484	0.159	1.000	1.000	0.234	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	26	20	26	26	18	34
Mann-Kendall S	223	93	11	220	8	66
p-Level	0.000	0.002	0.828	0.000	0.794	0.338
Trend	+	+		+		
MW-1002						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	2	0	-4	-2	0
p-Level	0.484	0.816	1.000	0.484	0.816	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	17	22	21	17	32
Mann-Kendall S	51	88	5	62	24	0
p-Level	0.132	0.000	0.912	0.064	0.348	1.000
Trend		+				
MW-1002G						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	5	-6	0	8	-6	0
p-Level	0.359	0.234	1.000	0.084	0.234	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	17	22	21	17	32
Mann-Kendall S	131	94	0	133	5	-21
p-Level	0.000	0.000	1.000	0.000	0.872	0.748
Trend	+	+		+		

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2020

	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	0	-3	-4	-2	-2	-4
p-Level	1	0.65	0.484	0.816	0.816	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	10	10	10	10	10	10
Mann-Kendall S	-20	22	1	-23	-4	1
p-Level	0.09	0.059	1	0.046	0.795	1
Trend						
MW-1004S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	10	-6	0	8	2	0
p-Level	0.016	0.234	1.000	0.084	0.816	1.000
Trend	+					
Trend Results for All Data Since Oct. 1997						
Sample Size	24	18	24	24	18	33
Mann-Kendall S	85	-86	16	68	-35	0
p-Level	0.036	0.000	0.712	0.096	0.200	1.000
Trend		-				
MW-1004P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	-3	0	3	-4	0
p-Level	0.234	0.650	1.000	0.650	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	24	18	24	24	18	33
Mann-Kendall S	113	48	0	81	16	4
p-Level	0.005	0.075	1.000	0.047	0.575	0.964
Trend	+					
MW-1005						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	0	0	0	-4	-4
p-Level	0.816	1.000	1.000	1.000	0.484	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	17	22	21	17	32
Mann-Kendall S	86	78	5	93	80	23
p-Level	0.010	0.000	0.912	0.004	0.000	0.724
Trend	+	+		+	+	
MW-1005S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-8	-3	-2	-6	-5	0
p-Level	0.084	0.650	0.816	0.234	0.359	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	17	22	21	17	32
Mann-Kendall S	-37	37	19	-25	-35	0
p-Level	0.281	0.140	0.616	0.474	0.164	1.000
Trend						

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2020

	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	-2	-4	-6	0	2
p-Level	0.816	0.816	0.484	0.234	1.000	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	22	17	22	22	17	32
Mann-Kendall S	16	28	20	43	17	31
p-Level	0.676	0.270	0.597	0.240	0.516	0.629
Trend						
MW-1015A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	8	4	0	6	4	0
p-Level	0.084	0.484	1.000	0.234	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	16	31	21	16	36
Mann-Kendall S	61	37	27	88	-49	0
p-Level	0.069	0.106	0.662	0.008	0.029	1.000
Trend				+		
MW-1015B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	-2	0	-2	-2	0
p-Level	0.816	0.816	1.000	0.816	0.816	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	21	16	31	21	16	36
Mann-Kendall S	110	43	19	122	3	0
p-Level	0.000	0.058	0.762	0.000	0.929	1.000
Trend	+			+		
MW-1013						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	-2	0	-2	-4	0
p-Level	0.816	0.816	1.000	0.816	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	16	16	16	16	15	16
Mann-Kendall S	3	-90	-38	24	-21	5
p-Level	0.929	0.000	0.096	0.306	0.328	0.859
Trend		-				
MW-1013A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	2	0	4	-5	2
p-Level	0.484	0.816	1.000	0.484	0.359	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	16	16	16	16	15	16
Mann-Kendall S	8	-11	-17	12	-9	-3
p-Level	0.756	0.658	0.478	0.626	0.698	0.929
Trend						

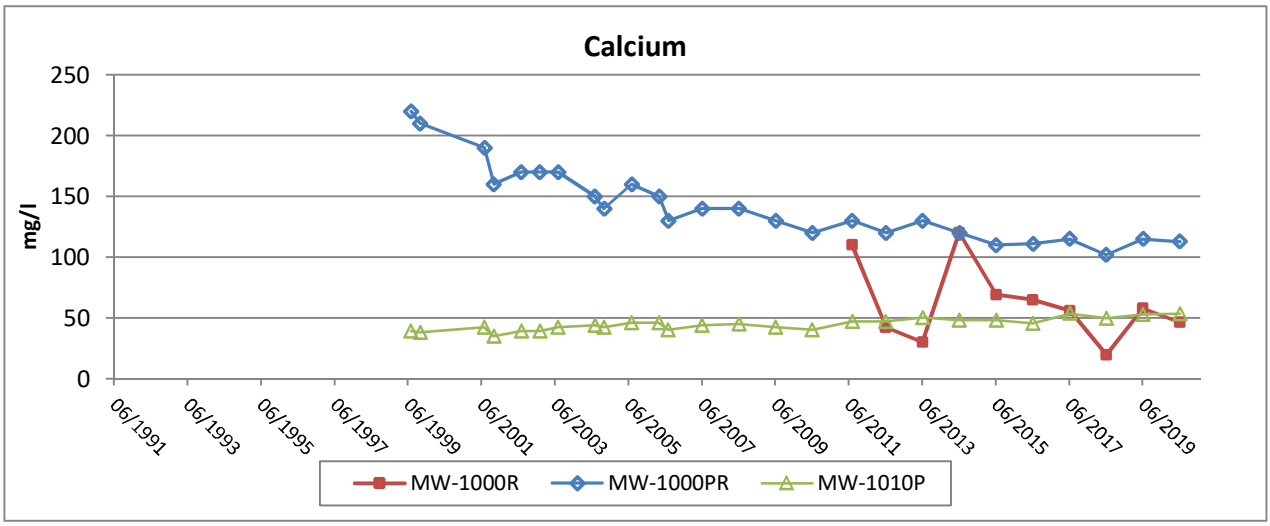
Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2020

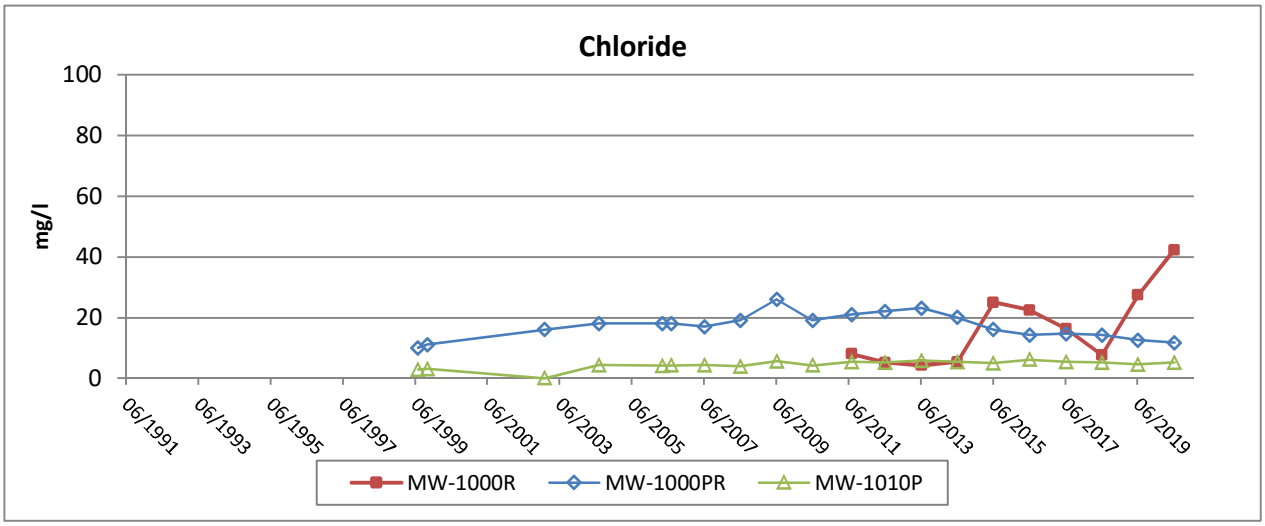
	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1013B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	3	4	0	6	-2	6
p-Level	0.650	0.484	1.000	0.234	0.816	0.234
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	28	29	21	36
Mann-Kendall S	-66	35	28	-93	-71	251
p-Level	0.224	0.374	0.596	0.085	0.033	0.000
Trend						+
MW-1013C						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	-10	-3	3	-2	2
p-Level	0.484	0.016	0.650	0.650	0.816	0.816
Trend		-				
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	28	29	21	36
Mann-Kendall S	-48	25	69	-192	-33	-295
p-Level	0.382	0.530	0.181	0.000	0.339	0.000
Trend				-		-
MW-1014						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	4	0	6	2	-4
p-Level	0.234	0.484	1.000	0.234	0.816	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	16	16	16	16	15	16
Mann-Kendall S	14	90	-1	21	-24	-15
p-Level	0.564	0.000	0.982	0.374	0.261	0.535
Trend		+				
MW-1014A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	4	0	6	-4	4
p-Level	0.484	0.484	1.000	0.234	0.484	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	26	20	25	26	18	33
Mann-Kendall S	-55	11	8	-31	-41	187
p-Level	0.236	0.749	0.872	0.512	0.132	0.004
Trend						+
MW-1014B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	-6	-4	-3	-6	-4
p-Level	1.000	0.234	0.484	0.650	0.234	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	29	22	28	29	21	36
Mann-Kendall S	-199	57	55	-259	-80	-440
p-Level	0.000	0.116	0.289	0.000	0.016	0.000
Trend	-			-		-

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2020

	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	6	-8	0	2	2	2
p-Level	0.234	0.084	1.000	0.816	0.816	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	29	23	28	29	21	36
Mann-Kendall S	-274	162	1	-303	-78	-596
p-Level	0.000	0.000	0.992	0.000	0.018	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.





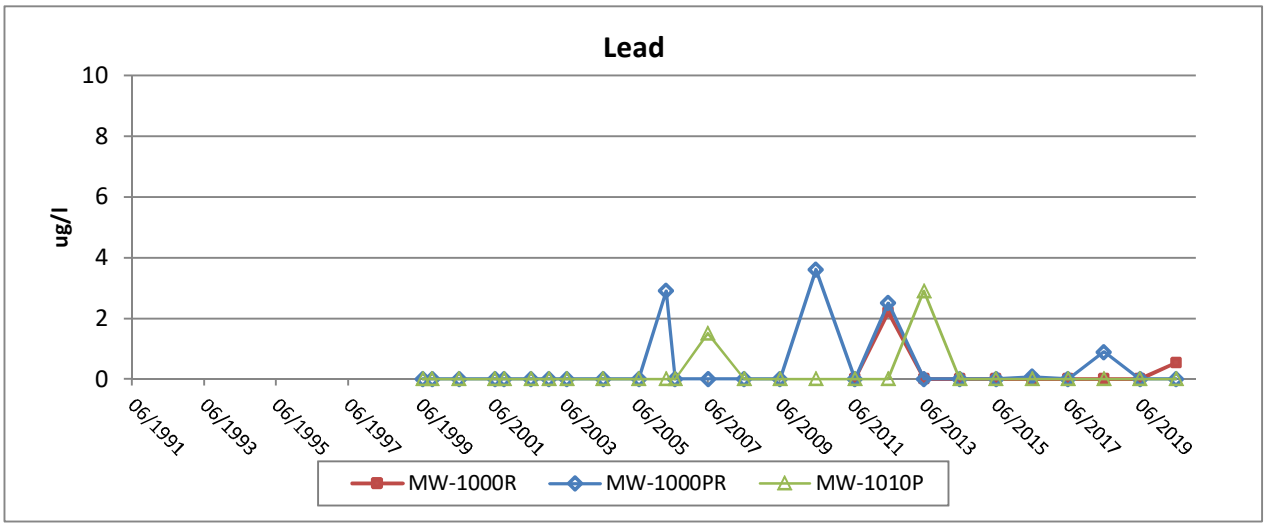


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Figure B-8a
Groundwater Trend Graphs - Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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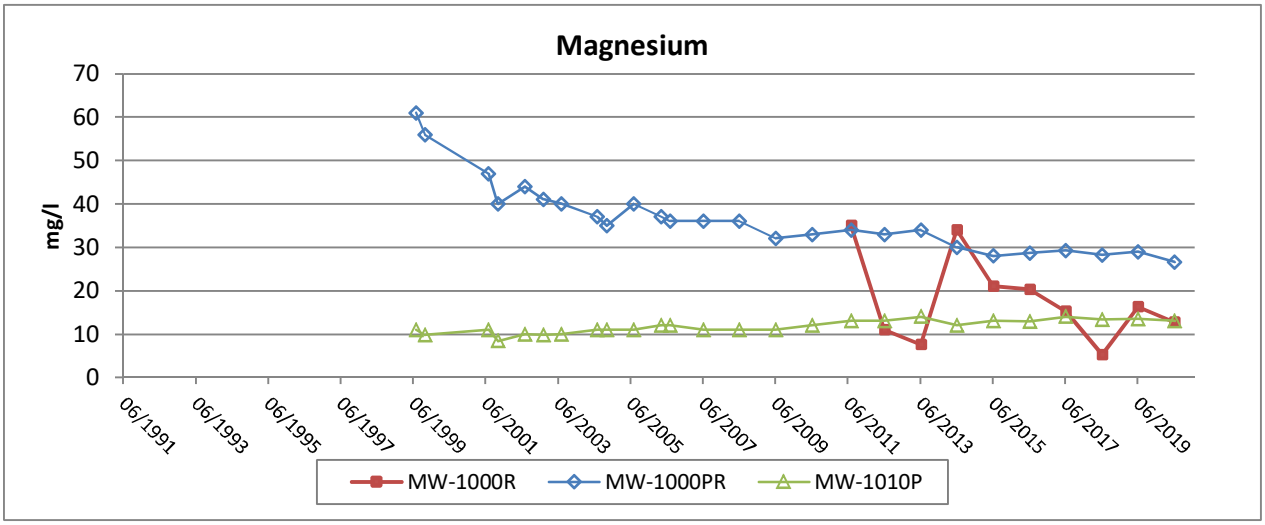

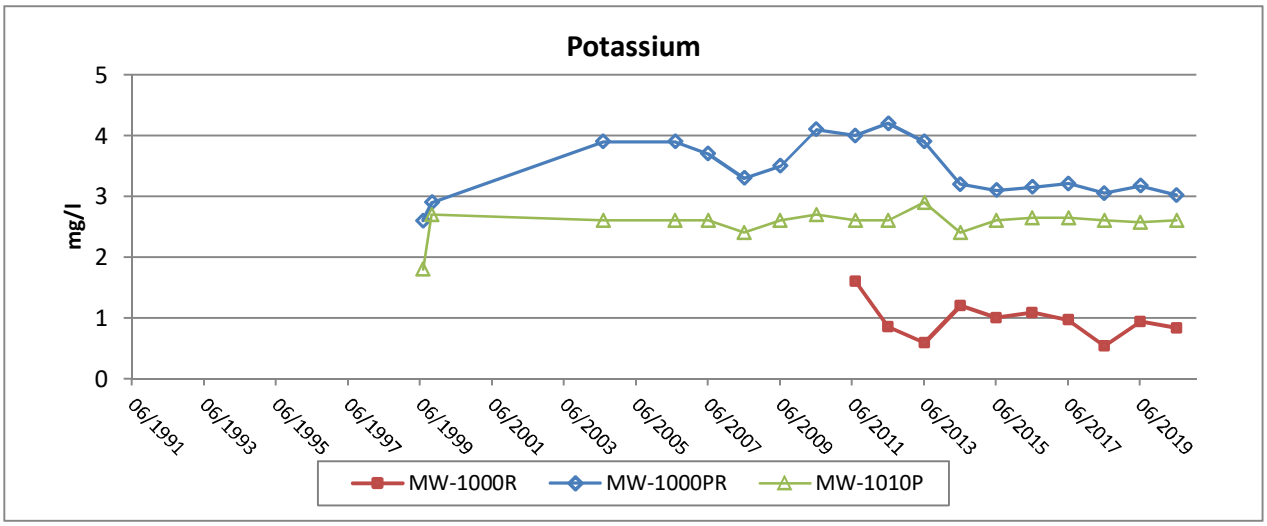

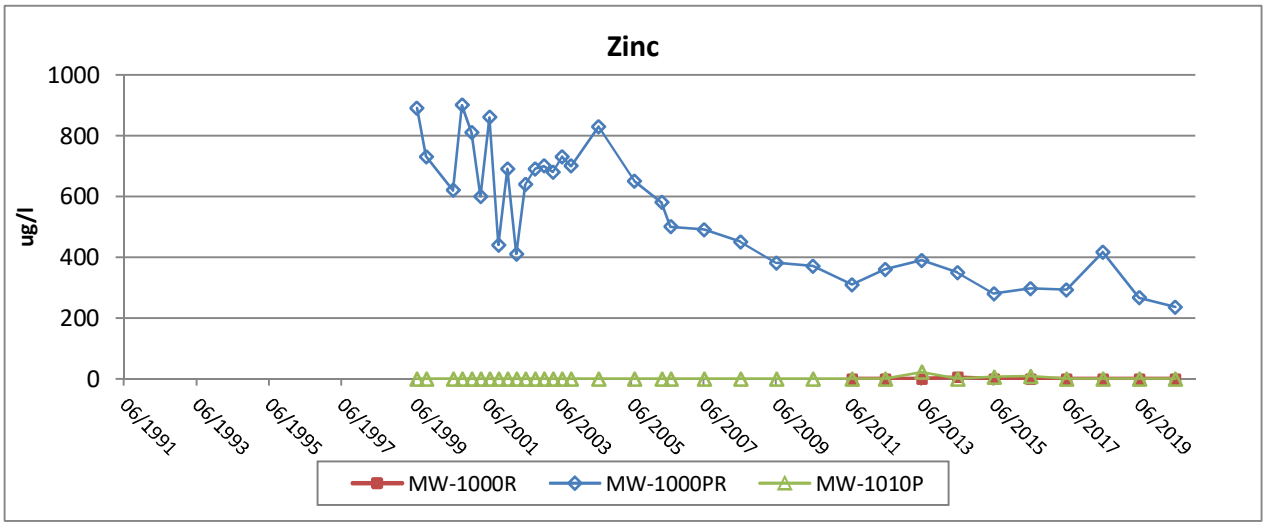

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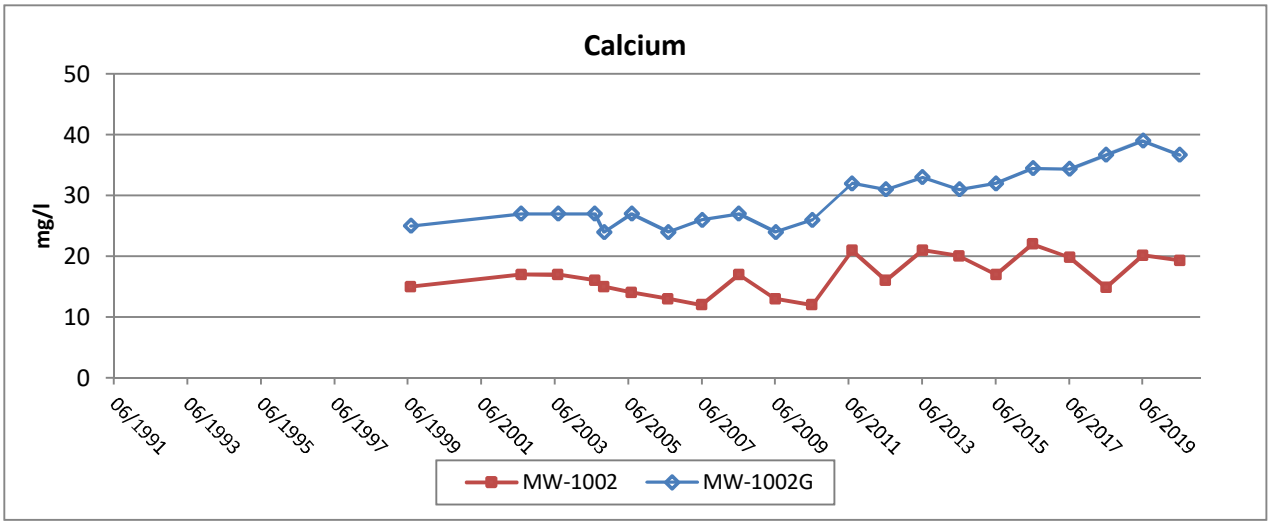
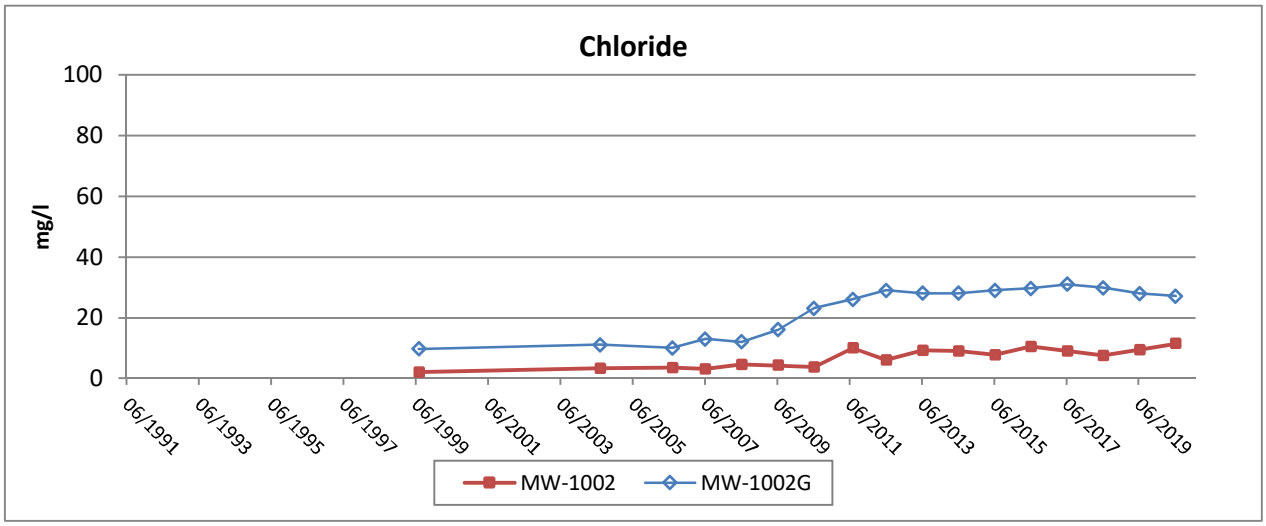
FLAMBEAU MINING COMPANY

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

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





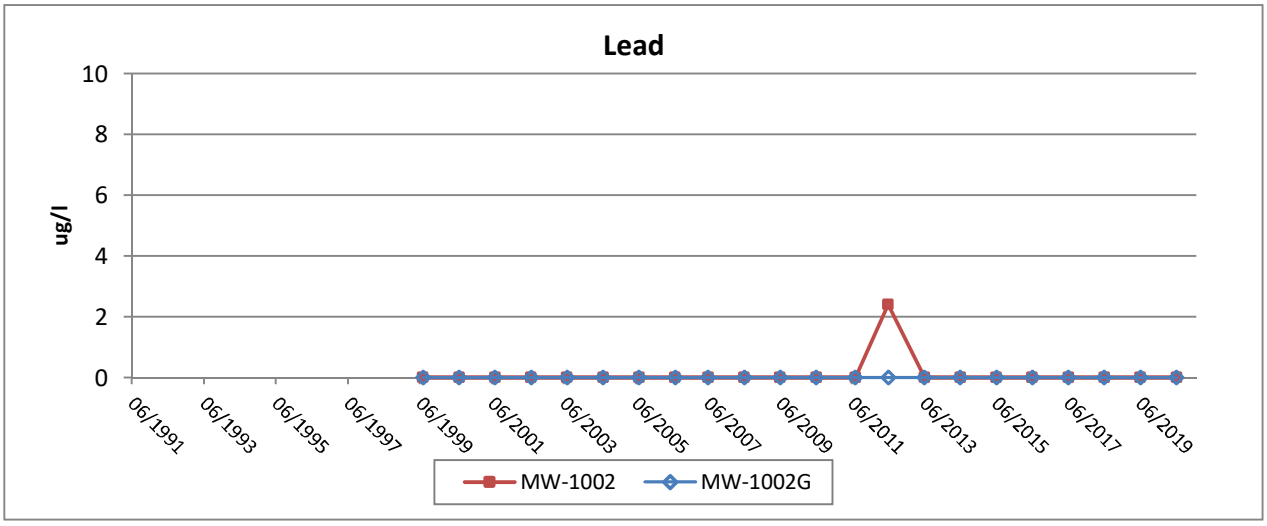


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Figure B-9a
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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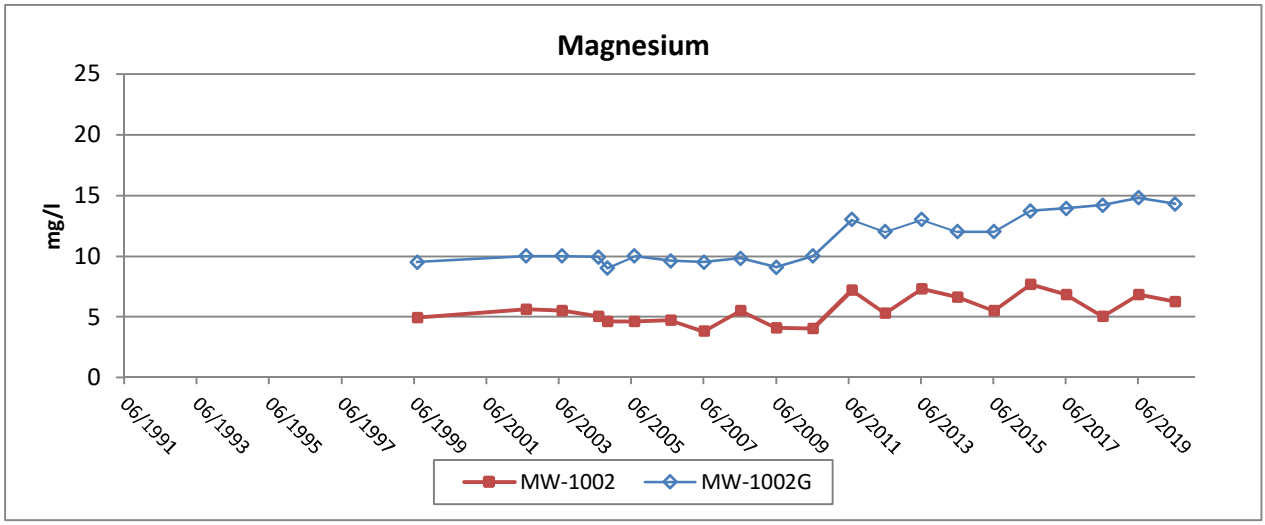

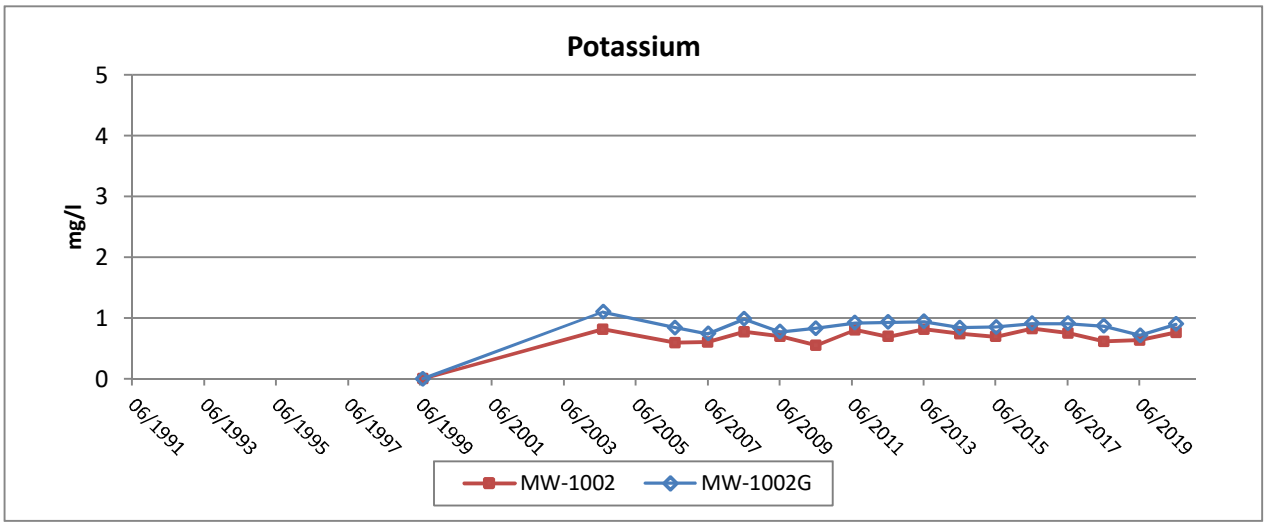

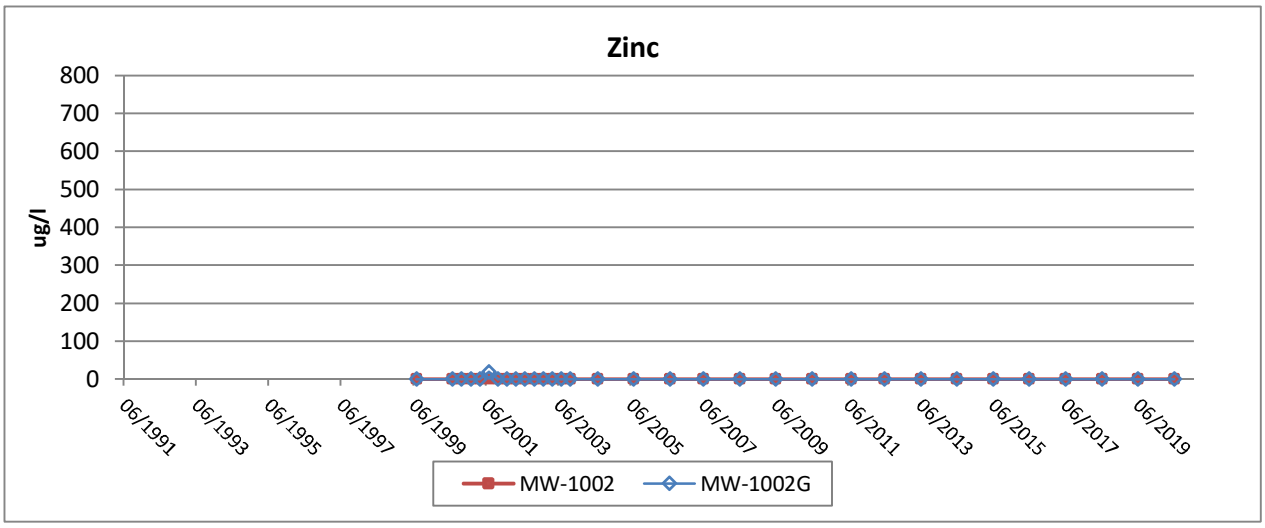

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Figure B-9b
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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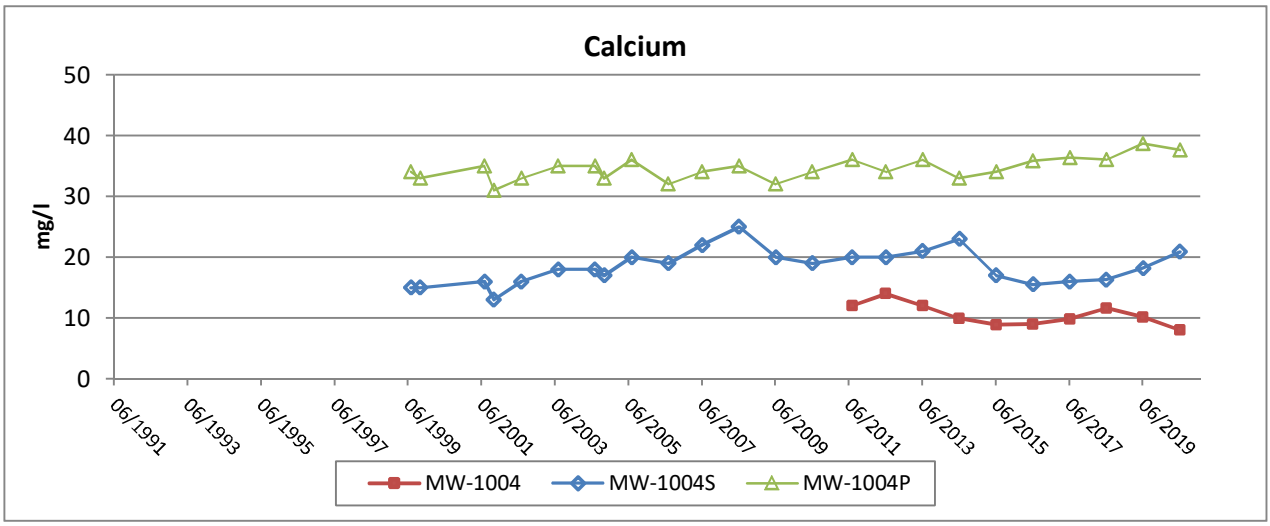

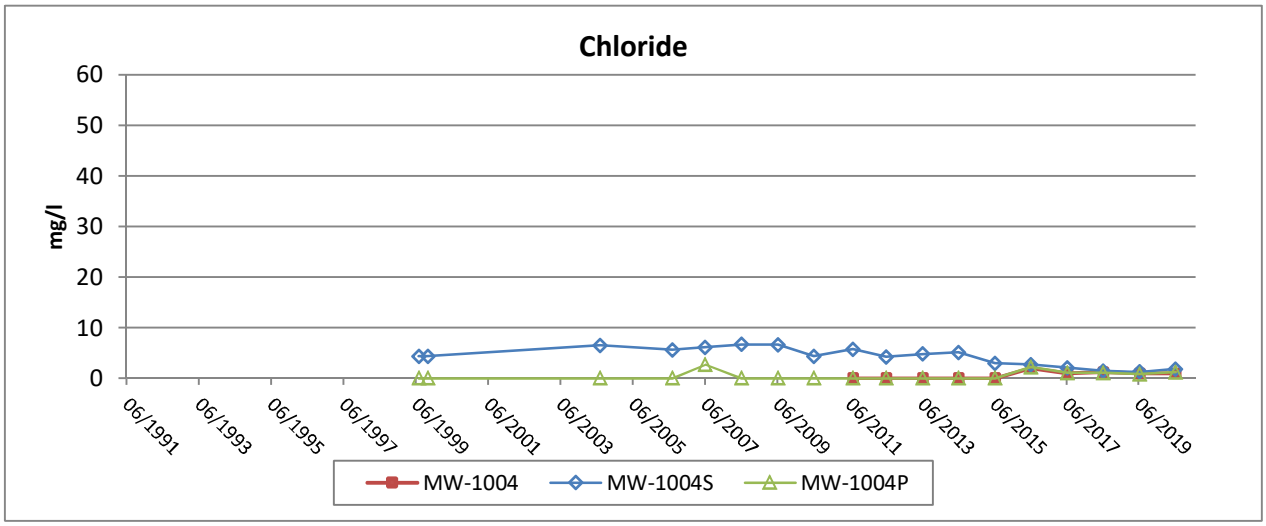

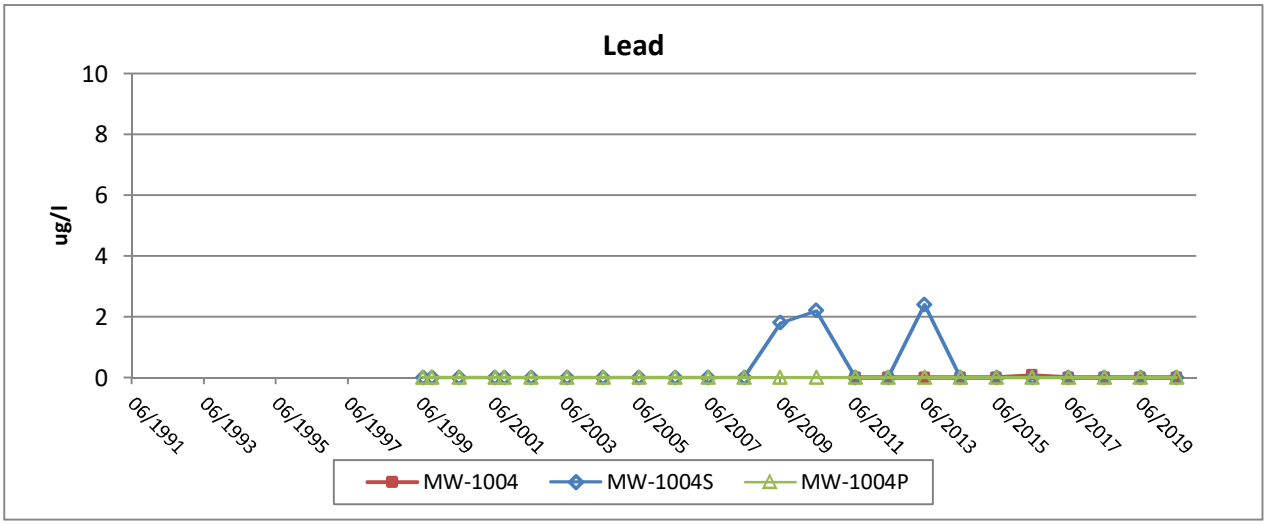

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Figure B-10a
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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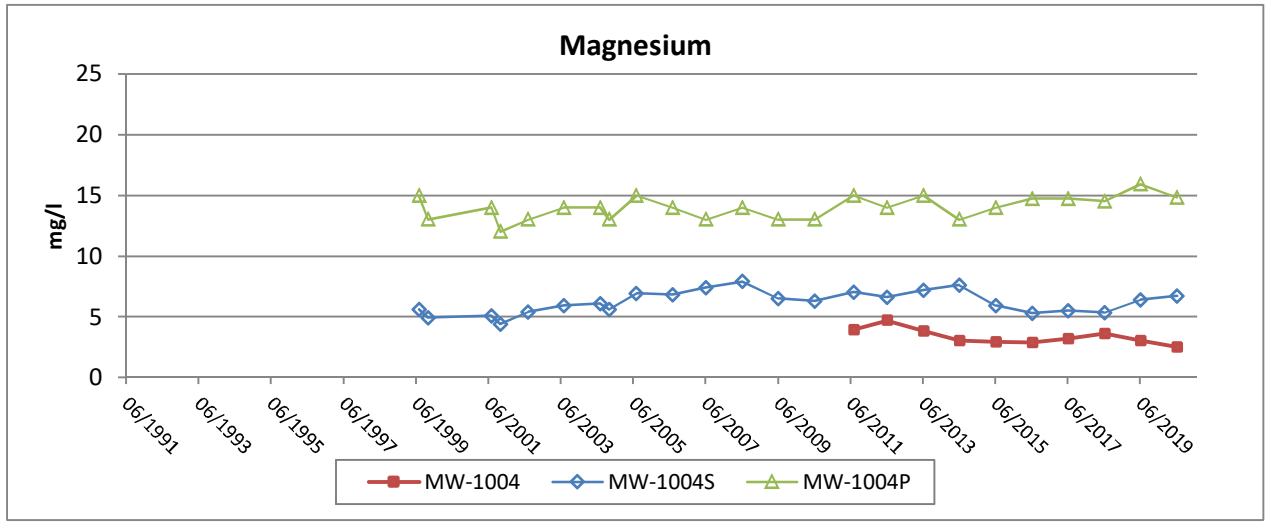

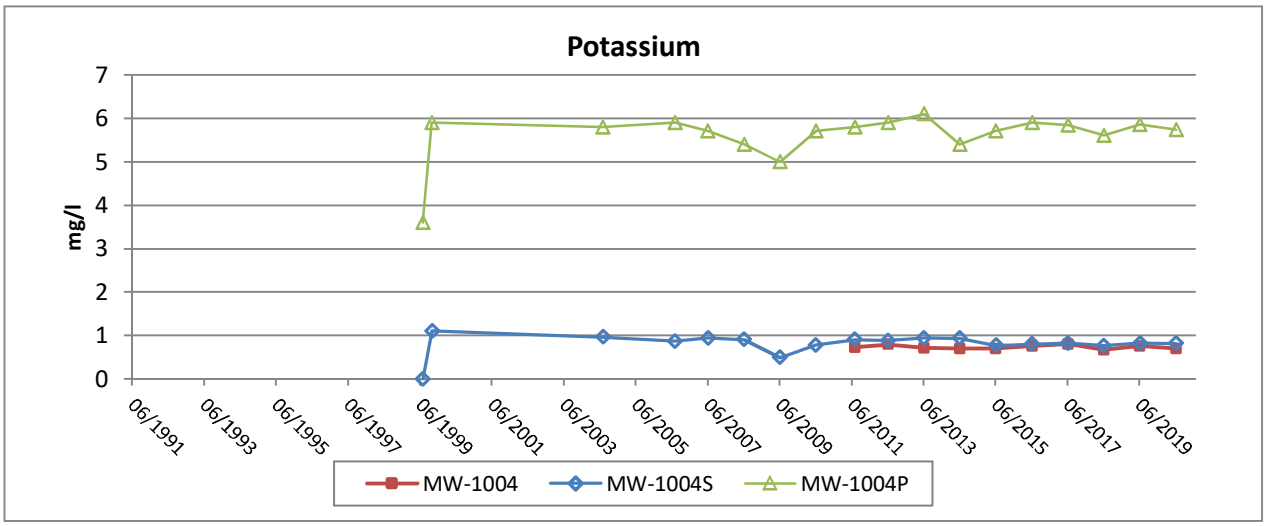

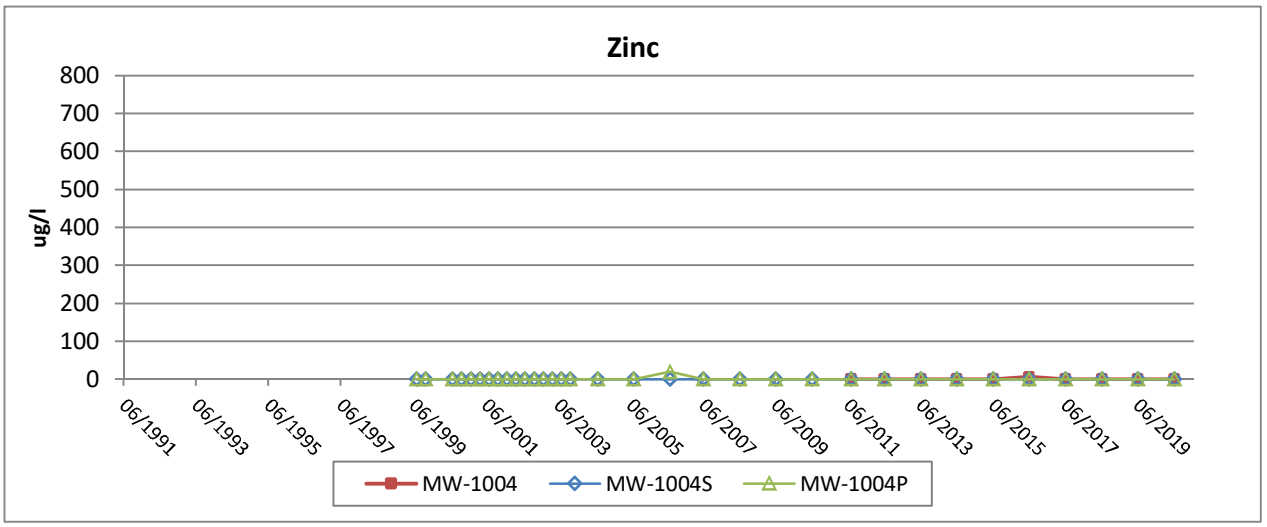

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Figure B-10b
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2021
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

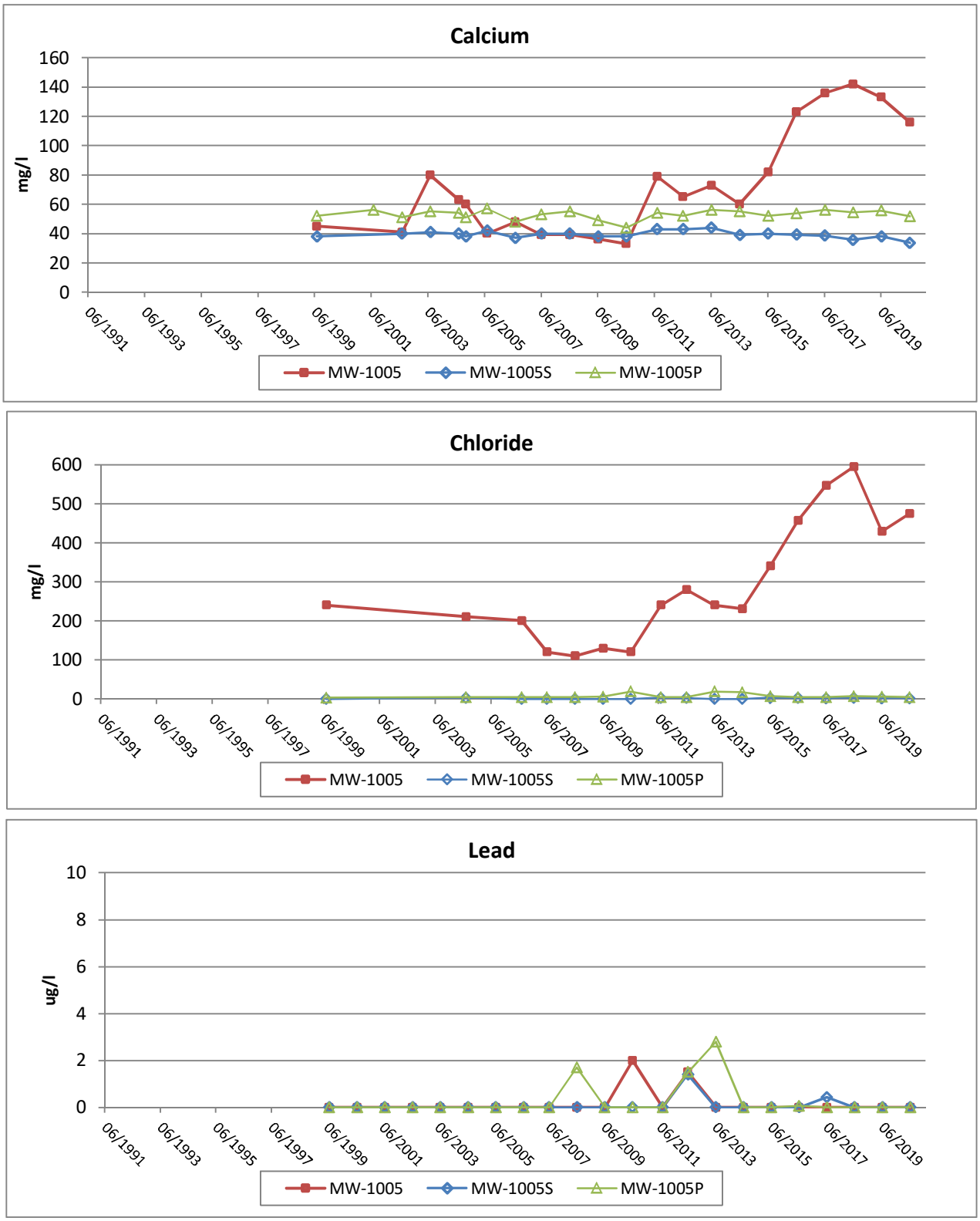

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Figure B-11a
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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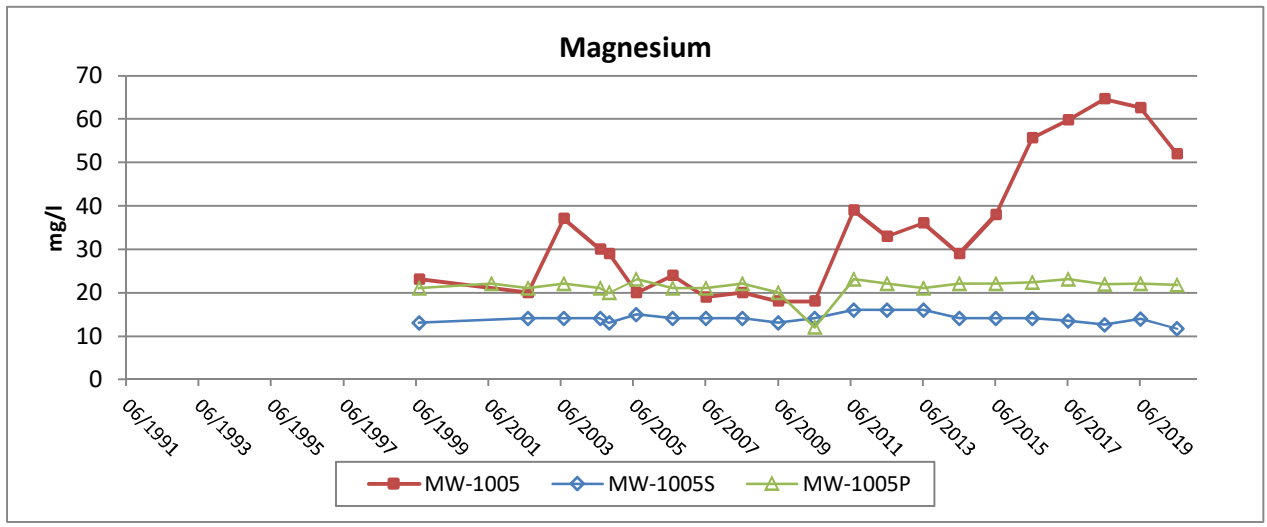

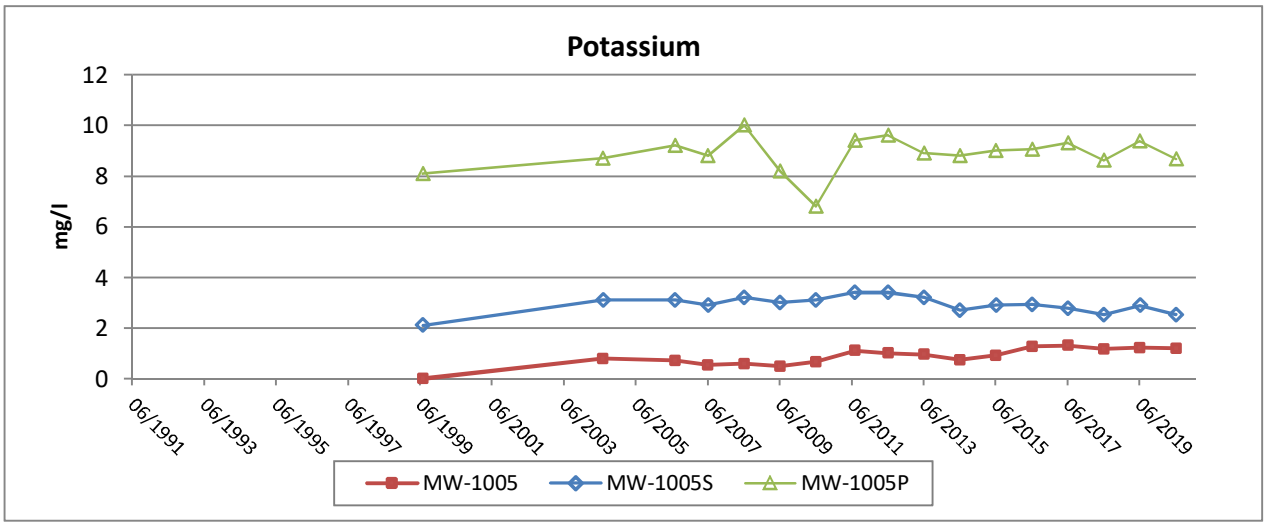

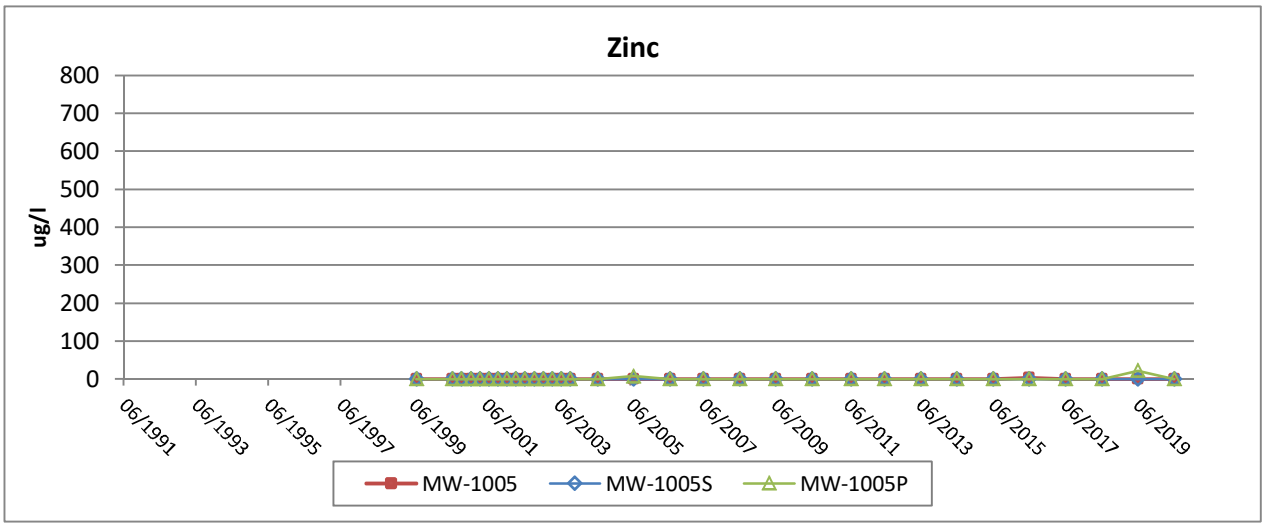

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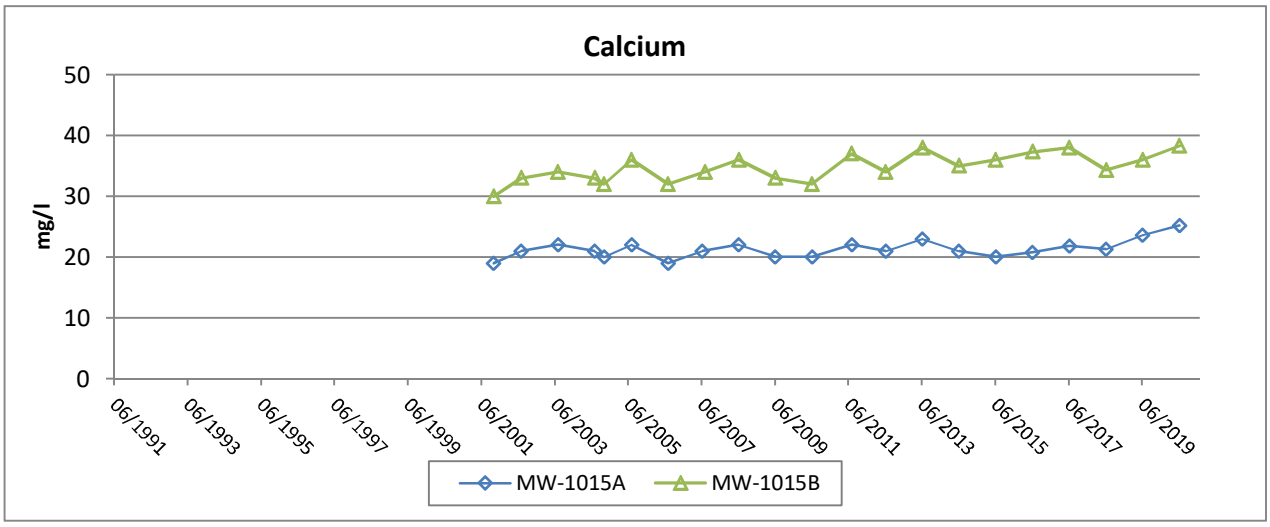
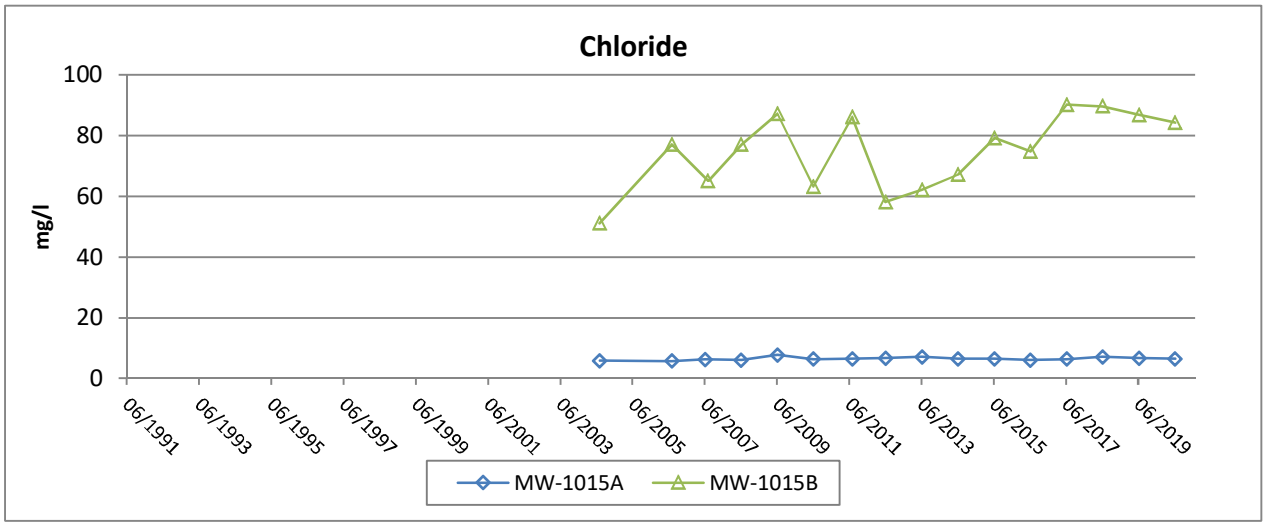
Figure B-11b
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





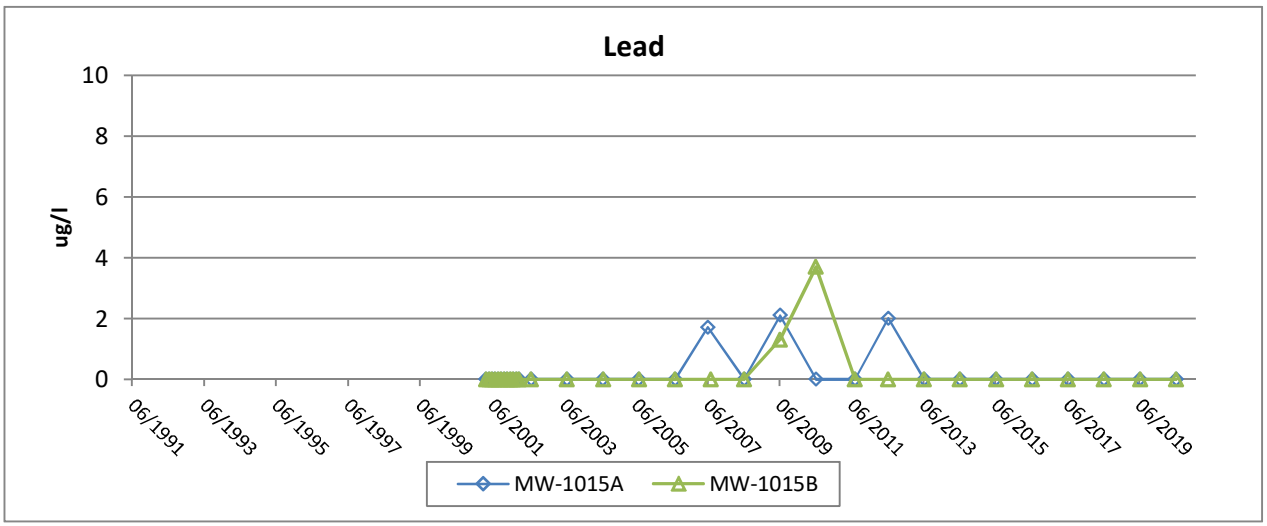


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Figure B-12a
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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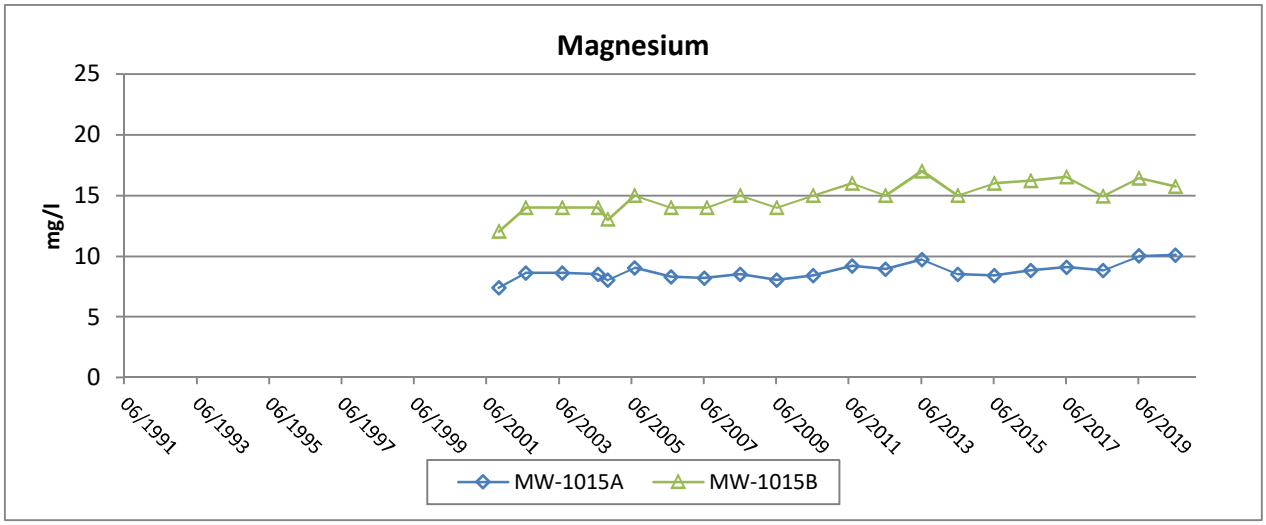

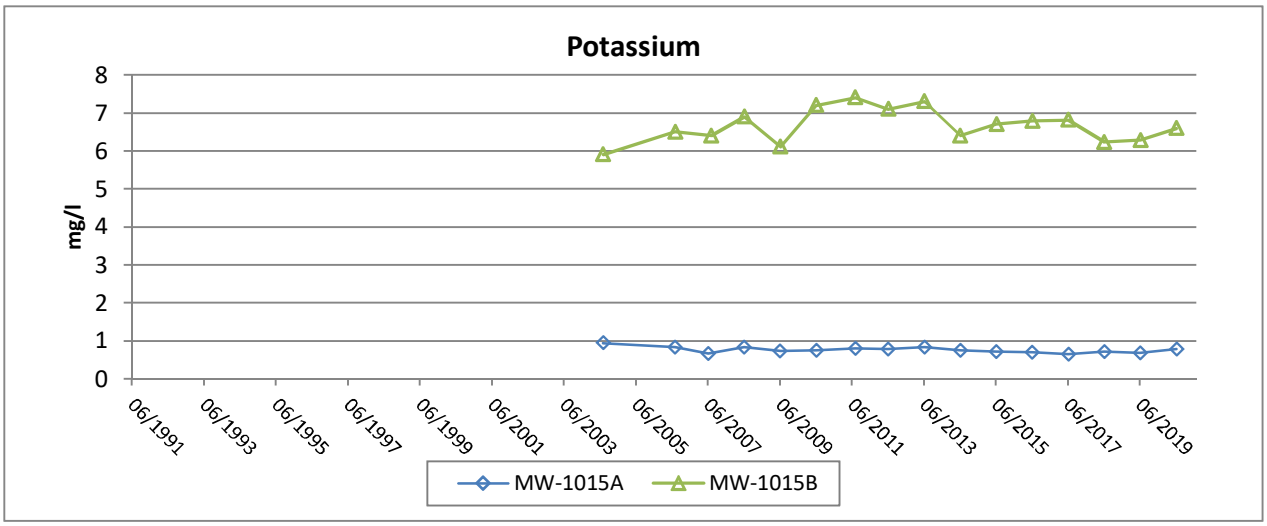

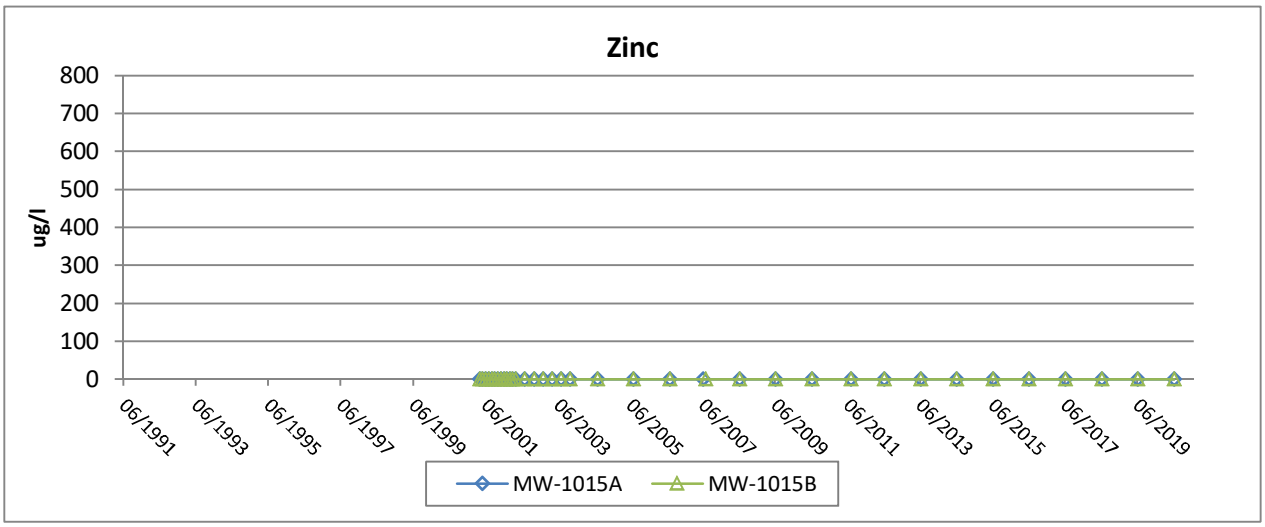

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Figure B-12b
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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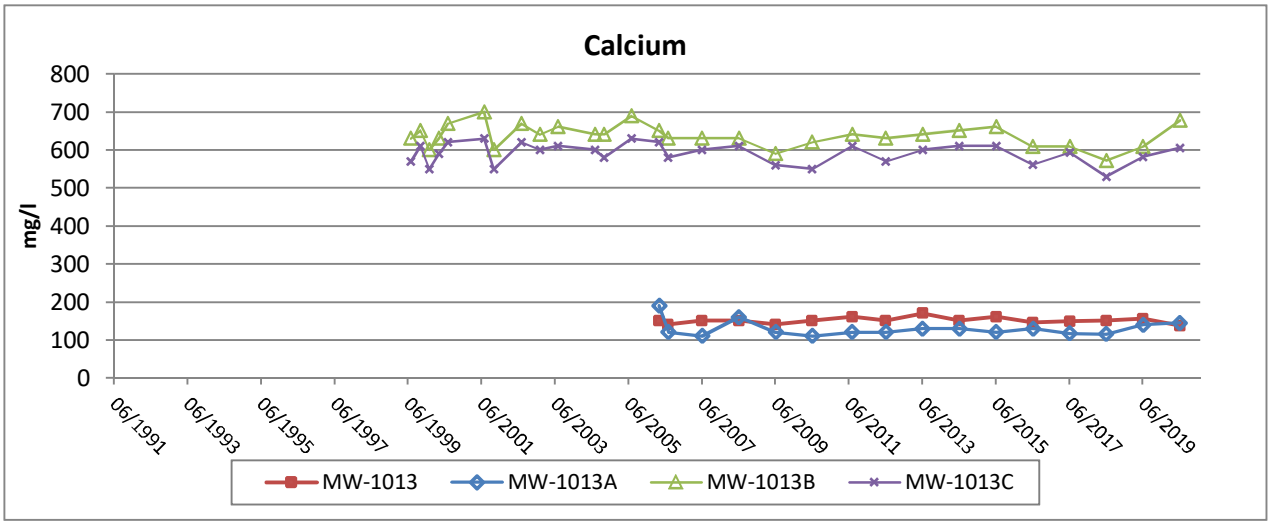

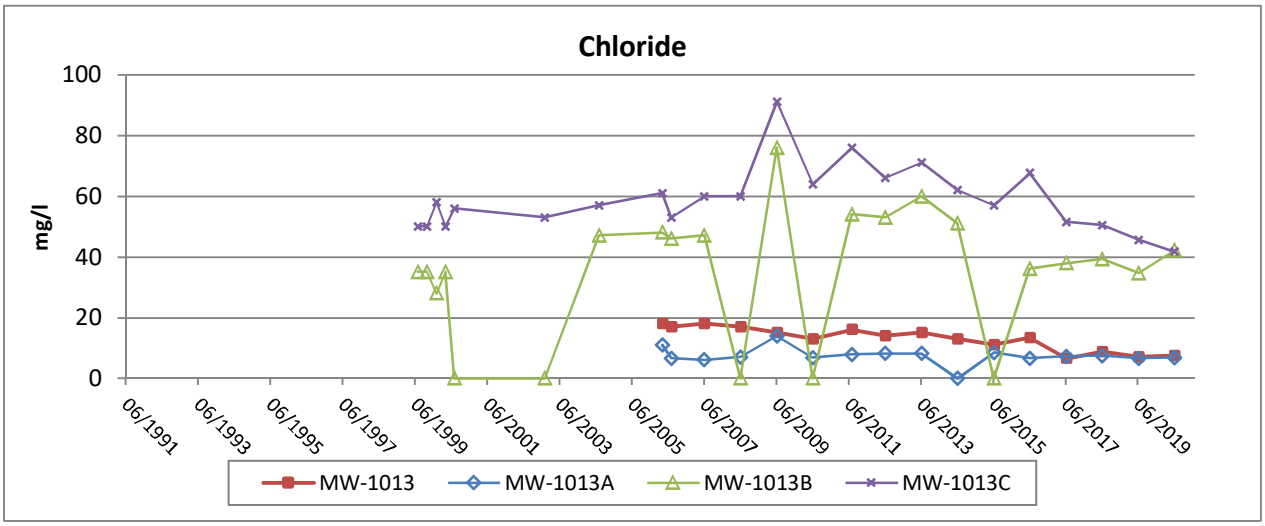

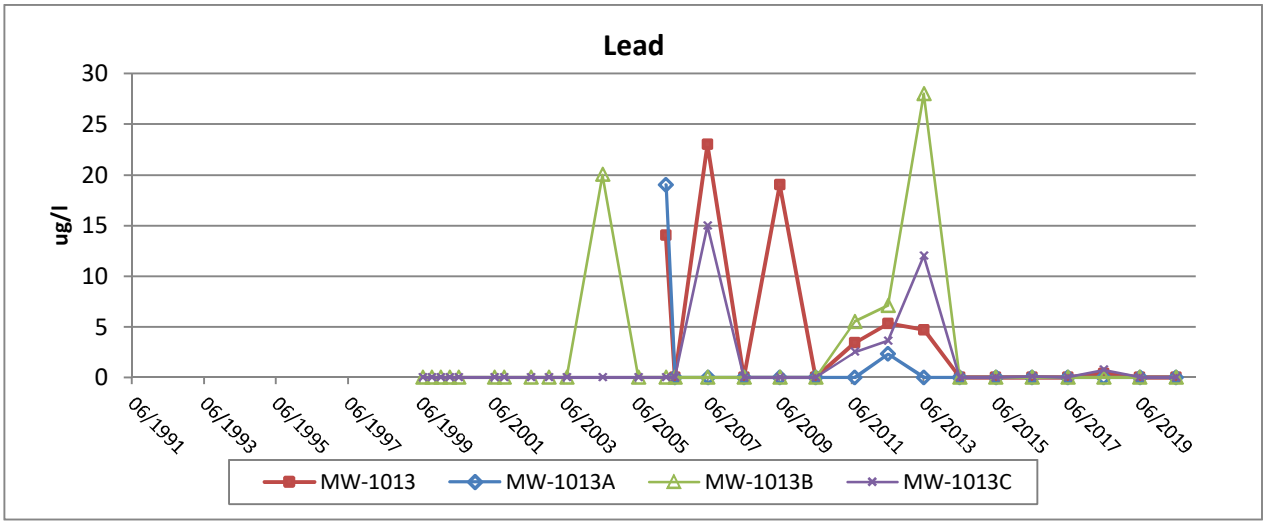

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Figure B-13a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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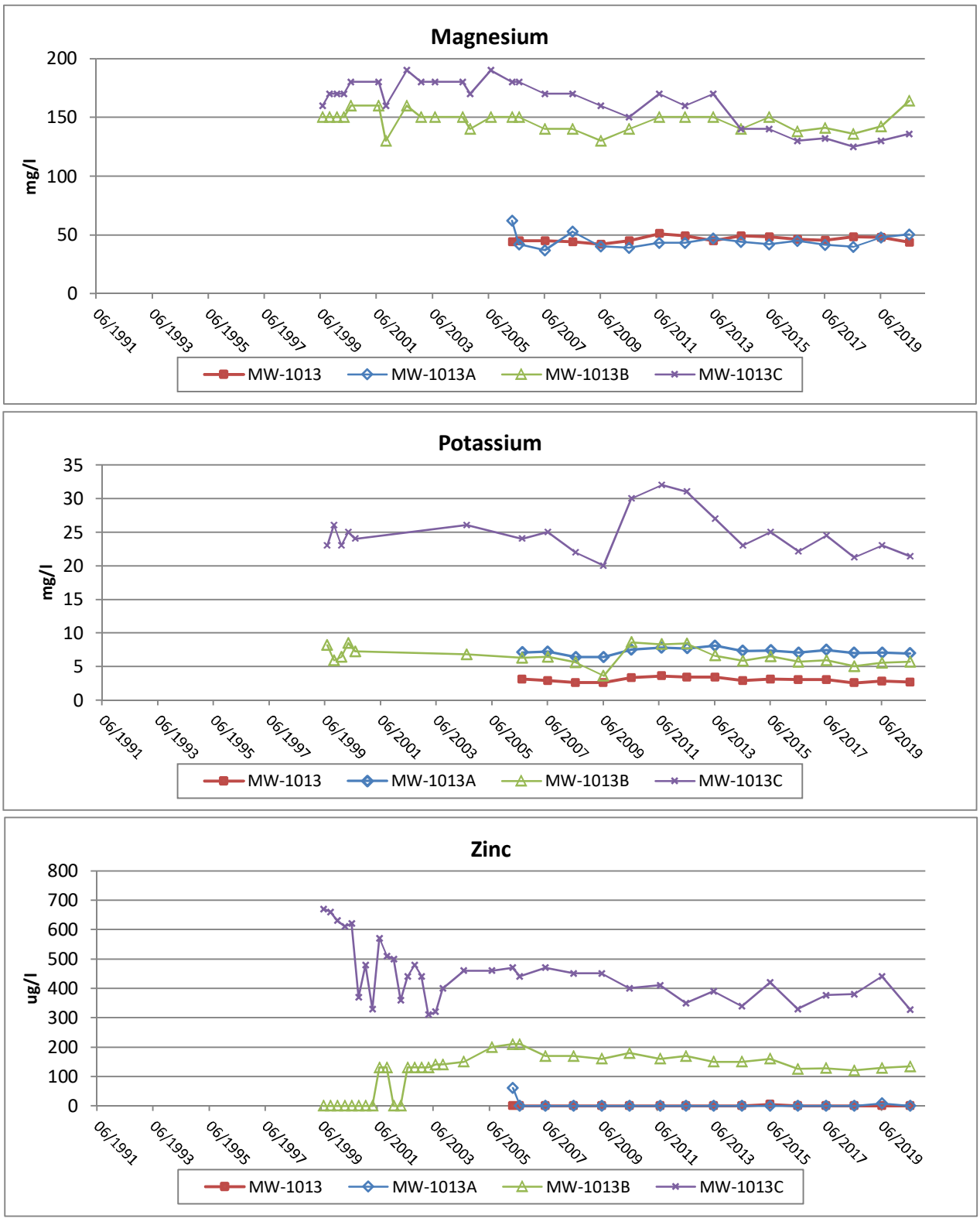

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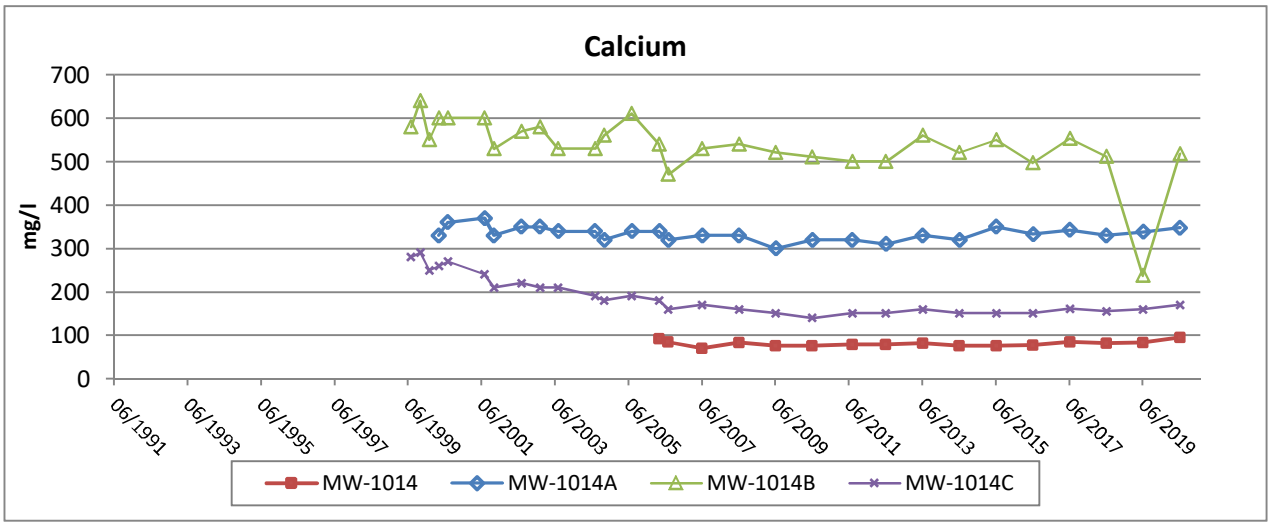
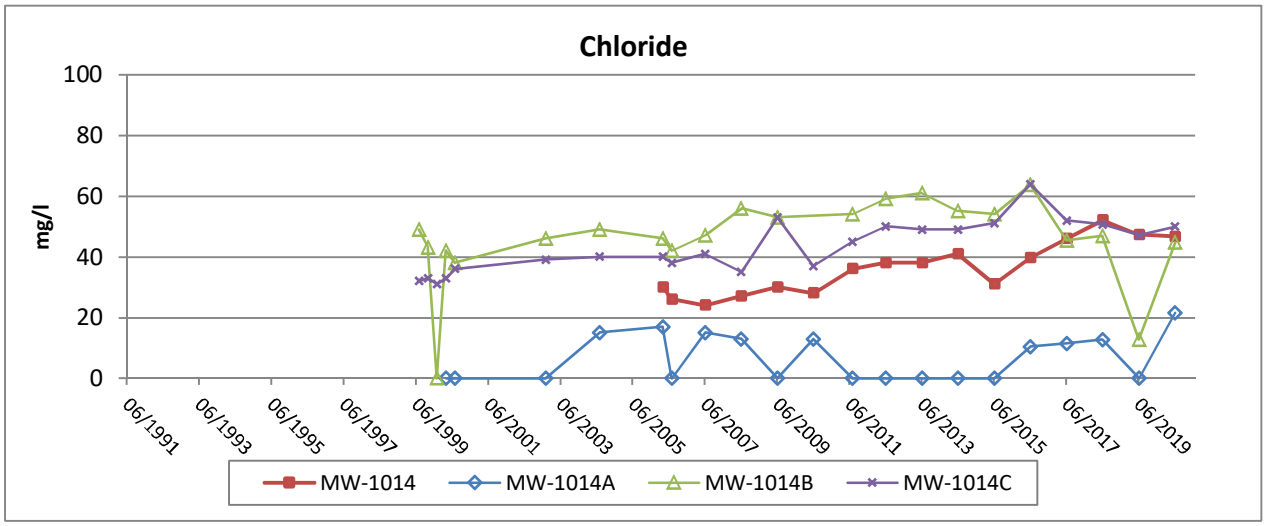
Figure B-13b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





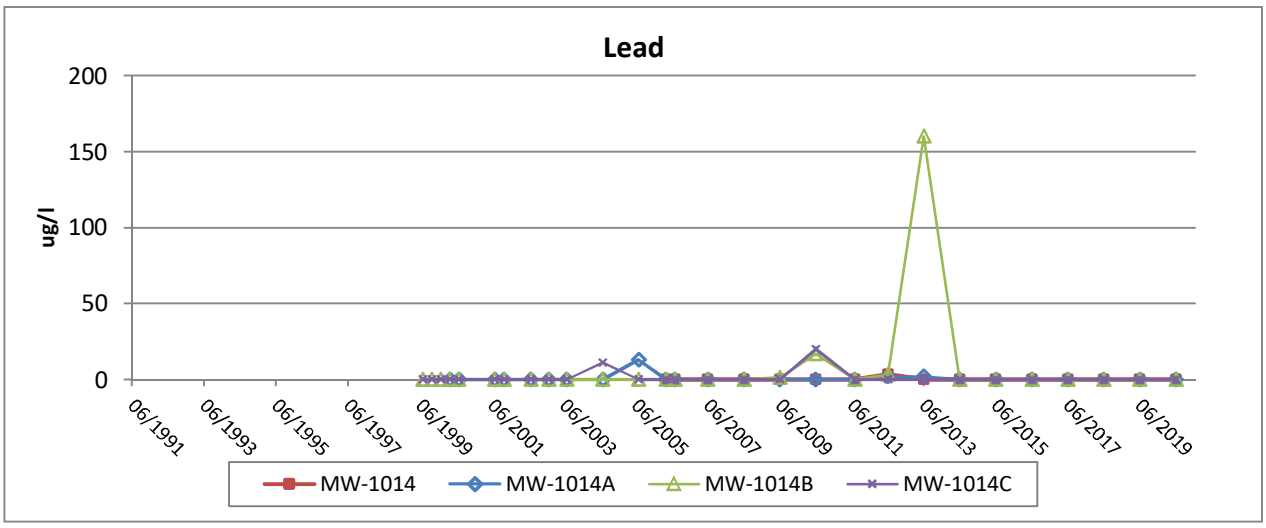


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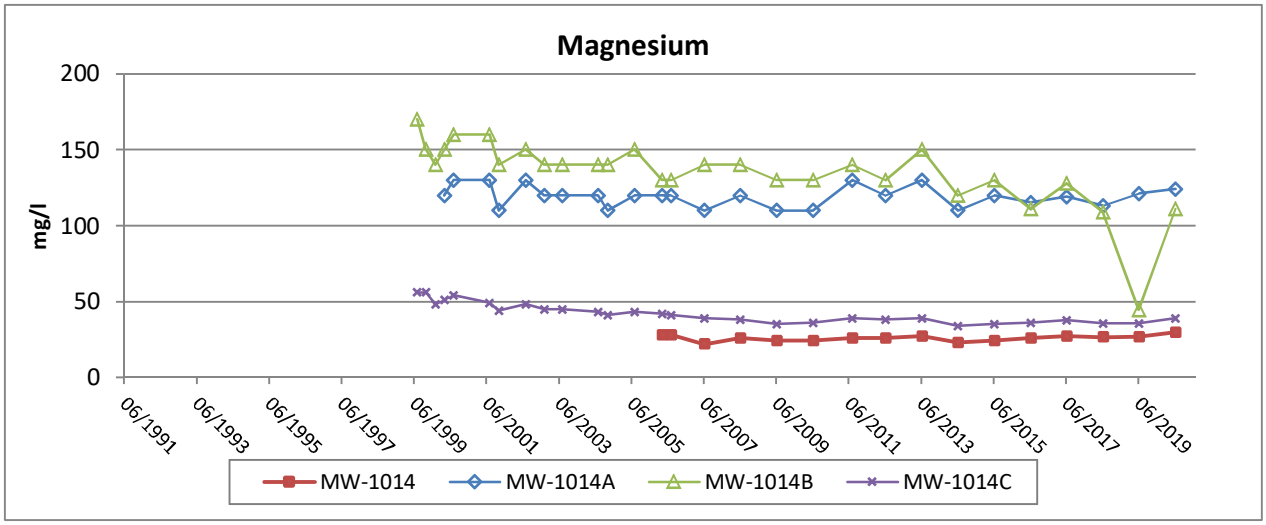
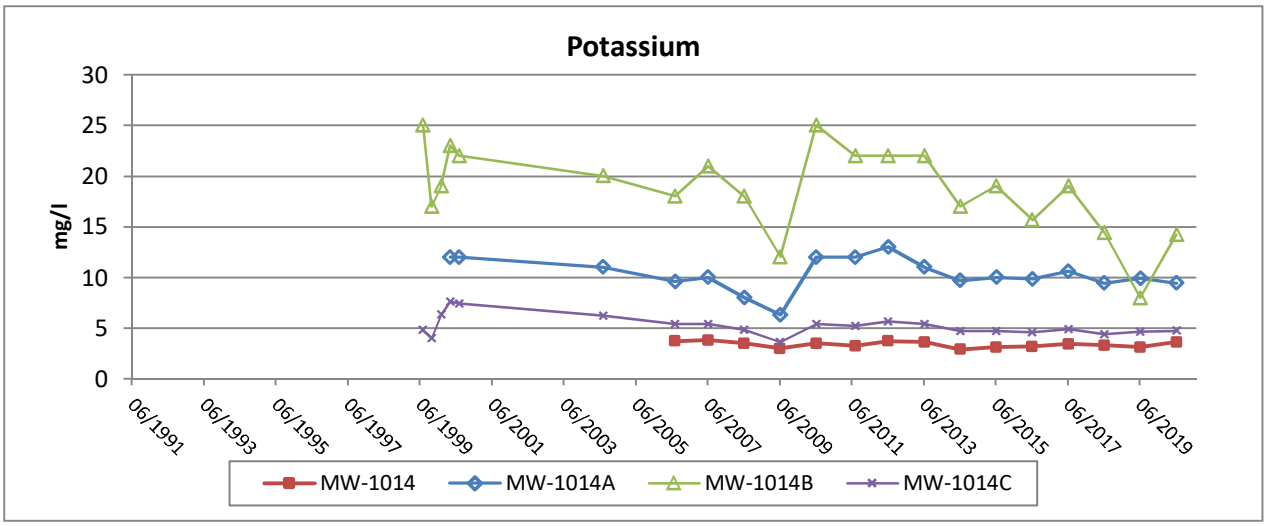
Figure B-14a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





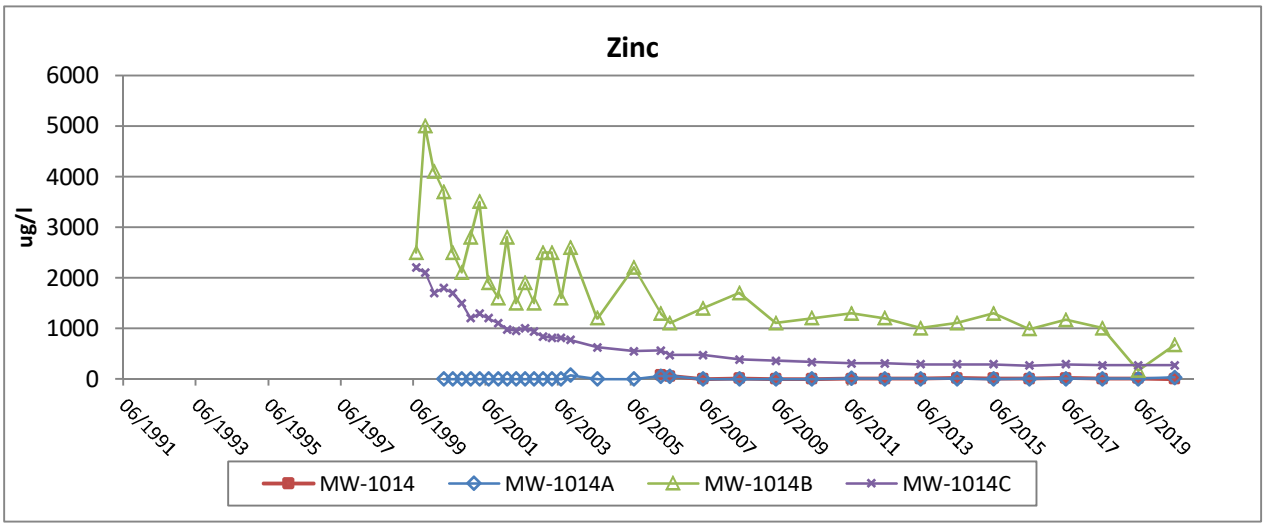


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Figure B-14b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

2020 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
2020-06	MW-1000PR		113	11.7	< 0.24	26.6	3.02	236
2020-06	MW-1000R		46.4	42.3	0.54	12.7	0.835	< 10.3
2020-06	MW-1002		19.3	11.4	< 0.24	6.26	0.756	< 10.3
2020-06	MW-1002	Dup.	18.5	11.4	< 0.24	6	0.741	< 10.3
2020-06	MW-1002G		36.7	27.0	< 0.24	14.3	0.9	< 10.3
2020-06	MW-1004		8.02	0.92	< 0.24	2.5	0.697	< 10.3
2020-06	MW-1004P		37.6	1.2	< 0.24	14.8	5.73	< 10.3
2020-06	MW-1004S		20.9	1.8	< 0.24	6.71	0.819	< 10.3
2020-06	MW-1005		116	475	< 0.24	52	1.18	< 10.3
2020-06	MW-1005P		51.5	3.9	< 0.24	21.7	8.66	< 10.3
2020-06	MW-1005S		33.6	1.5	< 0.24	11.7	2.52	< 10.3
2020-06	MW-1010P		53.1	5.1	< 0.24	13.1	2.6	< 10.3
2020-06	MW-1013		137	7.4	< 2.4	43.7	2.64	< 103
2020-06	MW-1013A		145	6.9	< 0.24	50.1	6.97	< 10.3
2020-06	MW-1013B		677	42.3	< 2.4	164	5.68	134
2020-06	MW-1013C		605	41.7	< 2.4	136	21.4	327
2020-06	MW-1014		95	46.6	< 0.24	29.8	3.62	< 10.3
2020-06	MW-1014A		348	21.5	< 0.47	124	9.42	31.5
2020-06	MW-1014B		518	44.7	< 0.47	111	14.2	674
2020-06	MW-1014C		170	49.9	< 0.47	39	4.71	274
2020-06	MW-1014C	Dup.	166	50.9	< 0.24	36.8	4.52	258
2020-06	MW-1015A		25.2	6.4	< 0.24	10.1	0.775	< 10.3
2020-06	MW-1015B		38.3	84.2	< 0.24	15.7	6.59	< 10.3

Attachment 3

Surface Water

Trend Analysis
Trend Graphs
2020 Data

Trend Analysis Results - Surface Water
Year Ending 2020

	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	8	7	10	10	9	8	8	6	7	10
Mann-Kendall S	0	7	-12	7	14	-12	-5	-5	-1	-5
p-Level	1.000	0.382	0.336	0.600	0.180	0.178	0.634	0.470	1.000	0.728
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	47	46	49	46	39	36	47	20	12	23
Mann-Kendall S	-238	-66	-77	-128	271	2	-64	32	8	-30
p-Level	0.030	0.538	0.485	0.229	0.000	0.990	0.493	0.318	0.638	0.448
Trend					+					
SW-2										
Trend Results for Most Recent 5 Years										
Sample Size	8	7	10	10	9	8	8	6	7	10
Mann-Kendall S	2	9	-13	7	18	-10	-7	-5	-3	-5
p-Level	0.904	0.238	0.292	0.600	0.076	0.276	0.473	0.470	0.772	0.728
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	47	46	49	46	39	36	47	20	12	23
Mann-Kendall S	-262	26	91	-189	201	-37	18	29	-2	-54
p-Level	0.017	0.813	0.408	0.075	0.014	0.626	0.856	0.369	0.946	0.164
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.

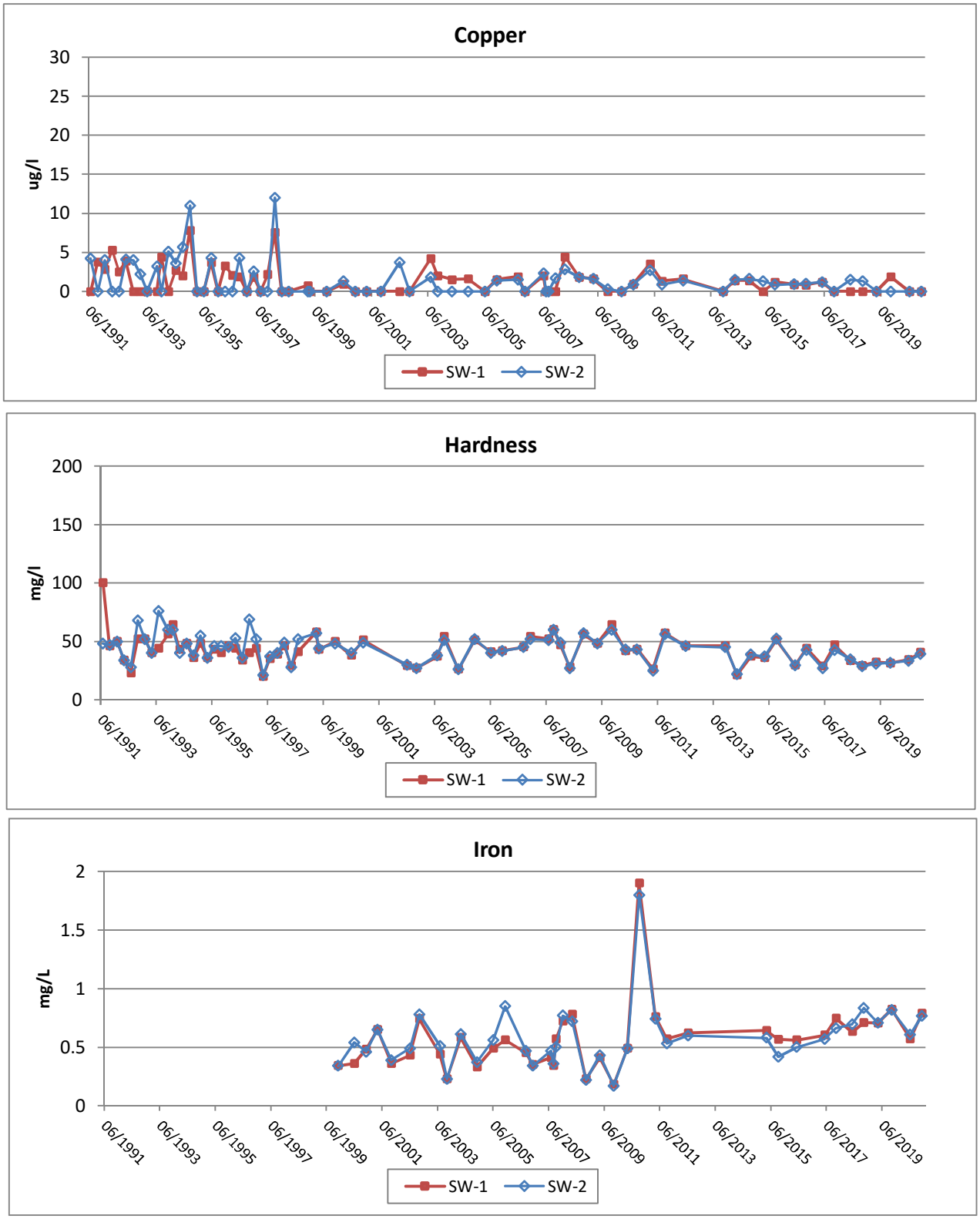

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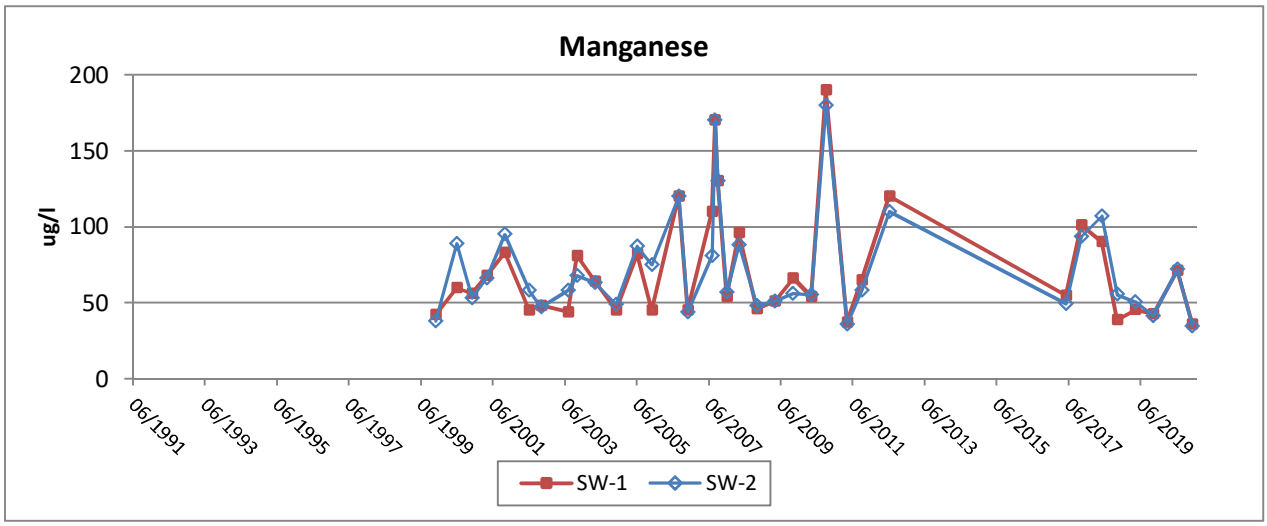
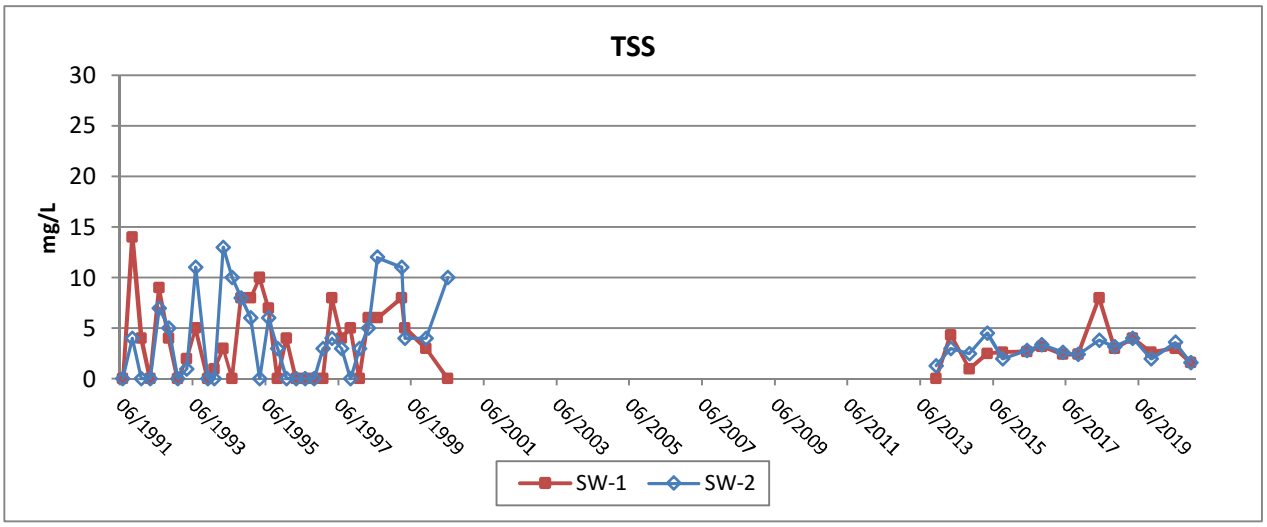
Figure B-15a
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





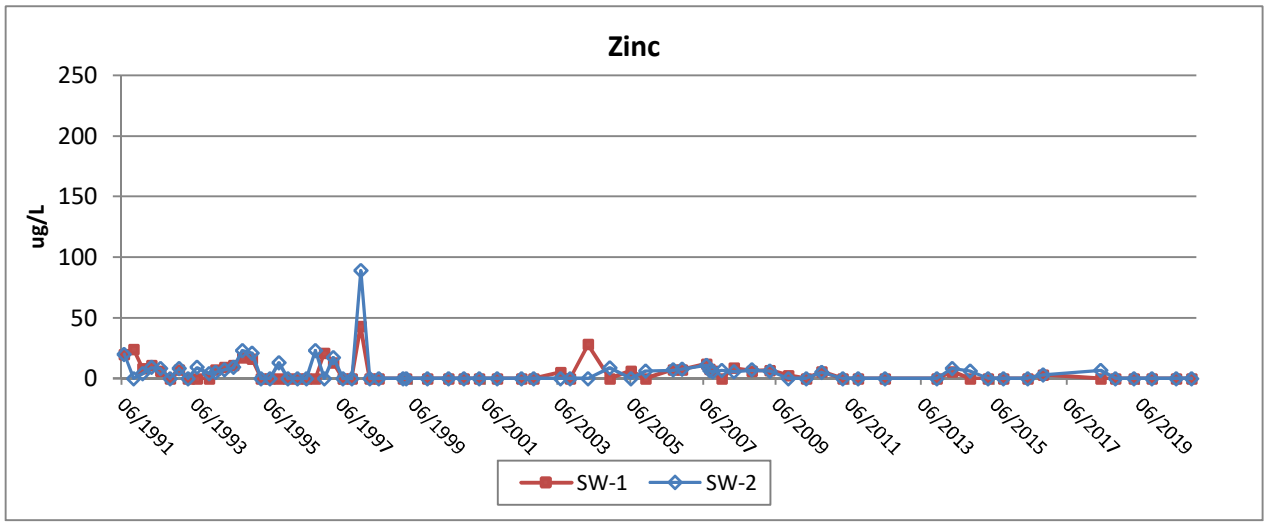


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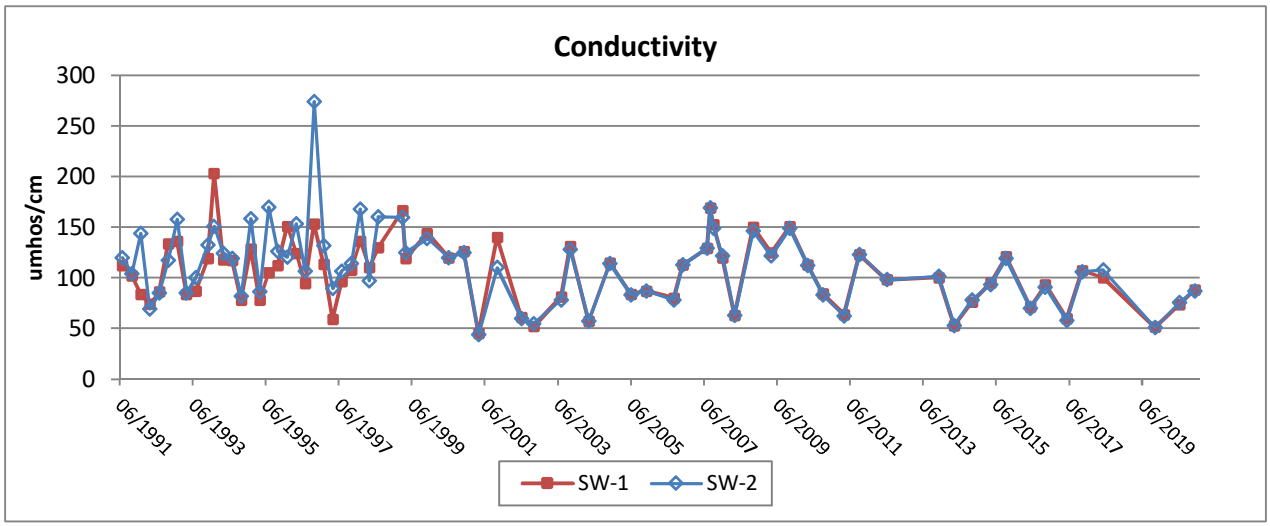
Figure B-15b
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20



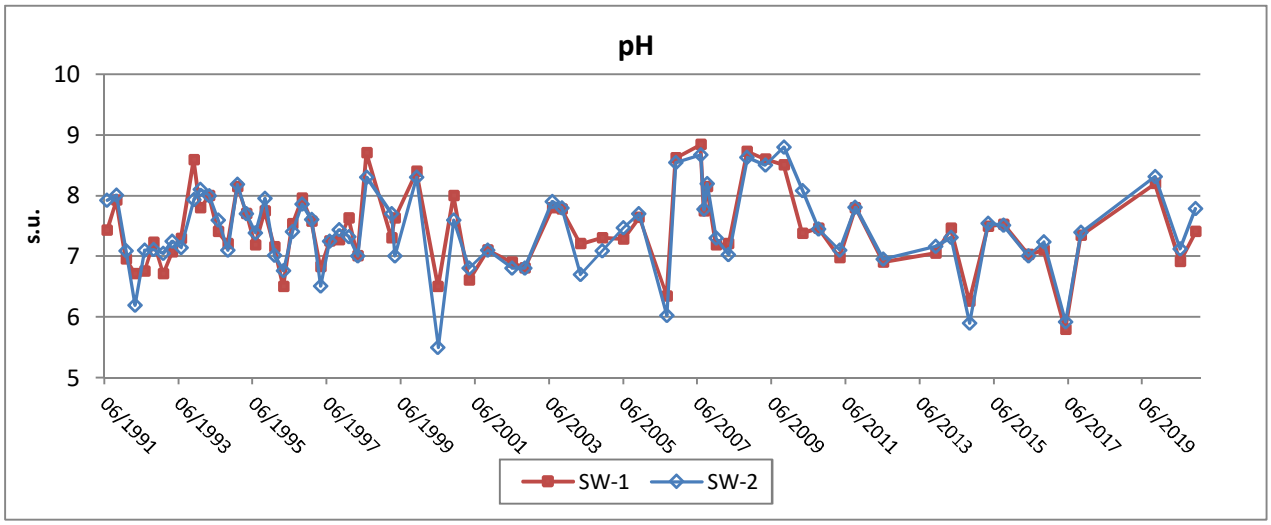


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Figure B-15c
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2021
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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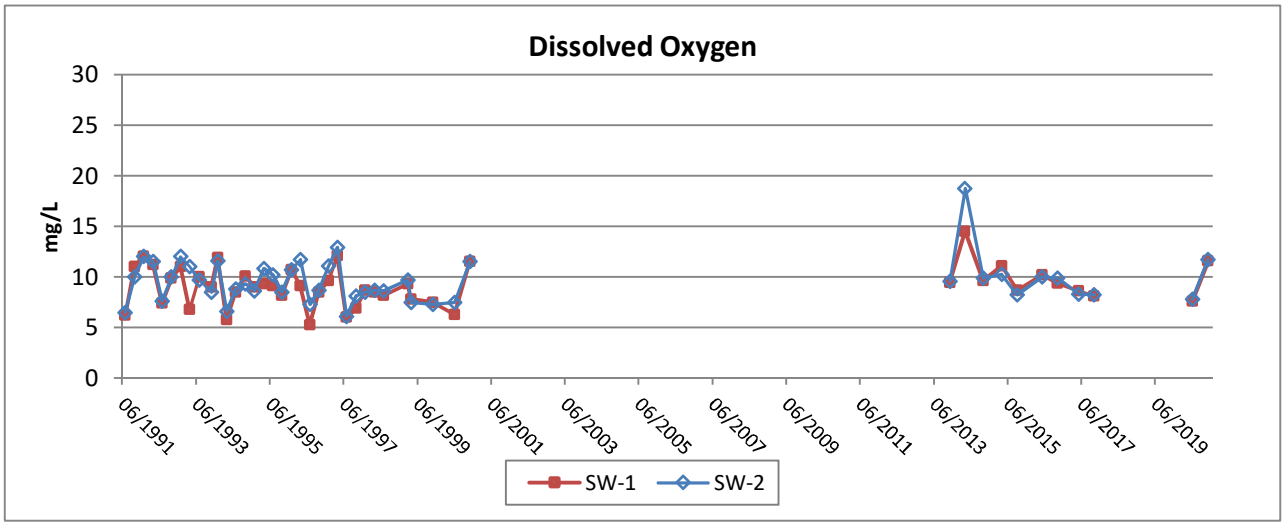

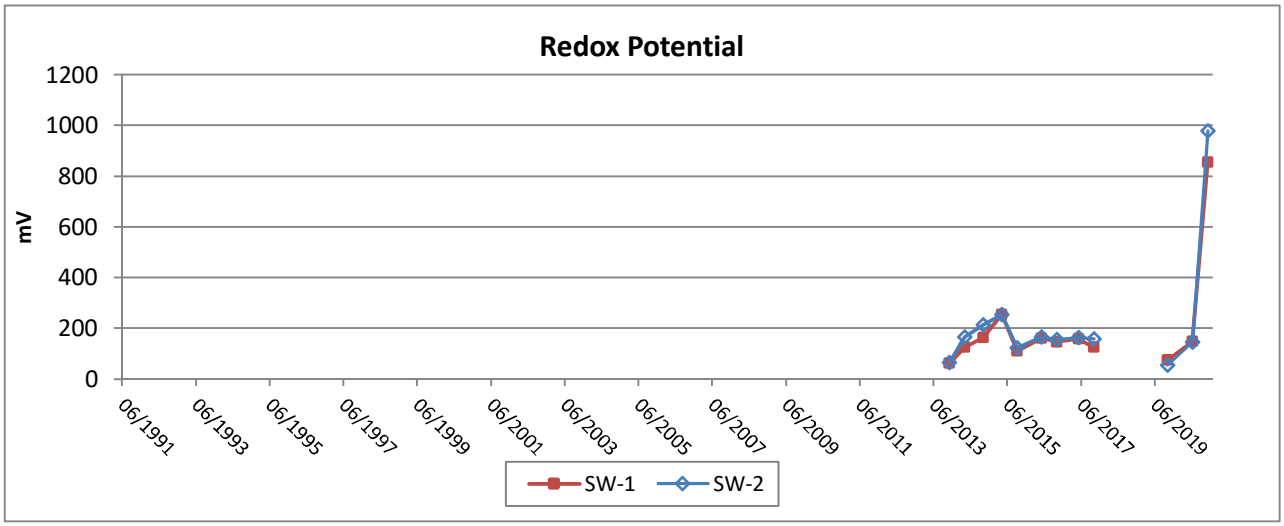

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Figure B-15d
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

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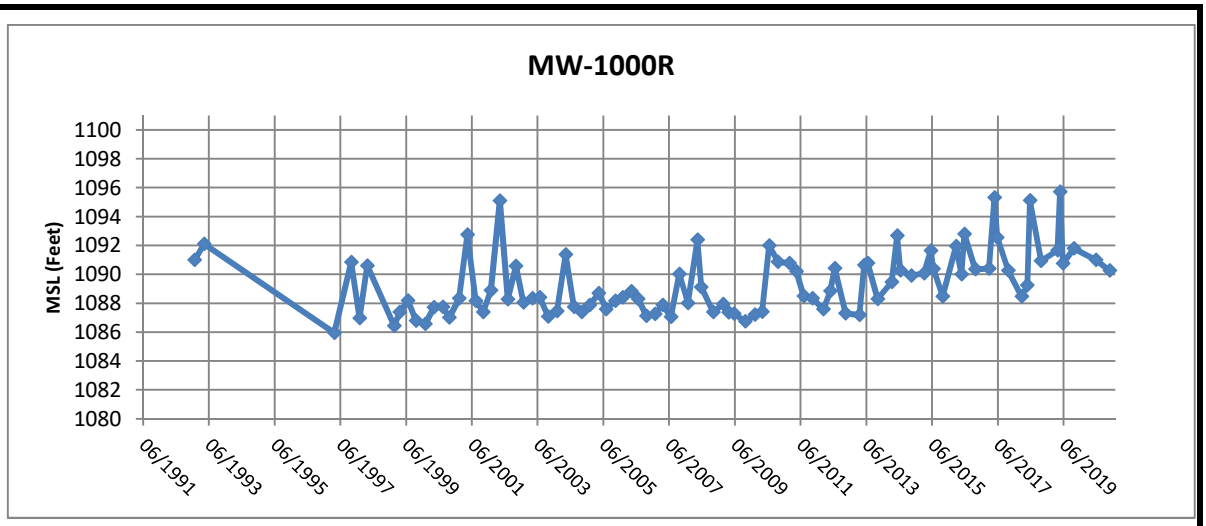
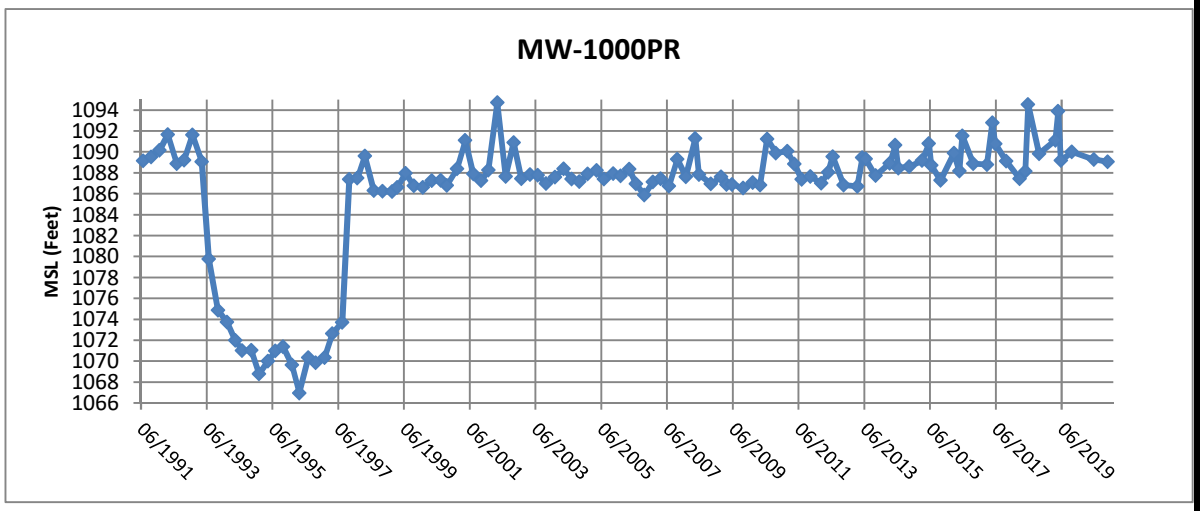
2020 Surface Water Results

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
2020-06	SW-1		73.38	6.91	< 1.9	34.2	0.568	71.0	< 10.3	7.58	148.09	3.0
2020-06	SW-1	Dup.			< 1.9	32.2	0.549	69.2	< 10.3			3.4
2020-06	SW-2		75.31	7.12	< 1.9	33.5	0.606	72.0	< 10.3	7.81	144.5	3.6
2020-11	SW-1		88.11	7.40	< 1.9	40.6	0.788	35.8	< 10.3	11.59	854	1.6
2020-11	SW-1	Dup.			< 1.9	39.3	0.775	35.0	< 10.3			< 0.95
2020-11	SW-2		86.94	7.79	< 1.9	39.4	0.766	34.7	< 10.3	11.72	978	1.6

Attachment 4

Hydrographs and Groundwater Elevation Data





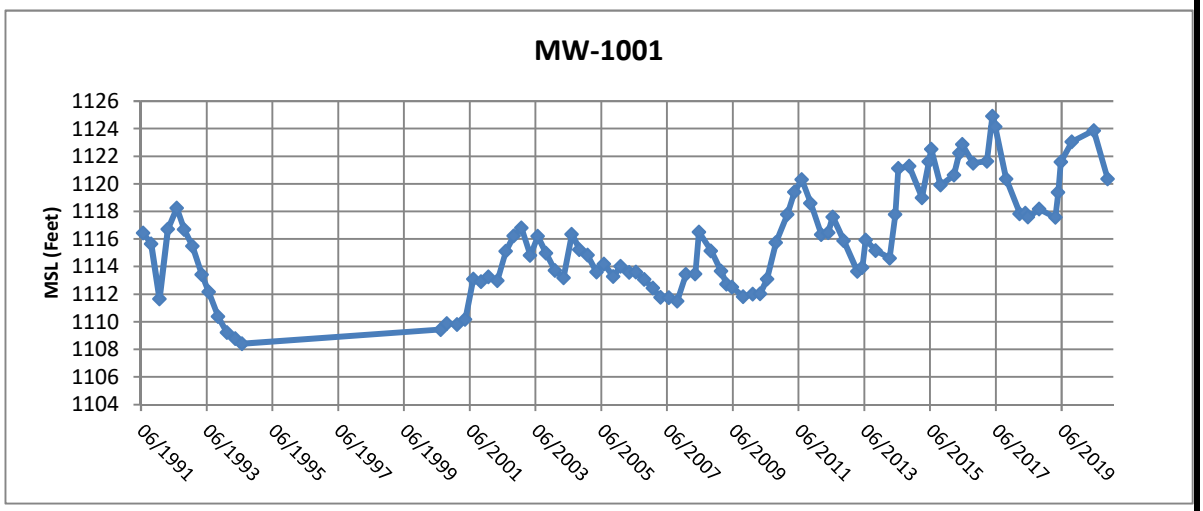


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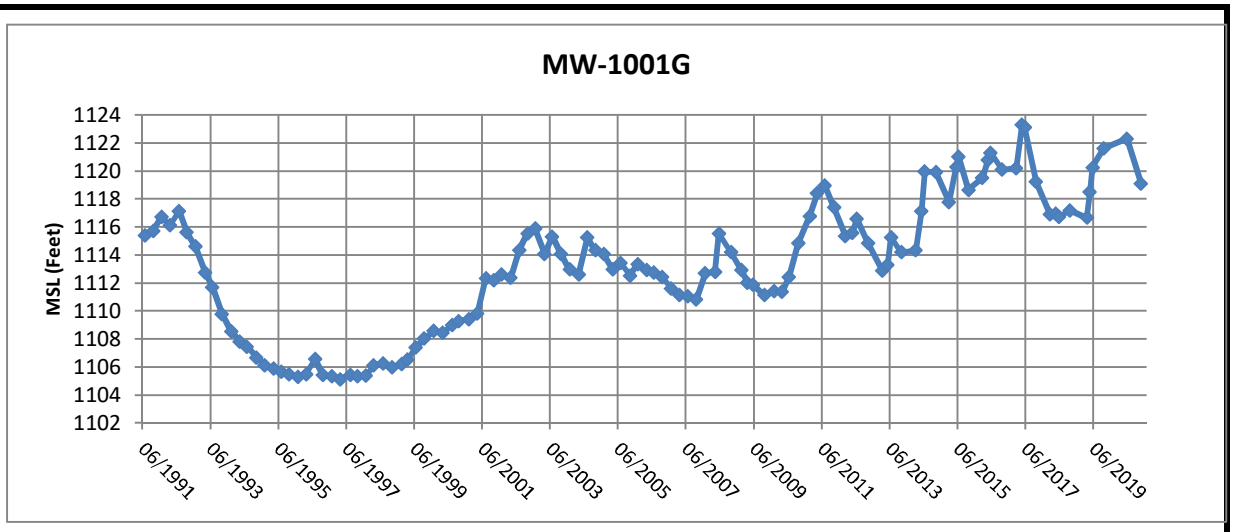
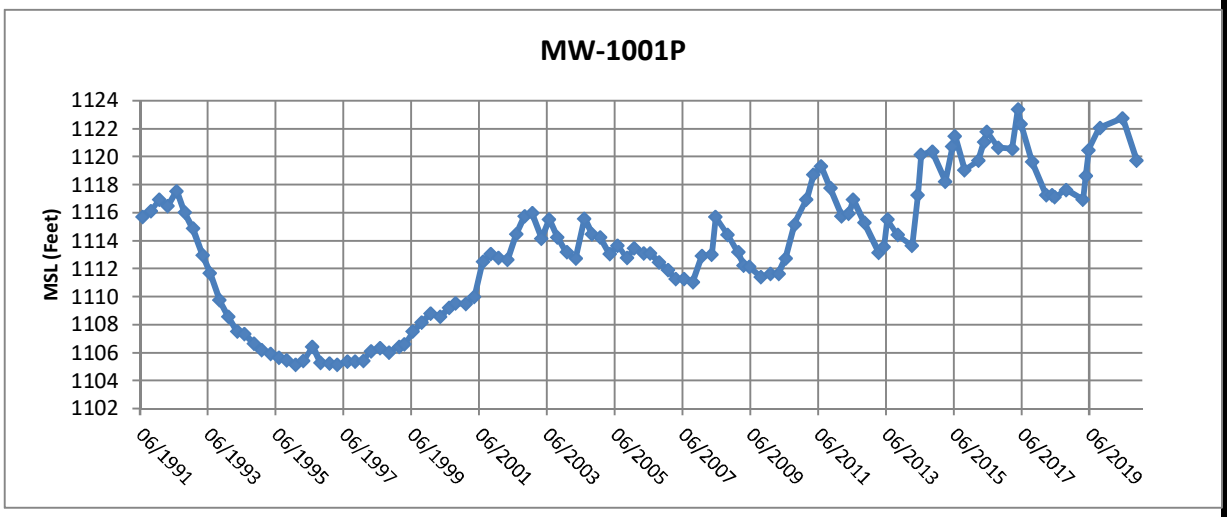
Figure B-16a
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





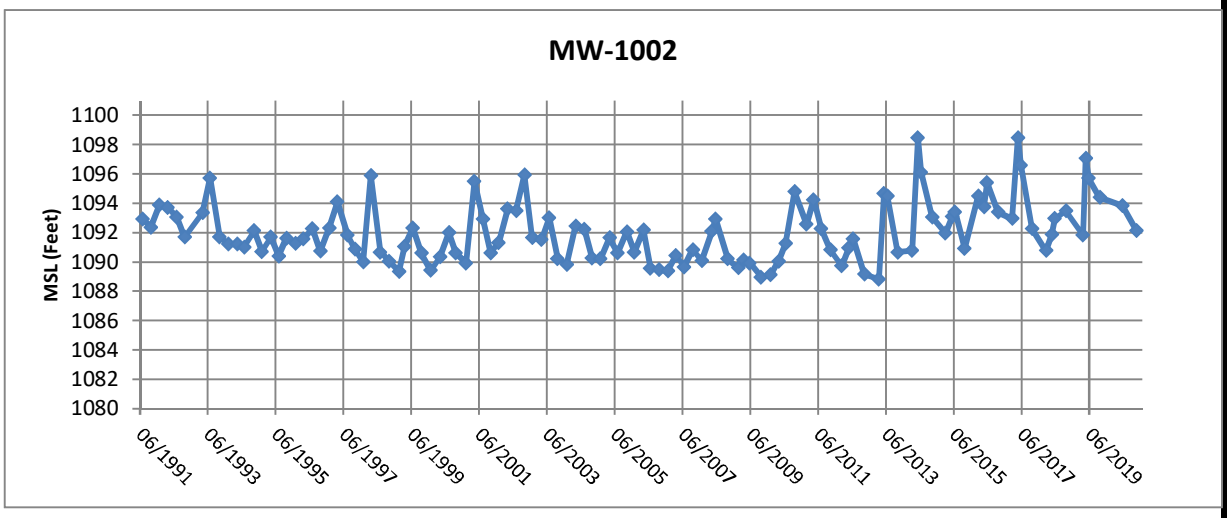


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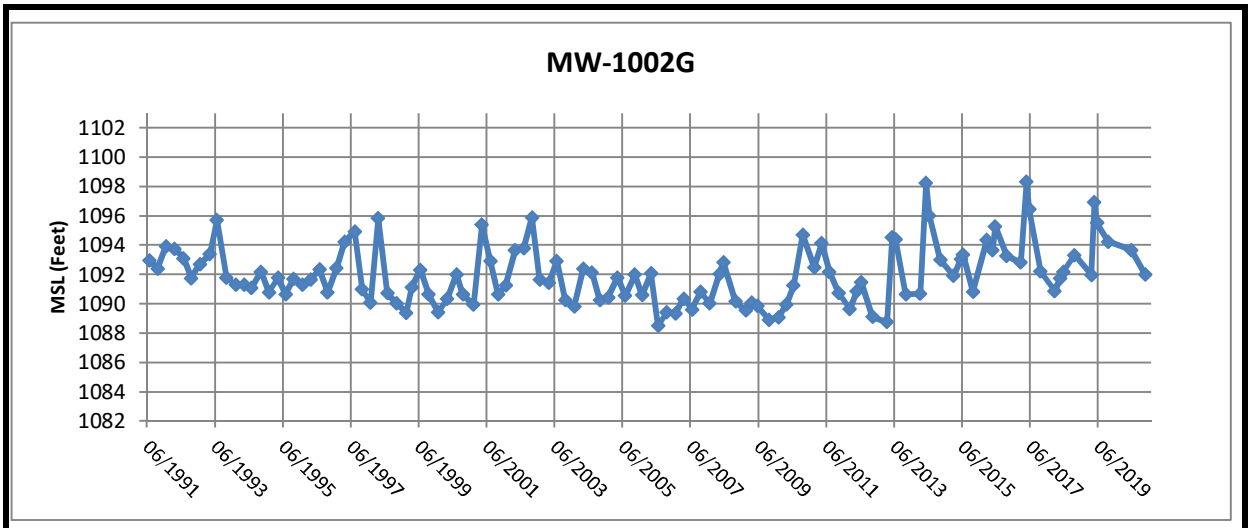
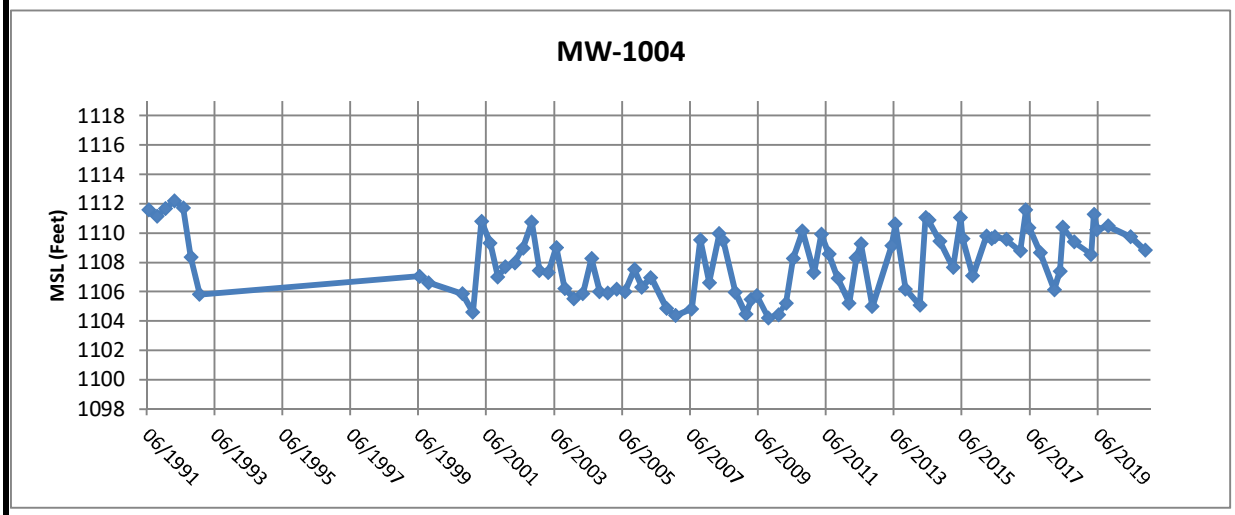
Figure B-16b
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





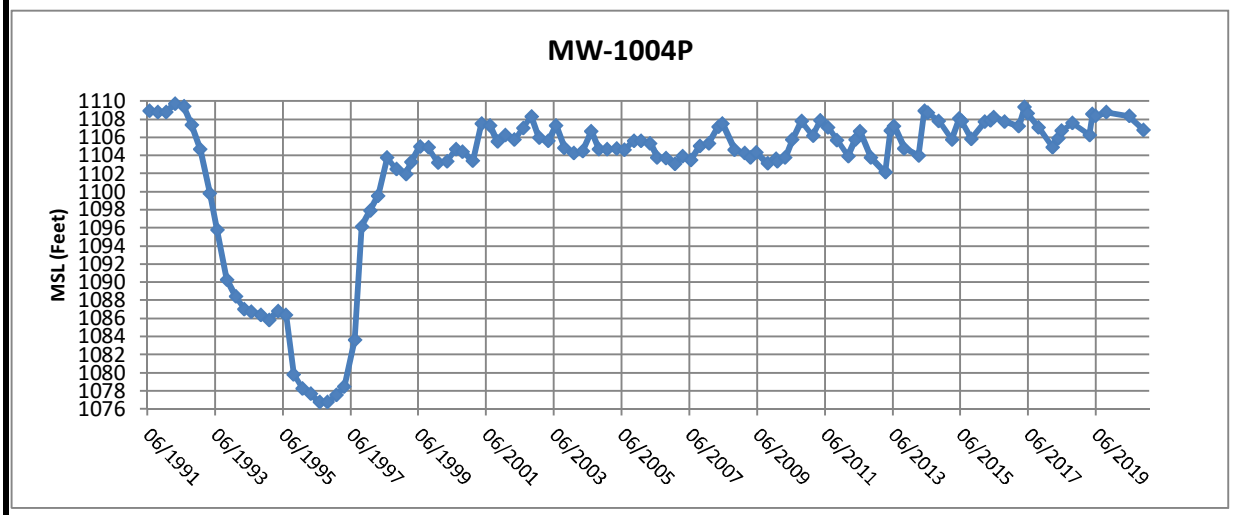


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Figure B-16c
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

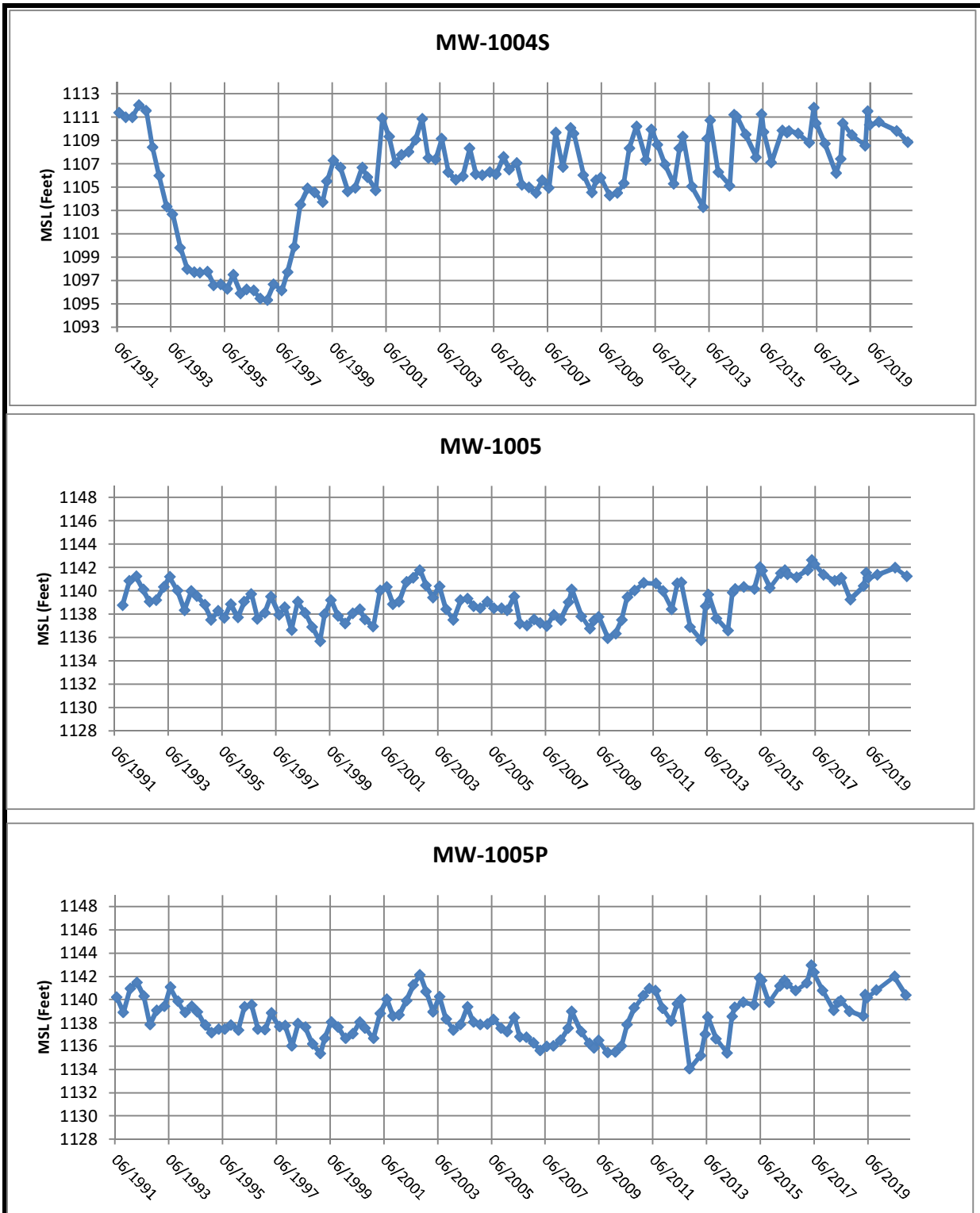

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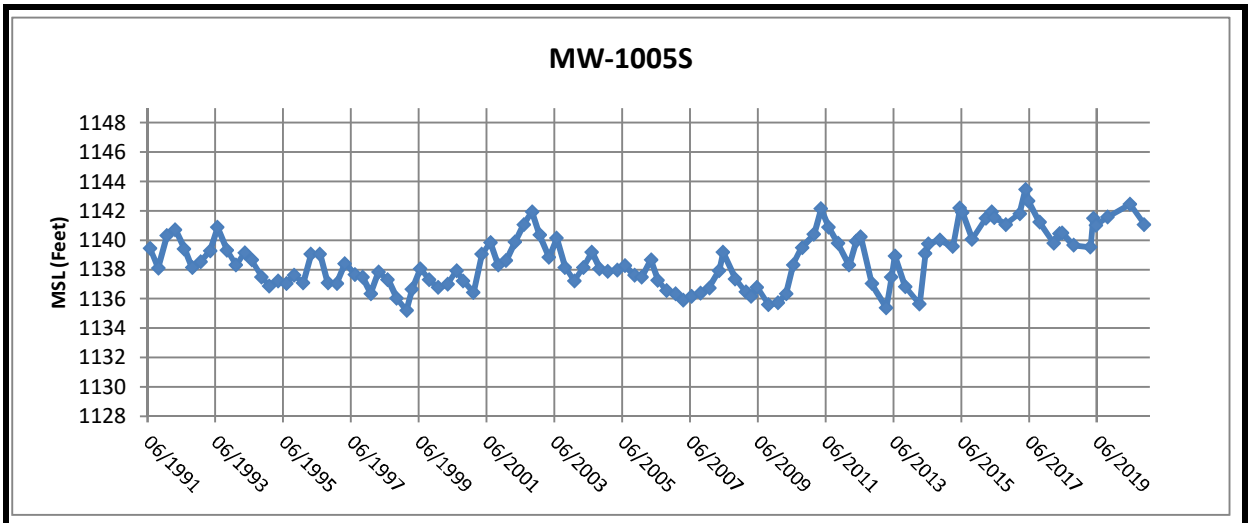
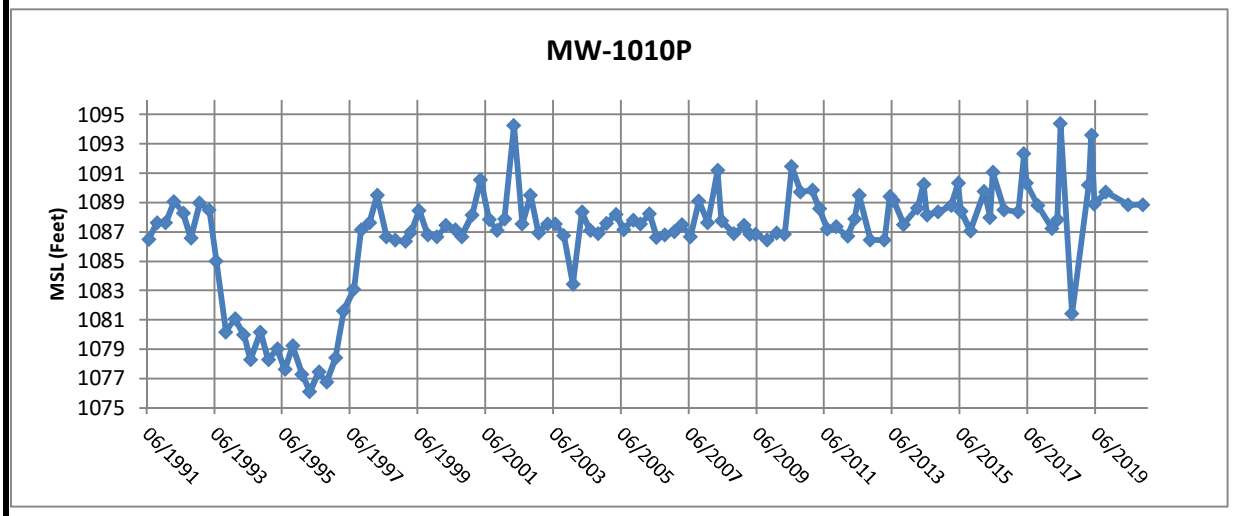
Figure B-16d
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





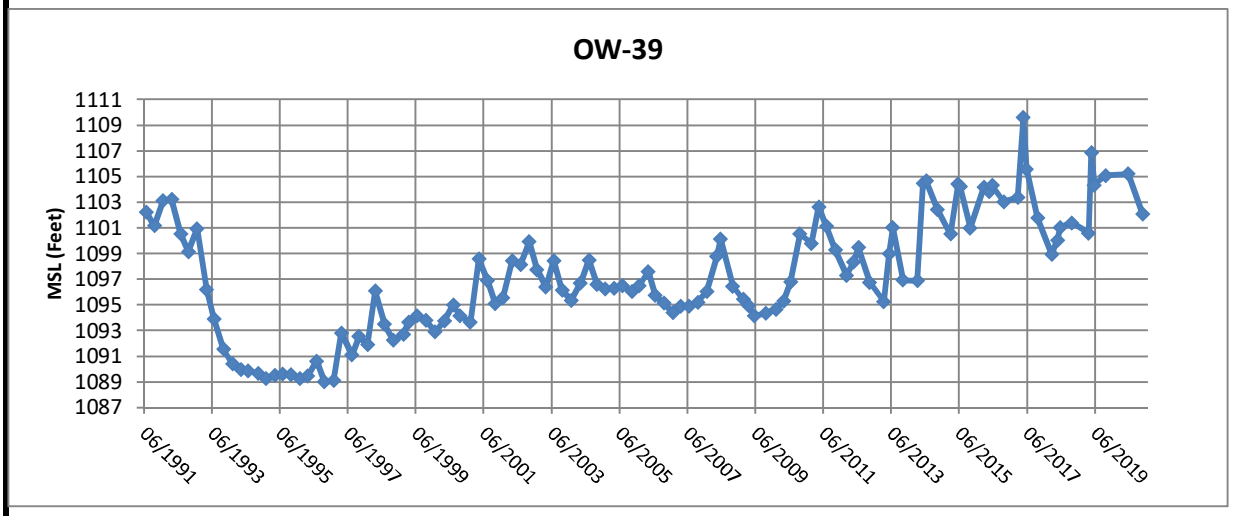


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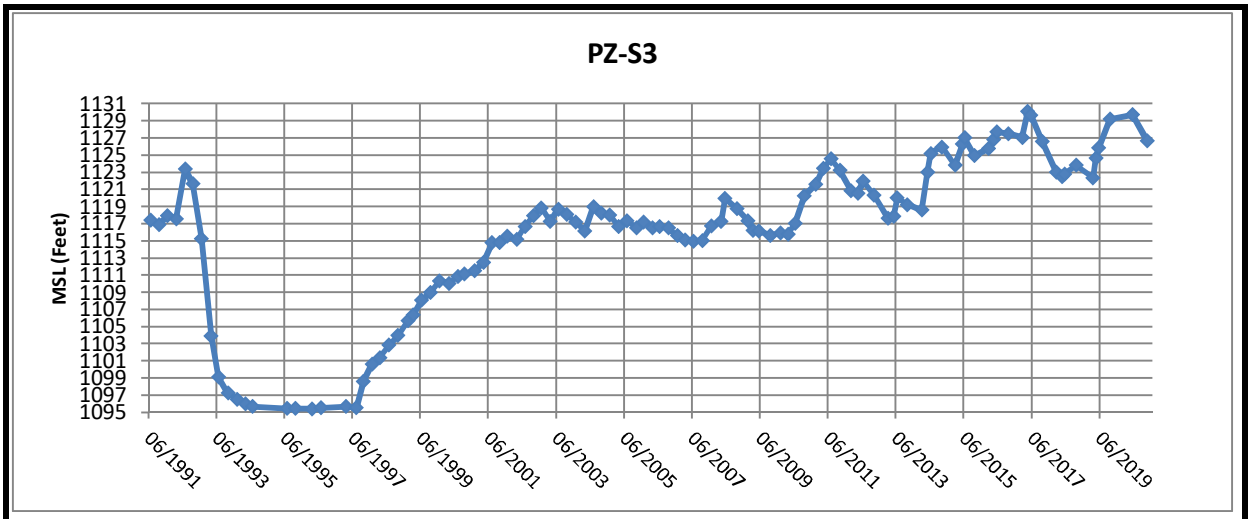
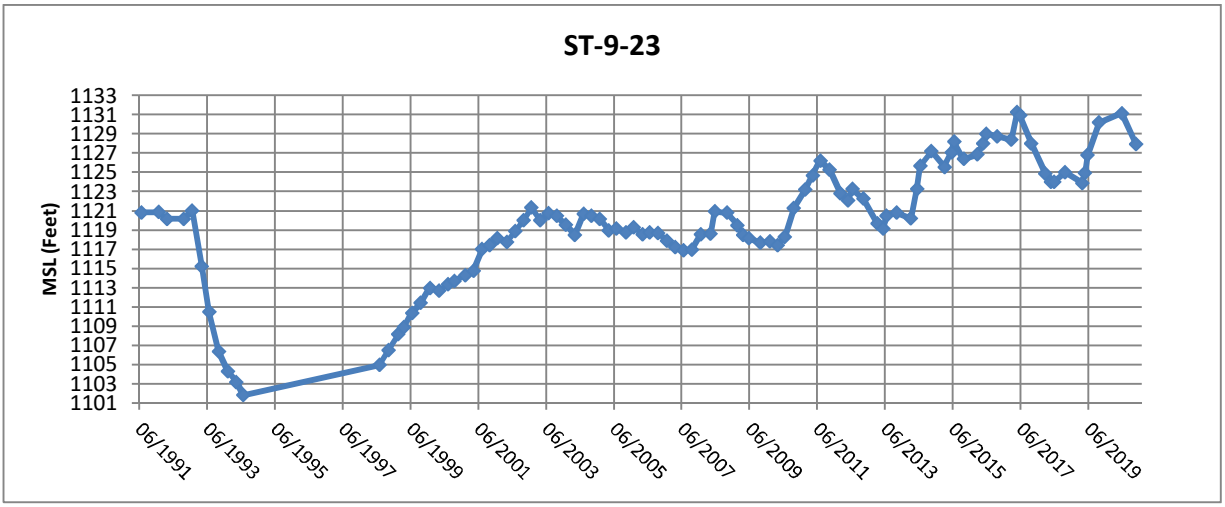
Figure B-16e
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





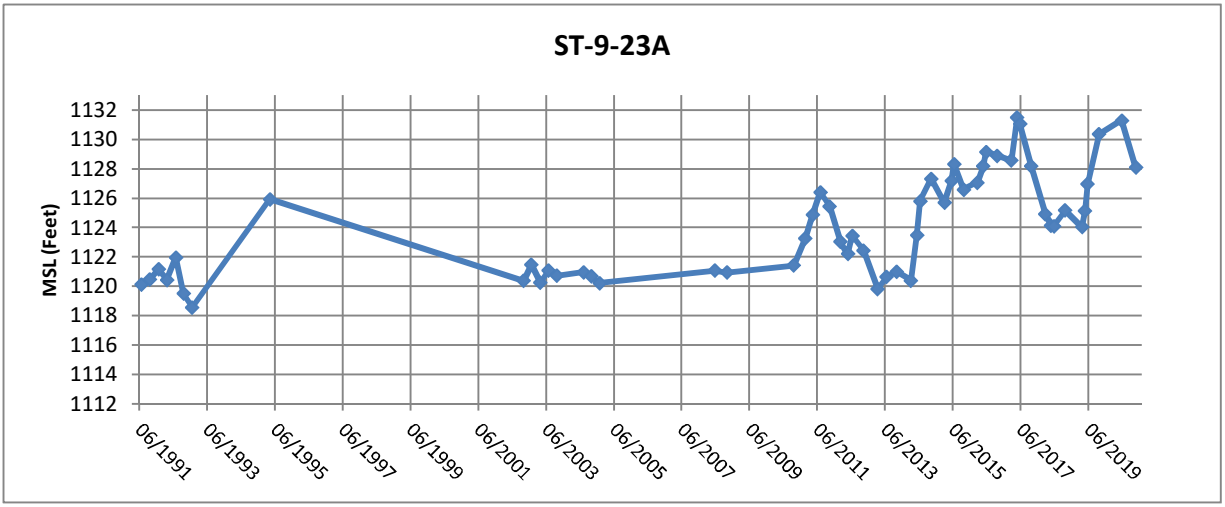


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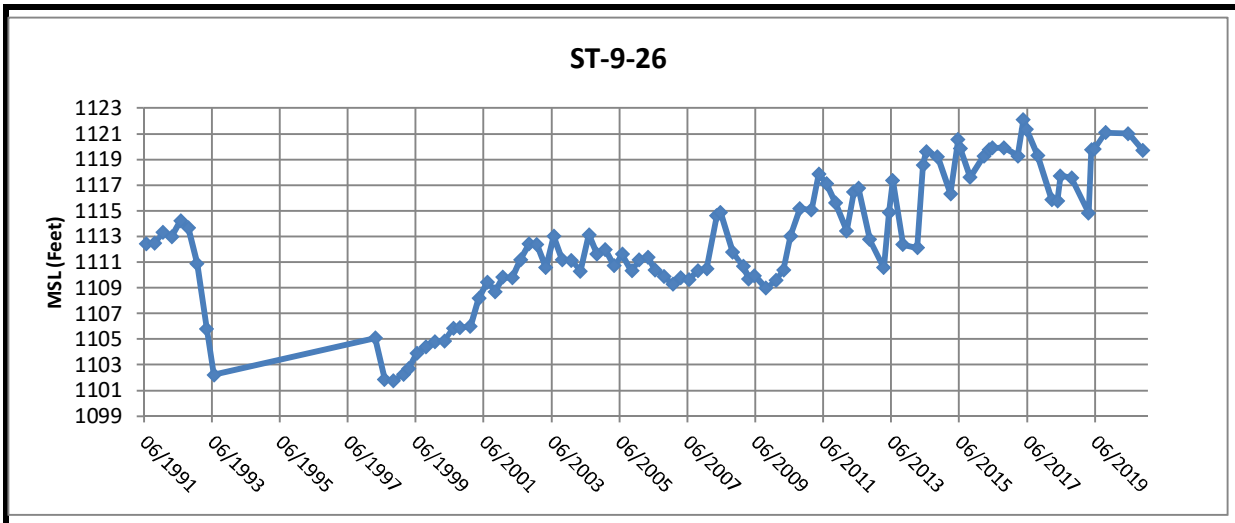
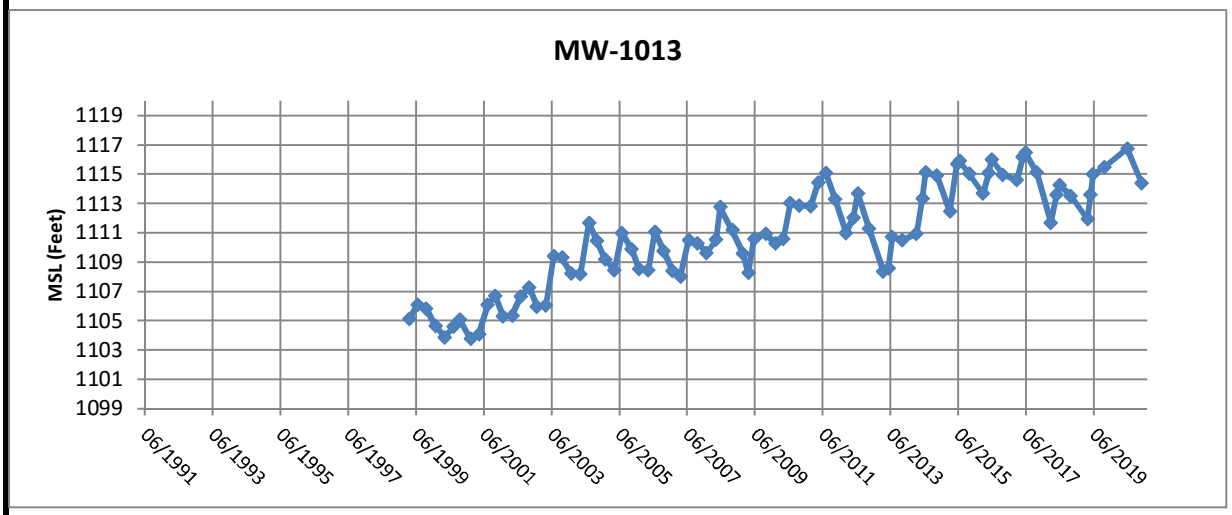
Figure B-16f
Hydrographs

Scale: NA		Date: January 2021
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





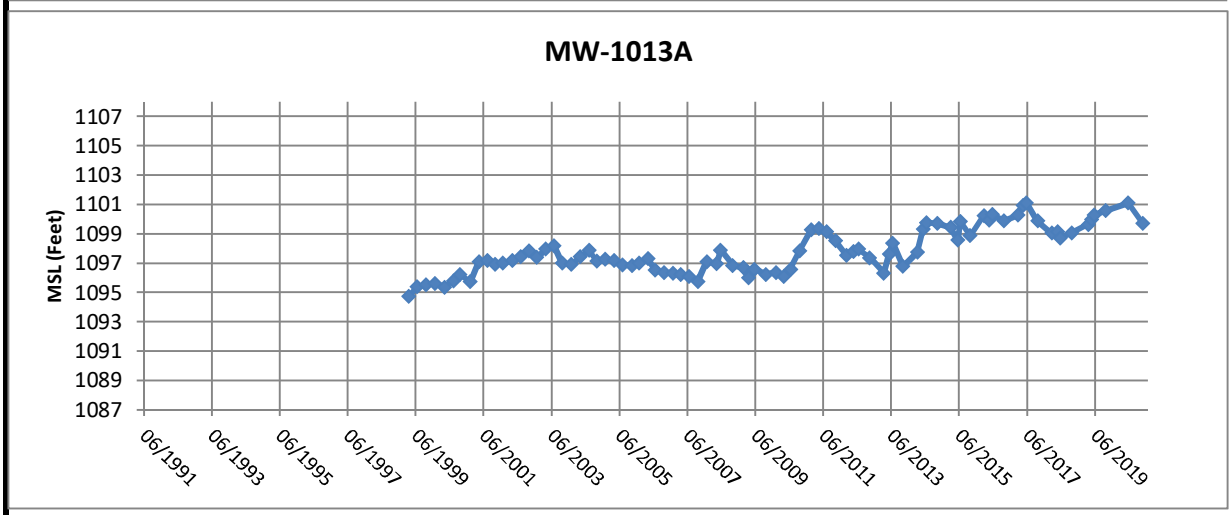


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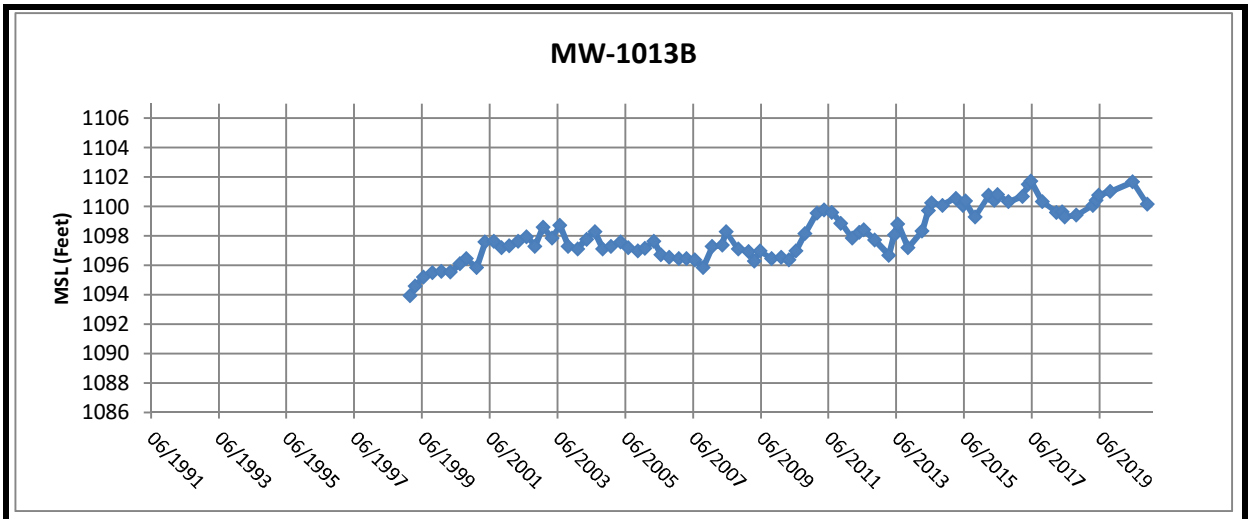
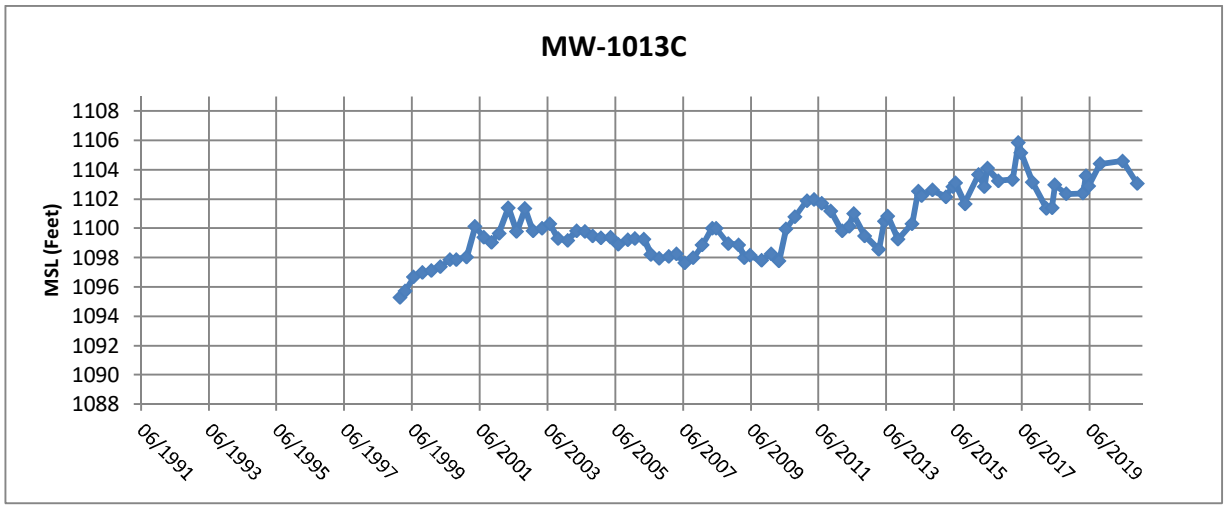
Figure B-16g
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





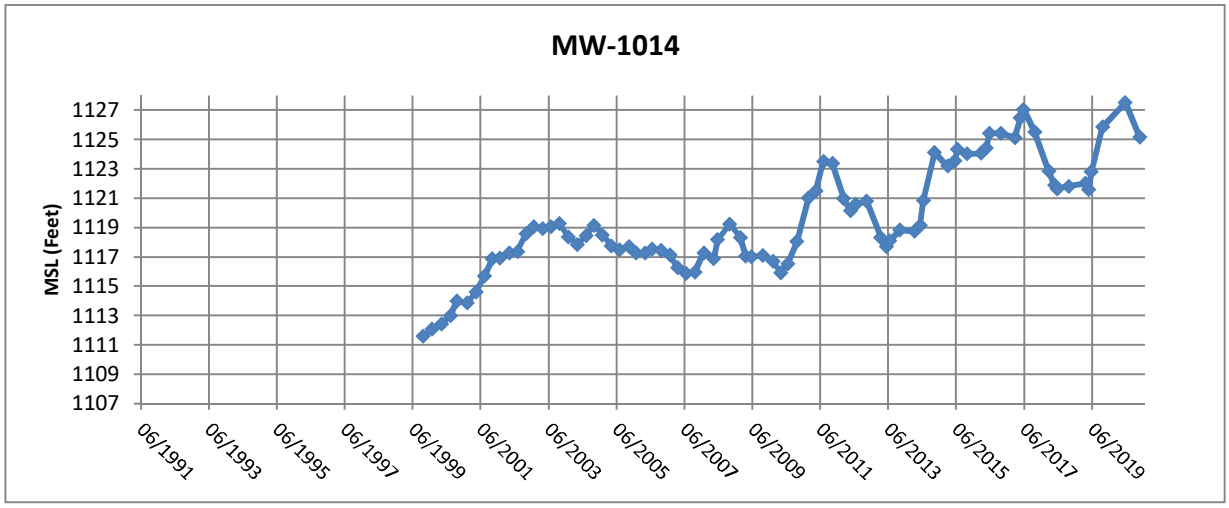


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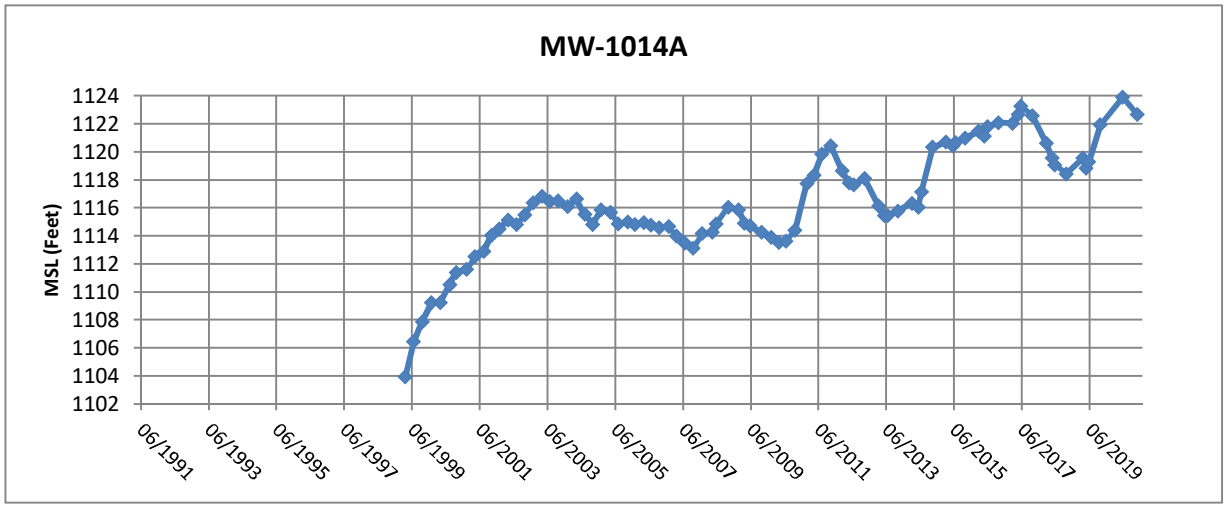
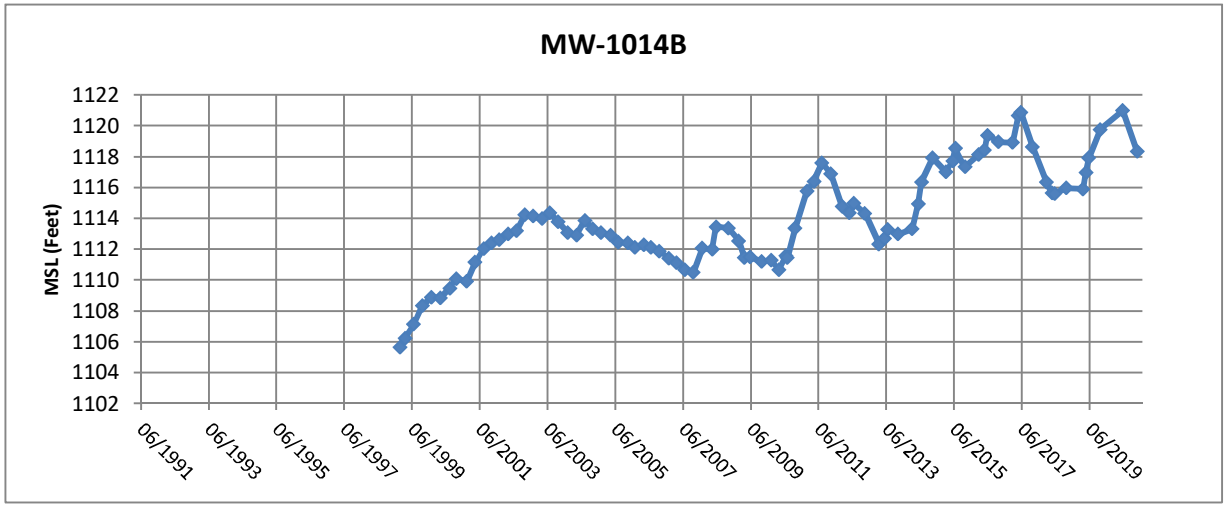
Figure B-16h
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20





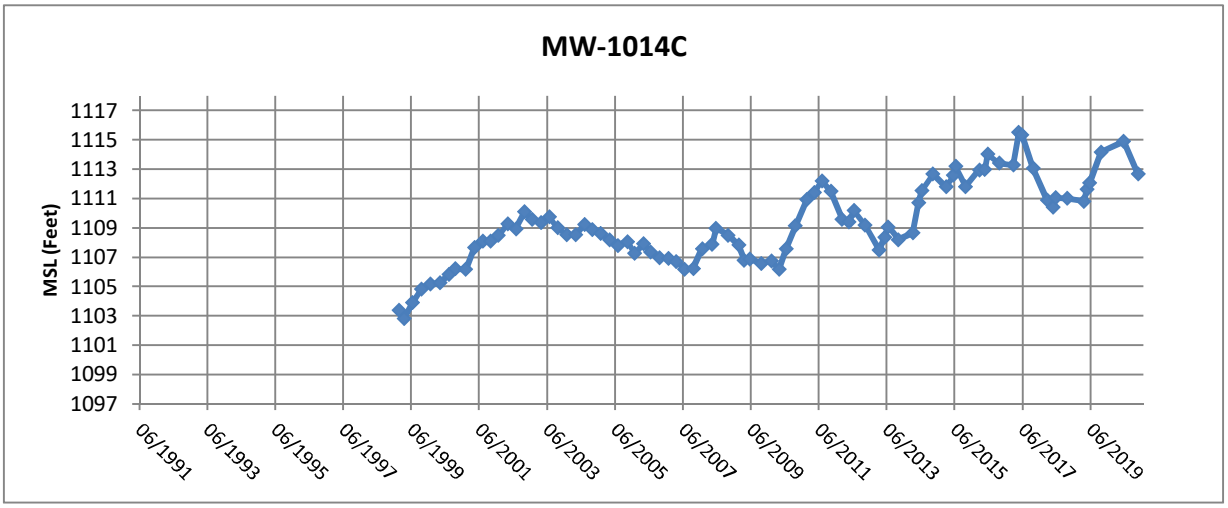


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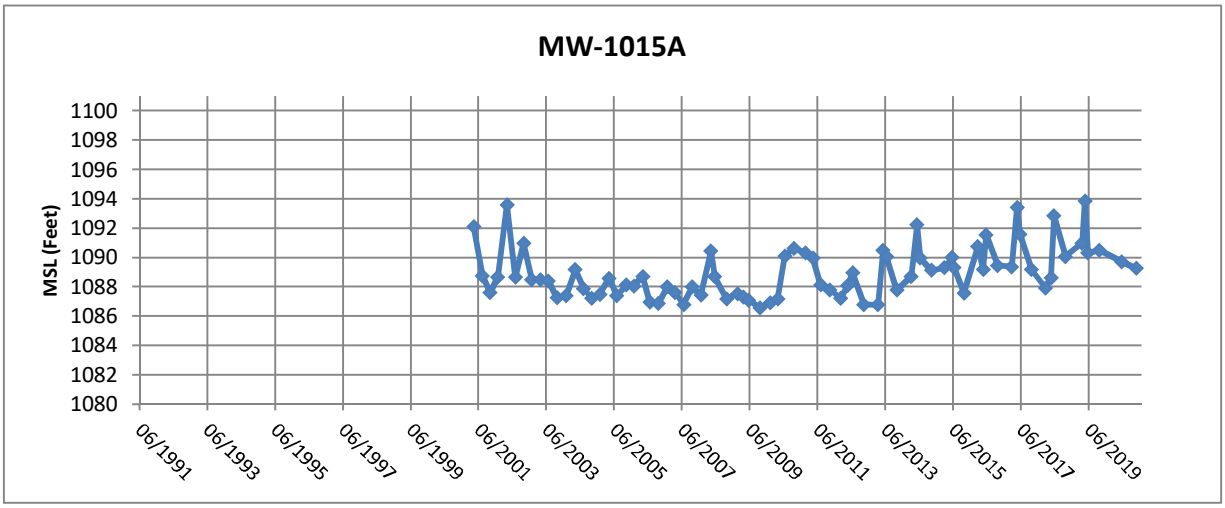
Figure B-16i
Hydrographs

Scale: NA	Date: January 2021	
Prepared By: SGL	Checked By: SVF	Project: 17F777.20



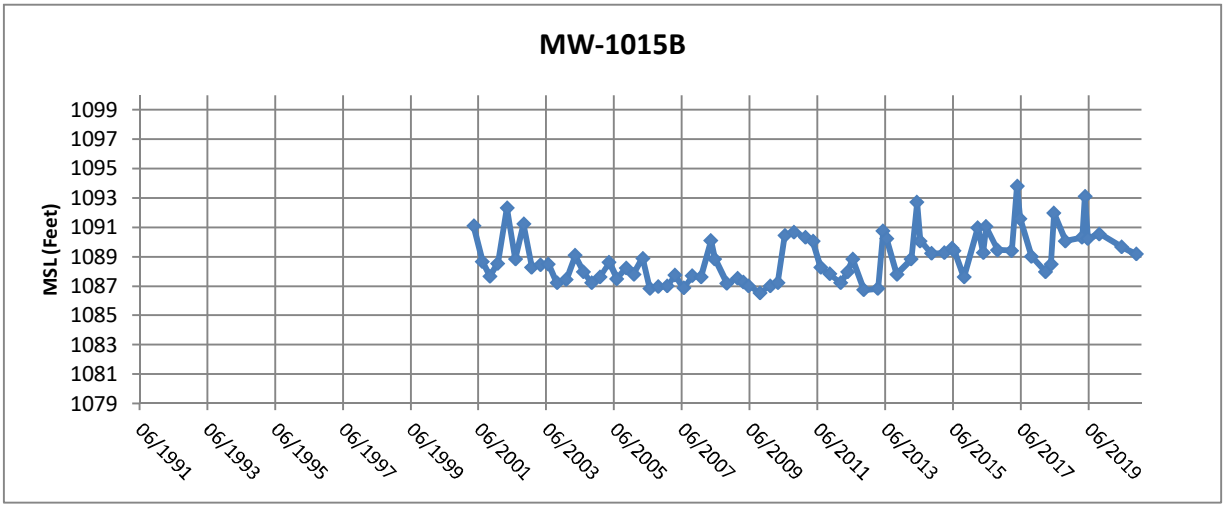


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Figure B-16j
Hydrographs

Scale: NA		Date: January 2021
Prepared By: SGL	Checked By: SVF	Project: 17F777.20

2020 Groundwater Elevation Results

Location	Sample Date	Elevation Ft. (MSL)		Sample Date	Elevation Ft. (MSL)
MW-1000PR	6/23/2020	1089.27		11/17/2020	1089.07
MW-1000R	6/23/2020	1091.01		11/17/2020	1090.26
MW-1001	6/23/2020	1123.86		11/17/2020	1120.36
MW-1001G	6/23/2020	1122.32		11/17/2020	1119.11
MW-1001P	6/23/2020	1122.74		11/17/2020	1119.71
MW-1002	6/24/2020	1093.83		11/18/2020	1092.12
MW-1002G	6/24/2020	1093.67		11/18/2020	1091.98
MW-1004	6/23/2020	1109.74		11/17/2020	1108.81
MW-1004P	6/23/2020	1108.35		11/17/2020	1106.8
MW-1004S	6/23/2020	1109.82		11/17/2020	1108.86
MW-1005	6/24/2020	1141.98		11/18/2020	1141.23
MW-1005P	6/24/2020	1141.98		11/18/2020	1140.39
MW-1005S	6/24/2020	1142.45		11/18/2020	1141.06
MW-1010P	6/23/2020	1088.84		11/17/2020	1088.85
MW-1013	6/23/2020	1116.73		11/17/2020	1114.39
MW-1013A	6/23/2020	1101.09		11/17/2020	1099.72
MW-1013B	6/23/2020	1101.67		11/17/2020	1100.18
MW-1013C	6/23/2020	1104.59		11/17/2020	1103.05
MW-1014	6/23/2020	1127.51		11/17/2020	1125.18
MW-1014A	6/23/2020	1123.91		11/17/2020	1122.68
MW-1014B	6/23/2020	1120.97		11/17/2020	1118.35
MW-1014C	6/23/2020	1114.9		11/17/2020	1112.67
MW-1015A	6/23/2020	1089.71		11/17/2020	1089.24
MW-1015B	6/23/2020	1089.66		11/17/2020	1089.17
OW-39	6/23/2020	1105.21		11/17/2020	1102.08
PZ-S3	6/23/2020	1129.7		11/17/2020	1126.7
ST-9-23	6/23/2020	1131.13		11/17/2020	1127.9
ST-9-23A	6/23/2020	1131.28		11/17/2020	1128.07
ST-9-26	6/23/2020	1121.02		11/17/2020	1119.71