LMS/GJO/43774

2023 Annual Inspection and Monitoring Report for the Grand Junction, Colorado, Site

June 2023

U.S. DEPARTMENT OF ENERGY | Legacy Management

This document has been designed for online viewing.

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Abbreviations

CAS	Condition Assessment Survey
DOE	U.S. Department of Energy
GEMS	Geospatial Environmental Mapping System
IC	institutional control
LM	Office of Legacy Management
LMS	Legacy Management Support
LTS&M Plan	Long-Term Surveillance and Maintenance Plan
PL	photograph location
RTC	Riverview Technology Corporation

Executive Summary

Physical and institutional controls enacted at the Grand Junction, Colorado, Site continue to be effective in preventing exposure to contamination remaining on the property. One feature continues to be monitored for potential repair; however, no follow-up inspection is required.

Annual groundwater and surface-water sampling was conducted in 2023 as required in the *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site*. Results of the sampling are summarized in this report and displayed in Appendixes A through D.

1.0 Introduction

The *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site* (LMS/GJO/S02013), also called the Long-Term Surveillance and Maintenance Plan (LTS&M Plan), requires a report to document the results of the annual site inspection and to address monitoring results from annual groundwater and surface-water monitoring. This report documents the results of the annual inspection conducted March 9, 2023, and presents the results of the annual groundwater and surface-water sampling event conducted February 13–14, 2023.

2.0 Site History

The Grand Junction, Colorado, Site (site) was contaminated during uranium milling and uranium oxide procurement activities conducted by the federal government from 1943 to 1974. The U.S. Department of Energy (DOE) remediated the property from 1986 to 2014. Removal of uranium mill tailings and contaminated soil began in late 1989, and most of the contaminated soil was removed by 1994. Additional small deposits of contaminated soil and material were removed during remedial action conducted from 1998 to 2014. Remediation involved decontaminating or demolishing contaminated buildings and removing contaminated soil. Contaminated materials were disposed of at the Uranium Mill Tailings Radiation Control Act Title I Grand Junction, Colorado, Disposal Site south of Grand Junction. Some contaminated materials were left in place and later remediated under a State of Colorado-approved covenant for deferred remediation.

In 2001, DOE transferred approximately 8 acres of the site, including Building 7, to the U.S. Department of the Army (occupied by an engineering unit of the U.S. Army Reserve). The remainder of the facility was transferred to the nonprofit Riverview Technology Corporation (RTC) in 2001, following approval of the covenant for deferred remediation. RTC leases several buildings to DOE so the agency can conduct ongoing operations. In 2018, the U.S. Army Reserve transferred ownership of Building 7 to the DOE Office of Legacy Management (LM) via the U.S. General Services Administration.

LM remains responsible for ensuring that contamination left on its former property is controlled to prevent exposure to the public and the environment. The following two types of contamination remain:

- Groundwater and surface water within the site perimeter
- Radium foil sealed belowground in a decommissioned calibration well

The site transfer agreement between DOE and RTC stipulated that contamination beneath Building 12A (the former computer and storage facility) and Building 20 (the former analytical chemistry laboratory) would be remediated when DOE vacated and demolished those buildings. DOE concluded operations in the laboratory in December 2003, and demolition of the building and remediation of underlying contaminated materials occurred in 2006. Demolition of 12A and associated remediation of the concrete slab and soil beneath the building were completed in 2014. These areas of the site are no longer part of the annual inspection requirements. Groundwater and surface water are being remediated by natural flushing of the alluvial aquifer. LM will provide stewardship oversight of the decommissioned calibration well in perpetuity.

3.0 Site Inspection

3.1 Inspection Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific LTS&M Plan.

3.2 Institutional Controls

Institutional controls (ICs) at the site consist of warning signs around the surface-water locations (North Pond, South Pond, and wetlands) to prevent their use, an information and warning plaque over the decommissioned well that contains radium foil, locks on groundwater monitoring wells, and deed restrictions that prohibit unauthorized excavations that could expose contaminated groundwater under the former DOE facility. Verification of these ICs is part of the annual inspection, and the results are included in this report.

3.3 Inspection Results

This report presents the results of the annual LM inspection of the Grand Junction site. H. Petrie of the Legacy Management Support (LMS) contractor conducted the inspection. S. Woods of LM; M. Cosby and A. Lawrence of the Colorado Department of Public Health and Environment; and S. Campbell, L. Tegelman, J. Davidson, and J. Swinehart of the LMS contractor attended the inspection.

The purposes of the annual inspection are to confirm the integrity of visible features at the site, identify changes in conditions that might affect site protectiveness, and determine the need, if any, for maintenance, additional inspections, or monitoring. Additionally, a Condition Assessment Survey (CAS) inspection of Facilities Information Management System assets occurs every 5 years. A portion of the CAS inspection occurred in fiscal year 2021; the next CAS inspection will occur in fiscal year 2026.

The annual inspection addresses only those portions of the site with remaining contaminated media that must be monitored and maintained to ensure continued protection of human health and the environment. Features discussed in this report are shown on Figure 1. Photographs to support specific observations are identified in the text and on Figure 1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 3.7.

3.3.1 Site Surveillance Features

Figure 1 shows the locations of site surveillance features. Inspection results and assessment of potential maintenance activities associated with site surveillance features are included in the following subsections.

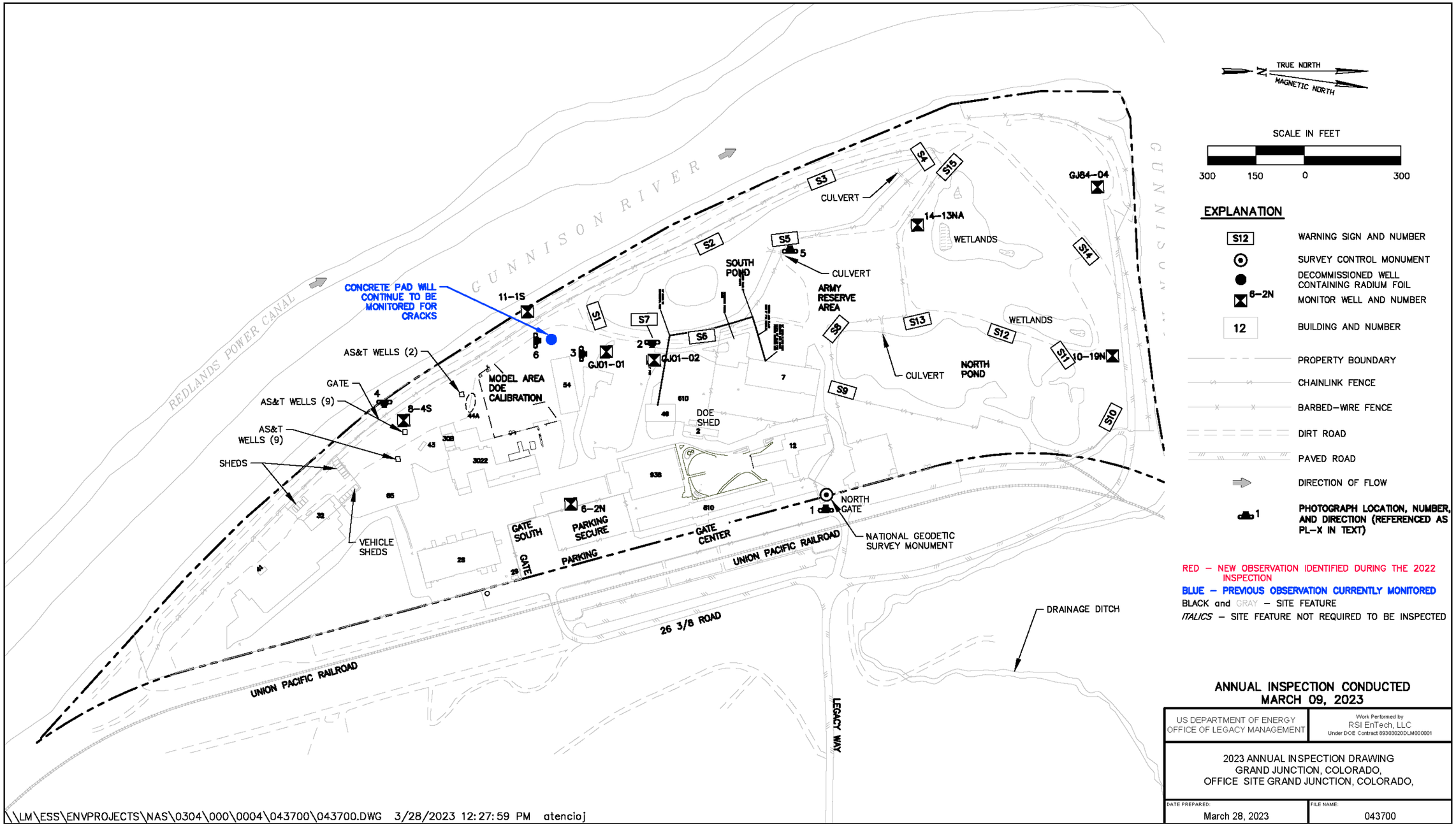


Figure 1. 2023 Annual Inspection Drawing for the Grand Junction, Colorado, Site

3.3.1.1 Monument

A U.S. Coast and Geodetic Survey monument near the former north gate establishes elevation control for the site (PL-1). No maintenance needs were identified.

3.3.1.2 Monitoring Wells

DOE owns eight monitoring wells on the property that have been used in the long-term monitoring program. Seven of these wells are currently used to monitor the progress of natural flushing of contaminants from the alluvial aquifer. Wells 10-19N, 11-1S, 14-13NA, GJ01-02 (PL-2, not currently monitored), and GJ84-04 are flush mounted and protected with standard metal monitoring well covers or manhole covers; well GJ84-04 is also protected by steel bollards. Wells 6-2N, 8-4S, and GJ01-01 (PL-3) have aboveground steel protective casing; steel bollards are in place as further protection for wells 6-2N and 8-4S. Twenty additional monitoring wells (PL-4) were inspected that were installed as part of a tracer project in association with the Applied Studies and Technology group. No maintenance needs were identified.

All wells requiring locks have been replaced with the new security locks with controlled keys.

3.3.1.3 Warning Signs

Fifteen warning signs installed on steel posts are positioned around the surface-water areas to ensure the signs are visible to a person approaching from any direction of reasonable access. All warning signs were undamaged, legible, and in good condition (PL-5). No maintenance needs were identified.

3.3.1.4 Radium Foil Well

In the 1980s, DOE installed a 300-foot-deep cased well to calibrate depth measurement systems on borehole geophysical logging trucks. Two strips of radium-226 foil were placed around the casing at depths of 81 feet (29 picocuries activity) and 181 feet (3 picocuries activity). During calibration, the instruments in the trucks detected the gamma radiation signal from the radium.

The well was decommissioned in place in 2000. DOE perforated the casing above and below each strip of foil and pressure-grouted the annulus with Portland cement to seal the foil in place. The well was filled with grout, and a metal plaque was mounted in concrete at ground level over the well. During the 2020 inspection, inspectors observed that the corner of the concrete pad was chipped off; it was repaired immediately following the inspection. The corner of the concrete pad that was repaired in 2020 was showing cracks in 2021; however, there was no structural damage to the concrete pad. During the 2022 inspection, the inspectors observed that the northwest corner of the concrete pad was chipped. No further cracking or chipping was observed during the 2023 inspection. There is no structural damage to the rest of the concrete pad that would affect the integrity of the well. The concrete pad will continue to be assessed during future inspections to determine if repairs are needed. The metal plaque includes the well information and an engraved warning (PL-6).

3.3.2 Inspection Areas

To ensure a thorough and efficient inspection, the site is divided into two areas referred to as transects: (1) the interior portion of the site and area within the former DOE property boundary that is addressed in the LTS&M Plan and (2) the outlying area.

Specific site surveillance features, such as survey markers, warning signs, and monitoring wells, were observed within each transect. Each transect was inspected for evidence of erosion, excavation, vandalism, or other phenomena that might indicate a loss of IC protectiveness or otherwise diminished protectiveness.

3.3.2.1 Interior Portions of the Site

This transect includes the surface-water areas and other site surveillance features within the former DOE property boundary.

Most of the site surveillance features and surface-water features are fenced off and not easily accessible by the public. There were no signs of activity, development, or land use change (e.g., well installations or excavations that could expose groundwater) on the site that might degrade protectiveness.

3.3.2.2 Outlying Area

There were no signs of activity, development, or land use change in other areas adjacent to the site that might expose contaminated groundwater or impact the natural flushing of the aquifer.

3.4 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) the annual inspection or other site visit reveals a condition that requires a return to the site to further evaluate the condition or (2) a citizen or outside agency notifies DOE that conditions at or near the site are substantially changed.

No need for a follow-up inspection was identified.

3.5 Maintenance and Repairs

The concrete pad around the 300-foot-deep decommissioned well showed the northwest corner was still chipped. No further changes to the concrete pad were observed and it has no structural damage that would affect the integrity of the well. The concrete pad will continue to be observed to determine if repairs are necessary following future inspections.

3.6 Corrective Action

No corrective action was required in 2023.

3.7 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	—	U.S. Coast and Geodetic Survey Monument
PL-2	90	Monitoring Well GJ01-02
PL-3	0	Monitoring Well GJ0-01
PL-4	90	Applied Studies & Technology Monitoring Well Gallery (18 Wells)
PL-5	270	Warning Sign S5
PL-6	—	Decommissioned Well Containing Radium Foil

Note:
— = Photograph taken vertically from above.

PL-1. U.S. Coast and Geodetic Survey Monument

PL-2. Monitoring Well GJ01-02

PL-3. Monitoring Well GJ0-01

PL-4. Applied Studies & Technology Monitoring Well Gallery (18 Wells)

PL-5. Warning Sign S5

PL-6. Decommissioned Well Containing Radium Foil

4.0 Environmental Monitoring

In accordance with the site-specific *Grand Junction Projects Office Remedial Action Project, Declaration for the Record of Decision and Record of Decision Summary* (DOE 1989), the compliance strategy for groundwater remediation at the Grand Junction site is natural flushing of the alluvial aquifer. Groundwater modeling predicted that groundwater remediation is expected to be completed 50–80 years after remediation of contaminated soils.

4.1 2023 Monitoring Results

The LTS&M Plan requires annual groundwater and surface-water monitoring. Sampling was conducted on February 13–14, 2023. In accordance with the LTS&M Plan, the 2023 monitoring network at the Grand Junction site consisted of seven monitoring wells and six surface-water locations, as shown on Figure 2. The Wetland Area surface water location was not sampled in 2023 because the limited surface water present was frozen. Samples were collected according to procedures specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351) and were analyzed for manganese (groundwater only), molybdenum, selenium, sulfate, and uranium. Field measurements were taken of total alkalinity, pH, specific conductance, temperature, and turbidity. In addition, groundwater levels were measured at each monitoring well.

Groundwater and surface monitoring results are summarized in Table 1. Time versus concentration graphs for each analyte for all monitoring wells and surface-water locations in the long-term monitoring network are displayed in Appendix A. A complete set of groundwater, surface water, and static water level data are displayed in Appendixes B, C, and D, respectively.

All water quality data for the Grand Junction site are archived in the environmental database at the LM Field Support Center at Grand Junction, Colorado. Water quality data are also available for viewing with dynamic mapping via the Geospatial Environmental Mapping System (GEMS) website at https://gems.lm.doe.gov/#&site=GJO.

Figure 2. 2023 Sampling Locations at the Grand Junction Site

Table 1. Summary of Historical and 2023 Results[a]

Location	Analyte									
	Manganese		Molybdenum		Selenium		Sulfate		Uranium	
	Historical Maximum	2023 Result	Historical Maximum	2023 Result	Historical Maximum	2023 Result	Historical Maximum	2023 Result	Historical Maximum	2023 Result
Groundwater[b]										
10-19N	10	1.47	0.541	0.0182	0.03	0.00159	5710	1250	1.43	0.116
11-1S	2.4	1.40	0.552	0.0117	0.0504	0.0015	2800	214	2.2	0.025
14-13NA	6.24	4.41	0.57	0.0745	0.0572	0.0015	2270	1620	1.7	0.184
6-2N	1.9	0.982	0.15	0.0257	0.14	0.0273	1480	978	1.1	0.0621
8-4S	3.28	1.13	2.65	0.0798	0.685	0.00772	2200	412	4.8	0.26
GJ01-01	0.71	0.403	0.162	0.0702	0.0634	0.0274	762	424	0.507	0.223
GJ84-04	4.8	2.79	0.413	0.0454	0.015	0.0015	3100	1010	1.5	0.124
Surface Water[c]										
North Pond	—	—	0.134	0.021	0.015	0.0041	7300	1290	0.993	0.374
South Pond	—	—	1.39	0.06	0.064	0.0015	5060	954	0.56	0.201
Wetland Area	—	—	8.9	—	0.0231	—	45,200	—	47	—
Upper Gunnison	—	—	0.09	0.00288	0.015	0.00385	513	292	0.012	0.0063
Upper Mid Gunnison	—	—	0.031	0.00304	0.016	0.00377	511	300	0.013	0.00642
Lower Gunnison	—	—	0.05	0.00336	0.017	0.00393	541	307	0.034	0.0072

Notes:

[a] Historical maximums from 1984–2023. All units are in milligrams per liter (mg/L).

[b] Results in red font exceed standards from "The Basic Standards for Ground Water" in Volume 5 *Code of Colorado Regulations* Section 1002-41 (5 CCR 1002-41) or background (for manganese and sulfate). Standards are molybdenum, 0.21 mg/L; selenium, 0.05 mg/L; and uranium, 0.03 mg/L. Background concentrations of manganese (0.72 mg/L) and sulfate (1150 mg/L) are the maximum concentration observed in upgradient monitoring wells GJ84-09 and GJ84-10.

[c] For the pond locations (North Pond, South Pond, and Wetland Area), results in red exceed the groundwater benchmarks listed above. For Gunnison River locations, results in red exceed the standards from "Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins" (5 CCR 1002-35). Standards are molybdenum, 0.16 mg/L; selenium, 0.0046 mg/L; and uranium, 0.03 mg/L.

5.0 References

5 CCR 1002-35. "Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins," *Code of Colorado Regulations*, https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8117&fileName=5%20CCR%201002-35.

5 CCR 1002-41. "The Basic Standards for Ground Water," *Code of Colorado Regulations*, https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8819&fileName=5%20CCR%201002-41.

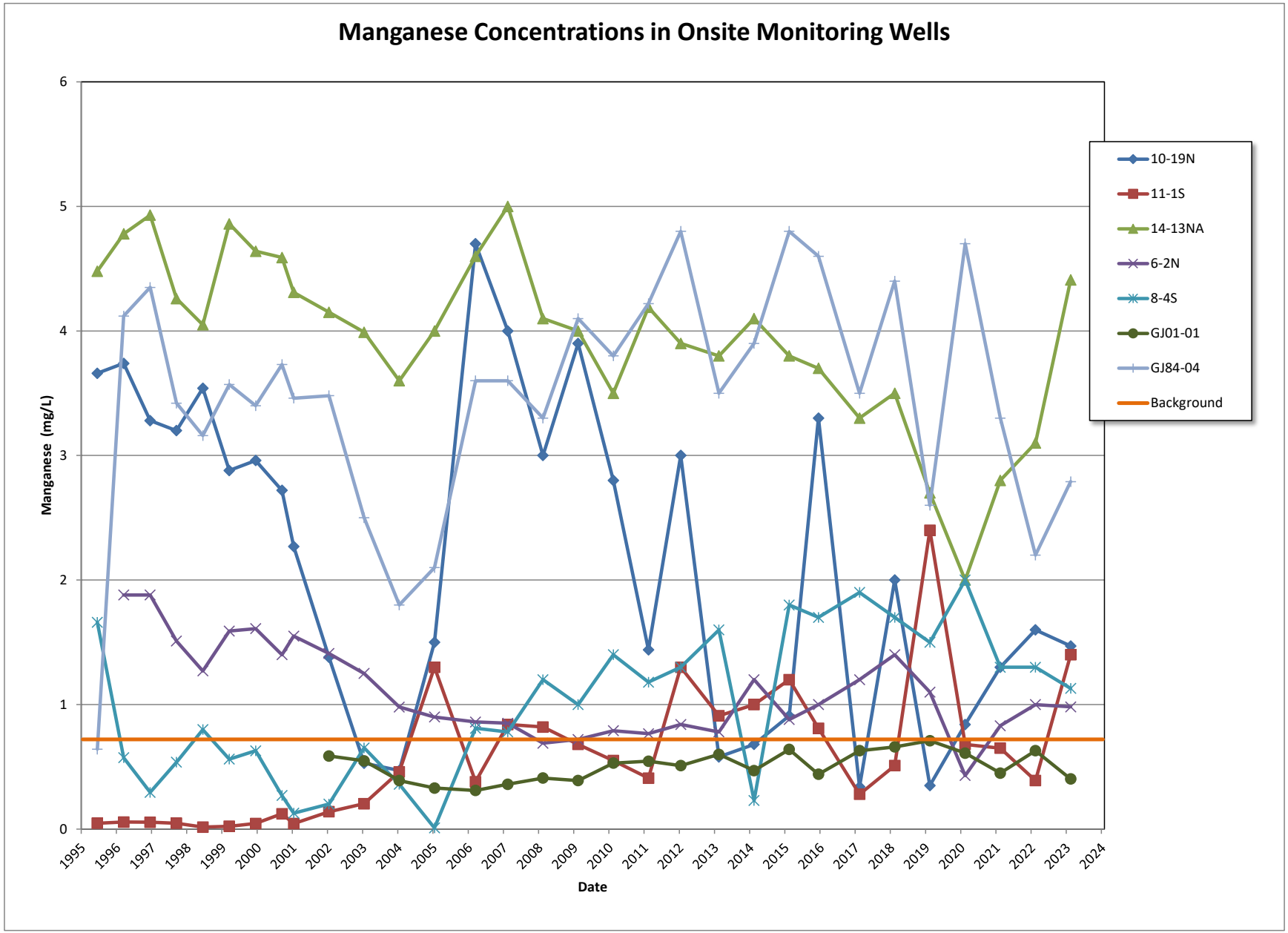
DOE (U.S. Department of Energy), 1989. *Grand Junction Projects Office Remedial Action Project, Declaration for the Record of Decision and Record of Decision Summary*, Grand Junction Projects Office, Grand Junction, Colorado, April.

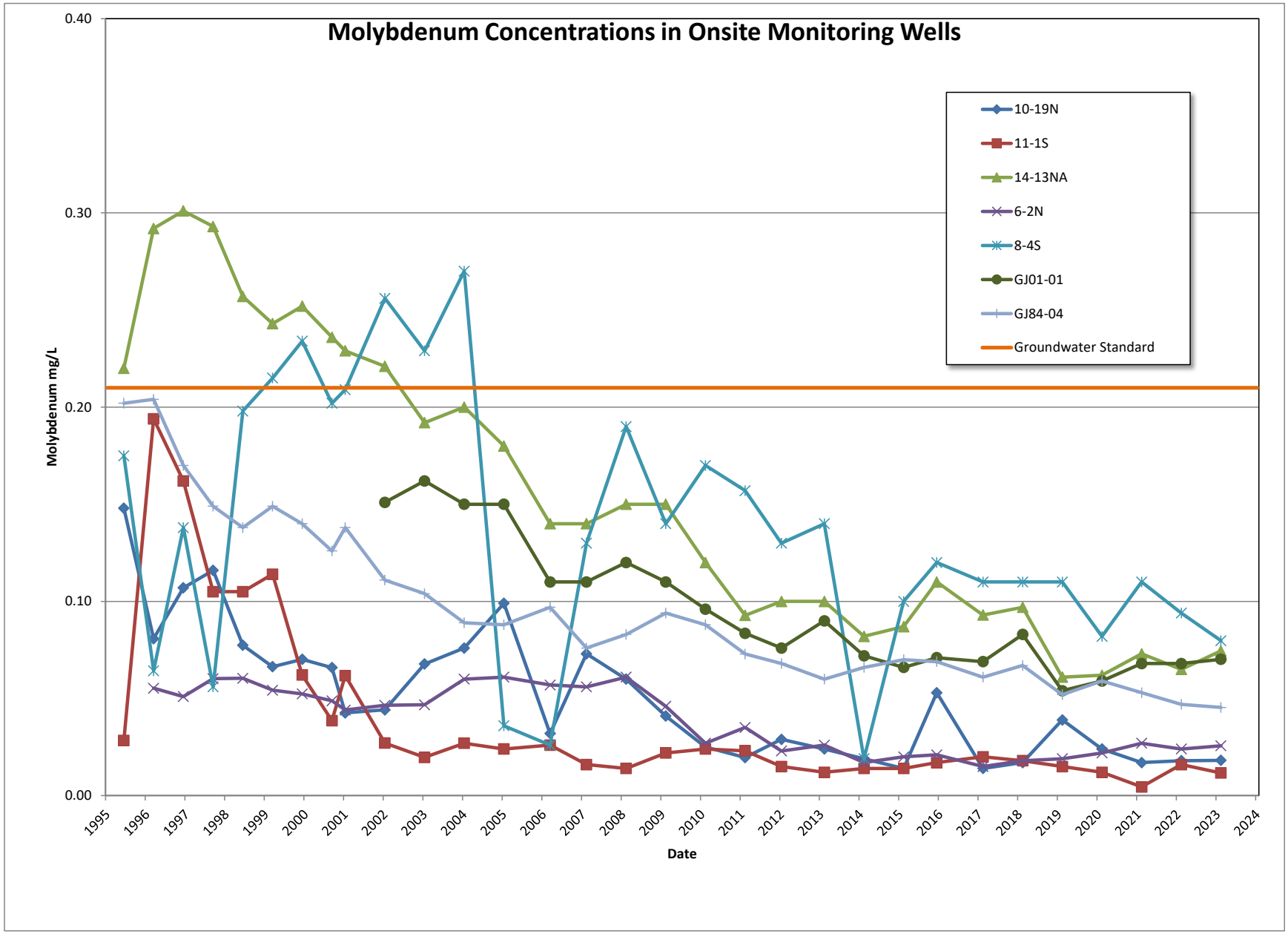
Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site, LMS/GJO/S02013, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

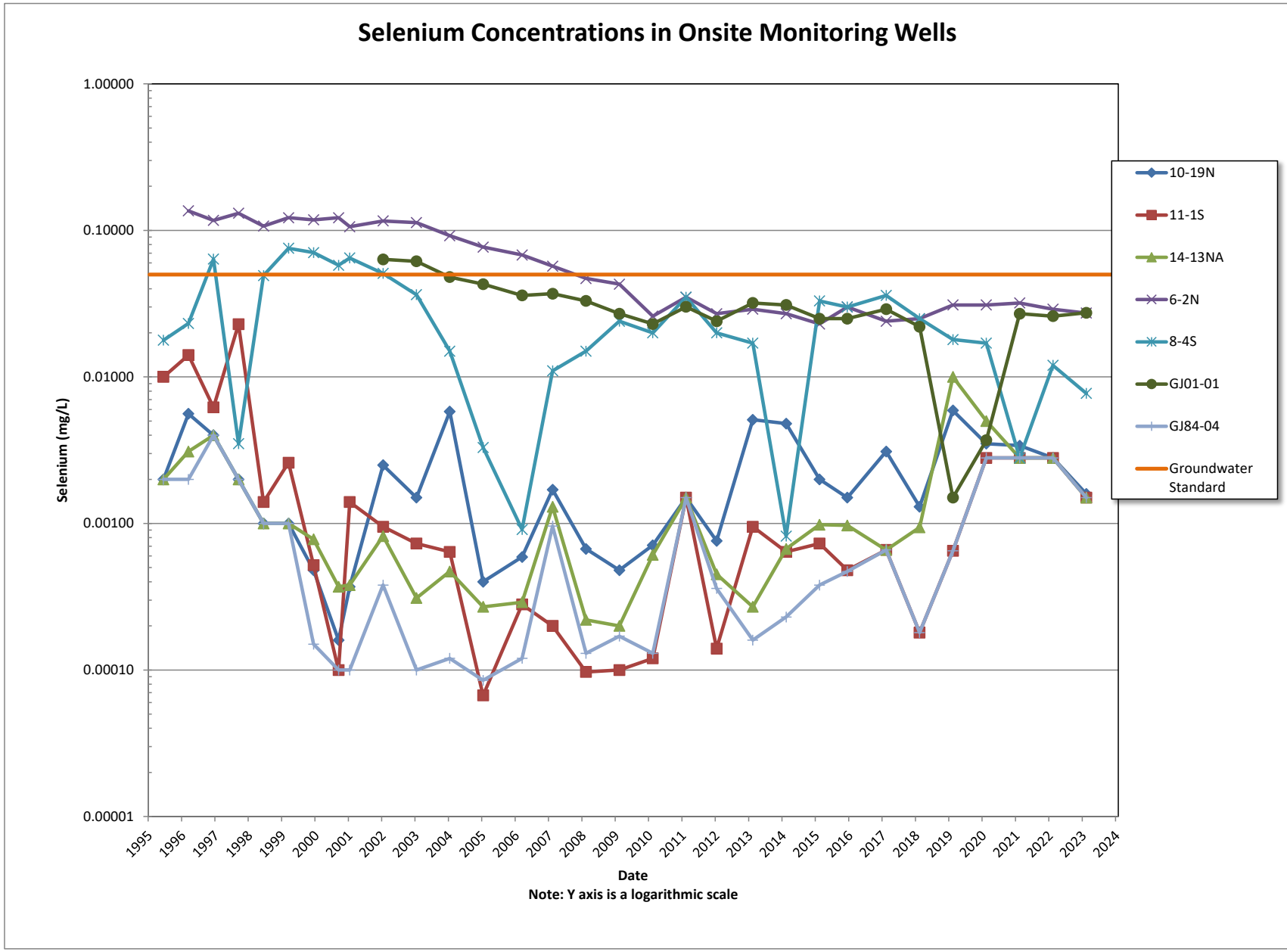
Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites, LMS/PRO/S04351, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

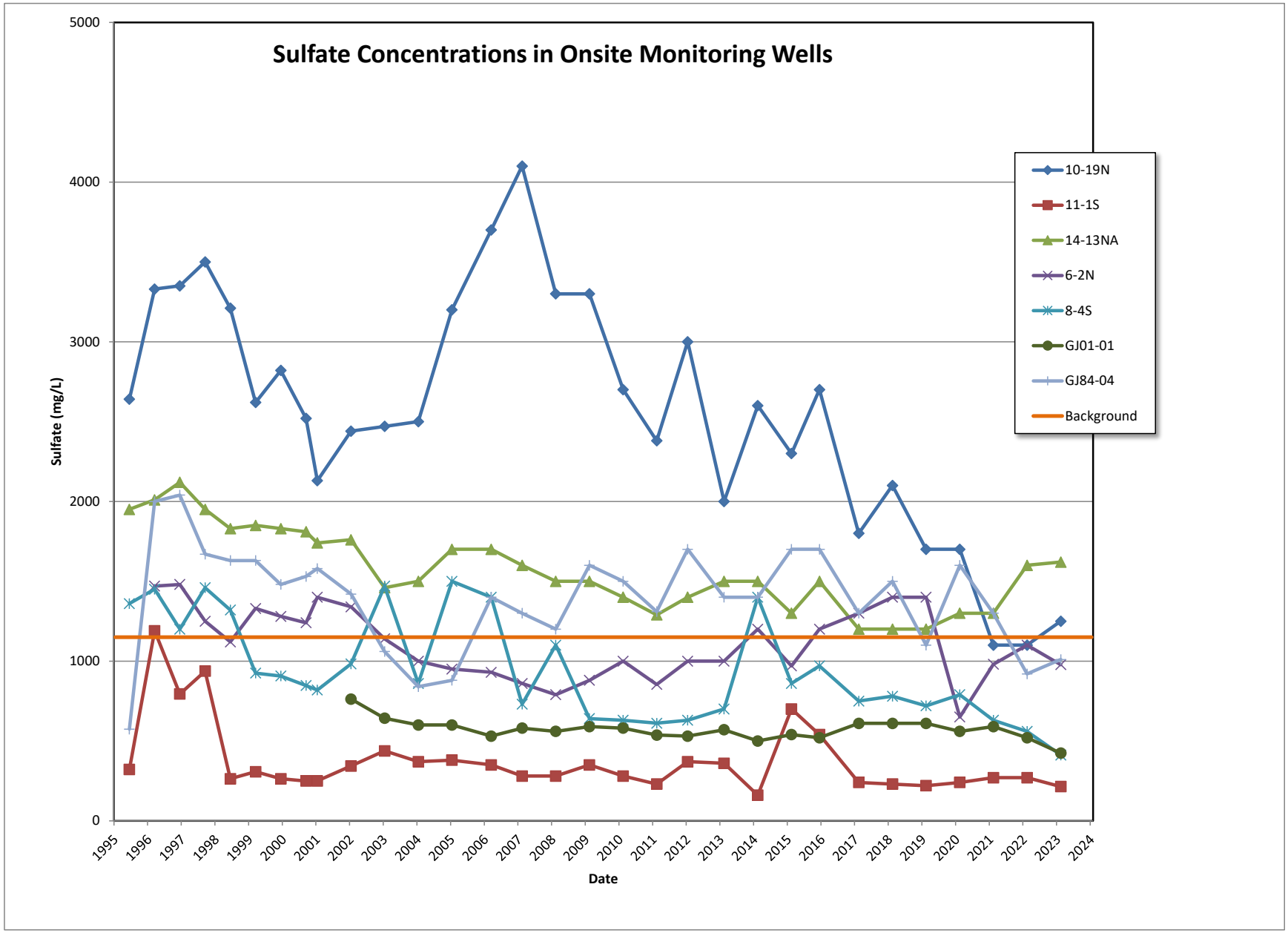
Appendix A

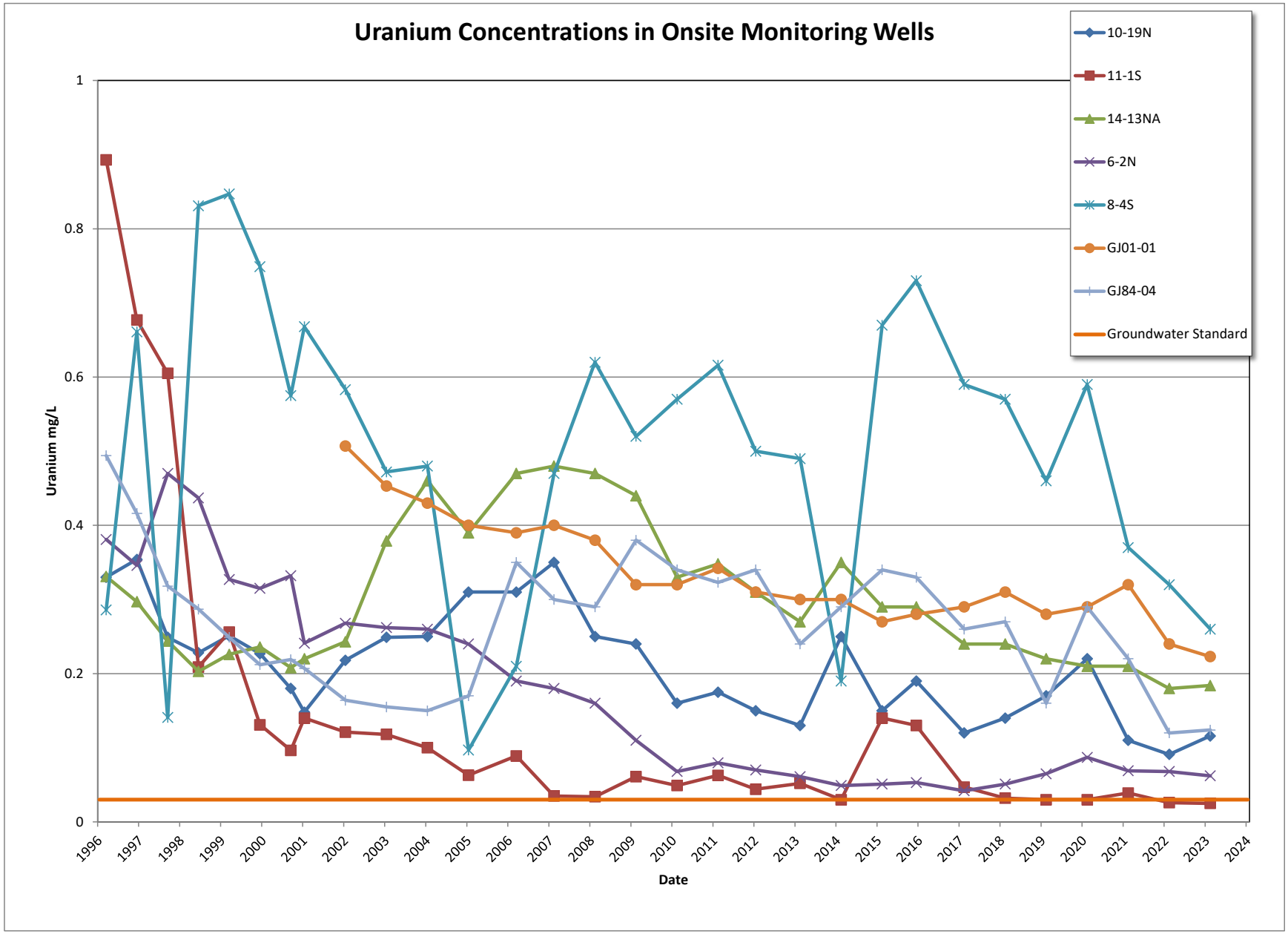
Time Versus Concentration Graphs

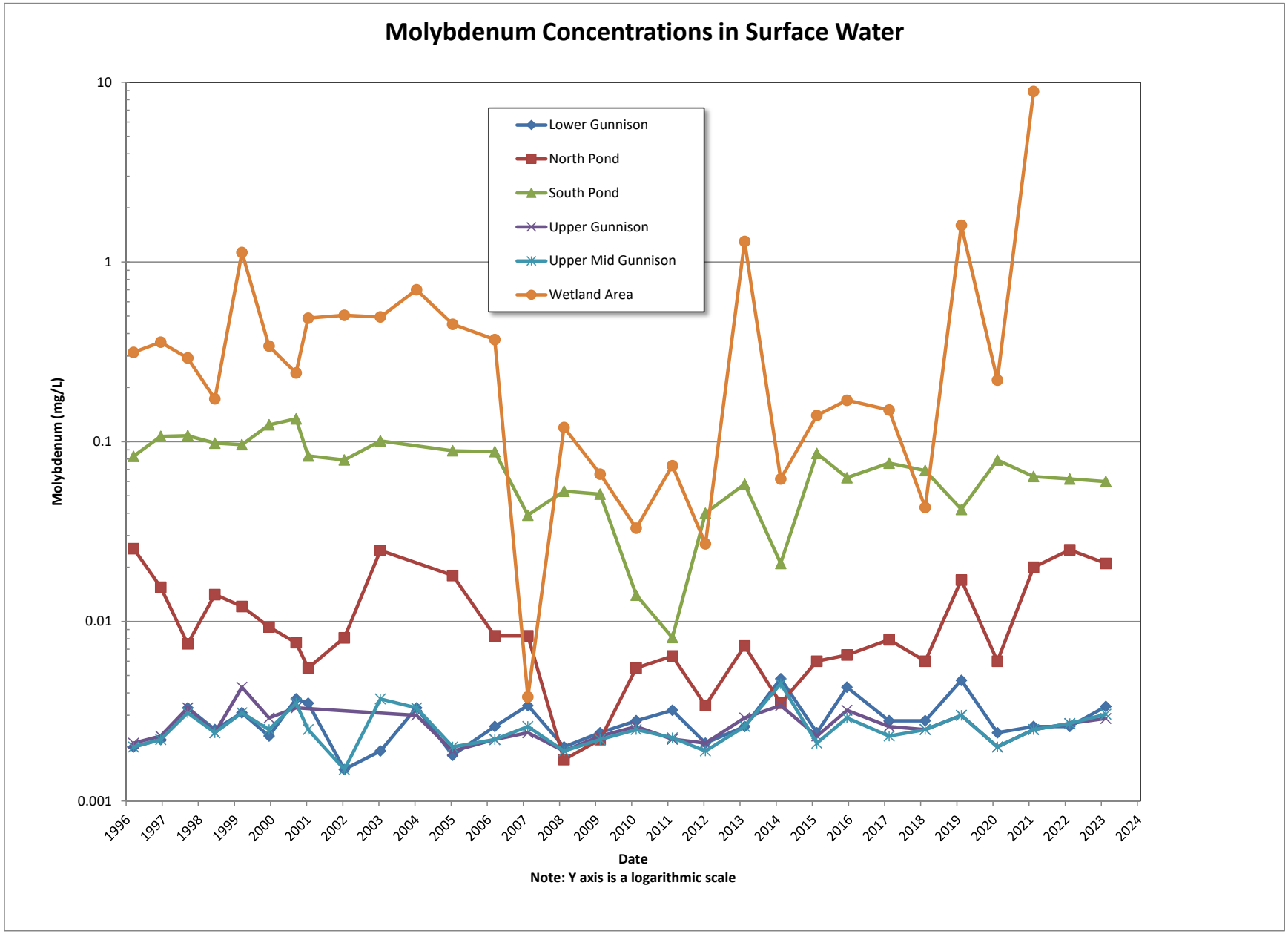

Manganese Concentrations in Onsite Monitoring Wells
Manganese (mg/L)
Date
0
1
2
3
4
5
6
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Background

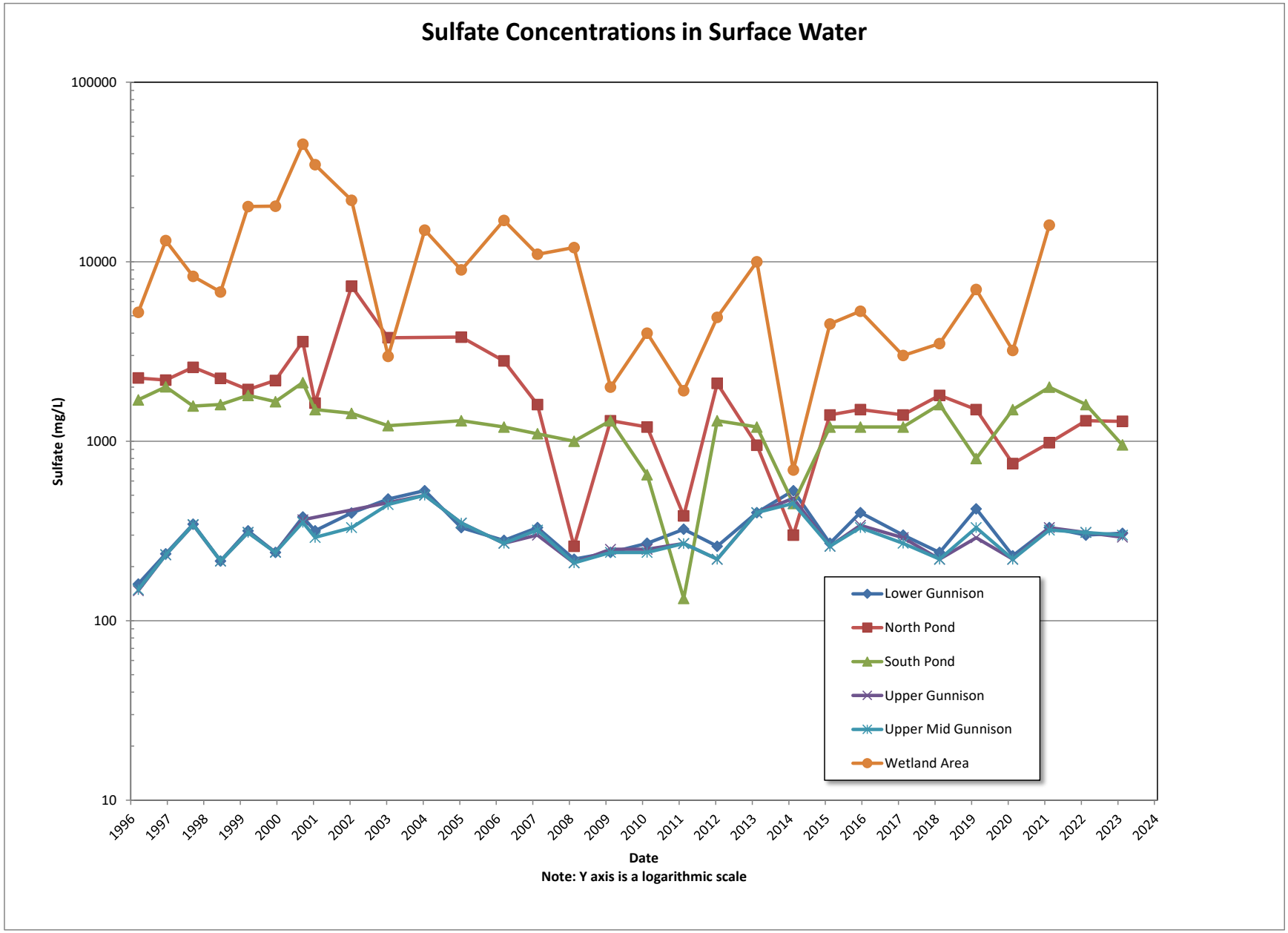

Molybdenum Concentrations in Onsite Monitoring Wells
Molybdenum mg/L
0.40
0.30
0.20
0.10
0.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Groundwater Standard

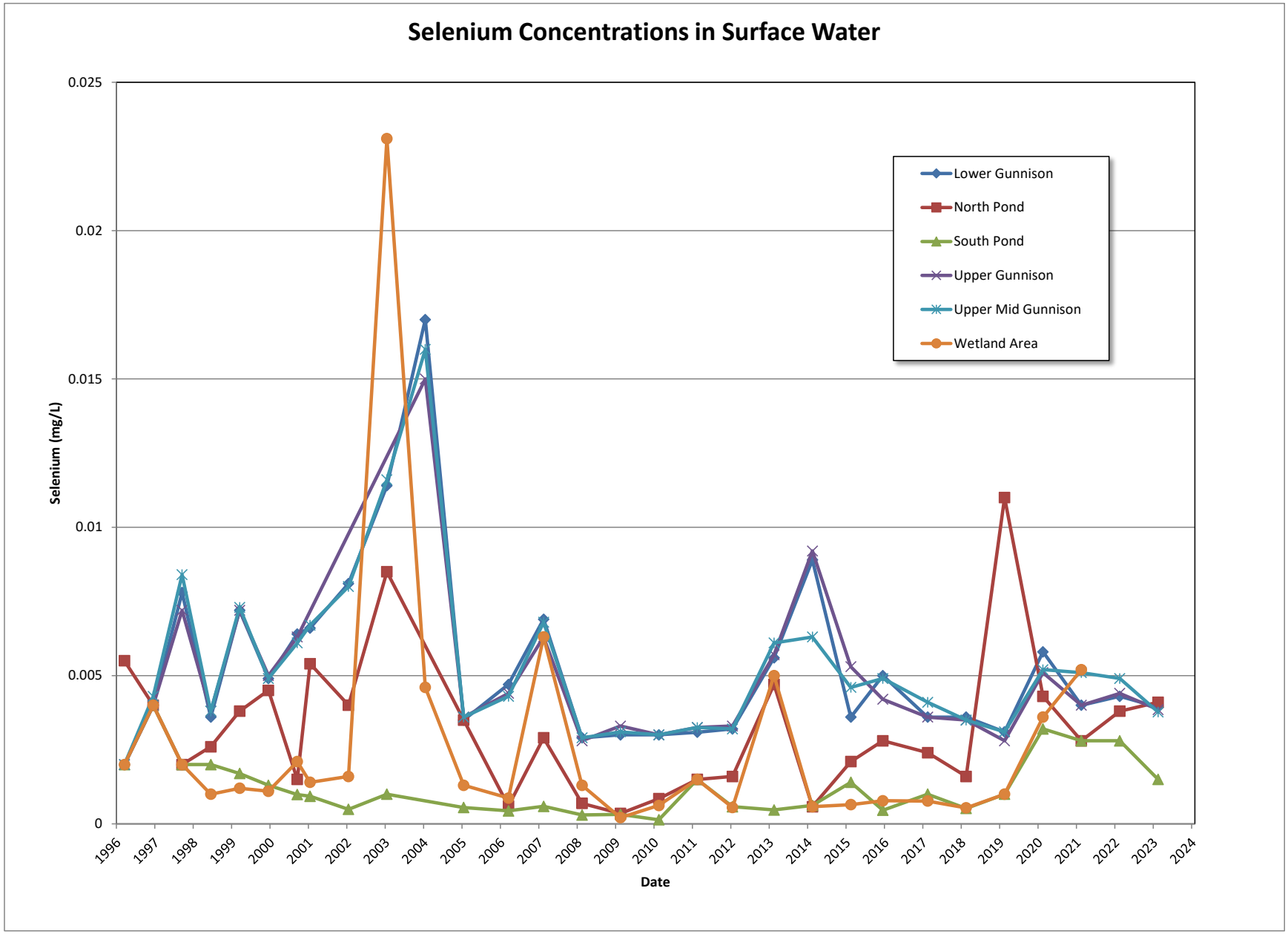

Selenium Concentrations in Onsite Monitoring Wells
1.00000
0.10000
0.01000
0.00100
0.00010
0.00001
Selenium (mg/L)
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
Note: Y axis is a logarithmic scale
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Groundwater Standard

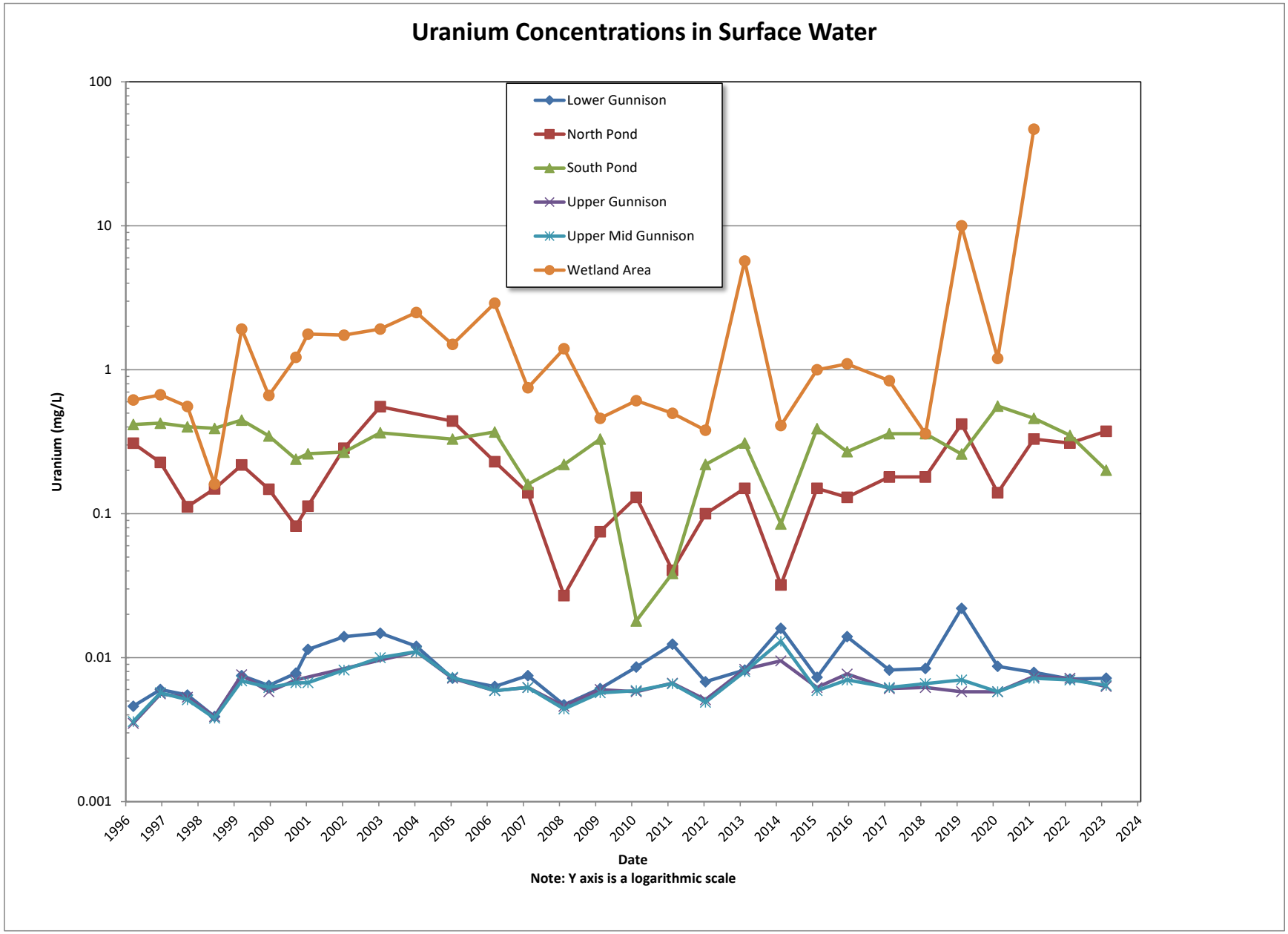

Sulfate Concentrations in Onsite Monitoring Wells
Sulfate (mg/L)
5000
4000
3000
2000
1000
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Background


Uranium Concentrations in Onsite Monitoring Wells
10-19N
11-1S
14-13NA
6-2N
8-4S
GJ01-01
GJ84-04
Groundwater Standard
Uranium mg/L
Date
0
0.2
0.4
0.6
0.8
1
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024


Molybdenum Concentrations in Surface Water
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area
Molybdenum (mg/L)
10
1
0.1
0.01
0.001
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
Note: Y axis is a logarithmic scale


Sulfate Concentrations in Surface Water
100000
10000
1000
100
10
Sulfate (mg/L)
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
Note: Y axis is a logarithmic scale
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area


Selenium Concentrations in Surface Water
0.025
0.02
0.015
0.01
0.005
0
Selenium (mg/L)
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area


Uranium Concentrations in Surface Water
Lower Gunnison
North Pond
South Pond
Upper Gunnison
Upper Mid Gunnison
Wetland Area
Uranium (mg/L)
100
10
1
0.1
0.01
0.001
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Date
Note: Y axis is a logarithmic scale

Appendix B

Groundwater Data

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:37:07 AM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Alkalinity, Total (As CaCO3)													
Alkalinity, Total (As CaCO3)	10-19N	WL	2/13/2023	(N)F	AL	O	334	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	11-1S	WL	2/13/2023	(N)F	AL	O	184	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	14-13NA	WL	2/13/2023	(N)F	AL	O	332	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	6-2N	WL	2/14/2023	(N)F	AL	O	248	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	8-4S	WL	2/14/2023	(N)F	AL	O	242	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	GJ01-01	WL	2/14/2023	(N)F	AL		300	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	GJ84-04	WL	2/13/2023	(N)F	AL	D	280	mg/L		F	#	-	-
Chloride													
Chloride	10-19N	WL	2/13/2023	(N)F	AL	O	166	mg/L		F	#	13.4	-
Chloride	11-1S	WL	2/13/2023	(N)F	AL	O	7.82	mg/L		F	#	0.067	-
Chloride	14-13NA	WL	2/13/2023	(N)F	AL	O	123	mg/L		F	#	6.7	-
Chloride	6-2N	WL	2/14/2023	(N)F	AL	O	78.8	mg/L		F	#	6.7	-
Chloride	8-4S	WL	2/14/2023	(N)F	AL	O	32.4	mg/L		F	#	6.7	-
Chloride	GJ01-01	WL	2/14/2023	(N)D	AL		64.3	mg/L		F	#	6.7	-
Chloride	GJ01-01	WL	2/14/2023	(N)F	AL		65.8	mg/L		F	#	6.7	-
Chloride	GJ84-04	WL	2/13/2023	(N)F	AL	D	78.2	mg/L		F	#	6.7	-
Manganese													
Manganese	10-19N	WL	2/13/2023	(T)F	AL	O	1.47	mg/L		F	#	0.01	-
Manganese	11-1S	WL	2/13/2023	(T)F	AL	O	1.4	mg/L		F	#	0.01	-
Manganese	14-13NA	WL	2/13/2023	(T)F	AL	O	4.41	mg/L		F	#	0.01	-
Manganese	6-2N	WL	2/14/2023	(T)F	AL	O	0.982	mg/L		F	#	0.001	-
Manganese	8-4S	WL	2/14/2023	(T)F	AL	O	1.13	mg/L		F	#	0.01	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:37:07 AM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Manganese	GJ01-01	WL	2/14/2023	(T)D	AL		0.403	mg/L		F	#	0.001	-
Manganese	GJ01-01	WL	2/14/2023	(T)F	AL		0.377	mg/L		F	#	0.001	-
Manganese	GJ84-04	WL	2/13/2023	(T)F	AL	D	2.79	mg/L		F	#	0.01	-
Molybdenum													
Molybdenum	10-19N	WL	2/13/2023	(T)F	AL	O	0.0182	mg/L		F	#	0.0002	-
Molybdenum	11-1S	WL	2/13/2023	(T)F	AL	O	0.0117	mg/L		F	#	0.0002	-
Molybdenum	14-13NA	WL	2/13/2023	(T)F	AL	O	0.0745	mg/L		F	#	0.0002	-
Molybdenum	6-2N	WL	2/14/2023	(T)F	AL	O	0.0257	mg/L		F	#	0.0002	-
Molybdenum	8-4S	WL	2/14/2023	(T)F	AL	O	0.0798	mg/L		F	#	0.0002	-
Molybdenum	GJ01-01	WL	2/14/2023	(T)D	AL		0.0702	mg/L		F	#	0.0002	-
Molybdenum	GJ01-01	WL	2/14/2023	(T)F	AL		0.0686	mg/L		F	#	0.0002	-
Molybdenum	GJ84-04	WL	2/13/2023	(T)F	AL	D	0.0454	mg/L		F	#	0.0002	-
pH													
pH	10-19N	WL	2/13/2023	(N)F	AL	O	7.01	s.u.		F	#	-	-
pH	11-1S	WL	2/13/2023	(N)F	AL	O	7.21	s.u.		F	#	-	-
pH	14-13NA	WL	2/13/2023	(N)F	AL	O	6.95	s.u.		F	#	-	-
pH	6-2N	WL	2/14/2023	(N)F	AL	O	7.53	s.u.		F	#	-	-
pH	8-4S	WL	2/14/2023	(N)F	AL	O	7.19	s.u.		F	#	-	-
pH	GJ01-01	WL	2/14/2023	(N)F	AL		7.19	s.u.		F	#	-	-
pH	GJ84-04	WL	2/13/2023	(N)F	AL	D	7.05	s.u.		F	#	-	-
Selenium													
Selenium	10-19N	WL	2/13/2023	(T)F	AL	O	0.00159	mg/L	B	F	#	0.0015	-
Selenium	11-1S	WL	2/13/2023	(T)F	AL	O	0.0015	mg/L	U	F	#	0.0015	-
Selenium	14-13NA	WL	2/13/2023	(T)F	AL	O	0.0015	mg/L	U	F	#	0.0015	-
Selenium	6-2N	WL	2/14/2023	(T)F	AL	O	0.0273	mg/L		F	#	0.0015	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:37:08 AM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Selenium	8-4S	WL	2/14/2023	(T)F	AL	O	0.00772	mg/L		F	#	0.0015	-
Selenium	GJ01-01	WL	2/14/2023	(T)D	AL		0.0271	mg/L		F	#	0.0015	-
Selenium	GJ01-01	WL	2/14/2023	(T)F	AL		0.0274	mg/L		F	#	0.0015	-
Selenium	GJ84-04	WL	2/13/2023	(T)F	AL	D	0.0015	mg/L	U	F	#	0.0015	-
Specific Conductance													
Specific Conductance	10-19N	WL	2/13/2023	(N)F	AL	O	2945	umhos/cm		F	#	-	-
Specific Conductance	11-1S	WL	2/13/2023	(N)F	AL	O	741	umhos/cm		F	#	-	-
Specific Conductance	14-13NA	WL	2/13/2023	(N)F	AL	O	3441	umhos/cm		F	#	-	-
Specific Conductance	6-2N	WL	2/14/2023	(N)F	AL	O	2409	umhos/cm		F	#	-	-
Specific Conductance	8-4S	WL	2/14/2023	(N)F	AL	O	1251	umhos/cm		F	#	-	-
Specific Conductance	GJ01-01	WL	2/14/2023	(N)F	AL		1483	umhos/cm		F	#	-	-
Specific Conductance	GJ84-04	WL	2/13/2023	(N)F	AL	D	2372	umhos/cm		F	#	-	-
Sulfate													
Sulfate	10-19N	WL	2/13/2023	(N)F	AL	O	1250	mg/L		F	#	26.6	-
Sulfate	11-1S	WL	2/13/2023	(N)F	AL	O	214	mg/L		F	#	13.3	-
Sulfate	14-13NA	WL	2/13/2023	(N)F	AL	O	1620	mg/L		F	#	13.3	-
Sulfate	6-2N	WL	2/14/2023	(N)F	AL	O	978	mg/L		F	#	13.3	-
Sulfate	8-4S	WL	2/14/2023	(N)F	AL	O	412	mg/L		F	#	13.3	-
Sulfate	GJ01-01	WL	2/14/2023	(N)D	AL		417	mg/L		F	#	13.3	-
Sulfate	GJ01-01	WL	2/14/2023	(N)F	AL		424	mg/L		F	#	13.3	-
Sulfate	GJ84-04	WL	2/13/2023	(N)F	AL	D	1010	mg/L		F	#	13.3	-
Temperature													
Temperature	10-19N	WL	2/13/2023	(N)F	AL	O	10.28	C		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:37:08 AM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	ZONE COMPLETION	FLOW REL.	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Temperature	11-1S	WL	2/13/2023	(N)F	AL	O	11.41	C		F	#	-	-
Temperature	14-13NA	WL	2/13/2023	(N)F	AL	O	13.18	C		F	#	-	-
Temperature	6-2N	WL	2/14/2023	(N)F	AL	O	15.07	C		F	#	-	-
Temperature	8-4S	WL	2/14/2023	(N)F	AL	O	11.43	C		F	#	-	-
Temperature	GJ01-01	WL	2/14/2023	(N)F	AL		13.69	C		F	#	-	-
Temperature	GJ84-04	WL	2/13/2023	(N)F	AL	D	11.15	C		F	#	-	-
Turbidity													
Turbidity	10-19N	WL	2/13/2023	(N)F	AL	O	3.46	NTU		F	#	-	-
Turbidity	11-1S	WL	2/13/2023	(N)F	AL	O	3.28	NTU		F	#	-	-
Turbidity	14-13NA	WL	2/13/2023	(N)F	AL	O	0.65	NTU		F	#	-	-
Turbidity	6-2N	WL	2/14/2023	(N)F	AL	O	1.49	NTU		F	#	-	-
Turbidity	8-4S	WL	2/14/2023	(N)F	AL	O	2.29	NTU		F	#	-	-
Turbidity	GJ01-01	WL	2/14/2023	(N)F	AL		0.42	NTU		F	#	-	-
Turbidity	GJ84-04	WL	2/13/2023	(N)F	AL	D	1.87	NTU		F	#	-	-
Uranium													
Uranium	10-19N	WL	2/13/2023	(T)F	AL	O	0.116	mg/L		F	#	0.000067	-
Uranium	11-1S	WL	2/13/2023	(T)F	AL	O	0.025	mg/L		F	#	0.000067	-
Uranium	14-13NA	WL	2/13/2023	(T)F	AL	O	0.184	mg/L		F	#	0.000067	-
Uranium	6-2N	WL	2/14/2023	(T)F	AL	O	0.0621	mg/L		F	#	0.000067	-
Uranium	8-4S	WL	2/14/2023	(T)F	AL	O	0.26	mg/L		F	#	0.000067	-
Uranium	GJ01-01	WL	2/14/2023	(T)D	AL		0.23	mg/L		F	#	0.000067	-
Uranium	GJ01-01	WL	2/14/2023	(T)F	AL		0.223	mg/L		F	#	0.000067	-
Uranium	GJ84-04	WL	2/13/2023	(T)F	AL	D	0.124	mg/L		F	#	0.000067	-

ZONES OF COMPLETION:

AL ALLUVIUM

GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (EQuIS201) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:37:08 AM

LOCATION TYPE:

WL	WELL

DATA QUALIFIERS:

F	Low flow sampling method used.
G	Possible grout contamination, pH > 9.
J	Estimated Value.
L	Less than 3 bore volumes purged prior to sampling.
N	Tentatively identified compound (TIC).
Q	Qualitative result due to sampling technique
R	Unusable result.
U	Parameter analyzed for but was not detected.
X	Location is undefined.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated Value.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Parameter analyzed for but was not detected.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X	Laboratory defined qualifier, see case narrative.

Y	Laboratory defined qualifier, see case narrative.
Z	Laboratory defined qualifier, see case narrative.

SAMPLE TYPES:

Fraction:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes:
F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

FLOW CODES:

B	BACKGROUND	C	CROSS GRADIENT	D	DOWN GRADIENT
F	OFF-SITE	N	UNKNOWN	O	ON-SITE
U	UPGRADIENT				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix C

Surface Water Data

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:22:43 AM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Alkalinity, Total (As CaCO3)										
Alkalinity, Total (As CaCO3)	Lower Gunnison	2/13/2023	(D)F	164	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	North Pond	2/13/2023	(N)F	238	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	South Pond	2/14/2023	(N)F	131	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	Upper Gunnison	2/13/2023	(N)F	171	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	Upper Mid Gunnison	2/13/2023	(N)F	162	mg/L			#	-	-
Chloride										
Chloride	Lower Gunnison	2/13/2023	(N)F	11.8	mg/L			#	0.335	-
Chloride	North Pond	2/13/2023	(N)F	194	mg/L			#	6.7	-
Chloride	South Pond	2/14/2023	(N)F	71.5	mg/L			#	6.7	-
Chloride	Upper Gunnison	2/13/2023	(N)F	10.3	mg/L			#	0.335	-
Chloride	Upper Mid Gunnison	2/13/2023	(N)F	10.4	mg/L			#	0.335	-
Molybdenum										
Molybdenum	Lower Gunnison	2/13/2023	(D)F	0.00336	mg/L			#	0.0002	-
Molybdenum	North Pond	2/13/2023	(T)F	0.021	mg/L			#	0.0002	-
Molybdenum	South Pond	2/14/2023	(T)F	0.06	mg/L			#	0.0002	-
Molybdenum	Upper Gunnison	2/13/2023	(T)F	0.00288	mg/L	B		#	0.0002	-
Molybdenum	Upper Mid Gunnison	2/13/2023	(T)F	0.00304	mg/L			#	0.0002	-
pH										
pH	Lower Gunnison	2/13/2023	(N)F	8.16	s.u.			#	-	-
pH	North Pond	2/13/2023	(N)F	8.07	s.u.			#	-	-
pH	South Pond	2/14/2023	(N)F	8.46	s.u.			#	-	-
pH	Upper Gunnison	2/13/2023	(N)F	8.16	s.u.			#	-	-
pH	Upper Mid Gunnison	2/13/2023	(N)F	8.19	s.u.			#	-	-
Selenium										
Selenium	Lower Gunnison	2/13/2023	(D)F	0.00393	mg/L	B		#	0.0015	-
Selenium	North Pond	2/13/2023	(T)F	0.0041	mg/L	B		#	0.0015	-
Selenium	South Pond	2/14/2023	(T)F	0.0015	mg/L	U		#	0.0015	-
Selenium	Upper Gunnison	2/13/2023	(T)F	0.00385	mg/L	B		#	0.0015	-
Selenium	Upper Mid Gunnison	2/13/2023	(T)F	0.00377	mg/L	B		#	0.0015	-
Specific Conductance										
Specific Conductance	Lower Gunnison	2/13/2023	(N)F	903	umhos/cm			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:22:43 AM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Specific Conductance	North Pond	2/13/2023	(N)F	3206	umhos/cm			#	-	-
Specific Conductance	South Pond	2/14/2023	(N)F	2154	umhos/cm			#	-	-
Specific Conductance	Upper Gunnison	2/13/2023	(N)F	876	umhos/cm			#	-	-
Specific Conductance	Upper Mid Gunnison	2/13/2023	(N)F	887	umhos/cm			#	-	-
Sulfate										
Sulfate	Lower Gunnison	2/13/2023	(N)F	307	mg/L			#	13.3	-
Sulfate	North Pond	2/13/2023	(N)F	1290	mg/L			#	13.3	-
Sulfate	South Pond	2/14/2023	(N)F	954	mg/L			#	13.3	-
Sulfate	Upper Gunnison	2/13/2023	(N)F	292	mg/L			#	13.3	-
Sulfate	Upper Mid Gunnison	2/13/2023	(N)F	300	mg/L			#	13.3	-
Temperature										
Temperature	Lower Gunnison	2/13/2023	(N)F	4.06	C			#	-	-
Temperature	North Pond	2/13/2023	(N)F	5.96	C			#	-	-
Temperature	South Pond	2/14/2023	(N)F	5.25	C			#	-	-
Temperature	Upper Gunnison	2/13/2023	(N)F	6.24	C			#	-	-
Temperature	Upper Mid Gunnison	2/13/2023	(N)F	5.21	C			#	-	-
Turbidity										
Turbidity	Lower Gunnison	2/13/2023	(N)F	16.6	NTU			#	-	-
Turbidity	North Pond	2/13/2023	(N)F	1.4	NTU			#	-	-
Turbidity	South Pond	2/14/2023	(N)F	3.69	NTU			#	-	-
Turbidity	Upper Gunnison	2/13/2023	(N)F	9.52	NTU			#	-	-
Turbidity	Upper Mid Gunnison	2/13/2023	(N)F	7.66	NTU			#	-	-
Uranium										
Uranium	Lower Gunnison	2/13/2023	(D)F	0.0072	mg/L			#	0.000067	-
Uranium	North Pond	2/13/2023	(T)F	0.374	mg/L			#	0.000067	-
Uranium	South Pond	2/14/2023	(T)F	0.201	mg/L			#	0.000067	-
Uranium	Upper Gunnison	2/13/2023	(T)F	0.0063	mg/L			#	0.000067	-
Uranium	Upper Mid Gunnison	2/13/2023	(T)F	0.00642	mg/L			#	0.000067	-

DATA QUALIFIERS:

F Low flow sampling method used.

G Possible grout contamination, pH > 9.

J Estimated Value.

L Less than 3 bore volumes purged prior to sampling.

N Tentatively identified compound (TIC).

Q	Qualitative result due to sampling technique
R	Unusable result.
U	Parameter analyzed for but was not detected.
X	Location is undefined.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated Value.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Parameter analyzed for but was not detected.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X	Laboratory defined qualifier, see case narrative.
Y	Laboratory defined qualifier, see case narrative.
Z	Laboratory defined qualifier, see case narrative.

SAMPLE TYPES:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes: F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix D

Static Water Level Data

STATIC WATER LEVELS (EQuIS700) FOR SITE GJO01, Grand Junction Site

REPORT DATE: 5/22/2023 11:20:21 AM

LOCATION CODE	MEASUREMENT DATE/TIME	TOP OF CASING ELEVATION (FT)	DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
10-19N	02/13/2023 15:39	4569.95	15.28	4554.67	
11-1S	02/13/2023 14:56	4576.08	17.82	4558.26	
14-13NA	02/13/2023 13:51	4563.95	7.76	4556.19	
6-2N	02/14/2023 13:38	4574.14	15.25	4558.89	
8-4S	02/14/2023 15:05	4571.99	13.36	4558.63	
GJ01-01	02/14/2023 13:06	4574.49	16.46	4558.03	
GJ84-04	02/13/2023 16:04	4566.54	11.48	4555.06	
Wetland Area	02/13/2023 14:29				I

FLOW CODES:

B	BACKGROUND	C	CROSS GRADIENT	D	DOWN GRADIENT
F	OFF-SITE	N	UNKNOWN	O	ON-SITE
U	UPGRADIENT				

WATER LEVEL FLAGS:

B	Water level is below the top of the pump	D	Dry
E	Water elevation may not be comparable to other water elevations at this site	F	Flowing
I	Inaccessible		