LMS/RVT/S38307

# 2021 Verification Monitoring Report, Riverton, Wyoming, Processing Site

**May 2022**

U.S. DEPARTMENT OF ENERGY | Legacy Management

*This document has been designed for online viewing.*

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# Abbreviations

| | |
|---|---|
| AWSS | alternate water supply system |
| bgs | below ground surface |
| CFR | *Code of Federal Regulations* |
| cfs | cubic feet per second |
| COC | contaminant of concern |
| CSM | conceptual site model |
| DOE | U.S. Department of Energy |
| EPA | U.S. Environmental Protection Agency |
| ft | feet |
| GCAP | Groundwater Compliance Action Plan |
| GEMS | Geospatial Environmental Mapping System |
| IC | institutional control |
| LM | Office of Legacy Management |
| LOESS | locally estimated scatterplot smoothing |
| LTMP | Long-Term Management Plan |
| MCL | maximum concentration limit |
| mg/L | milligrams per liter |
| NAW&SD | Northern Arapaho Water & Sewer Department |
| NRZ | naturally reduced zone |
| pCi/L | picocuries per liter |
| UMTRCA | Uranium Mill Tailings Radiation Control Act |
| USGS | U.S. Geological Survey |

# Executive Summary

This verification monitoring report presents data collected during calendar year 2021 and provides updates on the natural flushing compliance strategy and conceptual site model at the Riverton, Wyoming, Processing Site. Routine activities included monitoring institutional controls (ICs) and routine sampling of groundwater, surface water, and domestic wells.

ICs continue to function as intended at the Riverton site. IC monitoring was conducted to verify that ICs are in place and working to ensure that potential exposure to contaminated groundwater is minimized during the natural flushing period. Land and water use inspections within the IC boundary verified that warning signs around the oxbow lake were in place and in good condition. No additional land or water uses were identified that exposed or involved shallow groundwater. Sampling results from domestic wells indicated no impacts from site-related contaminants. The U.S. Department of Energy Office of Legacy Management (LM) director committed to fund needed upgrades to the alternate water supply system so that it will remain a viable IC for the Riverton site into the future.

Concentrations of uranium and molybdenum at the site continue to remain above the standards for groundwater in numerous surficial aquifer wells. Sampling results from semiconfined monitoring wells continue to indicate no impact from site-related molybdenum and uranium contamination. Sampling results from surface water indicate that groundwater discharge continues to affect the water quality in the oxbow lake, but there are no significant impacts to surface water in the Little Wind River and other ponds near the site.

Several types of information (e.g., contaminants mobilized by flood events, the current plume size and contaminant concentration levels, comparison of results to groundwater modeling predictions, historical data, and experience at other Uranium Mill Tailings Radiation Control Act sites) indicate that natural flushing of the surficial aquifer is occurring at the Riverton site but not at a rate that will meet the 100-year regulatory time frame. Based on this information, LM is assessing geochemical conditions at the site and working to identify data gaps necessary to evaluate groundwater remedy alternatives and determine an appropriate alternate compliance strategy for the site. The new compliance strategy will be presented to the U.S. Nuclear Regulatory Commission for approval in a new Groundwater Compliance Action Plan.

# 1.0 Introduction

This verification monitoring report presents routine data collected during calendar year 2021 and provides updates on the natural flushing compliance strategy and conceptual site model (CSM) at the Riverton, Wyoming, Processing Site. Data were generated from one routine groundwater and surface water sampling event conducted at the Riverton site during August 2021.

The Riverton site is regulated under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA). The compliance strategy for the Riverton site is natural flushing in conjunction with institutional controls (ICs) (DOE 1998b), as allowed by UMTRCA. Monitoring required during the natural flushing period is called verification monitoring because its purpose is to verify that the natural flushing strategy is progressing as predicted (or not) and to verify that ICs are in place and functioning as intended. Data collected during verification monitoring are reported annually in a verification monitoring report. These reports have been issued since 2001, and the reports from 2005 to 2017 are available on the U.S. Department of Energy (DOE) Office of Legacy Management (LM) website at https://www.lm.doe.gov/Riverton/Sites.aspx. All water quality data for the Riverton site are archived in the environmental database at the LM Field Support Center at Grand Junction, Colorado. Water quality data also are available for viewing with dynamic mapping via the Geospatial Environmental Mapping System (GEMS) website at https://gems.lm.doe.gov/#&site=RVT. The monitoring program at the Riverton site is specified in the *Draft Long-Term Management Plan for the Riverton, Wyoming, Processing Site* (DOE 2019a), also called the Long-Term Management Plan (LTMP). The LTMP is being updated to reflect new sampling locations that have been included in the long-term monitoring program.

# 2.0 Conceptual Site Model

The CSM provided in the *2015 Advanced Site Investigation and Monitoring Report, Riverton, Wyoming, Processing Site* (DOE 2016) does not require any updates based on the 2021 sampling results. Among other components, this conceptual model includes an ongoing contaminant source zone underneath the former tailings impoundment in the saturated zone, secondary contaminant sources within the plume footprint in evaporites within the unsaturated zone, and naturally reduced zones (NRZs) in the variably saturated zone. Data from 2021 confirmed the presence of an ongoing source underneath the former tailings pile that results in a persistent uranium plume with onsite concentrations up to 1.4 milligrams per liter (mg/L). The CSM (DOE 2016) also suggests that the unsaturated zone above the plume footprint has elevated solid-phase contaminants as seasonal high water levels bring and store contaminants into the typically unsaturated sediments from the underlying groundwater. During these high water levels, contaminants are wicked up and stored in the silt layer overlying much of the surficial aquifer and can be released during river flooding or other high recharge events (direct rain or snowmelt infiltration). This release of contaminants from the unsaturated zone into the groundwater was confirmed after flooding in 2010, 2016, and 2017 (Dam et al. 2015; DOE 2019b). Data from 2021 continued to confirm the CSM. In a year without flooding and no flood-induced input of secondary source from the unsaturated zone; contaminant concentrations in the surficial aquifer groundwater decreased through natural flushing processes. Whether or not the NRZs are a source or sink for uranium and molybdenum is being investigated by SLAC National Accelerator Laboratory personnel.

# 3.0 Site Conditions

## 3.1 Surface Remediation

A uranium and vanadium ore processing mill operated from 1958 to 1963 at the Riverton site. A tailings pile covered about 72 acres of the 140-acre site. The tailings and associated slurry water were the primary, original source of groundwater contamination of the surficial aquifer. In 1988 and 1989, the tailings pile was excavated down to an average depth of 4 feet (ft) below ground surface (bgs) based on a radium-226 soil standard in Title 40 *Code of Federal Regulations* Section 192 (40 CFR 192). Surface remediation activities resulted in removal of about 1.8 million cubic yards of tailings and associated materials, which were encapsulated at the Gas Hills East, Wyoming, Disposal Site (Figure 1) (DOE 1998b). Soils at and below the water table with elevated thorium-230 concentrations were left in place (DOE 1991) on portions of the former mill site as permitted by the supplemental standards provision of 40 CFR 192.

## 3.2 Hydrogeology

The Riverton site is on an alluvial terrace between the Wind River and the Little Wind River approximately 2.3 miles southwest of the town of Riverton, Wyoming (Figure 1). Groundwater is in three aquifers beneath the site: (1) a surficial unconfined aquifer (surficial aquifer), (2) a middle semiconfined aquifer, and (3) a deeper confined aquifer (DOE 1998c).

The surficial aquifer consists of approximately 15 to 20 ft of unconsolidated alluvial material; the semiconfined and confined aquifers are composed of shales and sandstones of the upper units of the Eocene Wind River Formation, which is more than 500 ft thick near the site. Depth to groundwater in the surficial aquifer is generally less than 10 ft bgs. For compliance purposes, the uppermost aquifer, where compliance with groundwater standards is assessed, comprises the surficial aquifer and semiconfined aquifer. Groundwater in the uppermost aquifer flows to the southeast.

Because the Riverton site is on an alluvial terrace between the Wind River and the Little Wind River, site groundwater conditions have been influenced by periodic flooding of these rivers. Artifacts of river flooding include the following:

- Formation of an oxbow lake in 1995
- Formation of a groundwater seep in a normally dry side channel of the Little Wind River in 2016
- Spikes in groundwater contaminant concentrations in areas inundated by flood waters
- High groundwater elevations depositing contaminants in the unsaturated zone
- High groundwater elevations leaching contaminants from the former tailings pile (White et al. 1984)
- Destruction of an LM stilling well and two LM monitoring wells on the south side of the Little Wind River in 2010
- Destruction of an LM stilling well (north side of the river) and the U.S. Geological Survey (USGS) gaging station on the Little Wind River in 2017

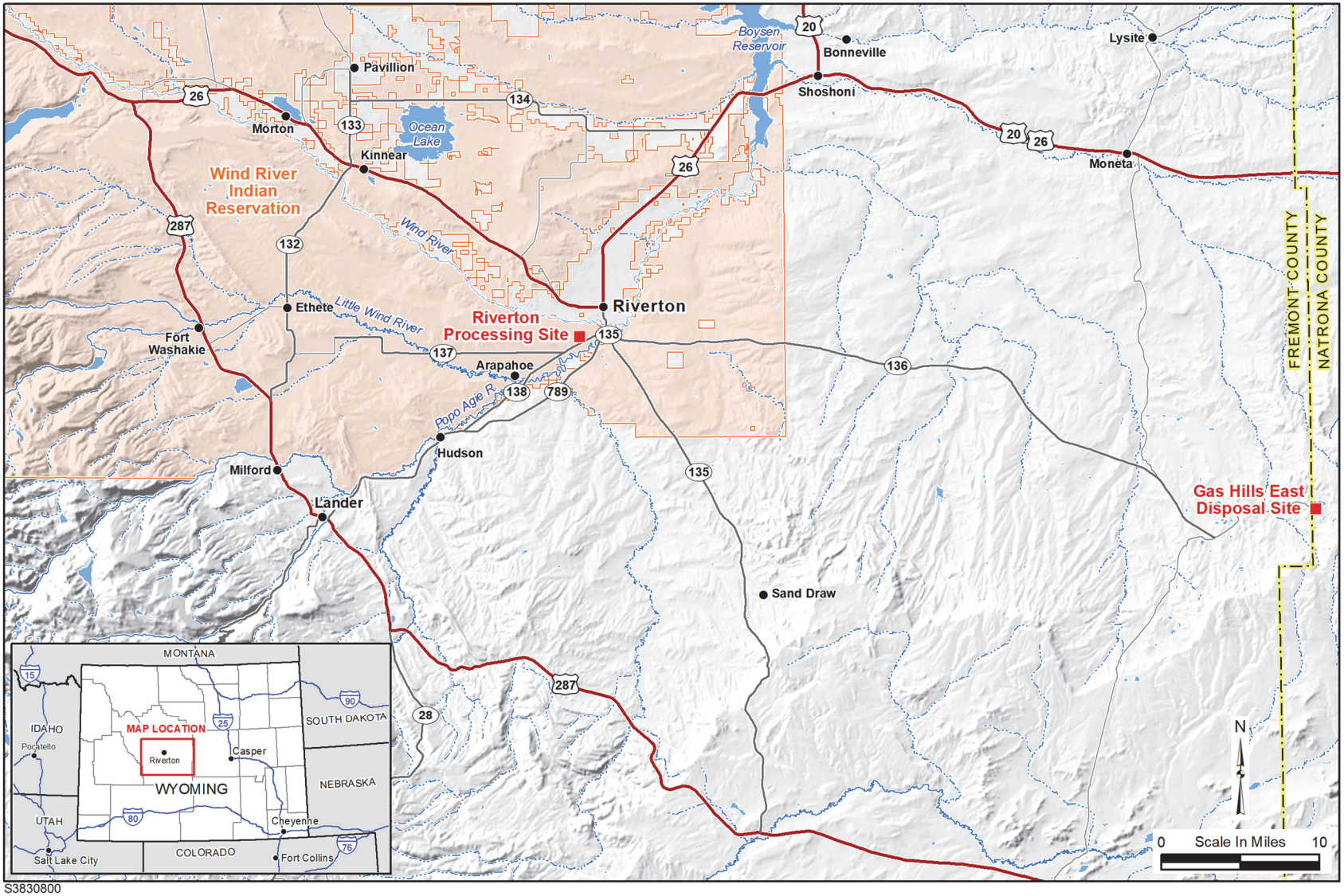



*Figure 1. Site Location Map*

Significant floods of the Little Wind River flooded portions of the site in 1963, 1965, 1967, 1983, 1991, 1995, 2010, 2016, and 2017, when peak river discharge was greater than 8000 cubic feet per second (cfs) (USGS 2021). Discharge data and flood data from the Little Wind River are presented in Section 5.2.1.

## 3.3 Water Quality

Shallow groundwater beneath and downgradient from the site was contaminated as a result of uranium-processing activities that occurred between 1958 and 1963 (DOE 1998c). Contaminants of concern (COCs) in the groundwater beneath the Riverton site are manganese, molybdenum, sulfate, and uranium. COCs were selected using a screening process that compared contaminant concentrations with the maximum concentration limits (MCLs) in 40 CFR 192 and evaluated potential human health risks and ecological risks. (Note: The MCLs for groundwater discussed here are different than the "MCLs" [i.e., maximum contaminant levels] for the U.S. Environmental Protection Agency [EPA] drinking water standards that are maximum concentrations allowed in drinking water.) The COC selection process is detailed in the *Environmental Assessment of Ground Water Compliance at the Riverton, Wyoming, Uranium Mill Tailings Site* (DOE 1998a). Molybdenum and uranium were selected as indicator contaminants for compliance monitoring in the *Final Ground Water Compliance Action Plan for the Riverton, Wyoming, Title I UMTRA Project Site* (DOE 1998b). These contaminants were selected as indicator contaminants because they are the most widely distributed and because they form significant aqueous plumes in the uppermost aquifer near the site. The MCLs for molybdenum and uranium are 0.10 mg/L and 30 picocuries per liter (pCi/L), respectively. Manganese and sulfate are not regulated under Title I of UMTRCA.

To provide a consistent comparison with historical data, uranium concentrations continue to be measured in milligrams per liter; therefore, the uranium standard referenced in this report has been converted from 30 pCi/L to 0.044 mg/L (which assumes secular equilibrium of uranium isotopes) to allow direct comparison of uranium data to the standard.

## 3.4 ICs

To protect human health and the environment during the natural flushing period, ICs are required to control exposure to contaminated groundwater. An IC boundary has been established that delineates the area that requires protection at the Riverton site (Figure 2). The IC boundary was set to encompass the area of current groundwater contamination and a surrounding buffer zone to account for potential future plume migration based on groundwater modeling for the site.

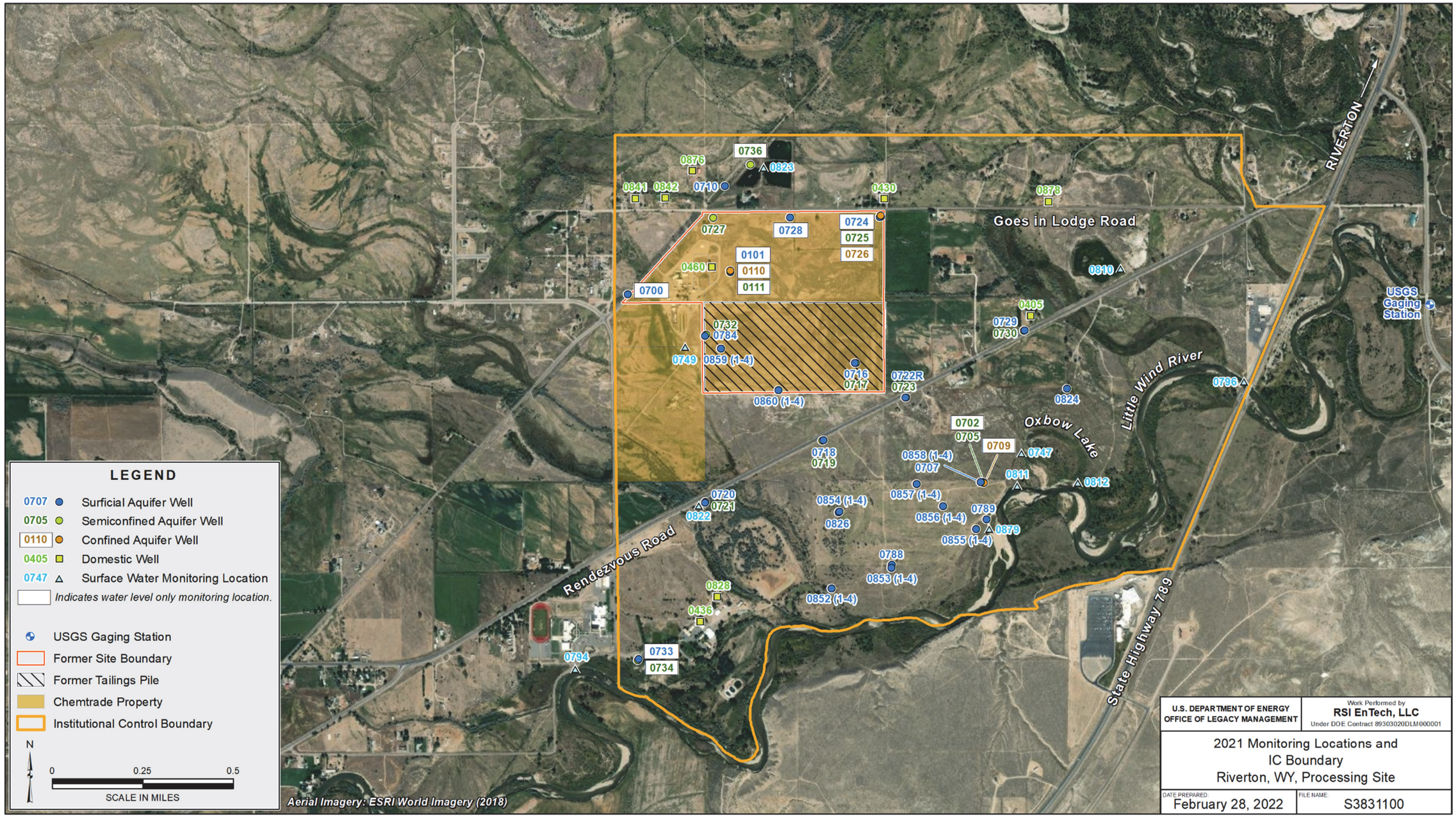



*Figure 2. 2021 Monitoring Locations and IC Boundary at the Riverton Site*

### 3.4.1 Site ICs

Cooperative efforts are ongoing among LM, the Northern Arapaho Tribe and Eastern Shoshone Tribe, and the State of Wyoming to implement viable and enforceable ICs at the Riverton site. ICs currently in place include the following:

- An alternate water supply system (AWSS), cofunded by DOE and the Indian Health Service and operated by Northern Arapaho Water & Sewer Department (NAW&SD), that supplies potable water to residents within the IC boundary to minimize use of groundwater.
- Warning signs installed around the oxbow lake that explain that the contaminated water is not safe for human consumption, with instructions not to drink from, fish in, or swim in the lake.
- A tribal ordinance that restricts well installation, prohibits surface impoundments, authorizes access to inspect and sample new wells, and notifies drilling contractors of the groundwater contamination within the IC boundary. Restrictions on well installation include a minimum depth of 150 ft bgs (approximately 50 ft below the top of the confined aquifer) and a requirement that surface casing be installed through the contaminated upper aquifer.
- An LM notification to area drilling contractors of the existing groundwater contamination.
- A State of Wyoming Department of Environmental Quality notification of existing groundwater contamination to be provided to private landowners who apply for a gravel pit permit within the IC boundary.
- A U.S. Bureau of Indian Affairs notification of existing groundwater contamination to be provided to individuals on tribal land who apply for a surface impoundment within or adjacent to the IC boundary.
- Notification to LM by the Wyoming State Engineer's Office when it receives permit applications for wells or surface impoundments within or adjacent to the IC boundary. This includes providing LM with a copy of the application (so LM may comment on it) and incorporating LM's comments on the permit, if approved.
- An easement and covenant to restrict land use and well drilling on the former mill site property, which was finalized on June 29, 2009; the former mill site was purchased by Chemtrade Refinery Services, Inc. (Chemtrade).

### 3.4.2 IC Monitoring

The LTMP specifies ongoing IC monitoring to verify that ICs are in place and working to ensure that potential exposure to contaminated groundwater is minimized during the natural flushing period. IC monitoring consists of two components: (1) sampling and (2) land and water use verification. The sampling component consists of sampling domestic wells. The land and water use verification consists of periodic inspection of land within the IC boundary to verify and document that no additional land or water uses expose or involve shallow groundwater, such as new wells, gravel pits, seeps, and recreational ponds.

Nine domestic wells were sampled during the August 2021 sampling event. Results for samples collected from domestic wells are presented in Section 5.1.2.2 and Appendix A.

NAW&SD is responsible for ensuring that the quality, safety, and quantity of the water in the AWSS are adequate. The organization is also required to maintain compliance with EPA standards that regulate community water systems. To assist in this effort and maintain the AWSS as a viable IC, LM has worked with the Northern Arapaho Tribe to ensure cooperative efforts and funding for ongoing maintenance, flushing, sampling, and capital improvements of the AWSS. Flushing and sampling of the AWSS was conducted by NAW&SD in 2021.

Inspection of areas within the IC boundary is a requirement of the LTMP. Land and water use verification within the IC boundary was conducted by Northern Arapaho Natural Resources Office personnel before the August 2021 sampling event and by the sampling crews during the August 2021 sampling event. Results of the water and land use inspections include the following:

- Warning signs around the oxbow lake were verified to be in place and in good condition (Figure 3)
- No additional land or water uses were identified that exposed or involved shallow groundwater

# 4.0 Monitoring Program

The verification monitoring program consists of 21 conventional monitoring wells, 9 multilevel monitoring wells, 9 domestic wells, and 10 surface water locations, all of which are listed in Table 1 and shown in Figure 2. The annual water sampling event at the Riverton site is conducted in late summer when water levels in surface water and the surficial aquifer are typically low. During the 2021 sampling event, the top ports (e.g., 0852-1) of all the multilevel monitoring wells were dry. In addition, surface water sampling location 0879 (dry) and monitoring well 0710 (no access agreement in place) were not sampled during the 2021 sampling event. At each sampling location, water samples were analyzed for COCs (i.e., manganese, molybdenum, sulfate, and uranium), and field measurements were taken of temperature, pH, specific conductance, total alkalinity, and turbidity. Water levels were measured in all wells in the monitoring network (except 0710, due to no access) during the annual sampling event.

In addition to routine monitoring, additional studies were in progress at the Riverton site in 2021. A tracer-test study was conducted at the site to assess field-scale plume persistence. Activities for this project included multiple tracer tests on the former mill site and downgradient of the site and abandonment of all the tracer-test wells at the conclusion of the project.


*Figure 3. Warning Signs at the Oxbow Lake*

*Table 1. 2021 Sampling Network at the Riverton Site*

| Location ID | Description | Rationale | Comments |
|---|---|---|---|
| **LM Monitoring Wells** | | | |
| 0101 | Surficial aquifer | Monitor upgradient portion of the plume | |
| 0705 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0707 | Surficial aquifer | Monitor centroid of plume | |
| 0710 | Surficial aquifer | Background location | |
| 0716 | Surficial aquifer | Monitor upgradient portion of plume | |
| 0717 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0718 | Surficial aquifer | Monitor lateral plume movement | |
| 0719 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0720 | Surficial aquifer | Monitor lateral plume movement | |
| 0721 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0722R | Surficial aquifer | Monitor centroid of plume | |
| 0723 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0727 | Semiconfined aquifer | Geochemical evidence of connection with surficial aquifer | |
| 0729 | Surficial aquifer | Monitor lateral plume movement | |
| 0730 | Semiconfined aquifer | Monitor semiconfined aquifer | |
| 0732 | Semiconfined aquifer | Geochemical evidence of connection with surficial aquifer | |
| 0784 | Surficial aquifer | Monitor lateral plume movement | |
| 0788 | Surficial aquifer | Monitor lateral plume movement | |
| 0789 | Surficial aquifer | Monitor centroid of plume | |
| 0824 | Surficial aquifer | Monitor lateral plume movement | |
| 0826 | Surficial aquifer | Monitor lateral plume movement | |
| 852 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 853 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 854 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 855 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 856 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 857 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 858 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 859 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| 860 (1–4) | Surficial aquifer | Monitor vertical variation in the surficial aquifer | Multilevel monitoring well |
| **Domestic Wells** | | | |
| 0405 | Confined aquifer | Potential POE | Private residence |
| 0430 | Confined aquifer | Potential POE | Private residence |
| 0436 | Confined aquifer | Potential POE | St. Stephens Indian Mission |
| 0460 | Confined aquifer | Potential POE | Chemtrade refinery |
| 0828 | Confined aquifer | Potential POE | St. Stephens Indian Mission |
| 0841 | Semiconfined aquifer | Potential POE | Private residence |
| 0842 | Confined aquifer | Potential POE | Private residence |

*Table 1. 2021 Sampling Network at the Riverton Site (continued)*

| Location ID | Description | Rationale | Comments |
|---|---|---|---|
| 0876 | Confined aquifer | Potential POE | Private residence |
| 0878 | Confined aquifer | Potential POE | Private residence |
| **Surface Water** | | | |
| 0747 | Oxbow lake | Impacted by groundwater discharge | |
| 0749 | Chemtrade refinery discharge ditch | Effluent from sulfuric acid plant | |
| 0794 | Little Wind River | Upstream of predicted plume discharge | |
| 0796 | Little Wind River | Downstream of predicted plume discharge | |
| 0810 | Pond—former gravel pit | Potential for impact—within IC boundary | |
| 0811 | Little Wind River | Within area of predicted plume discharge | |
| 0812 | Little Wind River | Within area of predicted plume discharge | |
| 0822 | West side ditch | Potential for impact—within IC boundary | |
| 0823 | Pond—former gravel pit | Upgradient of plume—within IC area | |
| 0879 | Seep | Impacted by groundwater discharge | Side channel of the Little Wind River |

**Abbreviation**: POE = point of exposure

In addition to the tracer-test study, a comprehensive risk assessment at the Riverton site was completed in 2021. This risk assessment was a coordinated effort between LM, Argonne National Laboratory, and the Northern Arapaho Tribe to address any human health and environmental risks posed by contaminated groundwater, including discharge to surface water bodies, uptake by plants, and potential impacts to the ecosystem. The study focused on the risk from cultural use of plants, which had never been assessed in the past. The study consisted of two phases: (1) in 2018, collection and analysis of 180 vegetation samples was conducted to assess this risk, and (2) in 2020, an additional collection and analysis of 80 vegetation samples was conducted in an area outside of the IC boundary to further assess background conditions. These studies resulted in the final report entitled *Riverton, Wyoming, Processing Site: An Environmental Risk Assessment Update, Final* (Argonne 2021). The report concluded that current conditions at the Riverton site are protective of human health and the environment provided ICs remain in place.

# 5.0 Results of 2021 Monitoring

## 5.1 Groundwater

### 5.1.1 Groundwater Flow

Water levels were measured at all monitoring wells (except 0710, due to no access) in the monitoring network (Figure 2) in August to verify groundwater flow direction and assess vertical gradients throughout the IC area. Water level data are included in Appendix B.

Assessment of horizontal groundwater flow direction in the surficial aquifer is required to ensure that the monitoring network is adequate for assessing contaminant plume movement and to ensure that the IC boundary provides a sufficient buffer to prevent access to contaminated

groundwater. As shown in Figure 4, groundwater elevation contours for the surficial aquifer indicate a general flow direction to the southeast in August 2021, which is consistent with the historical flow direction. In addition to water levels measured in August, continuous water level measurements were recorded by pressure transducers installed in wells along the groundwater flow path (Figure 5). Continuous groundwater elevations in Figure 5 demonstrate that the general groundwater flow direction was consistent throughout the year. In past years, June was an exception when groundwater and river levels were high because the groundwater flow direction reversed temporarily near the river (see Figure 5, well 0789).

Vertical gradients are used to assess the direction that groundwater will flow vertically. The methods traditionally applied to assess vertical flow use a negative gradient to indicate the potential for upward groundwater flow and a positive gradient to indicate the potential for downward groundwater flow. Regardless of the direction and magnitude indicated by the gradient, vertical migration of groundwater between the Riverton site aquifers is expected to be limited because of the aquitards separating aquifers (DOE 1998c). Vertical gradients are calculated from monitoring wells in an upper aquifer (aquifer 1) and lower aquifer (aquifer 2) using the following formula: $(GE_1 - GE_2) \div (SE_1 - SE_2)$, where GE = groundwater elevation and SE = screen elevation at the midpoint of the screen. Table 2 shows vertical gradients calculated from grouped monitoring wells (from August 2021 data). No vertical gradient was greater than an absolute magnitude of 0.1.

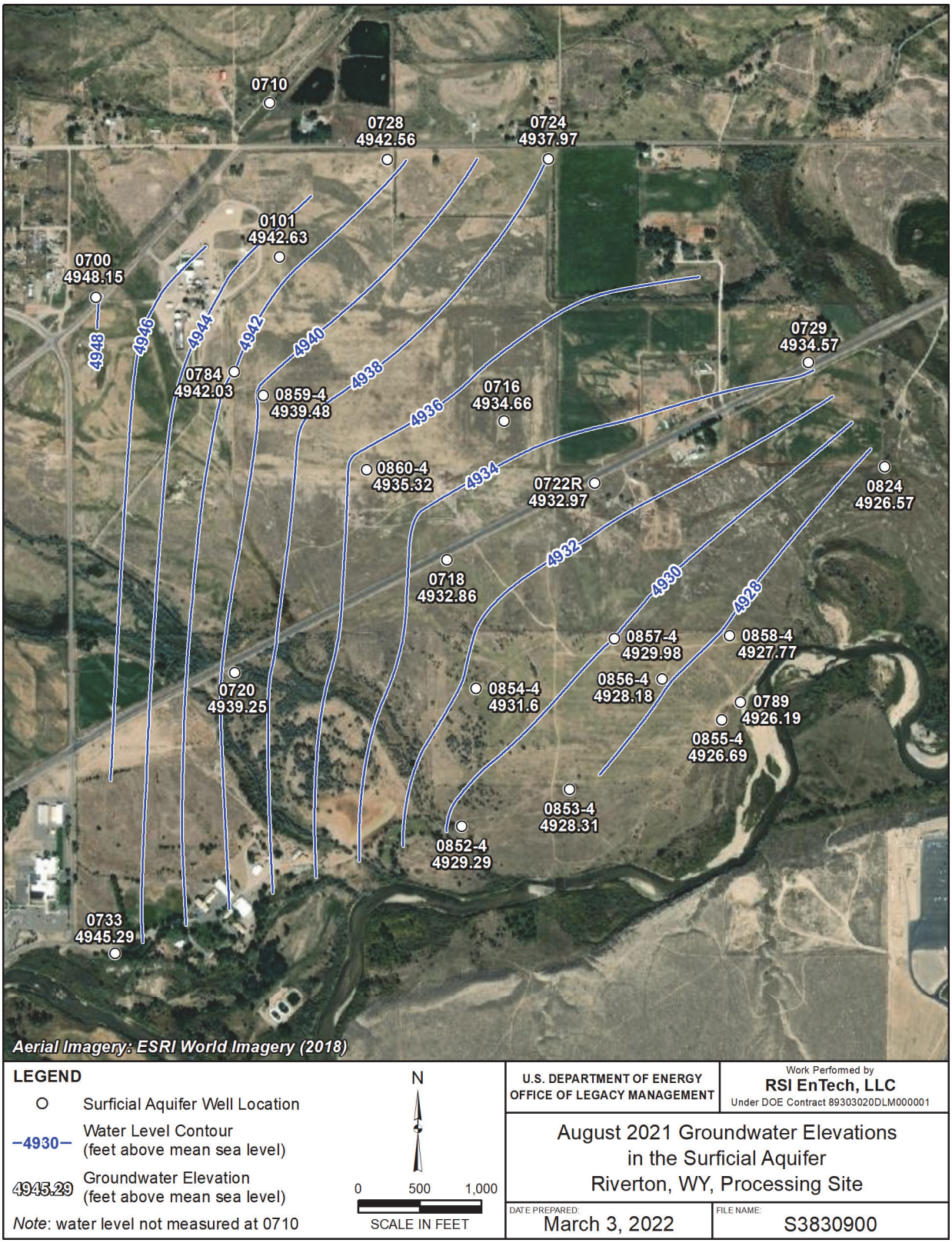



*Figure 4. August 2021 Groundwater Elevations in the Surficial Aquifer at the Riverton Site*

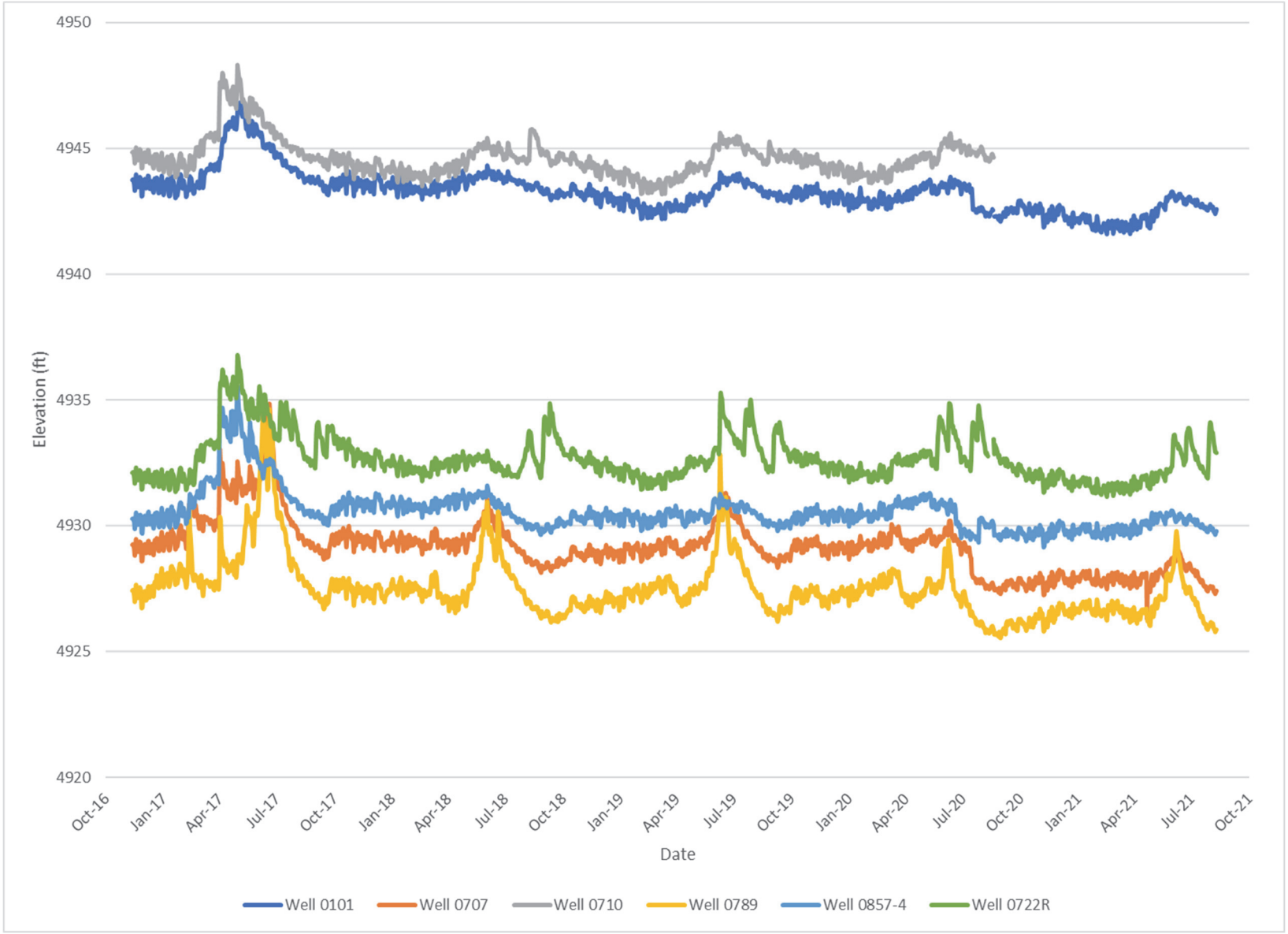



*Figure 5. Continuous Water Elevations in Selected Surficial Aquifer Wells*

*Table 2. August 2021 Vertical Gradients at the Riverton Site*

| Well ID | Aquifer | Water Elevation | Vertical Gradient[a] |
|---|---|---|---|
| 0724 | Surficial | 4937.97 | |
| 0725 | Semiconfined | 4939.20 | −0.070 |
| 0726 | Confined | 4937.73 | 0.002 |
| | | | |
| 0101 | Surficial | 4942.63 | |
| 0111 | Semiconfined | 4941.44 | 0.044 |
| 0110 | Confined | 4941.5 | 0.022 |
| | | | |
| 0784 | Surficial | 4942.03 | |
| 0732 | Semiconfined | 4940.27 | 0.066 |
| | | | |
| 0716 | Surficial | 4934.66 | |
| 0717 | Semiconfined | 4934.98 | −0.009 |
| | | | |
| 0707 | Surficial | 4927.57 | |
| 0705 | Semiconfined | 4927.21 | 0.013 |
| 0709 | Confined | 4928.94 | −0.018 |
| | | | |
| 0718 | Surficial | 4932.86 | |
| 0719 | Semiconfined | 4933.48 | −0.032 |
| | | | |
| 0722R | Surficial | 4932.97 | |
| 0723 | Semiconfined | 4932.95 | 0.0007 |
| | | | |
| 0720 | Surficial | 4939.25 | |
| 0721 | Semiconfined | 4935.76 | 0.097 |
| | | | |
| 0729 | Surficial | 4934.57 | |
| 0730 | Semiconfined | 4932.68 | 0.082 |
| | | | |
| 0733 | Surficial | 4945.29 | |
| 0734 | Semiconfined | 4943.35 | 0.086 |

**Note:**

[a] The vertical gradient from the semiconfined aquifer is between the semiconfined aquifer and the surficial aquifer, and the vertical gradient from the confined aquifer is between the confined aquifer and the surficial aquifer. A negative value indicates an upward vertical gradient; a positive value indicates a downward vertical gradient.

### 5.1.2 Groundwater Quality

Figure 6 through Figure 10 summarize surficial aquifer data from the 2021 sampling event. On these figures, the blue line is the locally estimated scatterplot smoothing (LOESS) line, which is an estimate of the average molybdenum or uranium concentration as it changes through time. The distribution of molybdenum in the surficial aquifer from the August 2021 sampling event is shown in Figure 6. Time-concentration plots for molybdenum in wells within contaminant plumes and wells bordering the contaminant plumes in the surficial aquifer are shown in Figure 7 and Figure 8, respectively. The distribution of uranium in the surficial aquifer, based on August 2021 sampling results, is shown in Figure 9. Time-concentration plots for uranium in wells within contaminant plumes and wells bordering the contaminant plumes in the surficial aquifer are shown in Figure 10 and Figure 11, respectively. The distribution of molybdenum and uranium plumes (shown in Figure 6 for molybdenum and Figure 9 for uranium) included data from conventional and multilevel monitoring wells. The multilevel monitoring-well port with the highest molybdenum and uranium concentrations was plotted on the figures; in areas where a conventional monitoring well was colocated with a multiport monitoring well (0707 and 0858, 0788 and 0853, 0826 and 0854; with conventional well and multiport well, respectively) the highest molybdenum and uranium concentration from either well was plotted.

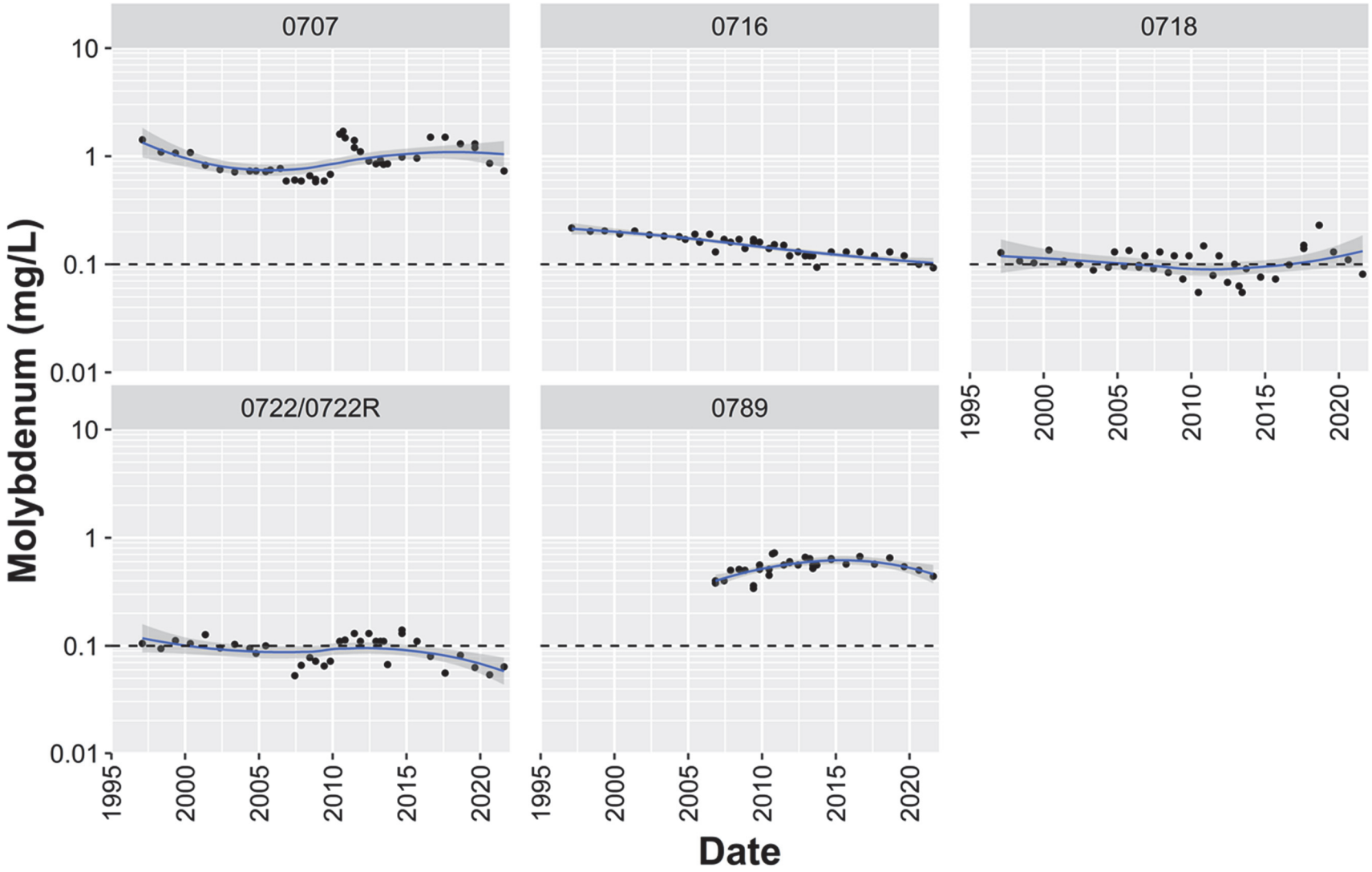
As shown in the plots and figures, concentrations of molybdenum and uranium in groundwater in the surficial aquifer are still above their respective MCLs. Flooding of the Little Wind River in 2010, 2016, and 2017 caused the molybdenum and uranium concentrations in wells within the area of inundation (0707, 0788, 0789, and 0826) to increase dramatically (2010 and 2016) and remain elevated (2017). Flooding of the Little Wind River did not occur in 2018; only minor flooding (above flood stage but no floodplain inundation) occurred in 2019; and no flooding occurred in 2020 or 2021. This resulted in a general decline in molybdenum and uranium concentrations compared to 2019 as the natural flushing progressed in the surficial aquifer without input of secondary source from the unsaturated zone. Concentrations have returned to preflood concentrations from 2009 for molybdenum (Figure 7 and Figure 8) and uranium (Figure 10 and Figure 11).

Concentrations of molybdenum and uranium in groundwater in the semiconfined aquifer are still below corresponding MCLs in areas where the overlying surficial aquifer groundwater is contaminated. This indicates no significant impact from site-related molybdenum or uranium contamination in this unit (Figure 12 for molybdenum and Figure 13 for uranium). Appendix C provides groundwater quality data by parameter for monitoring wells in the long-term monitoring network sampled in 2021.

#### *5.1.2.1 Multilevel Monitoring Wells*

Nine multilevel groundwater monitoring wells (0852 through 0860) were installed in 2015. Each multilevel monitoring well has four ports designated as -1, -2, -3, and -4 (e.g., 0860-1), with -1 being the top port and -4 being the bottom port. Construction details for the multilevel monitoring wells are provided in the *2015 Advanced Site Investigation and Monitoring Report, Riverton, Wyoming, Processing Site* (DOE 2016). Because of the low water table elevation at the time of sampling, all top ports in the multilevel wells were dry.


*Figure 6. Molybdenum Distribution in the Surficial Aquifer at the Riverton Site in August 2021*



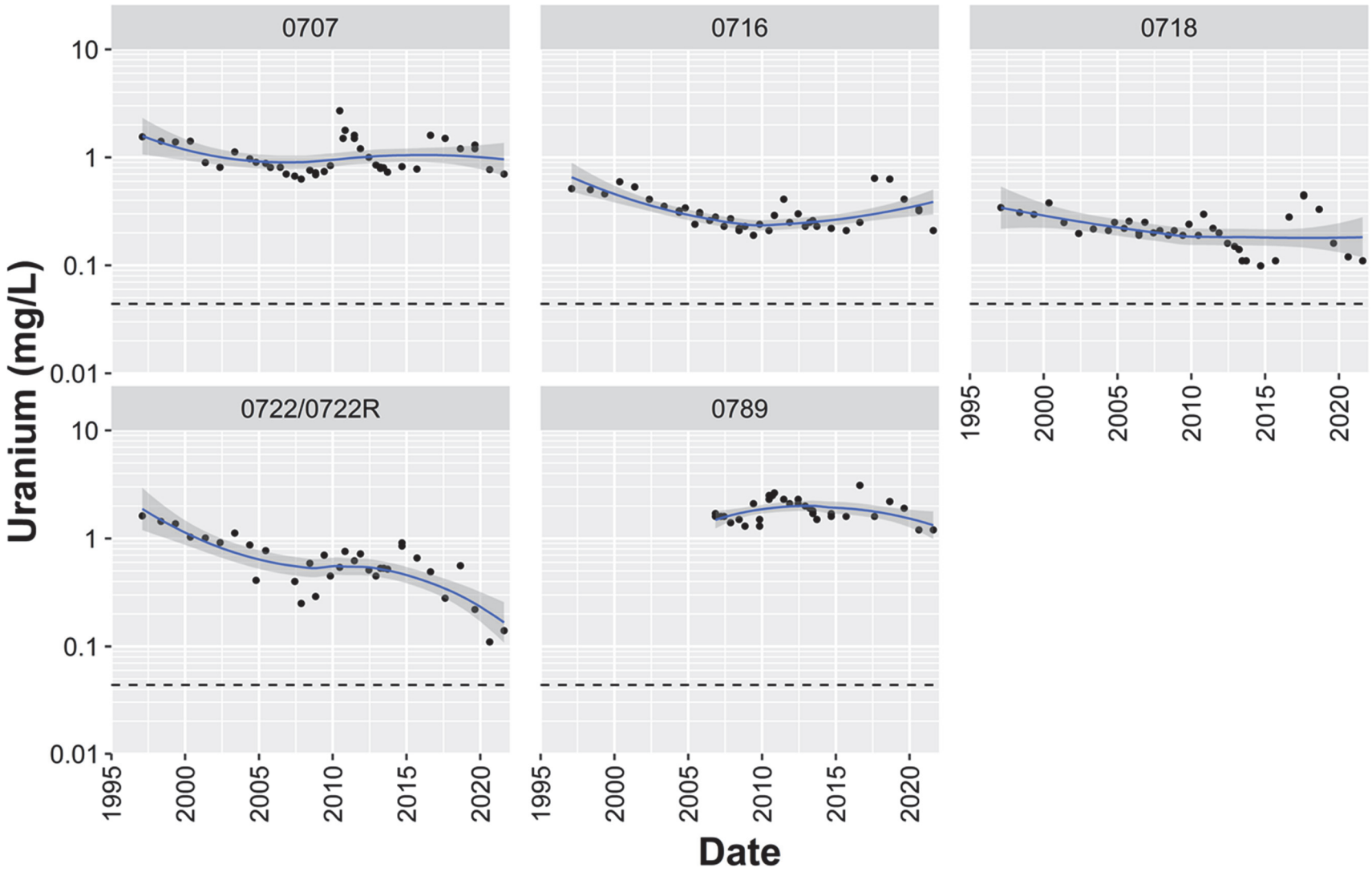

**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the molybdenum MCL of 0.10 mg/L.

*Figure 7. Molybdenum Concentrations in Surficial Aquifer Wells Within the Contaminant Plume*


**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the molybdenum MCL of 0.10 mg/L.

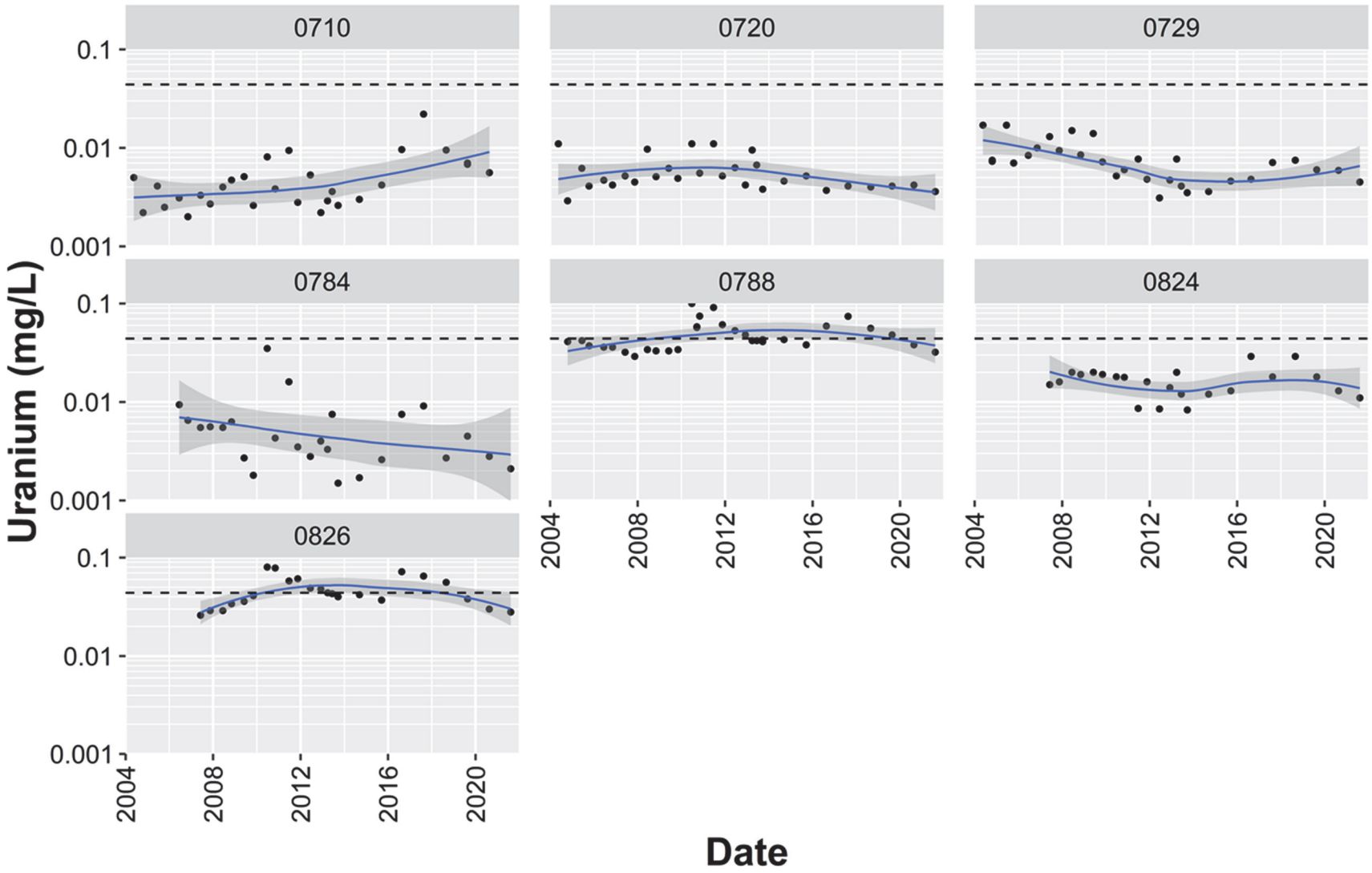
*Figure 8. Molybdenum Concentrations in Surficial Aquifer Wells on the Edge and Outside of the Contaminant Plume*


*Figure 9. Uranium Distribution in the Surficial Aquifer at the Riverton Site in August 2021*



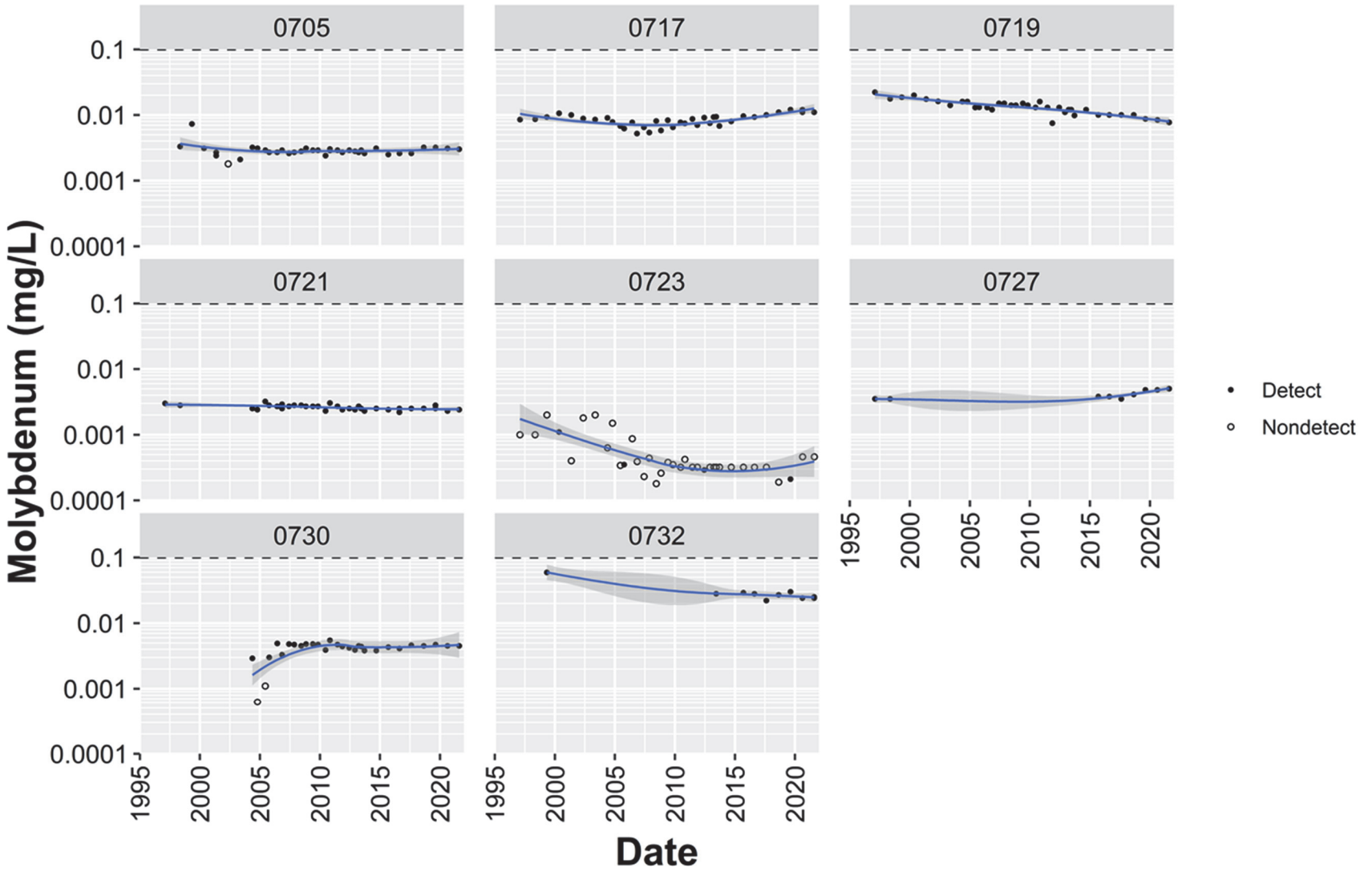

**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the uranium MCL of 0.044 mg/L.

*Figure 10. Uranium Concentrations in Surficial Aquifer Wells Within the Contaminant Plume*



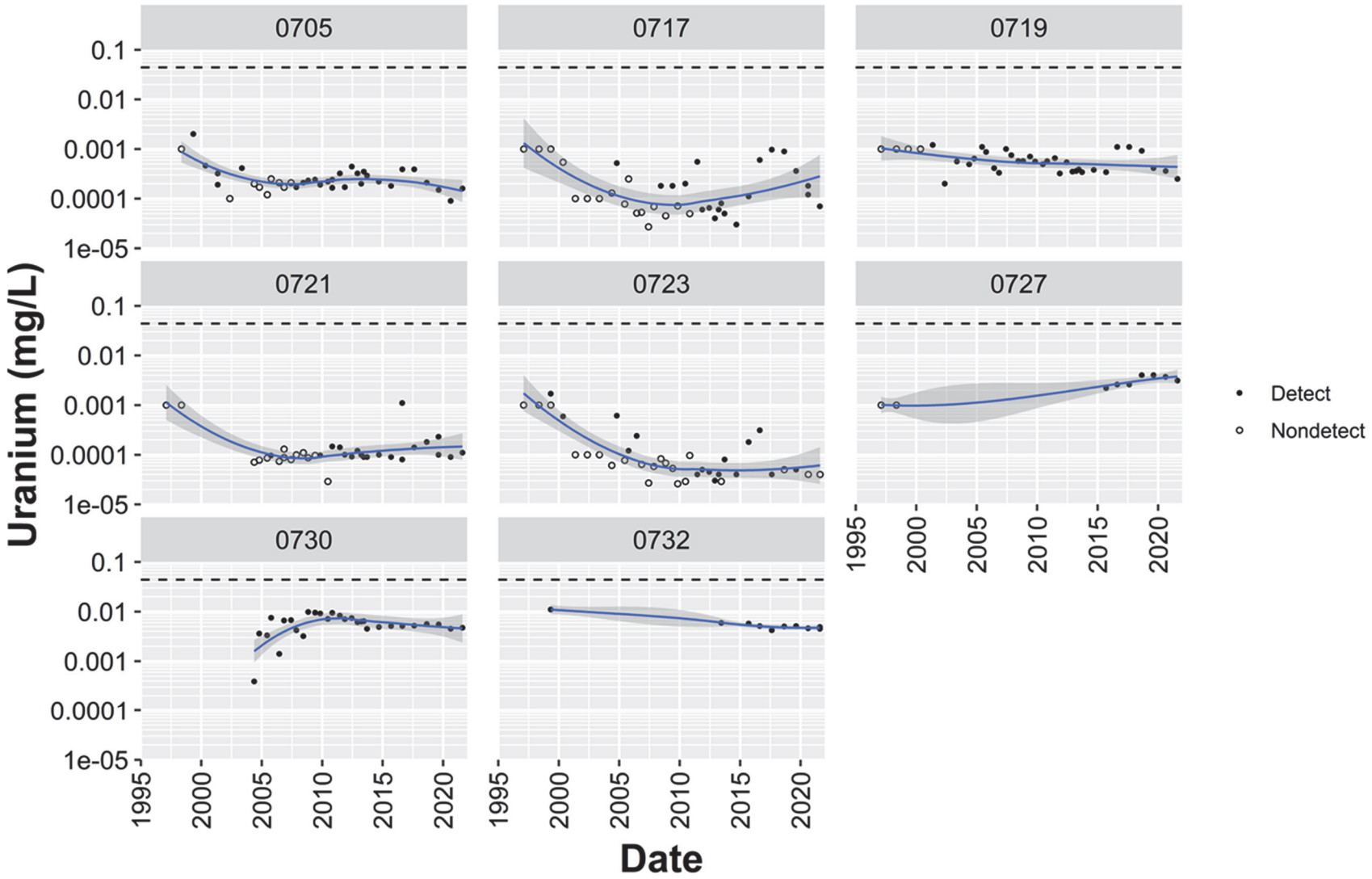

**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the uranium MCL of 0.044 mg/L.

*Figure 11. Uranium Concentrations in Surficial Aquifer Wells on the Edge and Outside of the Contaminant Plume*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the molybdenum MCL of 0.10 mg/L.

*Figure 12. Molybdenum Concentrations in Semiconfined Aquifer Wells*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the uranium MCL of 0.044 mg/L.

*Figure 13. Uranium Concentrations in Semiconfined Aquifer Wells*

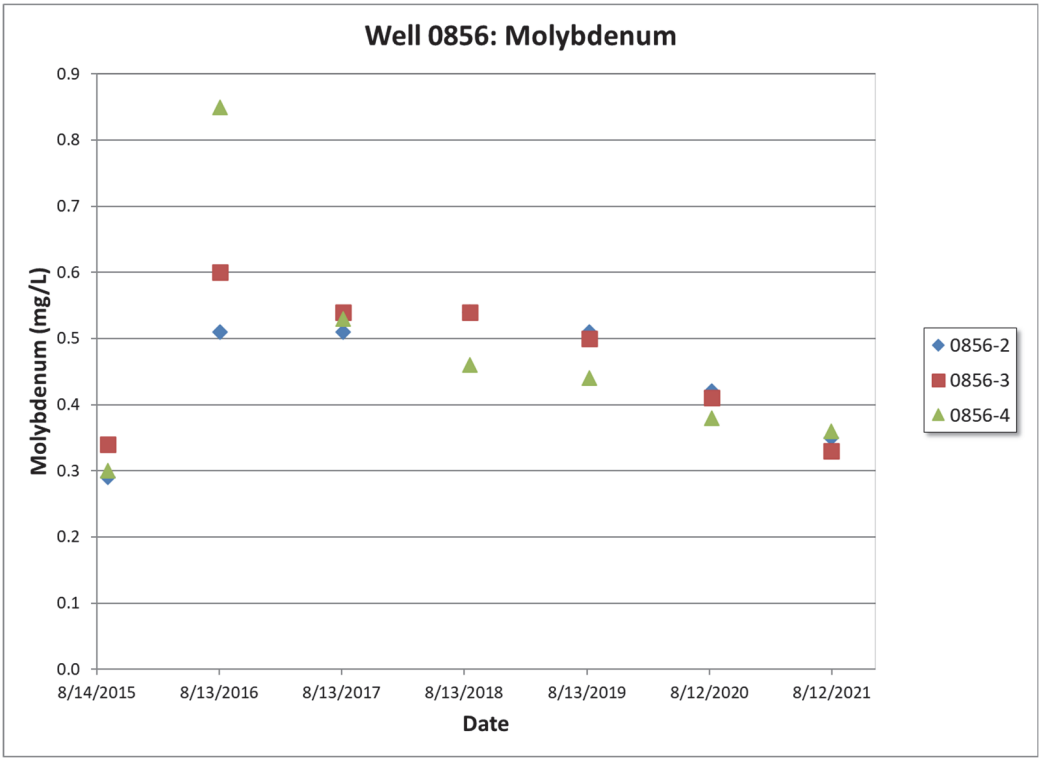
Figure 14 shows molybdenum and uranium concentrations, respectively, in multilevel monitoring well 0856, which is downgradient of the former tailings in an area affected by periodic flooding of the Little Wind River. This well had the highest uranium concentration ever measured at the Riverton site in 2016. As shown in these graphs, molybdenum and uranium concentrations were higher after the 2016 and 2017 floods than they were in 2015, which confirms the CSM of contaminants being stored in the unsaturated zone and released during flood events. Molybdenum and uranium concentrations in 2021 continued to decline (molybdenum) or remain at the same level (uranium) as the surficial aquifer continues to respond to a nonflood year. These figures also show some vertical stratification in the surficial aquifer, particularly after the 2016 flood when contaminants in the unsaturated zone were released into the groundwater. Vertical stratification is shown in numerous multiport wells near the Little Wind River after the 2016 flood (DOE 2019b) along with continued stratification in wells 0855, 0859, and 0860. Appendix D features graphs showing molybdenum and uranium concentrations in all multilevel monitoring wells.

Tracer testing was completed in wells 0859 and 0860 in June and July of 2021, whereas all ports were sampled on July 27 and July 28, 2021, before the tracer testing occurred. By the annual sampling date of August 10, 2021, most constituents in the majority of the ports in these wells were back to pretesting concentrations. Based on preliminary data from the preinjection samples (currently unpublished), notable exceptions are higher post testing uranium concentrations in well 0859-4 (pretesting of 0.091 mg/L and post testing of 0.12 mg/L), and lower post testing concentrations of uranium and molybdenum in well 0860-2 (pretesting of 1.8 and 0.58 mg/L and post testing of 1.4 and 0.33 mg/L, respectively). For uranium, these differences are not large enough to change anything beyond a slight adjustment of the 0.1 mg/L contour in Figure 9 at well 0859. Likewise, a greater molybdenum concentration at well 0860-2 in 2021 may have existed, which would move the 0.4 mg/L contour more toward the northwest in Figure 6.

In addition to the routine annual groundwater monitoring conducted by LM, groundwater sampling from the multilevel monitoring wells was conducted regularly from 2016 through 2018 by USGS personnel as part of LM's Applied Studies and Technology program. These data provide additional insights into vertical stratification of the surficial aquifer and distribution and movement of contaminants in the surficial aquifer after flooding and large recharge events (DOE 2019b).

#### *5.1.2.2 Domestic Wells*

Domestic wells used as potable water sources at residences within the IC boundary were sampled in 2021. Domestic wells sampled in 2021, with the exception of domestic well 0841, are completed in the confined aquifer; domestic well 0841 is completed in the semiconfined aquifer. Results from domestic wells did not indicate any impacts from the Riverton site. Concentrations of molybdenum in samples collected from domestic wells were 2 orders of magnitude below the standard, and concentrations of uranium in samples collected from domestic wells were 1 to 3 orders of magnitude below the standard. Figure 15 and Figure 16 show time-concentration graphs for molybdenum and uranium, respectively. Appendix A provides data obtained from sampling domestic wells in 2021.



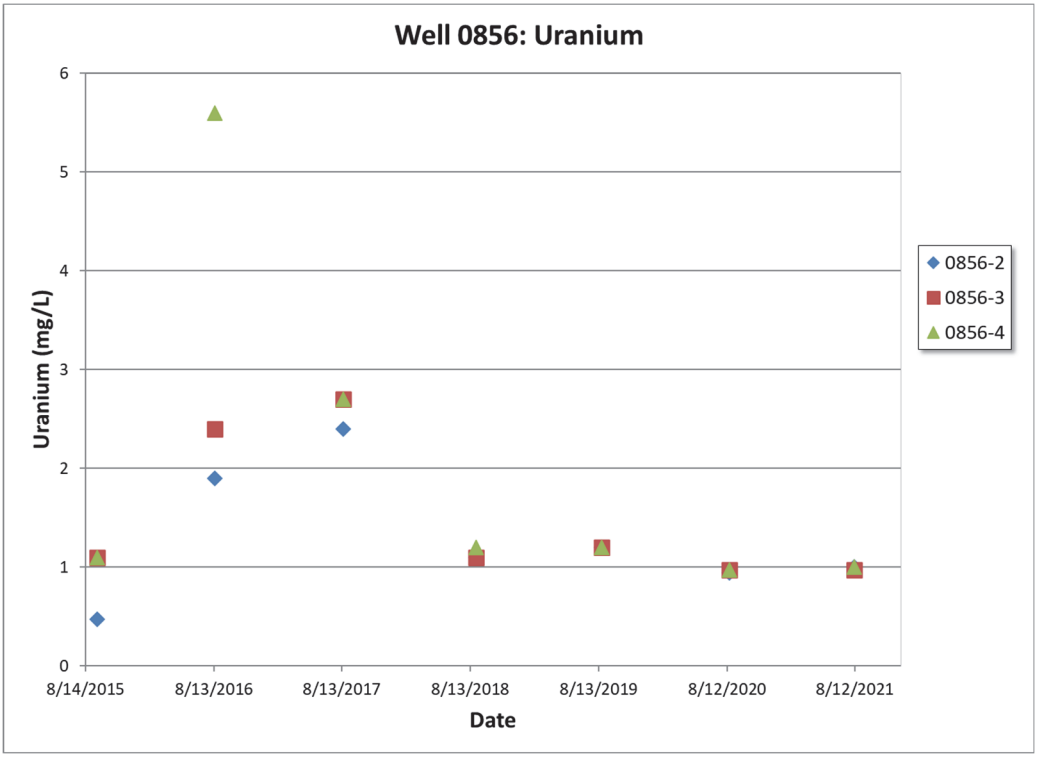
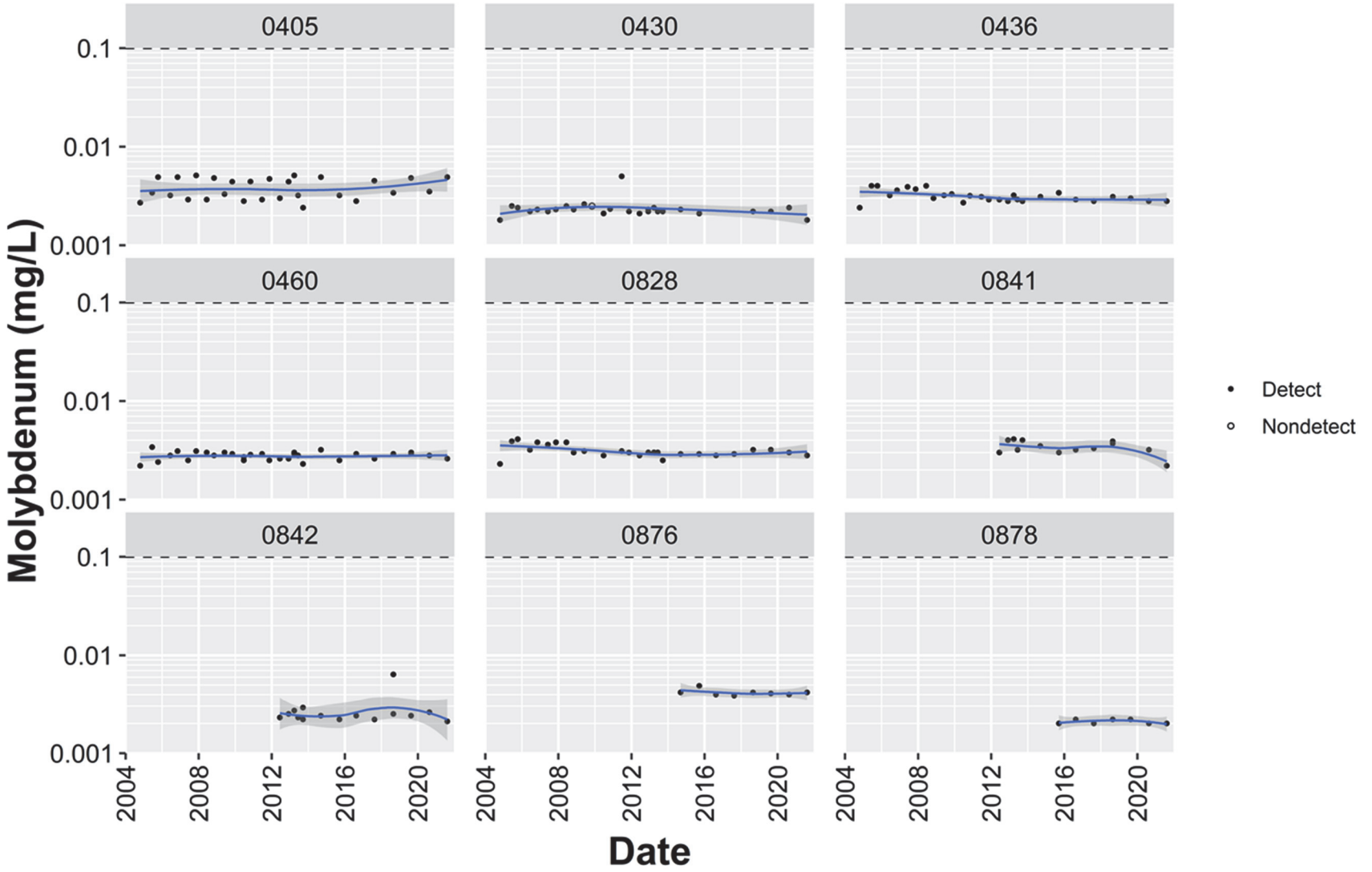
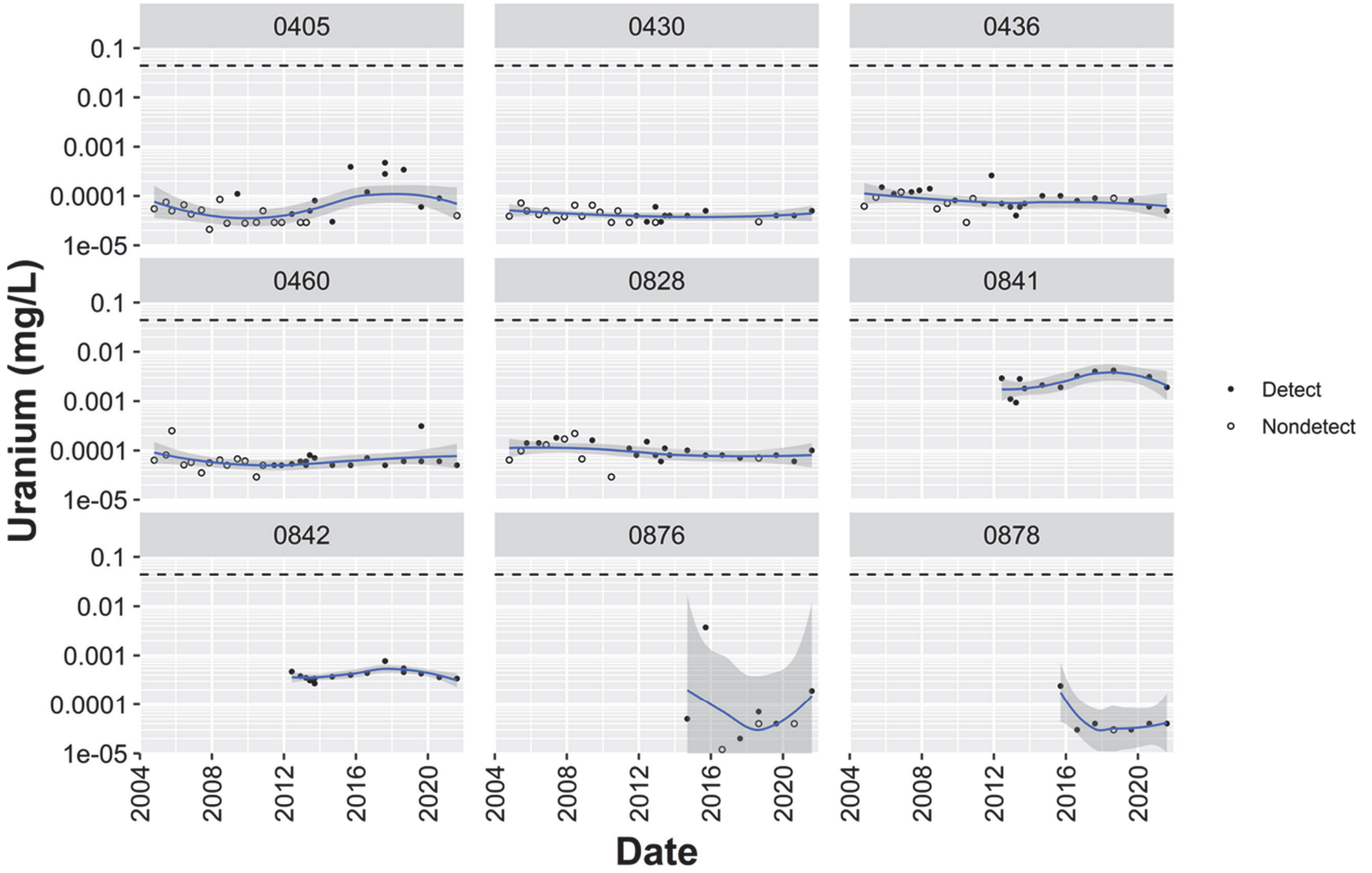




*Figure 14. Molybdenum and Uranium Concentrations in Multilevel Monitoring Well 0856*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the molybdenum MCL of 0.10 mg/L.

*Figure 15. Molybdenum Concentrations in Domestic Wells*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. Dashed line is the uranium MCL of 0.044 mg/L.

*Figure 16. Uranium Concentrations in Domestic Wells*

## 5.2 Surface Water

### 5.2.1 Surface Water Flow

Surface water flow in the Little Wind River has a direct impact on groundwater conditions at the Riverton site. The 2010 flood of the Little Wind River demonstrated a direct correlation between flooding of the Little Wind River and increased contaminant concentrations in the surficial aquifer (DOE 2011). This correlation was confirmed in 2016 and 2017. In addition, flooding of the Little Wind River has impacted the geomorphology of the Riverton site next to the Little Wind River with development and evolution of surface water features, such as the oxbow lake and a scour feature in the side channel of the Little Wind River that developed into a seep (Figure 17, location 0879).

Discharge in the Little Wind River is statistically the highest in June, which reflects spring runoff from the Wind River Range. An assessment of Little Wind River discharge data from June indicates that spring runoff and flow in the river were below normal in 2021 (Table 3) (USGS 2021). The peak 2021 discharge of 4220 cfs occurred on June 6, 2021. Figure 18 shows the highest peak discharges recorded since the start of milling operations in 1958 (USGS 2021).

*Figure 17. Surface Water Location 0879 in August 2021*

*Table 3. Discharge from the Little Wind River*

| Year[a] | Mean June Discharge (cfs) | Deviation from Mean[b] June Discharge (cfs) | Maximum June Discharge (cfs) |
|---|---|---|---|
| 2001 | 233.2 | −2107 | 2090 |
| 2002 | 740.6 | −1599 | 1930 |
| 2003 | 861.7 | −1478 | 2490 |
| 2004 | 1591 | −749 | 4120 |
| 2005 | 2272 | −68 | 4520 |
| 2006 | 642.4 | −1698 | 1710 |
| 2007 | 738.9 | −1601 | 1910 |
| 2008 | 2175 | −165 | 3730 |
| 2009 | 3012 | 672 | 4190 |
| 2010 | 5829 | 3489 | 13,300 |
| 2011 | 2861 | 521 | 7210 |
| 2012 | 594 | −1746 | 1610 |
| 2013 | 587 | −1753 | 1640 |
| 2014 | 1333 | −1007 | 3140 |
| 2015 | 2538 | 198 | 4240 |
| 2016 | 3443 | 1103 | 11,200 |
| 2017 | 6397 | 4057 | 12,855 |
| 2018 | 2375 | 35 | 4600 |
| 2019 | 3325 | 985 | 7920 |
| 2020 | 500 | −1840 | 3740 |
| 2021 | 1484 | −856 | 4220 |

**Notes:**
[a] USGS gaging station statistics.
[b] Based on a mean June discharge of 2340 cfs from 1941 to 2021.

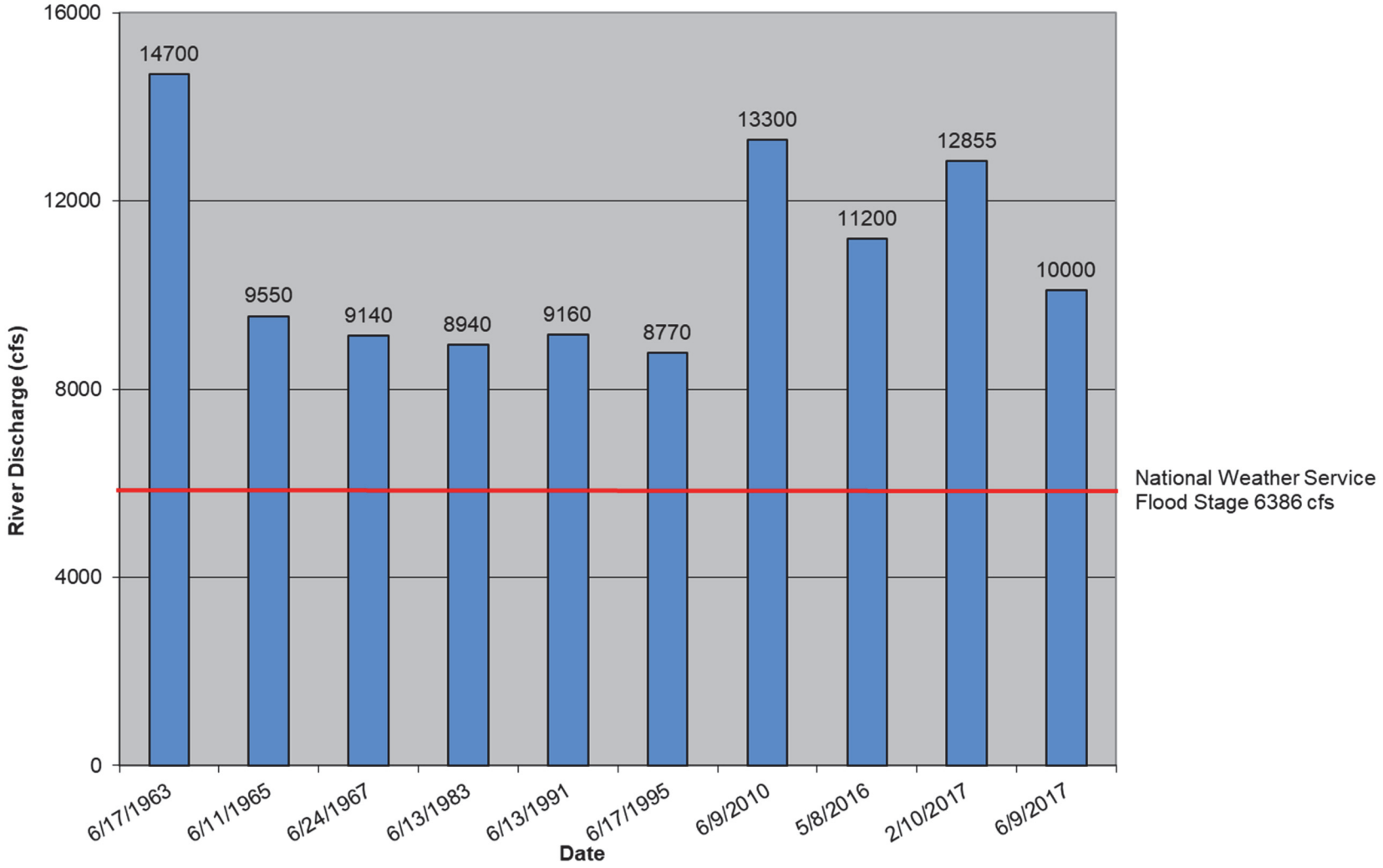



*Figure 18. Historical Maximum Discharges of the Little Wind River*

### 5.2.2 Surface Water Quality

Samples were collected at four locations on the Little Wind River (Figure 2), which flows generally to the northeast. Samples were collected from one location upstream of the groundwater plume (location 0794) and from three river locations adjacent to and downstream of the groundwater plume (locations 0811, 0812, and 0796). In 2021, molybdenum and uranium concentrations measured at downstream locations were slightly higher than the upstream location 0794, as shown for molybdenum in Figure 19 and for uranium in Figure 20; this indicates groundwater discharge to the river. The groundwater discharge was evident in 2021 because of limited dilution from low flow in the Little Wind River (46.4 cfs) on the day the samples were collected. Appendix E provides surface water quality data by parameter for all surface water locations sampled during 2021.

Two ponds (locations 0810 and 0823) formed from groundwater discharge into former gravel pits were sampled as part of the long-term monitoring network. These ponds are primarily used for fishing and swimming and are cross gradient (0810) and upgradient (0823) from contaminant plumes. Samples collected from the ponds had concentrations of molybdenum and uranium that were below their respective groundwater MCLs and comparable to background groundwater concentrations, which indicates no discernible impacts from the site. Figure 21 and Figure 22 show concentrations of molybdenum and uranium, respectively, over time in these ponds.

Concentrations of molybdenum and uranium in the oxbow lake (location 0747) have varied over time (see Figure 21 for molybdenum and Figure 22 for uranium). This variability is partially attributed to the time these samples are taken. If inflow from the Little Wind River to the oxbow lake occurred just before or during the sampling event, then contaminant concentrations are diluted. In 2021, the Little Wind River was not flowing into the oxbow lake during the August sampling event when low-flow conditions were observed. Hydraulic and water quality data indicate that the oxbow lake is fed by the discharge of contaminated groundwater; therefore, elevated concentrations are expected. Variability in uranium concentrations in the oxbow lake is also attributed to fluctuations in groundwater chemistry. In 2021, the concentration of uranium (0.13 mg/L) in the sample collected from the oxbow lake reflected uranium concentrations in the surficial groundwater (Figure 9), which remained above the groundwater MCL. Molybdenum concentrations in the oxbow lake have been historically below the groundwater MCL and were again in 2021 (Figure 21).

Field observations since 2002 indicate the oxbow lake is gradually filling with sediment and vegetation over time, as expected. Numerous abandoned meanders (oxbows) of the Wind and Little Wind Rivers are evident from satellite imagery (Figure 2). Eventually, the oxbow lake will fill in as other abandoned channels have and not be an expression of surface water at the Riverton site. Figure 23 and Figure 24 show photographs of the oxbow lake in May 2002 and August 2021, respectively, which illustrates the progress of the vegetation and sedimentation filling in the ponded water.

Surface water location 0879 is a scour feature in the side channel of the Little Wind River that developed into a seep (Figure 2). This location receives discharge of contaminated groundwater when water levels are high enough in the surficial aquifer; however, this location was dry in 2021 (Figure 17).

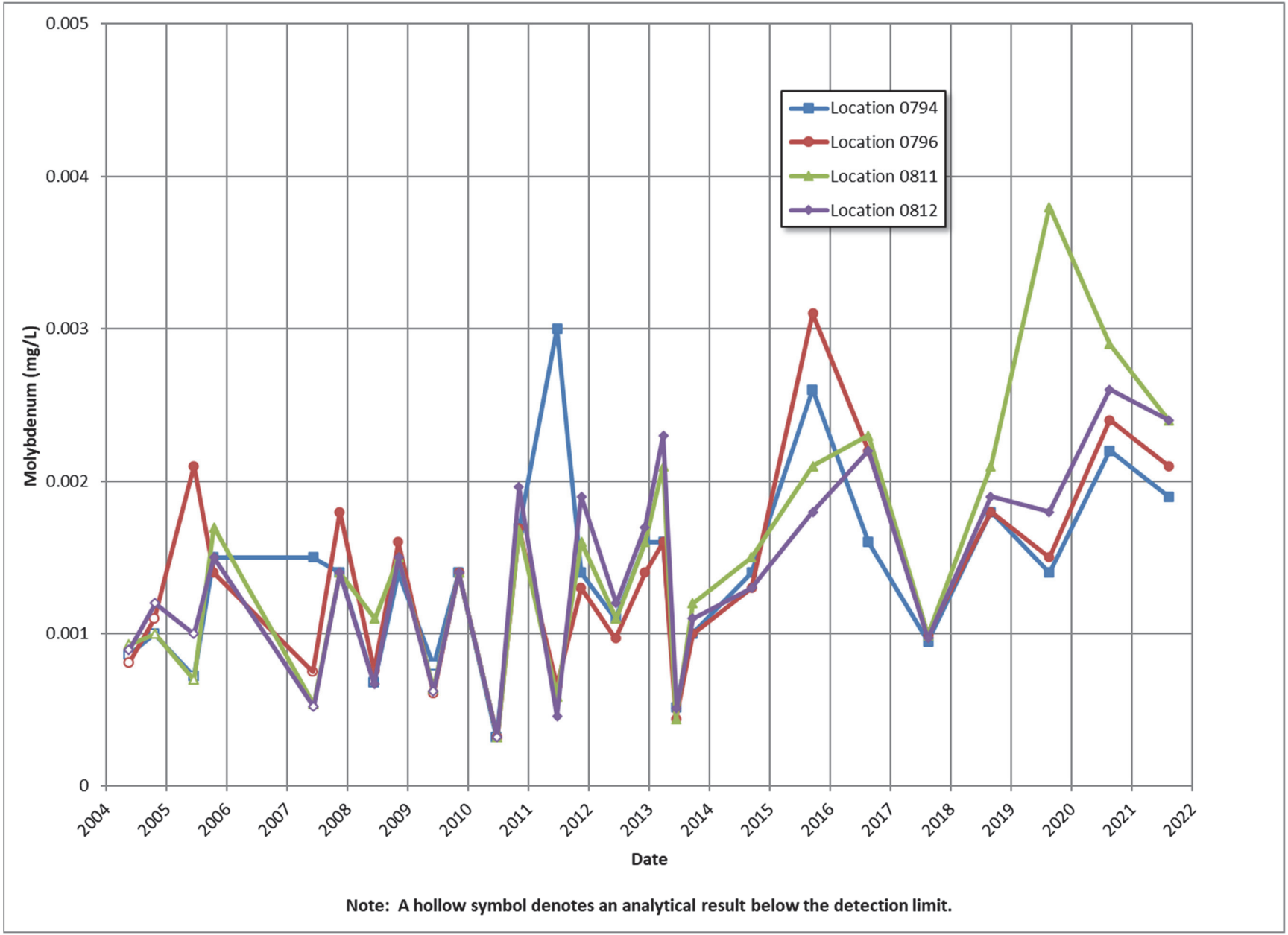



*Figure 19. Molybdenum Concentrations in Little Wind River Locations*

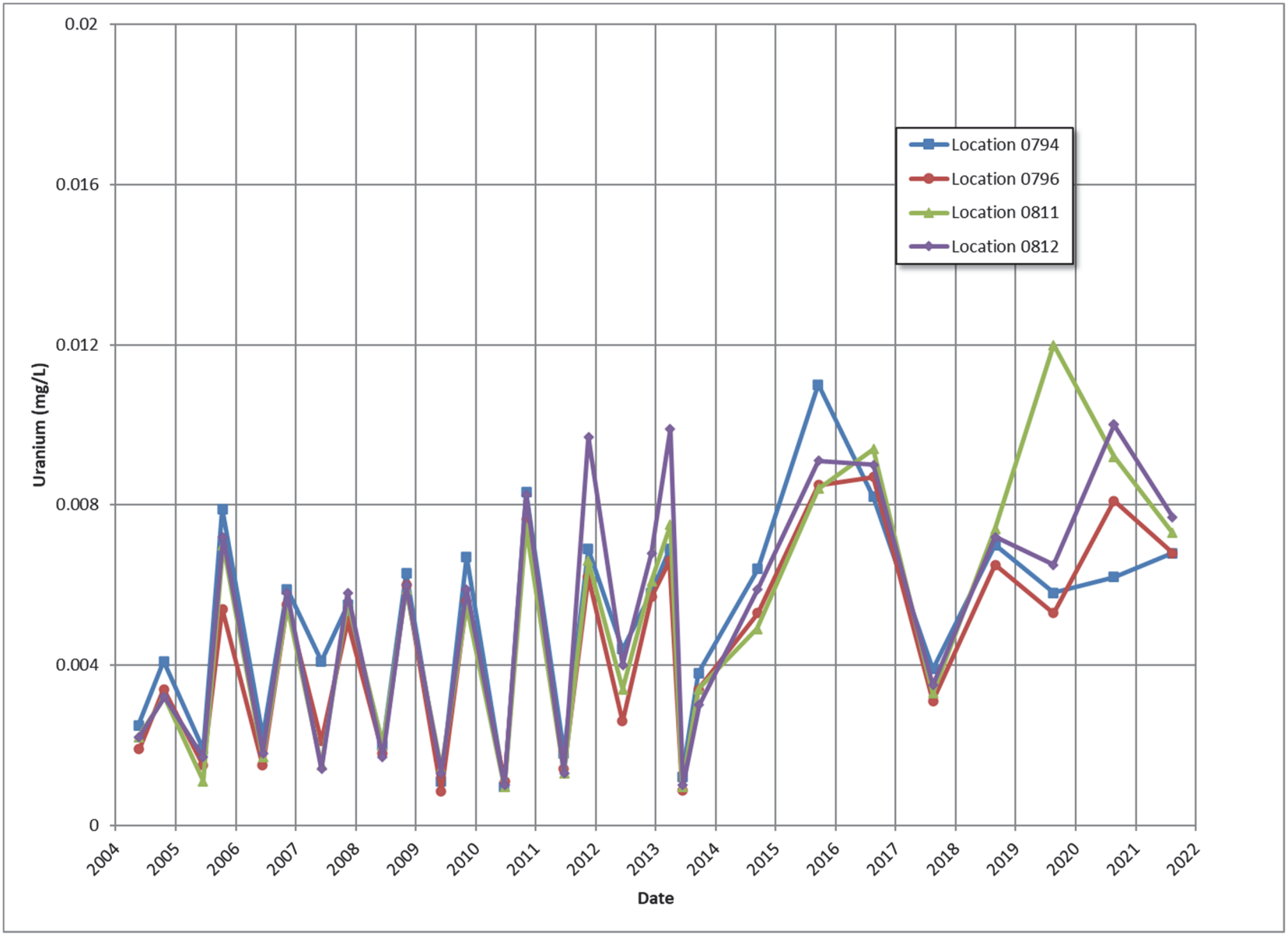
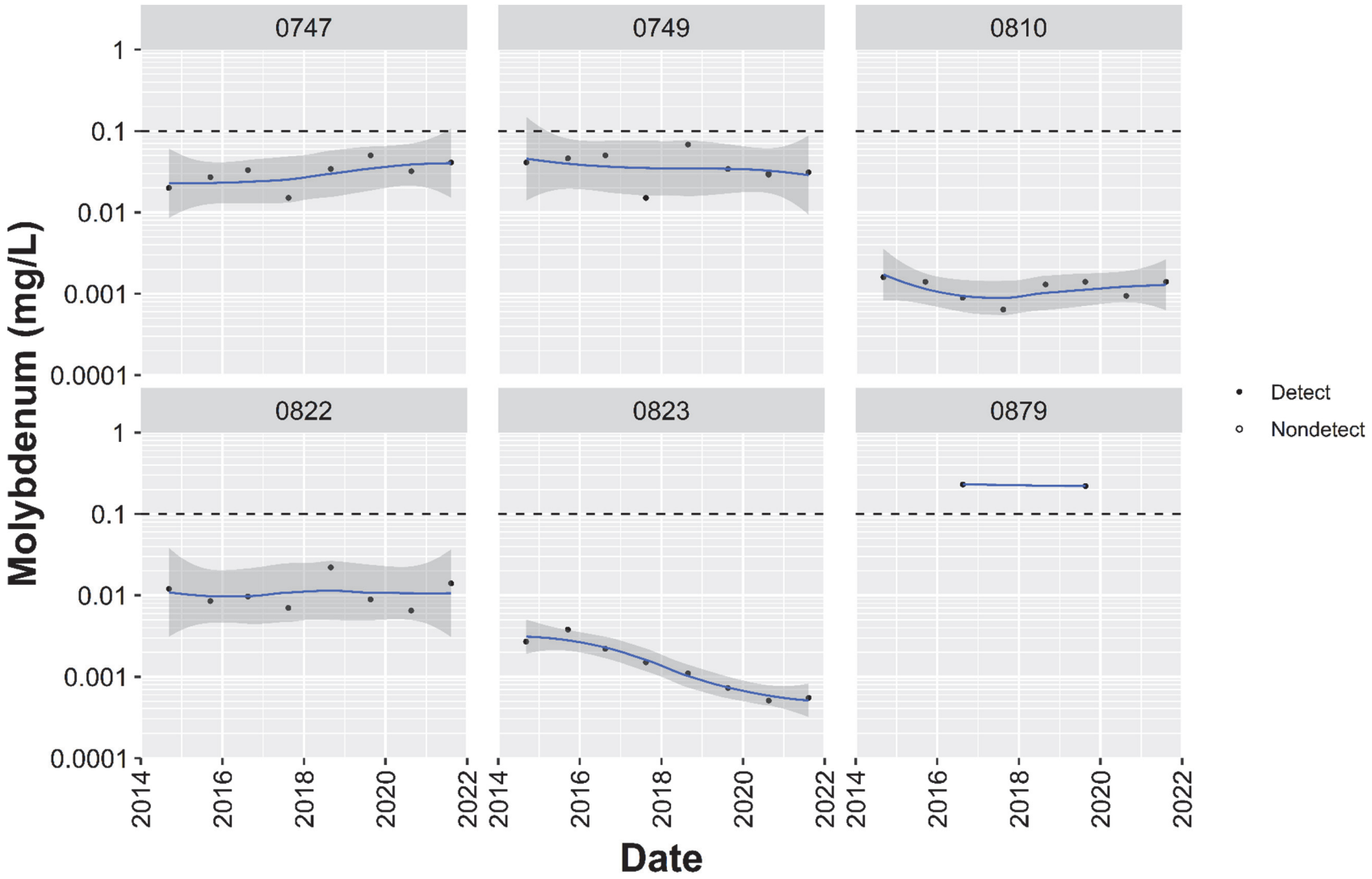
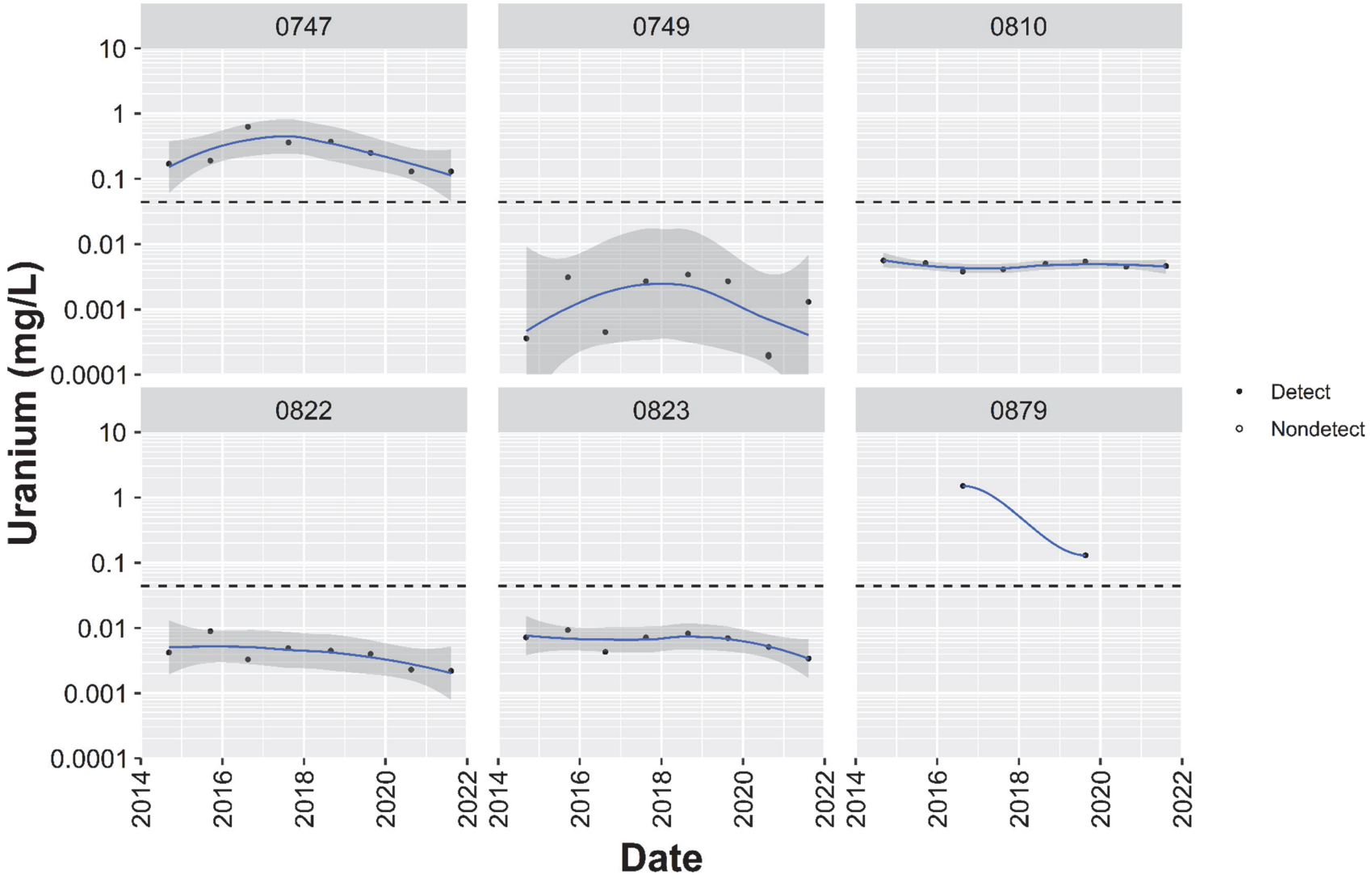



*Figure 20. Uranium Concentrations in Little Wind River Locations*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the molybdenum MCL of 0.10 mg/L.

*Figure 21. Molybdenum Concentrations in Ponds, Ditches, and Seeps*




**Note**: The blue line is the LOESS line, and the gray shading is its 95% confidence interval. The dashed line is the uranium MCL of 0.044 mg/L.

*Figure 22. Uranium Concentrations in Ponds and Ditches*

*Figure 23. Oxbow Lake in May 2002*

*Figure 24. Oxbow Lake in August 2021*

The sample collected at the ditch that carries discharge water from the Chemtrade sulfuric acid refinery (location 0749) had elevated concentrations of sulfate that have been in the 1500–3000 mg/L range from 2004 to March 2013. In June 2013, however, concentrations were significantly reduced (550 mg/L at location 0749) because of a change in plant processes that reduced sulfate in water discharge and in air emissions. Discharge from the ditch is regulated through a National Pollutant Discharge Elimination System permit issued to Chemtrade and administered by EPA. Since 2013, sulfate concentrations in the ditch have been generally elevated but variable (Figure 25), with a concentration of 1100 mg/L measured in August 2021 compared to the Chemtrade process water well 0460 with 160 mg/L sulfate. The unlined ditch will continue to be monitored because it is a continual source of sulfate to the surficial aquifer.

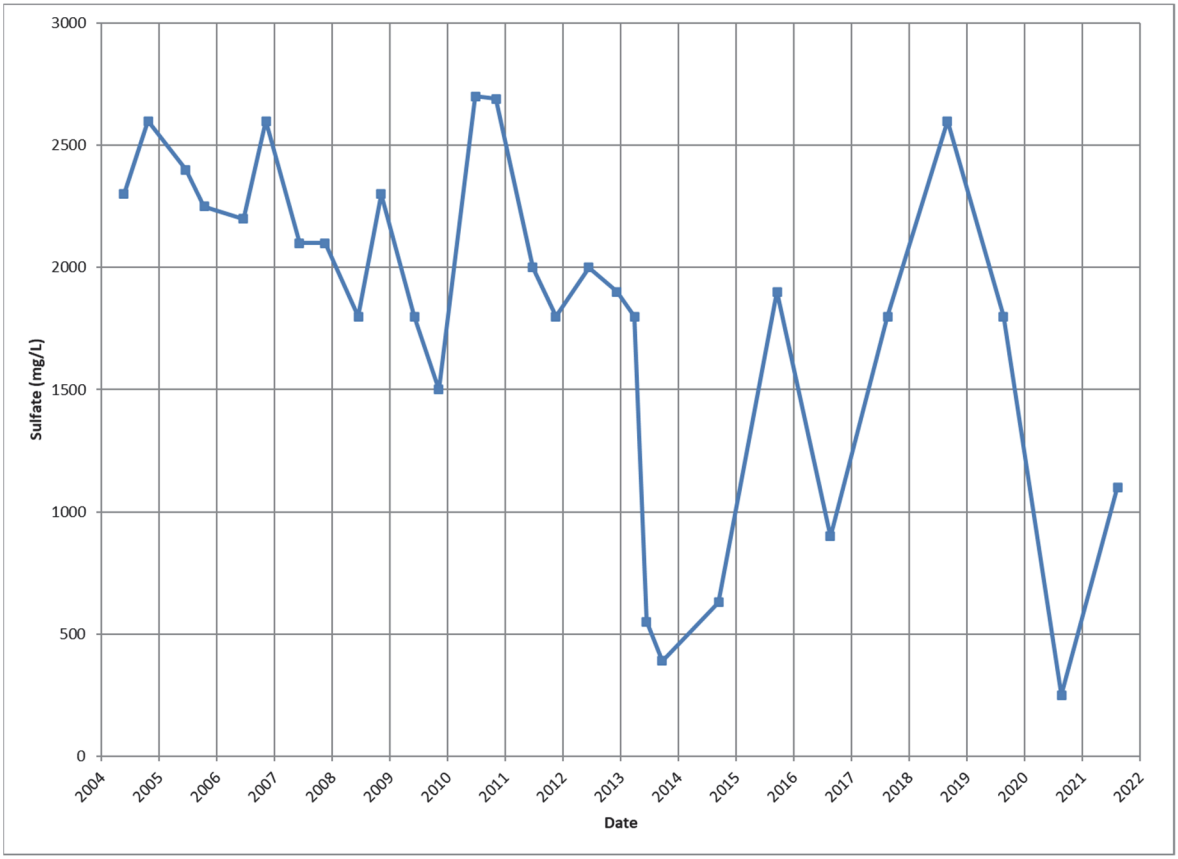



*Figure 25. Sulfate Concentrations at Location 0749*

Concentrations of molybdenum and uranium in the Chemtrade ditch (0749) are below the groundwater MCLs, but concentrations indicate a small contribution from plant processes (Figure 21 and Figure 22). The concentration of molybdenum in the sample collected from the ditch (0.031 mg/L) was elevated compared to the molybdenum concentration in process water used by the sulfuric acid plant that is supplied by well 0460 (0.0026 mg/L); this indicates some molybdenum input from plant processes. The concentration of uranium in the sample collected from the ditch was low (0.0013 mg/L) but elevated compared to concentrations of the process water used at the plant (0.00005 mg/L), which indicates some uranium input from plant processes.

Downstream of the Chemtrade ditch, a sample was collected from the west side irrigation ditch (location 0822). The molybdenum concentrations in this irrigation ditch are consistently lower than the Chemtrade ditch sample (location 0749) (Figure 21), which reflects a mixing of the ditch water with upgradient surface water or groundwater along the ditch flow path from location 0749 to location 0822 (Figure 2). The uranium concentrations in the west side irrigation ditch (0822) (Figure 21) have been relatively consistent through time, are similar to background groundwater and surface water concentrations (locations 810 and 823), and thus indicate no impacts to the water quality in the ditch with respect to uranium.

# 6.0 Compliance Strategy Assessment

After surface remediation was completed, groundwater numerical modeling in 1998 predicted that the alluvial aquifer will naturally flush contaminants to levels below applicable standards within the 100-year regulatory time frame. This modeling formed the basis for the natural flushing strategy that was approved in the *Final Ground Water Compliance Action Plan for the Riverton, Wyoming, Title I UMTRA Project Site* (DOE 1998b) in 1998. Before 2010, the progress of natural flushing was assessed using three tools: comparison to hydrogeologic modeling predictions, trend analysis, and curve matching and interpolation techniques applied to temporal plots of contaminant concentrations at individual locations. These techniques were based on a CSM of gradually declining contaminant concentrations after surface remediation of source material on the former mill site. Before 2010, these techniques indicated that natural flushing of the surficial aquifer was progressing toward applicable standards.

However, based on observations made in 2010 in context with historical data, the CSM and groundwater computer modeling were too simplistic to account for the spikes in contaminant concentrations in the surficial aquifer groundwater. Spikes in contaminant concentrations are attributed to flooding of the Little Wind River in June 2010, which mobilized contaminants into the saturated zone of the surficial aquifer. Cross-correlation of flood events in the Little Wind River with monitoring data reveals that uranium concentrations spiked in monitoring well 0707 in 1991, 1995, 2010, 2016, and 2017 following floods of the Little Wind River (Figure 26). Uranium concentrations in well 0707 decreased in 2020 and 2021 when there was no flooding of the Little Wind River and, therefore, no additional contaminant transfer from the unsaturated zone to the surficial aquifer. Figure 27 shows the average uranium concentration in surficial aquifer wells with a long history above the MCL (0707, 0716, 0718, and 0722/0722R). As shown in Figure 27, the average uranium concentration in these wells increased significantly after the 2010 flood event and increased again after the 2016 and 2017 flood events.

Although the 2010 flood of the Little Wind River caused significant spikes in contaminant concentrations in the surficial aquifer, uranium concentrations declined to preflood concentrations by 2013 (Figure 26 and Figure 27). These data indicate that the effects of the 2010 flood are relatively short-lived in context of the 100-year regulatory time frame. In 2016, significant concentration increases were seen again for molybdenum, uranium, and sulfate (Table 4, Figure 26, and Figure 27). Concentrations of uranium generally remained high after the 2016 and 2017 floods compared to preflood levels but declined again in 2021 to preflood levels after 4 years without a significant flood (Figures 26 and 27).

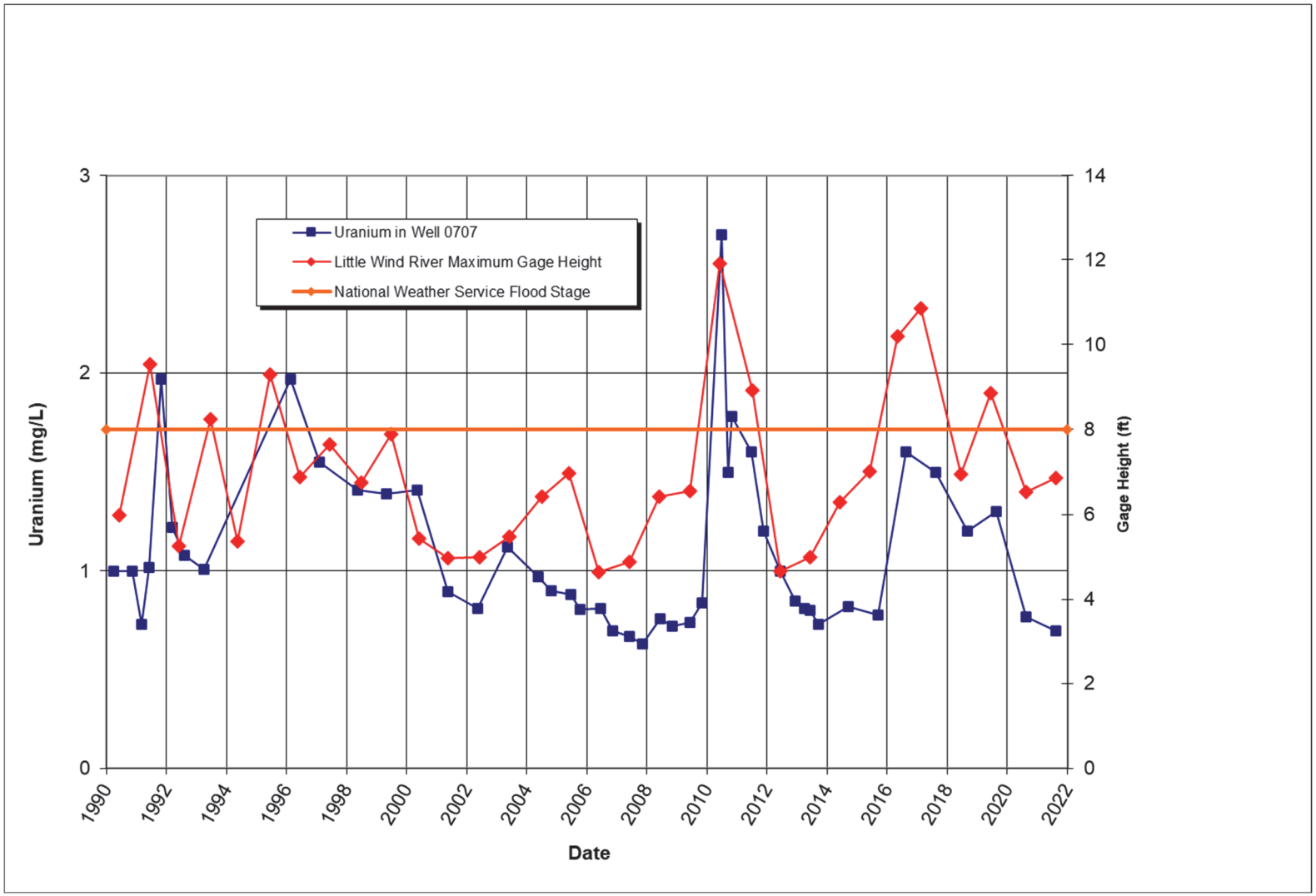



*Figure 26. Uranium Concentrations in Monitoring Well 0707 Versus Little Wind River Stage*

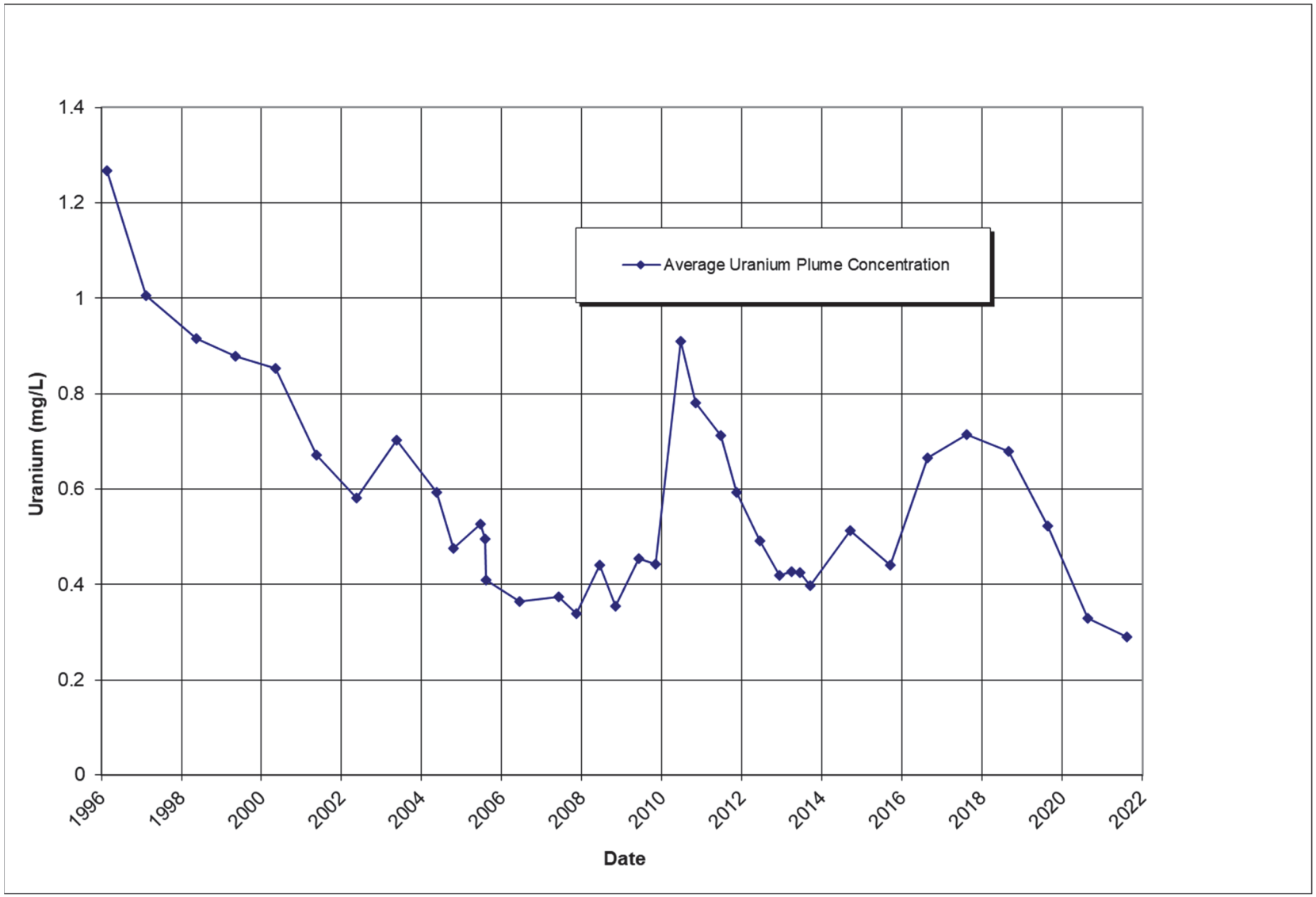



*Figure 27. Average Uranium Concentrations in the Surficial Aquifer (Wells 0707, 0716, 0718, and 0722/0722R)*

*Table 4. Comparison of Preflood (2009 and 2015), Flood (2016), and 2021 Results*

| Well | Molybdenum[a] | | | Uranium[a] | | | Sulfate[a] | | |
|---|---|---|---|---|---|---|---|---|---|
| | Preflood[b] | Flood 2016 | 2021 | Preflood[b] | Flood 2016 | 2021 | Preflood[b] | Flood 2016 | 2021 |
| 0707 | 0.68 | 1.5 | 0.73 | 0.84 | 1.6 | 0.70 | 1900 | 5800 | 2200 |
| 0788 | 0.024 | 0.022 | 0.032 | 0.034 | 0.059 | 0.032 | 630 | 2800 | 1400 |
| 0789 | 0.51 | 0.67 | 0.44 | 1.3 | 3.1 | 1.2 | 3900 | 11,000 | 4500 |
| 0826 | 0.023 | 0.041 | 0.043 | 0.041 | 0.072 | 0.028 | 580 | 3400 | 1600 |
| 0855-4 | 0.25 | 0.25 | 0.33 | 0.31 | 1.1 | 0.7 | 5100 | 6600 | 5000 |
| 0856-4 | 0.30 | 0.83 | 0.36 | 1.1 | 5.6 | 1 | 4000 | 14,000 | 3800 |

**Notes:**
[a] Units are milligrams per liter.
[b] Preflood data are from November 2009 for wells 0707, 0788, 0789, and 0826 and from August 2015 for wells 0855-4 and 0856-4.

Overall, natural flushing (contaminant movement and removal via groundwater flow) in the surficial aquifer is occurring; however, when natural flushing is coupled with the addition of secondary sources from the saturated (former mill site) and unsaturated zone, the rate does not appear to be fast enough to restore the aquifer within the 100-year regulatory time requirement. Several lines of evidence indicate that the natural flushing compliance strategy will not meet the 2089 target date. These include:

- Current plume configurations and magnitude.
  - A uranium concentration of 1.4 mg/L was measured in groundwater beneath the former mill site in 2021. Research indicates that the high uranium concentration is influenced by additional source(s) in the saturated zone.
  - Uranium concentrations in the center of the plume adjacent to the Little Wind River were as high as 1.2 mg/L in 2021, which is 2 orders of magnitude higher than the uranium standard of 0.044 mg/L.
- Groundwater concentrations of molybdenum and uranium are outside the predicted error range generated from the initial groundwater modeling (Figure 28 and Figure 29).
- At other UMTRCA sites with similar geology and contaminants, concentrations of groundwater COCs are not attenuating as quickly as predicted by groundwater modeling (Shafer et al. 2014).
- Time versus concentration graphs for some individual wells in the contaminant plume (Figures 7 and 10) at the Riverton site show flat trendlines.
- Future flooding of the Little Wind River and extreme precipitation events will likely cause an increase in contaminant concentrations in groundwater, even if the increase is relatively short-lived, which will prolong the time required for natural flushing.
- Additional contaminants in the saturated zone, unsaturated zone, or both (Section 2.0) (DOE 2016) may be acting as additional contaminant sources for elevated concentrations in groundwater.

Completion of natural flushing within the 100-year regulatory time frame is unlikely. Ongoing work includes analyses of the extensive solid and water-phase datasets collected to date. These analyses will result in a report that evaluates and summarizes geochemical conditions at the site through 2020. This effort will also include an assessment of data gaps to be answered to complete reactive transport modeling and assess new compliance strategies for the Riverton site. This work will result in a recommendation for a new compliance strategy that will be detailed in a new Groundwater Compliance Action Plan (GCAP).

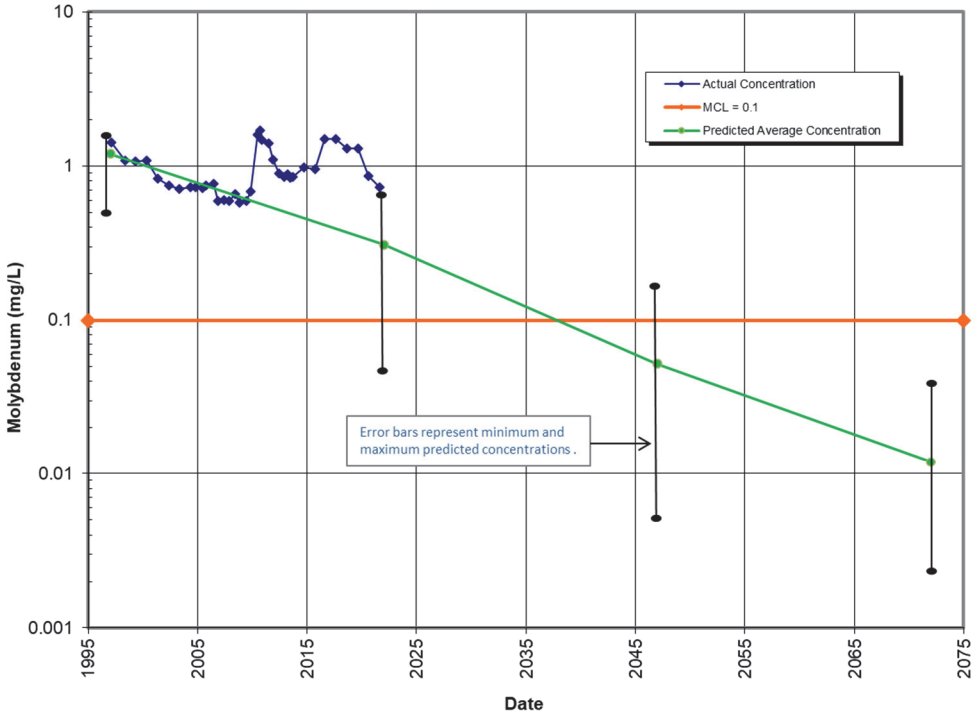



*Figure 28. Predicted Versus Measured Molybdenum Concentrations in Well 0707*

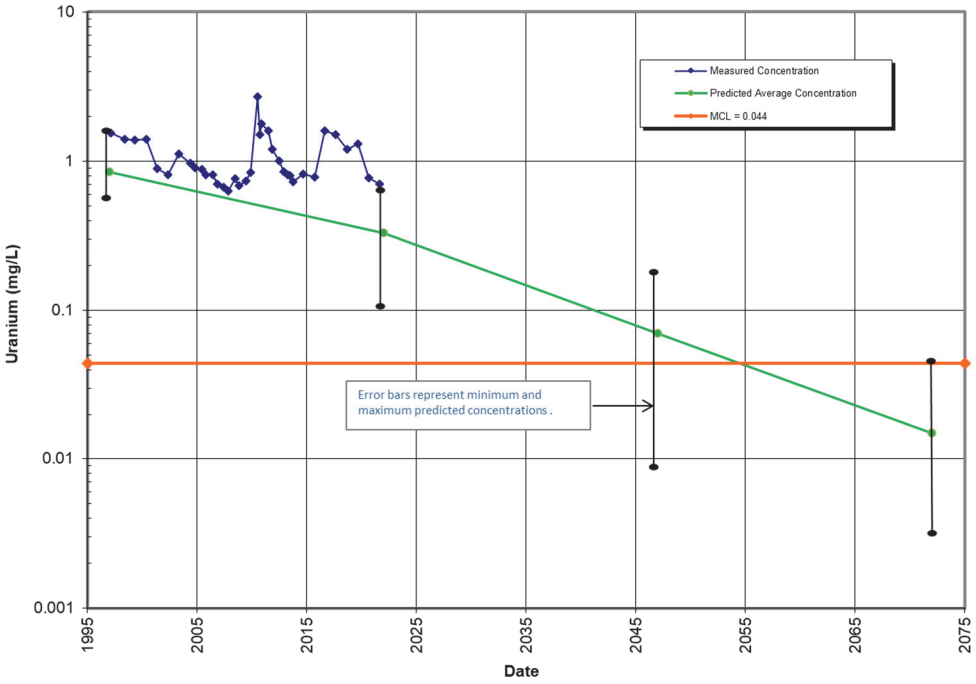



*Figure 29. Predicated Versus Measured Uranium Concentrations in Well 0707*

# 7.0 Conclusion and Recommendations

Verification monitoring results from 2021 verify that mill-related groundwater contamination continues to impact the surficial aquifer and oxbow lake, but ICs are in place and functioning as intended to protect human health and the environment. In addition, verification monitoring results continue to verify that mill-related contamination has not impacted any potable domestic wells within the IC boundary and has not impacted water quality in the Little Wind River or the gravel pit ponds. A comprehensive risk assessment that focused on risk from cultural uses of plants was completed by Argonne National Laboratory. The risk assessment report concluded that the current conditions at the Riverton site are protective of human health and the environment provided that ICs remain in place (Argonne 2021).

Molybdenum and uranium concentrations in the surficial aquifer groundwater remain above their respective MCLs. After the 2010 flood on the Little Wind River, molybdenum and uranium concentrations increased but then returned to their preflood levels by 2013. A flood in 2016 and two floods on the Little Wind River in 2017 confirmed that contaminant concentrations tend to spike after a flood event in the inundated area. In 2021, contaminant concentrations continued to decline after 4 years without significant flooding of the Little Wind River.

LM has gained a better understanding of the CSM, contaminant distributions, and properties of the surficial aquifer's unsaturated zone at the Riverton site. As a result, LM has determined that the natural flushing compliance strategy will not reduce contaminant concentrations in the surficial aquifer to levels below the MCL within the 100-year regulatory time frame; therefore, new compliance strategies will be evaluated, and a new compliance strategy will be selected and presented to the U.S. Nuclear Regulatory Commission for concurrence.

# 8.0 References

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# Appendix A

# Domestic Well Data

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/15/2022 5:02:23 PM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Alkalinity, Total (As CaCO3)** | | | | | | | | | | | | | |
| Alkalinity, Total (As CaCO3) | 0405 | WL | 8/11/2021 | (N)F | | | 50 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0430 | WL | 8/11/2021 | (N)F | | | 179 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0436 | WL | 8/11/2021 | (N)F | | | 149 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0460 | WL | 8/10/2021 | (N)F | | | 188 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0828 | WL | 8/11/2021 | (N)F | | | 148 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0841 | WL | 8/11/2021 | (N)F | | | 215 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0842 | WL | 8/11/2021 | (N)F | | | 173 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0876 | WL | 8/11/2021 | (N)F | | | 35 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0878 | WL | 8/11/2021 | (N)F | | | 170 | mg/L | | | # | - | - |
| **Manganese** | | | | | | | | | | | | | |
| Manganese | 0405 | WL | 8/11/2021 | (T)F | | | 0.0034 | mg/L | J | J | # | 0.00074 | - |
| Manganese | 0405 | WL | 8/11/2021 | (T)D | | | 0.0041 | mg/L | J | | # | 0.00074 | - |
| Manganese | 0430 | WL | 8/11/2021 | (T)F | | | 0.016 | mg/L | | | # | 0.00074 | - |
| Manganese | 0436 | WL | 8/11/2021 | (T)F | | | 0.0014 | mg/L | J | J | # | 0.00074 | - |
| Manganese | 0460 | WL | 8/10/2021 | (T)F | | | 0.0011 | mg/L | J | J | # | 0.00074 | - |
| Manganese | 0828 | WL | 8/11/2021 | (T)F | | | 0.0015 | mg/L | J | J | # | 0.00074 | - |
| Manganese | 0841 | WL | 8/11/2021 | (T)F | | | 0.0031 | mg/L | J | J | # | 0.00074 | - |
| Manganese | 0842 | WL | 8/11/2021 | (T)F | | | 0.053 | mg/L | | J | # | 0.00074 | - |
| Manganese | 0876 | WL | 8/11/2021 | (T)F | | | 0.0013 | mg/L | J | | # | 0.00074 | - |
| Manganese | 0878 | WL | 8/11/2021 | (T)F | | | 0.006 | mg/L | J | | # | 0.00074 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/15/2022 5:02:23 PM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Molybdenum** | | | | | | | | | | | | | |
| Molybdenum | 0405 | WL | 8/11/2021 | (T)F | | | 0.0049 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0405 | WL | 8/11/2021 | (T)D | | | 0.0049 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0430 | WL | 8/11/2021 | (T)F | | | 0.0018 | mg/L | J | | # | 0.00046 | - |
| Molybdenum | 0436 | WL | 8/11/2021 | (T)F | | | 0.0028 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0460 | WL | 8/10/2021 | (T)F | | | 0.0026 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0828 | WL | 8/11/2021 | (T)F | | | 0.0028 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0841 | WL | 8/11/2021 | (T)F | | | 0.0022 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0842 | WL | 8/11/2021 | (T)F | | | 0.0021 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0876 | WL | 8/11/2021 | (T)F | | | 0.0042 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0878 | WL | 8/11/2021 | (T)F | | | 0.002 | mg/L | | | # | 0.00046 | - |
| **Oxidation Reduction Potential** | | | | | | | | | | | | | |
| Oxidation Reduction Potential | 0405 | WL | 8/11/2021 | (N)F | | | -6.4 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0430 | WL | 8/11/2021 | (N)F | | | 64.9 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0460 | WL | 8/10/2021 | (N)F | | | 75.5 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0841 | WL | 8/11/2021 | (N)F | | | 75.6 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0842 | WL | 8/11/2021 | (N)F | | | 30.1 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0876 | WL | 8/11/2021 | (N)F | | | 117.8 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0878 | WL | 8/11/2021 | (N)F | | | 117.8 | mV | | | # | - | - |
| **pH** | | | | | | | | | | | | | |
| pH | 0405 | WL | 8/11/2021 | (N)F | | | 9.07 | s.u. | | | # | - | - |
| pH | 0430 | WL | 8/11/2021 | (N)F | | | 8.92 | s.u. | | | # | - | - |
| pH | 0436 | WL | 8/11/2021 | (N)F | | | 8.77 | s.u. | | | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/15/2022 5:02:23 PM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 0460 | WL | 8/10/2021 | (N)F | | | 8.8 | s.u. | | | # | - | - |
| pH | 0828 | WL | 8/11/2021 | (N)F | | | 8.74 | s.u. | | | # | - | - |
| pH | 0841 | WL | 8/11/2021 | (N)F | | | 7.65 | s.u. | | | # | - | - |
| pH | 0842 | WL | 8/11/2021 | (N)F | | | 8.1 | s.u. | | | # | - | - |
| pH | 0876 | WL | 8/11/2021 | (N)F | | | 7.65 | s.u. | | | # | - | - |
| pH | 0878 | WL | 8/11/2021 | (N)F | | | 8.94 | s.u. | | | # | - | - |
| **Specific Conductance** | | | | | | | | | | | | | |
| Specific Conductance | 0405 | WL | 8/11/2021 | (N)F | | | 1036 | umhos/cm | | | # | - | - |
| Specific Conductance | 0430 | WL | 8/11/2021 | (N)F | | | 781 | umhos/cm | | | # | - | - |
| Specific Conductance | 0436 | WL | 8/11/2021 | (N)F | | | 839 | umhos/cm | | | # | - | - |
| Specific Conductance | 0460 | WL | 8/10/2021 | (N)F | | | 791 | umhos/cm | | | # | - | - |
| Specific Conductance | 0828 | WL | 8/11/2021 | (N)F | | | 840 | umhos/cm | | | # | - | - |
| Specific Conductance | 0841 | WL | 8/11/2021 | (N)F | | | 926 | umhos/cm | | | # | - | - |
| Specific Conductance | 0842 | WL | 8/11/2021 | (N)F | | | 701 | umhos/cm | | | # | - | - |
| Specific Conductance | 0876 | WL | 8/11/2021 | (N)F | | | 939 | umhos/cm | | | # | - | - |
| Specific Conductance | 0878 | WL | 8/11/2021 | (N)F | | | 644 | umhos/cm | | | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/15/2022 5:02:24 PM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sulfate** | | | | | | | | | | | | | |
| Sulfate | 0405 | WL | 8/11/2021 | (N)F | | | 370 | mg/L | | | # | 5.3 | - |
| Sulfate | 0405 | WL | 8/11/2021 | (N)D | | | 380 | mg/L | | | # | 4.2 | - |
| Sulfate | 0430 | WL | 8/11/2021 | (N)F | | | 170 | mg/L | | | # | 2.6 | - |
| Sulfate | 0436 | WL | 8/11/2021 | (N)F | | | 210 | mg/L | | | # | 2.6 | - |
| Sulfate | 0460 | WL | 8/10/2021 | (N)F | | | 160 | mg/L | | | # | 2.6 | - |
| Sulfate | 0828 | WL | 8/11/2021 | (N)F | | | 220 | mg/L | | | # | 2.6 | - |
| Sulfate | 0841 | WL | 8/11/2021 | (N)F | | | 250 | mg/L | | | # | 2.6 | - |
| Sulfate | 0842 | WL | 8/11/2021 | (N)F | | | 140 | mg/L | | | # | 1.1 | - |
| Sulfate | 0876 | WL | 8/11/2021 | (N)F | | | 260 | mg/L | | | # | 2.6 | - |
| Sulfate | 0878 | WL | 8/11/2021 | (N)F | | | 230 | mg/L | | | # | 2.6 | - |
| **Temperature** | | | | | | | | | | | | | |
| Temperature | 0405 | WL | 8/11/2021 | (N)F | | | 18.73 | C | | | # | - | - |
| Temperature | 0430 | WL | 8/11/2021 | (N)F | | | 28.52 | C | | | # | - | - |
| Temperature | 0436 | WL | 8/11/2021 | (N)F | | | 21.76 | C | | J | # | - | - |
| Temperature | 0460 | WL | 8/10/2021 | (N)F | | | 24.39 | C | | | # | - | - |
| Temperature | 0828 | WL | 8/11/2021 | (N)F | | | 21.675 | C | | J | # | - | - |
| Temperature | 0841 | WL | 8/11/2021 | (N)F | | | 19.46 | C | | | # | - | - |
| Temperature | 0842 | WL | 8/11/2021 | (N)F | | | 14.14 | C | | | # | - | - |
| Temperature | 0876 | WL | 8/11/2021 | (N)F | | | 21.63 | C | | | # | - | - |
| Temperature | 0878 | WL | 8/11/2021 | (N)F | | | 18.89 | C | | | # | - | - |
| **Turbidity** | | | | | | | | | | | | | |
| Turbidity | 0405 | WL | 8/11/2021 | (N)F | | | 1.62 | NTU | | | # | - | - |
| Turbidity | 0430 | WL | 8/11/2021 | (N)F | | | 9.98 | NTU | | | # | - | - |
| Turbidity | 0436 | WL | 8/11/2021 | (N)F | | | 1.03 | NTU | | | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/15/2022 5:02:24 PM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turbidity | 0460 | WL | 8/10/2021 | (N)F | | | 0.43 | NTU | | | # | - | - |
| Turbidity | 0828 | WL | 8/11/2021 | (N)F | | | 0.92 | NTU | | | # | - | - |
| Turbidity | 0841 | WL | 8/11/2021 | (N)F | | | 1.56 | NTU | | | # | - | - |
| Turbidity | 0842 | WL | 8/11/2021 | (N)F | | | 2.03 | NTU | | | # | - | - |
| Turbidity | 0876 | WL | 8/11/2021 | (N)F | | | 1.57 | NTU | | | # | - | - |
| Turbidity | 0878 | WL | 8/11/2021 | (N)F | | | 1.1 | NTU | | | # | - | - |
| **Uranium** | | | | | | | | | | | | | |
| Uranium | 0405 | WL | 8/11/2021 | (T)F | | | 0.00004 | mg/L | U | | # | 0.00004 | - |
| Uranium | 0405 | WL | 8/11/2021 | (T)D | | | 0.00004 | mg/L | U | | # | 0.00004 | - |
| Uranium | 0430 | WL | 8/11/2021 | (T)F | | | 0.00005 | mg/L | J | | # | 0.00004 | - |
| Uranium | 0436 | WL | 8/11/2021 | (T)F | | | 0.00005 | mg/L | J | | # | 0.00004 | - |
| Uranium | 0460 | WL | 8/10/2021 | (T)F | | | 0.00005 | mg/L | J | | # | 0.00004 | - |
| Uranium | 0828 | WL | 8/11/2021 | (T)F | | | 0.0001 | mg/L | | | # | 0.00004 | - |
| Uranium | 0841 | WL | 8/11/2021 | (T)F | | | 0.0019 | mg/L | | | # | 0.00004 | - |
| Uranium | 0842 | WL | 8/11/2021 | (T)F | | | 0.00034 | mg/L | | | # | 0.00004 | - |
| Uranium | 0876 | WL | 8/11/2021 | (T)F | | | 0.00019 | mg/L | | | # | 0.00004 | - |
| Uranium | 0878 | WL | 8/11/2021 | (T)F | | | 0.00004 | mg/L | J | | # | 0.00004 | - |

**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

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

# Appendix B

# Static Water Level Data

## STATIC WATER LEVELS (EQuIS700) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/18/2022 12:03:50 PM**

| LOCATION CODE | MEASUREMENT DATE/TIME | TOP OF CASING ELEVATION (FT) | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|
| 0101 | 08/04/2021 08:48 | 4953.16 | 10.53 | 4942.63 | |
| 0110 | 08/10/2021 09:12 | 4954.58 | 13.08 | 4941.50 | |
| 0111 | 08/10/2021 09:13 | 4951.26 | 9.82 | 4941.44 | |
| 0700 | 08/10/2021 16:19 | 4955.27 | 7.12 | 4948.15 | |
| 0702 | 08/10/2021 17:00 | 4934.44 | 6.90 | 4927.54 | |
| 0705 | 08/11/2021 11:54 | 4934.32 | 7.11 | 4927.21 | |
| 0707 | 08/11/2021 12:20 | 4933.75 | 6.18 | 4927.57 | |
| 0709 | 08/10/2021 17:01 | 4934.17 | 5.23 | 4928.94 | |
| 0716 | 08/10/2021 11:05 | 4943.14 | 8.48 | 4934.66 | |
| 0717 | 08/10/2021 10:42 | 4942.79 | 7.81 | 4934.98 | |
| 0718 | 08/11/2021 13:17 | 4941.35 | 8.49 | 4932.86 | |
| 0719 | 08/11/2021 12:57 | 4941.44 | 7.96 | 4933.48 | |
| 0720 | 08/11/2021 14:04 | 4944.44 | 5.19 | 4939.25 | |
| 0721 | 08/11/2021 14:30 | 4944.37 | 8.61 | 4935.76 | |
| 0722R | 08/11/2021 09:03 | 4941.14 | 8.17 | 4932.97 | |
| 0723 | 08/11/2021 09:18 | 4939.94 | 6.99 | 4932.95 | |
| 0724 | 08/10/2021 16:04 | 4945.14 | 7.17 | 4937.97 | |
| 0725 | 08/10/2021 17:23 | 4945.44 | 6.24 | 4939.20 | |
| 0726 | 08/10/2021 17:21 | 4945.43 | 7.70 | 4937.73 | |
| 0727 | 08/10/2021 09:57 | 4955.62 | 10.31 | 4945.31 | |
| 0728 | 08/10/2021 11:03 | 4949.96 | 7.40 | 4942.56 | |
| 0729 | 08/10/2021 16:51 | 4936.65 | 2.08 | 4934.57 | |
| 0730 | 08/10/2021 16:30 | 4937.16 | 4.48 | 4932.68 | |
| 0732 | 08/10/2021 12:06 | 4949.06 | 8.79 | 4940.27 | |
| 0733 | 08/11/2021 16:04 | 4950.72 | 5.43 | 4945.29 | |
| 0734 | 08/11/2021 16:05 | 4950.33 | 6.98 | 4943.35 | |
| 0736 | 08/11/2021 16:08 | 4949.69 | 7.63 | 4942.06 | |
| 0784 | 08/10/2021 11:33 | 4949.47 | 7.44 | 4942.03 | |
| 0788 | 08/10/2021 08:18 | 4937.96 | 9.66 | 4928.30 | |
| 0789 | 08/11/2021 09:38 | 4936.39 | 10.20 | 4926.19 | |
| 0824 | 08/11/2021 08:31 | 4932.94 | 6.37 | 4926.57 | |
| 0826 | 08/10/2021 12:38 | 4939.89 | 8.30 | 4931.59 | |
| 0852-4 | 08/10/2021 10:35 | 4940.80 | 11.51 | 4929.29 | |
| 0853-4 | 08/10/2021 10:01 | 4938.49 | 10.18 | 4928.31 | |
| 0854-4 | 08/10/2021 13:05 | 4939.95 | 8.35 | 4931.60 | |

## STATIC WATER LEVELS (EQuIS700) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/18/2022 12:03:50 PM**

| LOCATION CODE | MEASUREMENT DATE/TIME | TOP OF CASING ELEVATION (FT) | DEPTH FROM TOP OF CASING (FT) | WATER ELEVATION (FT) | WATER LEVEL FLAG |
|---|---|---|---|---|---|
| 0855-4 | 08/11/2021 10:25 | 4934.79 | 8.10 | 4926.69 | |
| 0856-4 | 08/10/2021 15:25 | 4937.23 | 9.05 | 4928.18 | |
| 0857-4 | 08/10/2021 14:15 | 4939.11 | 9.13 | 4929.98 | |
| 0858-4 | 08/10/2021 16:37 | 4935.69 | 7.92 | 4927.77 | |
| 0859-4 | 08/10/2021 15:07 | 4948.69 | 9.21 | 4939.48 | |
| 0860-4 | 08/10/2021 14:06 | 4946.82 | 11.50 | 4935.32 | |

**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 | | |

# Appendix C

# Monitoring Well Data

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:00 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Alkalinity, Total (As CaCO3)** | | | | | | | | | | | | | |
| Alkalinity, Total (As CaCO3) | 0101 | WL | 8/10/2021 | (N)F | | | 264 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0705 | WL | 8/11/2021 | (N)F | | | 55 | mg/L | | FQ | # | - | - |
| Alkalinity, Total (As CaCO3) | 0707 | WL | 8/11/2021 | (N)F | | | 334 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0716 | WL | 8/10/2021 | (N)F | | | 339 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0717 | WL | 8/10/2021 | (N)F | | | 198 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0718 | WL | 8/11/2021 | (N)F | | | 315 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0719 | WL | 8/11/2021 | (N)F | | | 94 | mg/L | | FQ | # | - | - |
| Alkalinity, Total (As CaCO3) | 0720 | WL | 8/11/2021 | (N)F | | | 244 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0721 | WL | 8/11/2021 | (N)F | | | 97 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0722R | WL | 8/11/2021 | (N)F | | | 287 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0723 | WL | 8/11/2021 | (N)F | | | 328 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0727 | WL | 8/10/2021 | (N)F | | | 198 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0729 | WL | 8/10/2021 | (N)F | | | 304 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0730 | WL | 8/10/2021 | (D)F | | | 333 | mg/L | | FQ | # | - | - |
| Alkalinity, Total (As CaCO3) | 0732 | WL | 8/10/2021 | (N)F | | | 254 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0784 | WL | 8/10/2021 | (N)F | | | 174 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0788 | WL | 8/10/2021 | (N)F | | | 401 | mg/L | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:00 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | 0789 | WL | 8/11/2021 | (N)F | | | 449 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0824 | WL | 8/11/2021 | (N)F | | | 372 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0826 | WL | 8/10/2021 | (N)F | | | 344 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0852-2 | WL | 8/10/2021 | (N)F | | | 360 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0852-3 | WL | 8/10/2021 | (N)F | | | 356 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0852-4 | WL | 8/10/2021 | (N)F | | | 366 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0853-2 | WL | 8/10/2021 | (N)F | | | 414 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0853-3 | WL | 8/10/2021 | (N)F | | | 432 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0853-4 | WL | 8/10/2021 | (N)F | | | 416 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0854-2 | WL | 8/10/2021 | (N)F | | | 332 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0854-3 | WL | 8/10/2021 | (N)F | | | 342 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0854-4 | WL | 8/10/2021 | (N)F | | | 348 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0855-2 | WL | 8/11/2021 | (N)F | | | 538 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0855-3 | WL | 8/11/2021 | (N)F | | | 468 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0855-4 | WL | 8/11/2021 | (N)F | | | 500 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0856-2 | WL | 8/10/2021 | (N)F | | | 332 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0856-3 | WL | 8/10/2021 | (N)F | | | 352 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0856-4 | WL | 8/10/2021 | (N)F | | | 362 | mg/L | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:00 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total (As CaCO3) | 0857-2 | WL | 8/10/2021 | (N)F | | | 334 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0857-3 | WL | 8/10/2021 | (N)F | | | 320 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0857-4 | WL | 8/10/2021 | (N)F | | | 326 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0858-2 | WL | 8/10/2021 | (N)F | | | 328 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0858-3 | WL | 8/10/2021 | (N)F | | | 340 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0858-4 | WL | 8/10/2021 | (N)F | | | 348 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0859-2 | WL | 8/10/2021 | (N)F | | | 187 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0859-3 | WL | 8/10/2021 | (N)F | | | 178 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0859-4 | WL | 8/10/2021 | (N)F | | | 248 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0860-2 | WL | 8/10/2021 | (N)F | | | 307 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0860-3 | WL | 8/10/2021 | (N)F | | | 272 | mg/L | | F | # | - | - |
| Alkalinity, Total (As CaCO3) | 0860-4 | WL | 8/10/2021 | (N)F | | | 298 | mg/L | | F | # | - | - |
| **Manganese** | | | | | | | | | | | | | |
| Manganese | 0101 | WL | 8/10/2021 | (T)F | | | 0.38 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0705 | WL | 8/11/2021 | (T)F | | | 0.00074 | mg/L | U | FJQ | # | 0.00074 | - |
| Manganese | 0707 | WL | 8/11/2021 | (T)F | | | 0.79 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0716 | WL | 8/10/2021 | (T)F | | | 0.19 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0717 | WL | 8/10/2021 | (T)F | | | 0.15 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0718 | WL | 8/11/2021 | (T)F | | | 0.21 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0719 | WL | 8/11/2021 | (T)F | | | 0.15 | mg/L | | FQ | # | 0.00074 | - |
| Manganese | 0720 | WL | 8/11/2021 | (T)F | | | 0.00074 | mg/L | U | FJ | # | 0.00074 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:00 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese | 0721 | WL | 8/11/2021 | (T)F | | | 0.0021 | mg/L | J | FJ | # | 0.00074 | - |
| Manganese | 0722R | WL | 8/11/2021 | (T)F | | | 0.00074 | mg/L | U | FJ | # | 0.00074 | - |
| Manganese | 0723 | WL | 8/11/2021 | (T)F | | | 0.34 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0727 | WL | 8/10/2021 | (T)F | | | 0.058 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0729 | WL | 8/10/2021 | (T)F | | | 0.13 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0730 | WL | 8/10/2021 | (D)F | | | 0.043 | mg/L | | FQ | # | 0.00074 | - |
| Manganese | 0732 | WL | 8/10/2021 | (T)F | | | 0.17 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0732 | WL | 8/10/2021 | (T)D | | | 0.18 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0784 | WL | 8/10/2021 | (T)F | | | 0.65 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0788 | WL | 8/10/2021 | (T)F | | | 0.46 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0789 | WL | 8/11/2021 | (T)F | | | 0.17 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0824 | WL | 8/11/2021 | (T)F | | | 0.036 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0826 | WL | 8/10/2021 | (T)F | | | 1.7 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0852-2 | WL | 8/10/2021 | (T)F | | | 0.59 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0852-3 | WL | 8/10/2021 | (T)F | | | 0.57 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0852-4 | WL | 8/10/2021 | (T)D | | | 0.66 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0852-4 | WL | 8/10/2021 | (T)F | | | 0.69 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0853-2 | WL | 8/10/2021 | (T)F | | | 0.5 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0853-3 | WL | 8/10/2021 | (T)F | | | 1 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0853-4 | WL | 8/10/2021 | (T)F | | | 0.92 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0854-2 | WL | 8/10/2021 | (T)F | | | 2.1 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0854-3 | WL | 8/10/2021 | (T)F | | | 1.9 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0854-4 | WL | 8/10/2021 | (T)F | | | 1.8 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0855-2 | WL | 8/11/2021 | (T)F | | | 0.39 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0855-3 | WL | 8/11/2021 | (T)D | | | 0.71 | mg/L | | F | # | 0.00074 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:00 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese | 0855-3 | WL | 8/11/2021 | (T)F | | | 0.73 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0855-4 | WL | 8/11/2021 | (T)F | | | 1.3 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0856-2 | WL | 8/10/2021 | (T)F | | | 0.21 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0856-3 | WL | 8/10/2021 | (T)F | | | 0.47 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0856-4 | WL | 8/10/2021 | (T)F | | | 1 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0857-2 | WL | 8/10/2021 | (T)F | | | 1.6 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0857-3 | WL | 8/10/2021 | (T)F | | | 1.9 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0857-4 | WL | 8/10/2021 | (T)F | | | 2 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0858-2 | WL | 8/10/2021 | (T)F | | | 0.64 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0858-3 | WL | 8/10/2021 | (T)F | | | 0.74 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0858-4 | WL | 8/10/2021 | (T)F | | | 0.75 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0859-2 | WL | 8/10/2021 | (T)F | | | 0.19 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0859-3 | WL | 8/10/2021 | (T)F | | | 0.86 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0859-4 | WL | 8/10/2021 | (T)F | | | 1.4 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0860-2 | WL | 8/10/2021 | (T)F | | | 0.44 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0860-3 | WL | 8/10/2021 | (T)F | | | 1.2 | mg/L | | F | # | 0.00074 | - |
| Manganese | 0860-4 | WL | 8/10/2021 | (T)F | | | 1.1 | mg/L | | F | # | 0.00074 | - |
| **Molybdenum** | | | | | | | | | | | | | |
| Molybdenum | 0101 | WL | 8/10/2021 | (T)F | | | 0.016 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0705 | WL | 8/11/2021 | (T)F | | | 0.003 | mg/L | | FQ | # | 0.00046 | - |
| Molybdenum | 0707 | WL | 8/11/2021 | (T)F | | | 0.73 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0716 | WL | 8/10/2021 | (T)F | | | 0.093 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0717 | WL | 8/10/2021 | (T)F | | | 0.011 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0718 | WL | 8/11/2021 | (T)F | | | 0.081 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0719 | WL | 8/11/2021 | (T)F | | | 0.0077 | mg/L | | FQ | # | 0.00046 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:01 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | 0720 | WL | 8/11/2021 | (T)F | | | 0.0013 | mg/L | J | F | # | 0.00046 | - |
| Molybdenum | 0721 | WL | 8/11/2021 | (T)F | | | 0.0024 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0722R | WL | 8/11/2021 | (T)F | | | 0.064 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0723 | WL | 8/11/2021 | (T)F | | | 0.00046 | mg/L | U | F | # | 0.00046 | - |
| Molybdenum | 0727 | WL | 8/10/2021 | (T)F | | | 0.005 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0729 | WL | 8/10/2021 | (T)F | | | 0.0017 | mg/L | J | F | # | 0.00046 | - |
| Molybdenum | 0730 | WL | 8/10/2021 | (D)F | | | 0.0045 | mg/L | | FQ | # | 0.00046 | - |
| Molybdenum | 0732 | WL | 8/10/2021 | (T)F | | | 0.024 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0732 | WL | 8/10/2021 | (T)D | | | 0.025 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0784 | WL | 8/10/2021 | (T)F | | | 0.063 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0788 | WL | 8/10/2021 | (T)F | | | 0.032 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0789 | WL | 8/11/2021 | (T)F | | | 0.44 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0824 | WL | 8/11/2021 | (T)F | | | 0.0036 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0826 | WL | 8/10/2021 | (T)F | | | 0.037 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0852-2 | WL | 8/10/2021 | (T)F | | | 0.007 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0852-3 | WL | 8/10/2021 | (T)F | | | 0.0063 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0852-4 | WL | 8/10/2021 | (T)D | | | 0.0068 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0852-4 | WL | 8/10/2021 | (T)F | | | 0.0065 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0853-2 | WL | 8/10/2021 | (T)F | | | 0.02 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0853-3 | WL | 8/10/2021 | (T)F | | | 0.027 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0853-4 | WL | 8/10/2021 | (T)F | | | 0.026 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0854-2 | WL | 8/10/2021 | (T)F | | | 0.051 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0854-3 | WL | 8/10/2021 | (T)F | | | 0.047 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0854-4 | WL | 8/10/2021 | (T)F | | | 0.047 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0855-2 | WL | 8/11/2021 | (T)F | | | 0.32 | mg/L | | F | # | 0.00046 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:01 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Molybdenum | 0855-3 | WL | 8/11/2021 | (T)D | | | 0.32 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0855-3 | WL | 8/11/2021 | (T)F | | | 0.33 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0855-4 | WL | 8/11/2021 | (T)F | | | 0.31 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0856-2 | WL | 8/10/2021 | (T)F | | | 0.35 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0856-3 | WL | 8/10/2021 | (T)F | | | 0.33 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0856-4 | WL | 8/10/2021 | (T)F | | | 0.36 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0857-2 | WL | 8/10/2021 | (T)F | | | 0.62 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0857-3 | WL | 8/10/2021 | (T)F | | | 0.59 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0857-4 | WL | 8/10/2021 | (T)F | | | 0.59 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0858-2 | WL | 8/10/2021 | (T)F | | | 0.71 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0858-3 | WL | 8/10/2021 | (T)F | | | 0.76 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0858-4 | WL | 8/10/2021 | (T)F | | | 0.77 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0859-2 | WL | 8/10/2021 | (T)F | | | 0.042 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0859-3 | WL | 8/10/2021 | (T)F | | | 0.046 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0859-4 | WL | 8/10/2021 | (T)F | | | 0.064 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0860-2 | WL | 8/10/2021 | (T)F | | | 0.33 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0860-3 | WL | 8/10/2021 | (T)F | | | 0.23 | mg/L | | F | # | 0.00046 | - |
| Molybdenum | 0860-4 | WL | 8/10/2021 | (T)F | | | 0.24 | mg/L | | F | # | 0.00046 | - |
| **Oxidation Reduction Potential** | | | | | | | | | | | | | |
| Oxidation Reduction Potential | 0101 | WL | 8/10/2021 | (N)F | | | 45.7 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0716 | WL | 8/10/2021 | (N)F | | | -41.9 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0717 | WL | 8/10/2021 | (N)F | | | -140.6 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0722R | WL | 8/11/2021 | (N)F | | | 1.9 | mV | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:01 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oxidation Reduction Potential | 0723 | WL | 8/11/2021 | (N)F | | | -103.2 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0727 | WL | 8/10/2021 | (N)F | | | -16.9 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0729 | WL | 8/10/2021 | (N)F | | | 72.6 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0730 | WL | 8/10/2021 | (N)F | | | -37.8 | mV | | FQ | # | - | - |
| Oxidation Reduction Potential | 0732 | WL | 8/10/2021 | (N)F | | | -7.3 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0784 | WL | 8/10/2021 | (N)F | | | -3.8 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0824 | WL | 8/11/2021 | (N)F | | | -72.1 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0859-2 | WL | 8/10/2021 | (N)F | | | -4.8 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0859-3 | WL | 8/10/2021 | (N)F | | | 3.9 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0859-4 | WL | 8/10/2021 | (N)F | | | -80.4 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0860-2 | WL | 8/10/2021 | (N)F | | | 24.6 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0860-3 | WL | 8/10/2021 | (N)F | | | -8.8 | mV | | F | # | - | - |
| Oxidation Reduction Potential | 0860-4 | WL | 8/10/2021 | (N)F | | | -31.9 | mV | | F | # | - | - |
| **pH** | | | | | | | | | | | | | |
| pH | 0101 | WL | 8/10/2021 | (N)F | | | 7.3 | s.u. | | F | # | - | - |
| pH | 0705 | WL | 8/11/2021 | (N)F | | | 8.18 | s.u. | | FQ | # | - | - |
| pH | 0707 | WL | 8/11/2021 | (N)F | | | 7.04 | s.u. | | F | # | - | - |
| pH | 0716 | WL | 8/10/2021 | (N)F | | | 7.16 | s.u. | | F | # | - | - |
| pH | 0717 | WL | 8/10/2021 | (N)F | | | 7.83 | s.u. | | F | # | - | - |
| pH | 0718 | WL | 8/11/2021 | (N)F | | | 7.08 | s.u. | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:01 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 0719 | WL | 8/11/2021 | (N)F | | | 7.73 | s.u. | | FQ | # | - | - |
| pH | 0720 | WL | 8/11/2021 | (N)F | | | 7.22 | s.u. | | F | # | - | - |
| pH | 0721 | WL | 8/11/2021 | (N)F | | | 8.82 | s.u. | | F | # | - | - |
| pH | 0722R | WL | 8/11/2021 | (N)F | | | 7.14 | s.u. | | F | # | - | - |
| pH | 0723 | WL | 8/11/2021 | (N)F | | | 7.22 | s.u. | | F | # | - | - |
| pH | 0727 | WL | 8/10/2021 | (N)F | | | 7.76 | s.u. | | F | # | - | - |
| pH | 0729 | WL | 8/10/2021 | (N)F | | | 7.11 | s.u. | | F | # | - | - |
| pH | 0730 | WL | 8/10/2021 | (N)F | | | 7.48 | s.u. | | FQ | # | - | - |
| pH | 0732 | WL | 8/10/2021 | (N)F | | | 7.22 | s.u. | | F | # | - | - |
| pH | 0784 | WL | 8/10/2021 | (N)F | | | 7.37 | s.u. | | F | # | - | - |
| pH | 0788 | WL | 8/10/2021 | (N)F | | | 6.99 | s.u. | | F | # | - | - |
| pH | 0789 | WL | 8/11/2021 | (N)F | | | 7.1 | s.u. | | F | # | - | - |
| pH | 0824 | WL | 8/11/2021 | (N)F | | | 7.16 | s.u. | | F | # | - | - |
| pH | 0826 | WL | 8/10/2021 | (N)F | | | 7.27 | s.u. | | F | # | - | - |
| pH | 0852-2 | WL | 8/10/2021 | (N)F | | | 7.36 | s.u. | | F | # | - | - |
| pH | 0852-3 | WL | 8/10/2021 | (N)F | | | 7.34 | s.u. | | F | # | - | - |
| pH | 0852-4 | WL | 8/10/2021 | (N)F | | | 7.29 | s.u. | | F | # | - | - |
| pH | 0853-2 | WL | 8/10/2021 | (N)F | | | 7.03 | s.u. | | F | # | - | - |
| pH | 0853-3 | WL | 8/10/2021 | (N)F | | | 7.04 | s.u. | | F | # | - | - |
| pH | 0853-4 | WL | 8/10/2021 | (N)F | | | 7.06 | s.u. | | F | # | - | - |
| pH | 0854-2 | WL | 8/10/2021 | (N)F | | | 7.23 | s.u. | | F | # | - | - |
| pH | 0854-3 | WL | 8/10/2021 | (N)F | | | 7.23 | s.u. | | F | # | - | - |
| pH | 0854-4 | WL | 8/10/2021 | (N)F | | | 7.24 | s.u. | | F | # | - | - |
| pH | 0855-2 | WL | 8/11/2021 | (N)F | | | 7.13 | s.u. | | F | # | - | - |
| pH | 0855-3 | WL | 8/11/2021 | (N)F | | | 7.09 | s.u. | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:02 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 0855-4 | WL | 8/11/2021 | (N)F | | | 7.05 | s.u. | | F | # | - | - |
| pH | 0856-2 | WL | 8/10/2021 | (N)F | | | 7.12 | s.u. | | F | # | - | - |
| pH | 0856-3 | WL | 8/10/2021 | (N)F | | | 7.08 | s.u. | | F | # | - | - |
| pH | 0856-4 | WL | 8/10/2021 | (N)F | | | 7.07 | s.u. | | F | # | - | - |
| pH | 0857-2 | WL | 8/10/2021 | (N)F | | | 7.07 | s.u. | | F | # | - | - |
| pH | 0857-3 | WL | 8/10/2021 | (N)F | | | 7.16 | s.u. | | F | # | - | - |
| pH | 0857-4 | WL | 8/10/2021 | (N)F | | | 7.05 | s.u. | | F | # | - | - |
| pH | 0858-2 | WL | 8/10/2021 | (N)F | | | 7.05 | s.u. | | F | # | - | - |
| pH | 0858-3 | WL | 8/10/2021 | (N)F | | | 7.05 | s.u. | | F | # | - | - |
| pH | 0858-4 | WL | 8/10/2021 | (N)F | | | 7.05 | s.u. | | F | # | - | - |
| pH | 0859-2 | WL | 8/10/2021 | (N)F | | | 7.04 | s.u. | | F | # | - | - |
| pH | 0859-3 | WL | 8/10/2021 | (N)F | | | 7.01 | s.u. | | F | # | - | - |
| pH | 0859-4 | WL | 8/10/2021 | (N)F | | | 7.13 | s.u. | | F | # | - | - |
| pH | 0860-2 | WL | 8/10/2021 | (N)F | | | 7.01 | s.u. | | F | # | - | - |
| pH | 0860-3 | WL | 8/10/2021 | (N)F | | | 6.97 | s.u. | | F | # | - | - |
| pH | 0860-4 | WL | 8/10/2021 | (N)F | | | 6.98 | s.u. | | F | # | - | - |
| **Specific Conductance** | | | | | | | | | | | | | |
| Specific Conductance | 0101 | WL | 8/10/2021 | (N)F | | | 1118 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0705 | WL | 8/11/2021 | (N)F | | | 1178 | umhos/cm | | FQ | # | - | - |
| Specific Conductance | 0707 | WL | 8/11/2021 | (N)F | | | 4433 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0716 | WL | 8/10/2021 | (N)F | | | 1738 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0717 | WL | 8/10/2021 | (N)F | | | 1870 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0718 | WL | 8/11/2021 | (N)F | | | 4191 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0719 | WL | 8/11/2021 | (N)F | | | 1307 | umhos/cm | | FQ | # | - | - |
| Specific Conductance | 0720 | WL | 8/11/2021 | (N)F | | | 550 | umhos/cm | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:02 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | 0721 | WL | 8/11/2021 | (N)F | | | 852 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0722R | WL | 8/11/2021 | (N)F | | | 794 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0723 | WL | 8/11/2021 | (N)F | | | 3737 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0727 | WL | 8/10/2021 | (N)F | | | 564 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0729 | WL | 8/10/2021 | (N)F | | | 658 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0730 | WL | 8/10/2021 | (N)F | | | 839 | umhos/cm | | FQ | # | - | - |
| Specific Conductance | 0732 | WL | 8/10/2021 | (N)F | | | 2824 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0784 | WL | 8/10/2021 | (N)F | | | 2789 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0788 | WL | 8/10/2021 | (N)F | | | 3085 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0789 | WL | 8/11/2021 | (N)F | | | 8254 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0824 | WL | 8/11/2021 | (N)F | | | 845 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0826 | WL | 8/10/2021 | (N)F | | | 2931 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0852-2 | WL | 8/10/2021 | (N)F | | | 1573 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0852-3 | WL | 8/10/2021 | (N)F | | | 1514 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0852-4 | WL | 8/10/2021 | (N)F | | | 1504 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0853-2 | WL | 8/10/2021 | (N)F | | | 3096 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0853-3 | WL | 8/10/2021 | (N)F | | | 3342 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0853-4 | WL | 8/10/2021 | (N)F | | | 3334 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0854-2 | WL | 8/10/2021 | (N)F | | | 3322 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0854-3 | WL | 8/10/2021 | (N)F | | | 3292 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0854-4 | WL | 8/10/2021 | (N)F | | | 3338 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0855-2 | WL | 8/11/2021 | (N)F | | | 9068 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0855-3 | WL | 8/11/2021 | (N)F | | | 9038 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0855-4 | WL | 8/11/2021 | (N)F | | | 9133 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0856-2 | WL | 8/10/2021 | (N)F | | | 6666 | umhos/cm | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:02 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | 0856-3 | WL | 8/10/2021 | (N)F | | | 6753 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0856-4 | WL | 8/10/2021 | (N)F | | | 6824 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0857-2 | WL | 8/10/2021 | (N)F | | | 6285 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0857-3 | WL | 8/10/2021 | (N)F | | | 6108 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0857-4 | WL | 8/10/2021 | (N)F | | | 6246 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0858-2 | WL | 8/10/2021 | (N)F | | | 4237 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0858-3 | WL | 8/10/2021 | (N)F | | | 4342 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0858-4 | WL | 8/10/2021 | (N)F | | | 4348 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0859-2 | WL | 8/10/2021 | (N)F | | | 2985 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0859-3 | WL | 8/10/2021 | (N)F | | | 3448 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0859-4 | WL | 8/10/2021 | (N)F | | | 4238 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0860-2 | WL | 8/10/2021 | (N)F | | | 4436 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0860-3 | WL | 8/10/2021 | (N)F | | | 3866 | umhos/cm | | F | # | - | - |
| Specific Conductance | 0860-4 | WL | 8/10/2021 | (N)F | | | 3792 | umhos/cm | | F | # | - | - |
| **Sulfate** | | | | | | | | | | | | | |
| Sulfate | 0101 | WL | 8/10/2021 | (N)F | | | 290 | mg/L | | FJ | # | 2.6 | - |
| Sulfate | 0705 | WL | 8/11/2021 | (N)F | | | 410 | mg/L | | FQ | # | 5.3 | - |
| Sulfate | 0707 | WL | 8/11/2021 | (N)F | | | 2200 | mg/L | | F | # | 26 | - |
| Sulfate | 0716 | WL | 8/10/2021 | (N)F | | | 600 | mg/L | | F | # | 5.3 | - |
| Sulfate | 0717 | WL | 8/10/2021 | (N)F | | | 680 | mg/L | | F | # | 5.3 | - |
| Sulfate | 0718 | WL | 8/11/2021 | (N)F | | | 2100 | mg/L | | F | # | 26 | - |
| Sulfate | 0719 | WL | 8/11/2021 | (N)F | | | 500 | mg/L | | FQ | # | 5.3 | - |
| Sulfate | 0720 | WL | 8/11/2021 | (N)F | | | 50 | mg/L | | F | # | 0.53 | - |
| Sulfate | 0721 | WL | 8/11/2021 | (N)F | | | 270 | mg/L | | F | # | 2.6 | - |
| Sulfate | 0722R | WL | 8/11/2021 | (N)F | | | 140 | mg/L | | F | # | 1.1 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:02 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sulfate | 0723 | WL | 8/11/2021 | (N)F | | | 1700 | mg/L | | F | # | 26 | - |
| Sulfate | 0727 | WL | 8/10/2021 | (N)F | | | 95 | mg/L | | F | # | 1.1 | - |
| Sulfate | 0729 | WL | 8/10/2021 | (N)F | | | 44 | mg/L | | F | # | 0.53 | - |
| Sulfate | 0730 | WL | 8/10/2021 | (N)F | | | 110 | mg/L | | FQ | # | 1.1 | - |
| Sulfate | 0732 | WL | 8/10/2021 | (N)F | | | 1400 | mg/L | | F | # | 13 | - |
| Sulfate | 0732 | WL | 8/10/2021 | (N)D | | | 1500 | mg/L | | FJ | # | 13 | - |
| Sulfate | 0784 | WL | 8/10/2021 | (N)F | | | 1600 | mg/L | | FJ | # | 13 | - |
| Sulfate | 0788 | WL | 8/10/2021 | (N)F | | | 1400 | mg/L | | FJ | # | 13 | - |
| Sulfate | 0789 | WL | 8/11/2021 | (N)F | | | 4500 | mg/L | | F | # | 53 | - |
| Sulfate | 0824 | WL | 8/11/2021 | (N)F | | | 93 | mg/L | | F | # | 1.1 | - |
| Sulfate | 0826 | WL | 8/10/2021 | (N)F | | | 1300 | mg/L | | FJ | # | 13 | - |
| Sulfate | 0852-2 | WL | 8/10/2021 | (N)F | | | 430 | mg/L | | F | # | 5.3 | - |
| Sulfate | 0852-3 | WL | 8/10/2021 | (N)F | | | 410 | mg/L | | F | # | 5.3 | - |
| Sulfate | 0852-4 | WL | 8/10/2021 | (N)D | | | 420 | mg/L | | FJ | # | 5.3 | - |
| Sulfate | 0852-4 | WL | 8/10/2021 | (N)F | | | 410 | mg/L | | F | # | 5.3 | - |
| Sulfate | 0853-2 | WL | 8/10/2021 | (N)F | | | 1300 | mg/L | | F | # | 13 | - |
| Sulfate | 0853-3 | WL | 8/10/2021 | (N)F | | | 1500 | mg/L | | F | # | 13 | - |
| Sulfate | 0853-4 | WL | 8/10/2021 | (N)F | | | 1500 | mg/L | | F | # | 13 | - |
| Sulfate | 0854-2 | WL | 8/10/2021 | (N)F | | | 1500 | mg/L | | F | # | 13 | - |
| Sulfate | 0854-3 | WL | 8/10/2021 | (N)F | | | 1400 | mg/L | | F | # | 13 | - |
| Sulfate | 0854-4 | WL | 8/10/2021 | (N)F | | | 1500 | mg/L | | F | # | 13 | - |
| Sulfate | 0855-2 | WL | 8/11/2021 | (N)F | | | 5000 | mg/L | | F | # | 53 | - |
| Sulfate | 0855-3 | WL | 8/11/2021 | (N)D | | | 5000 | mg/L | | F | # | 53 | - |
| Sulfate | 0855-3 | WL | 8/11/2021 | (N)F | | | 4900 | mg/L | | F | # | 53 | - |
| Sulfate | 0855-4 | WL | 8/11/2021 | (N)F | | | 5000 | mg/L | | F | # | 53 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:03 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sulfate | 0856-2 | WL | 8/10/2021 | (N)F | | | 3600 | mg/L | | F | # | 53 | - |
| Sulfate | 0856-3 | WL | 8/10/2021 | (N)F | | | 3900 | mg/L | | F | # | 53 | - |
| Sulfate | 0856-4 | WL | 8/10/2021 | (N)F | | | 3800 | mg/L | | F | # | 26 | - |
| Sulfate | 0857-2 | WL | 8/10/2021 | (N)F | | | 3500 | mg/L | | F | # | 26 | - |
| Sulfate | 0857-3 | WL | 8/10/2021 | (N)F | | | 3500 | mg/L | | F | # | 26 | - |
| Sulfate | 0857-4 | WL | 8/10/2021 | (N)F | | | 3500 | mg/L | | F | # | 26 | - |
| Sulfate | 0858-2 | WL | 8/10/2021 | (N)F | | | 2200 | mg/L | | F | # | 26 | - |
| Sulfate | 0858-3 | WL | 8/10/2021 | (N)F | | | 2200 | mg/L | | F | # | 26 | - |
| Sulfate | 0858-4 | WL | 8/10/2021 | (N)F | | | 2300 | mg/L | | F | # | 26 | - |
| Sulfate | 0859-2 | WL | 8/10/2021 | (N)F | | | 1600 | mg/L | | F | # | 11 | - |
| Sulfate | 0859-3 | WL | 8/10/2021 | (N)F | | | 2000 | mg/L | | F | # | 26 | - |
| Sulfate | 0859-4 | WL | 8/10/2021 | (N)F | | | 2400 | mg/L | | FJ | # | 26 | - |
| Sulfate | 0860-2 | WL | 8/10/2021 | (N)F | | | 2300 | mg/L | | FJ | # | 26 | - |
| Sulfate | 0860-3 | WL | 8/10/2021 | (N)F | | | 2000 | mg/L | | FJ | # | 26 | - |
| Sulfate | 0860-4 | WL | 8/10/2021 | (N)F | | | 2000 | mg/L | | FJ | # | 26 | - |
| **Temperature** | | | | | | | | | | | | | |
| Temperature | 0101 | WL | 8/10/2021 | (N)F | | | 12.89 | C | | F | # | - | - |
| Temperature | 0705 | WL | 8/11/2021 | (N)F | | | 12.18 | C | | FJQ | # | - | - |
| Temperature | 0707 | WL | 8/11/2021 | (N)F | | | 12.7 | C | | FJ | # | - | - |
| Temperature | 0716 | WL | 8/10/2021 | (N)F | | | 15.47 | C | | F | # | - | - |
| Temperature | 0717 | WL | 8/10/2021 | (N)F | | | 12.26 | C | | F | # | - | - |
| Temperature | 0718 | WL | 8/11/2021 | (N)F | | | 14.48 | C | | FJ | # | - | - |
| Temperature | 0719 | WL | 8/11/2021 | (N)F | | | 15.15 | C | | FJQ | # | - | - |
| Temperature | 0720 | WL | 8/11/2021 | (N)F | | | 13.94 | C | | FJ | # | - | - |
| Temperature | 0721 | WL | 8/11/2021 | (N)F | | | 12.09 | C | | FJ | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:03 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | 0722R | WL | 8/11/2021 | (N)F | | | 15.6 | C | | F | # | - | - |
| Temperature | 0723 | WL | 8/11/2021 | (N)F | | | 13.77 | C | | F | # | - | - |
| Temperature | 0727 | WL | 8/10/2021 | (N)F | | | 14.81 | C | | F | # | - | - |
| Temperature | 0729 | WL | 8/10/2021 | (N)F | | | 16.9 | C | | F | # | - | - |
| Temperature | 0730 | WL | 8/10/2021 | (N)F | | | 17.16 | C | | FQ | # | - | - |
| Temperature | 0732 | WL | 8/10/2021 | (N)F | | | 13.05 | C | | F | # | - | - |
| Temperature | 0784 | WL | 8/10/2021 | (N)F | | | 18.38 | C | | F | # | - | - |
| Temperature | 0788 | WL | 8/10/2021 | (N)F | | | 11.62 | C | | FJ | # | - | - |
| Temperature | 0789 | WL | 8/11/2021 | (N)F | | | 12.66 | C | | FJ | # | - | - |
| Temperature | 0824 | WL | 8/11/2021 | (N)F | | | 15.35 | C | | F | # | - | - |
| Temperature | 0826 | WL | 8/10/2021 | (N)F | | | 12.12 | C | | FJ | # | - | - |
| Temperature | 0852-2 | WL | 8/10/2021 | (N)F | | | 12.35 | C | | FJ | # | - | - |
| Temperature | 0852-3 | WL | 8/10/2021 | (N)F | | | 11.46 | C | | FJ | # | - | - |
| Temperature | 0852-4 | WL | 8/10/2021 | (N)F | | | 10.48 | C | | FJ | # | - | - |
| Temperature | 0853-2 | WL | 8/10/2021 | (N)F | | | 13.32 | C | | FJ | # | - | - |
| Temperature | 0853-3 | WL | 8/10/2021 | (N)F | | | 12.16 | C | | FJ | # | - | - |
| Temperature | 0853-4 | WL | 8/10/2021 | (N)F | | | 11.12 | C | | FJ | # | - | - |
| Temperature | 0854-2 | WL | 8/10/2021 | (N)F | | | 13.08 | C | | FJ | # | - | - |
| Temperature | 0854-3 | WL | 8/10/2021 | (N)F | | | 12.3 | C | | FJ | # | - | - |
| Temperature | 0854-4 | WL | 8/10/2021 | (N)F | | | 11.89 | C | | FJ | # | - | - |
| Temperature | 0855-2 | WL | 8/11/2021 | (N)F | | | 14.01 | C | | FJ | # | - | - |
| Temperature | 0855-3 | WL | 8/11/2021 | (N)F | | | 13.95 | C | | FJ | # | - | - |
| Temperature | 0855-4 | WL | 8/11/2021 | (N)F | | | 11.81 | C | | FJ | # | - | - |
| Temperature | 0856-2 | WL | 8/10/2021 | (N)F | | | 16.34 | C | | FJ | # | - | - |
| Temperature | 0856-3 | WL | 8/10/2021 | (N)F | | | 16.04 | C | | FJ | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:03 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature | 0856-4 | WL | 8/10/2021 | (N)F | | | 15.15 | C | | FJ | # | - | - |
| Temperature | 0857-2 | WL | 8/10/2021 | (N)F | | | 18.71 | C | | FJ | # | - | - |
| Temperature | 0857-3 | WL | 8/10/2021 | (N)F | | | 18.08 | C | | FJ | # | - | - |
| Temperature | 0857-4 | WL | 8/10/2021 | (N)F | | | 16.4 | C | | FJ | # | - | - |
| Temperature | 0858-2 | WL | 8/10/2021 | (N)F | | | 13.03 | C | | FJ | # | - | - |
| Temperature | 0858-3 | WL | 8/10/2021 | (N)F | | | 12.89 | C | | FJ | # | - | - |
| Temperature | 0858-4 | WL | 8/10/2021 | (N)F | | | 11.51 | C | | FJ | # | - | - |
| Temperature | 0859-2 | WL | 8/10/2021 | (N)F | | | 18.39 | C | | F | # | - | - |
| Temperature | 0859-3 | WL | 8/10/2021 | (N)F | | | 17.35 | C | | F | # | - | - |
| Temperature | 0859-4 | WL | 8/10/2021 | (N)F | | | 15.94 | C | | F | # | - | - |
| Temperature | 0860-2 | WL | 8/10/2021 | (N)F | | | 17.43 | C | | F | # | - | - |
| Temperature | 0860-3 | WL | 8/10/2021 | (N)F | | | 16.68 | C | | F | # | - | - |
| Temperature | 0860-4 | WL | 8/10/2021 | (N)F | | | 15.27 | C | | F | # | - | - |
| **Turbidity** | | | | | | | | | | | | | |
| Turbidity | 0101 | WL | 8/10/2021 | (N)F | | | 5.01 | NTU | | F | # | - | - |
| Turbidity | 0705 | WL | 8/11/2021 | (N)F | | | 5.94 | NTU | | FQ | # | - | - |
| Turbidity | 0707 | WL | 8/11/2021 | (N)F | | | 1.28 | NTU | | F | # | - | - |
| Turbidity | 0716 | WL | 8/10/2021 | (N)F | | | 3.57 | NTU | | F | # | - | - |
| Turbidity | 0717 | WL | 8/10/2021 | (N)F | | | 3.4 | NTU | | F | # | - | - |
| Turbidity | 0718 | WL | 8/11/2021 | (N)F | | | 8.54 | NTU | | F | # | - | - |
| Turbidity | 0719 | WL | 8/11/2021 | (N)F | | | 6.12 | NTU | | FQ | # | - | - |
| Turbidity | 0720 | WL | 8/11/2021 | (N)F | | | 0.75 | NTU | | F | # | - | - |
| Turbidity | 0721 | WL | 8/11/2021 | (N)F | | | 1.41 | NTU | | F | # | - | - |
| Turbidity | 0722R | WL | 8/11/2021 | (N)F | | | 0.47 | NTU | | F | # | - | - |
| Turbidity | 0723 | WL | 8/11/2021 | (N)F | | | 2 | NTU | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:03 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turbidity | 0727 | WL | 8/10/2021 | (N)F | | | 2.7 | NTU | | F | # | - | - |
| Turbidity | 0729 | WL | 8/10/2021 | (N)F | | | 0.95 | NTU | | F | # | - | - |
| Turbidity | 0730 | WL | 8/10/2021 | (N)F | | | 10.5 | NTU | | FQ | # | - | - |
| Turbidity | 0732 | WL | 8/10/2021 | (N)F | | | 0.56 | NTU | | F | # | - | - |
| Turbidity | 0784 | WL | 8/10/2021 | (N)F | | | 1.47 | NTU | | F | # | - | - |
| Turbidity | 0788 | WL | 8/10/2021 | (N)F | | | 2.41 | NTU | | F | # | - | - |
| Turbidity | 0789 | WL | 8/11/2021 | (N)F | | | 1.23 | NTU | | F | # | - | - |
| Turbidity | 0824 | WL | 8/11/2021 | (N)F | | | 3.13 | NTU | | F | # | - | - |
| Turbidity | 0826 | WL | 8/10/2021 | (N)F | | | 1.62 | NTU | | F | # | - | - |
| Turbidity | 0852-2 | WL | 8/10/2021 | (N)F | | | 2.65 | NTU | | F | # | - | - |
| Turbidity | 0852-3 | WL | 8/10/2021 | (N)F | | | 1.5 | NTU | | F | # | - | - |
| Turbidity | 0852-4 | WL | 8/10/2021 | (N)F | | | 1.65 | NTU | | F | # | - | - |
| Turbidity | 0853-2 | WL | 8/10/2021 | (N)F | | | 1.91 | NTU | | F | # | - | - |
| Turbidity | 0853-3 | WL | 8/10/2021 | (N)F | | | 1.21 | NTU | | F | # | - | - |
| Turbidity | 0853-4 | WL | 8/10/2021 | (N)F | | | 2.97 | NTU | | F | # | - | - |
| Turbidity | 0854-2 | WL | 8/10/2021 | (N)F | | | 0.46 | NTU | | F | # | - | - |
| Turbidity | 0854-3 | WL | 8/10/2021 | (N)F | | | 0.58 | NTU | | F | # | - | - |
| Turbidity | 0854-4 | WL | 8/10/2021 | (N)F | | | 1.54 | NTU | | F | # | - | - |
| Turbidity | 0855-2 | WL | 8/11/2021 | (N)F | | | 1.03 | NTU | | F | # | - | - |
| Turbidity | 0855-3 | WL | 8/11/2021 | (N)F | | | 1.19 | NTU | | F | # | - | - |
| Turbidity | 0855-4 | WL | 8/11/2021 | (N)F | | | 0.45 | NTU | | F | # | - | - |
| Turbidity | 0856-2 | WL | 8/10/2021 | (N)F | | | 0.93 | NTU | | F | # | - | - |
| Turbidity | 0856-3 | WL | 8/10/2021 | (N)F | | | 0.72 | NTU | | F | # | - | - |
| Turbidity | 0856-4 | WL | 8/10/2021 | (N)F | | | 3.29 | NTU | | F | # | - | - |
| Turbidity | 0857-2 | WL | 8/10/2021 | (N)F | | | 0.83 | NTU | | F | # | - | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:04 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turbidity | 0857-3 | WL | 8/10/2021 | (N)F | | | 0.47 | NTU | | F | # | - | - |
| Turbidity | 0857-4 | WL | 8/10/2021 | (N)F | | | 3.44 | NTU | | F | # | - | - |
| Turbidity | 0858-2 | WL | 8/10/2021 | (N)F | | | 0.59 | NTU | | F | # | - | - |
| Turbidity | 0858-3 | WL | 8/10/2021 | (N)F | | | 0.47 | NTU | | F | # | - | - |
| Turbidity | 0858-4 | WL | 8/10/2021 | (N)F | | | 1.78 | NTU | | F | # | - | - |
| Turbidity | 0859-2 | WL | 8/10/2021 | (N)F | | | 0.51 | NTU | | F | # | - | - |
| Turbidity | 0859-3 | WL | 8/10/2021 | (N)F | | | 0.33 | NTU | | F | # | - | - |
| Turbidity | 0859-4 | WL | 8/10/2021 | (N)F | | | 5.51 | NTU | | F | # | - | - |
| Turbidity | 0860-2 | WL | 8/10/2021 | (N)F | | | 0.62 | NTU | | F | # | - | - |
| Turbidity | 0860-3 | WL | 8/10/2021 | (N)F | | | 0.33 | NTU | | F | # | - | - |
| Turbidity | 0860-4 | WL | 8/10/2021 | (N)F | | | 1.42 | NTU | | F | # | - | - |
| **Uranium** | | | | | | | | | | | | | |
| Uranium | 0101 | WL | 8/10/2021 | (T)F | | | 0.019 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0705 | WL | 8/11/2021 | (T)F | | | 0.00016 | mg/L | | FQ | # | 0.00004 | - |
| Uranium | 0707 | WL | 8/11/2021 | (T)F | | | 0.7 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0716 | WL | 8/10/2021 | (T)F | | | 0.21 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0717 | WL | 8/10/2021 | (T)F | | | 0.00007 | mg/L | J | F | # | 0.00004 | - |
| Uranium | 0718 | WL | 8/11/2021 | (T)F | | | 0.11 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0719 | WL | 8/11/2021 | (T)F | | | 0.00025 | mg/L | | FQ | # | 0.00004 | - |
| Uranium | 0720 | WL | 8/11/2021 | (T)F | | | 0.0036 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0721 | WL | 8/11/2021 | (T)F | | | 0.00011 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0722R | WL | 8/11/2021 | (T)F | | | 0.14 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0723 | WL | 8/11/2021 | (T)F | | | 0.00004 | mg/L | U | F | # | 0.00004 | - |
| Uranium | 0727 | WL | 8/10/2021 | (T)F | | | 0.0031 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0729 | WL | 8/10/2021 | (T)F | | | 0.0045 | mg/L | | F | # | 0.00004 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:04 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uranium | 0730 | WL | 8/10/2021 | (D)F | | | 0.0047 | mg/L | | FQ | # | 0.00004 | - |
| Uranium | 0732 | WL | 8/10/2021 | (T)F | | | 0.0045 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0732 | WL | 8/10/2021 | (T)D | | | 0.0049 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0784 | WL | 8/10/2021 | (T)F | | | 0.0021 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0788 | WL | 8/10/2021 | (T)F | | | 0.032 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0789 | WL | 8/11/2021 | (T)F | | | 1.2 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0824 | WL | 8/11/2021 | (T)F | | | 0.011 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0826 | WL | 8/10/2021 | (T)F | | | 0.028 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0852-2 | WL | 8/10/2021 | (T)F | | | 0.017 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0852-3 | WL | 8/10/2021 | (T)F | | | 0.016 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0852-4 | WL | 8/10/2021 | (T)D | | | 0.017 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0852-4 | WL | 8/10/2021 | (T)F | | | 0.016 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0853-2 | WL | 8/10/2021 | (T)F | | | 0.032 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0853-3 | WL | 8/10/2021 | (T)F | | | 0.033 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0853-4 | WL | 8/10/2021 | (T)F | | | 0.033 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0854-2 | WL | 8/10/2021 | (T)F | | | 0.033 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0854-3 | WL | 8/10/2021 | (T)F | | | 0.036 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0854-4 | WL | 8/10/2021 | (T)F | | | 0.036 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0855-2 | WL | 8/11/2021 | (T)F | | | 0.98 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0855-3 | WL | 8/11/2021 | (T)D | | | 0.93 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0855-3 | WL | 8/11/2021 | (T)F | | | 0.95 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0855-4 | WL | 8/11/2021 | (T)F | | | 0.7 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0856-2 | WL | 8/10/2021 | (T)F | | | 1 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0856-3 | WL | 8/10/2021 | (T)F | | | 0.97 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0856-4 | WL | 8/10/2021 | (T)F | | | 1 | mg/L | | F | # | 0.00004 | - |

## GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (EQuIS200) FOR SITE RVT01, Riverton Processing Site

**REPORT DATE: 3/11/2022 11:11:04 AM**

| PARAMETER | LOCATION CODE/TYPE | | SAMPLE DATE | SAMPLE TYPE | DEPTH RANGE (FT BLS) | | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECTION LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uranium | 0857-2 | WL | 8/10/2021 | (T)F | | | 1.1 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0857-3 | WL | 8/10/2021 | (T)F | | | 1 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0857-4 | WL | 8/10/2021 | (T)F | | | 1.1 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0858-2 | WL | 8/10/2021 | (T)F | | | 0.77 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0858-3 | WL | 8/10/2021 | (T)F | | | 0.73 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0858-4 | WL | 8/10/2021 | (T)F | | | 0.74 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0859-2 | WL | 8/10/2021 | (T)F | | | 0.019 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0859-3 | WL | 8/10/2021 | (T)F | | | 0.034 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0859-4 | WL | 8/10/2021 | (T)F | | | 0.12 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0860-2 | WL | 8/10/2021 | (T)F | | | 1.4 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0860-3 | WL | 8/10/2021 | (T)F | | | 0.86 | mg/L | | F | # | 0.00004 | - |
| Uranium | 0860-4 | WL | 8/10/2021 | (T)F | | | 0.79 | mg/L | | F | # | 0.00004 | - |

**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:**

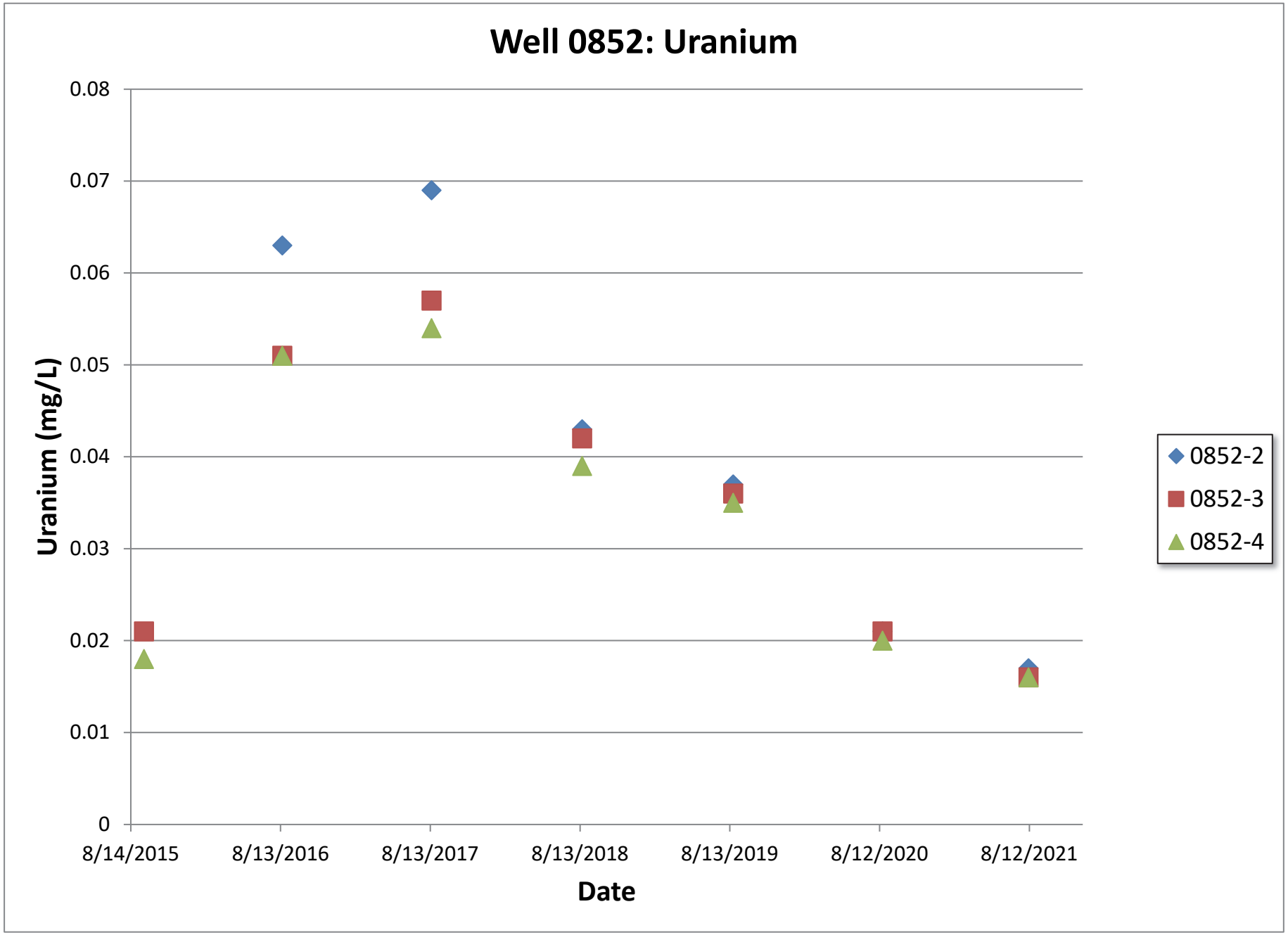
Fraction:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

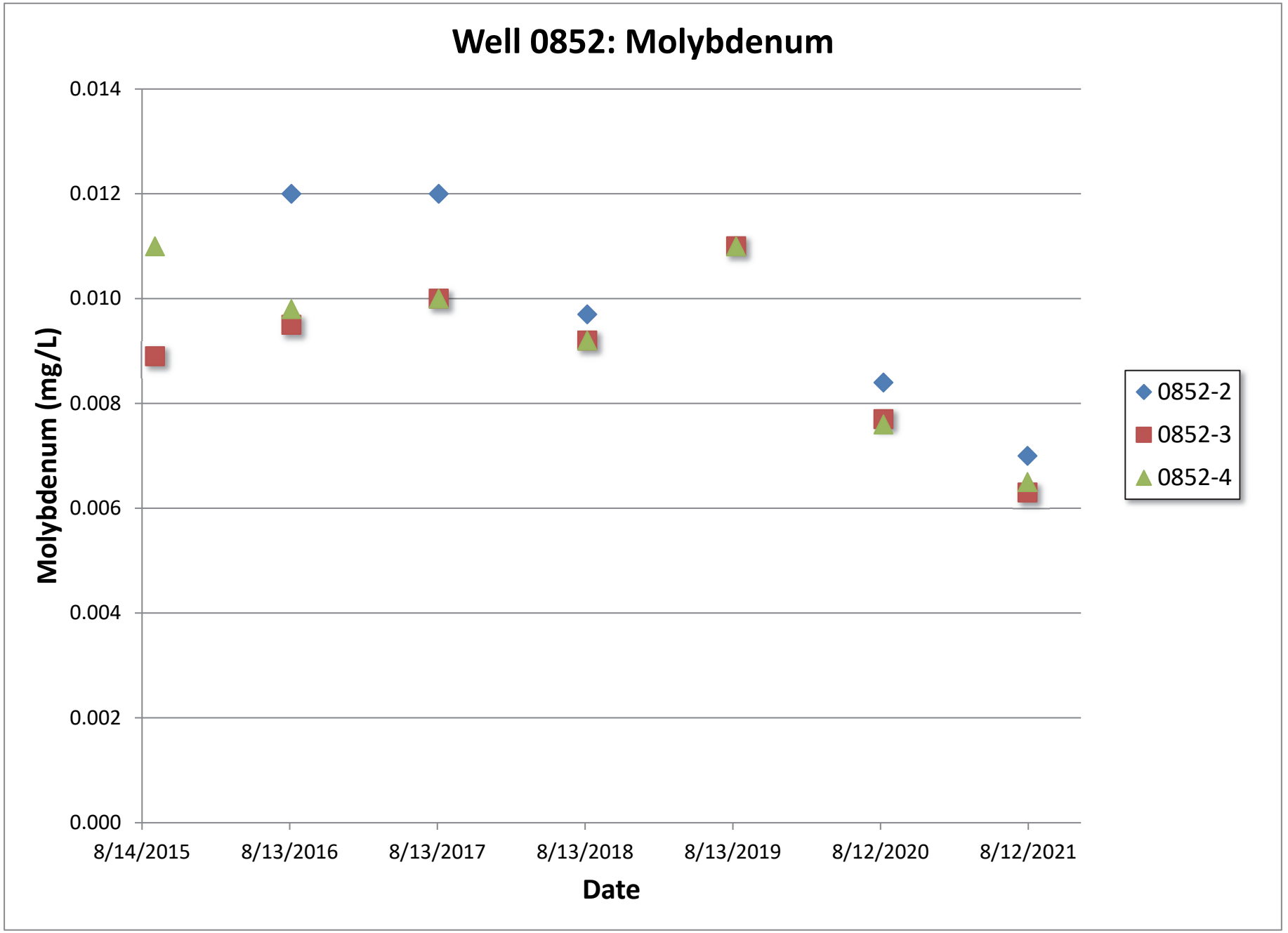
Type Codes:
F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

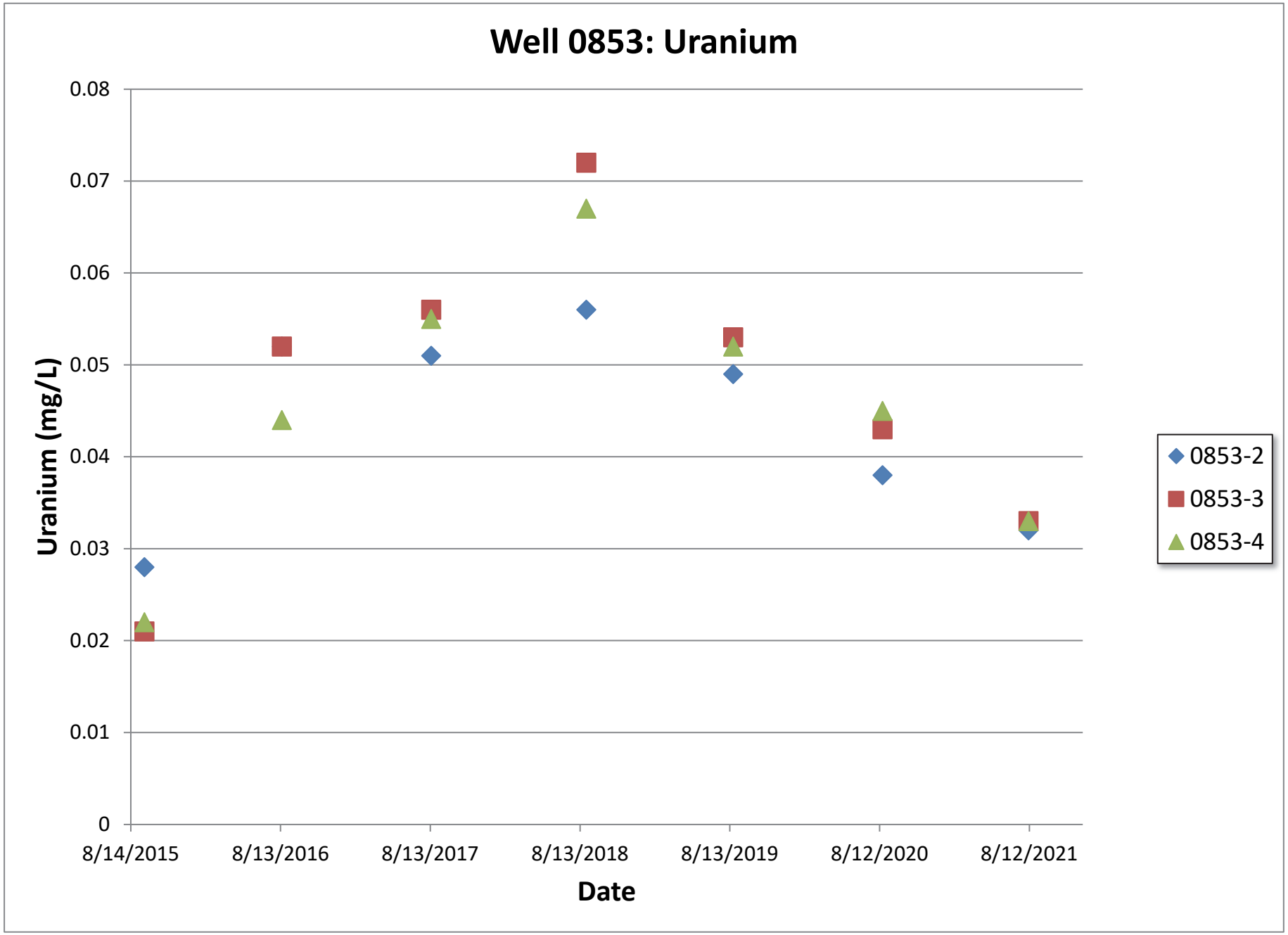
**QA QUALIFIER: # = validated according to Quality Assurance guidelines.**

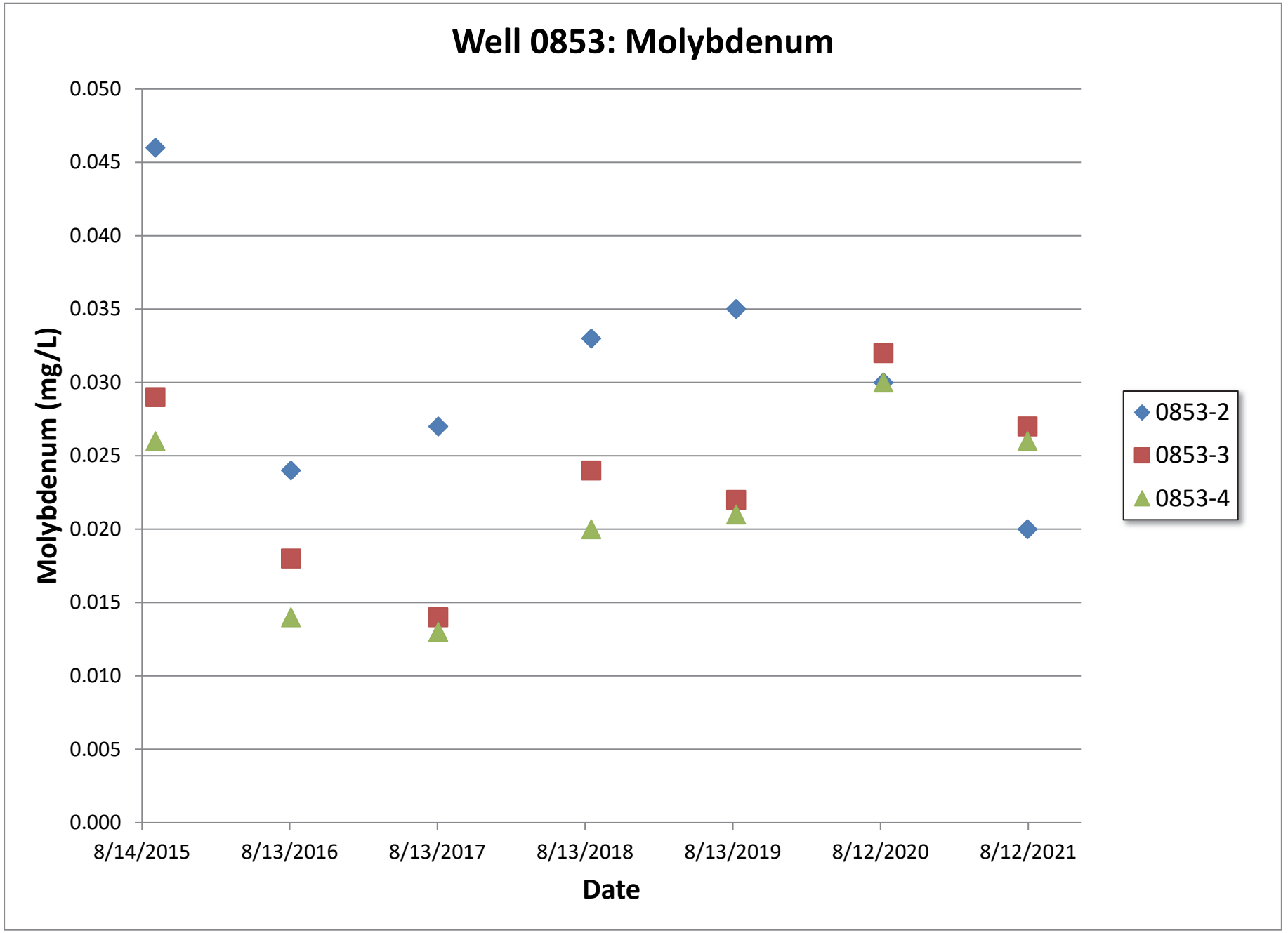
# Appendix D

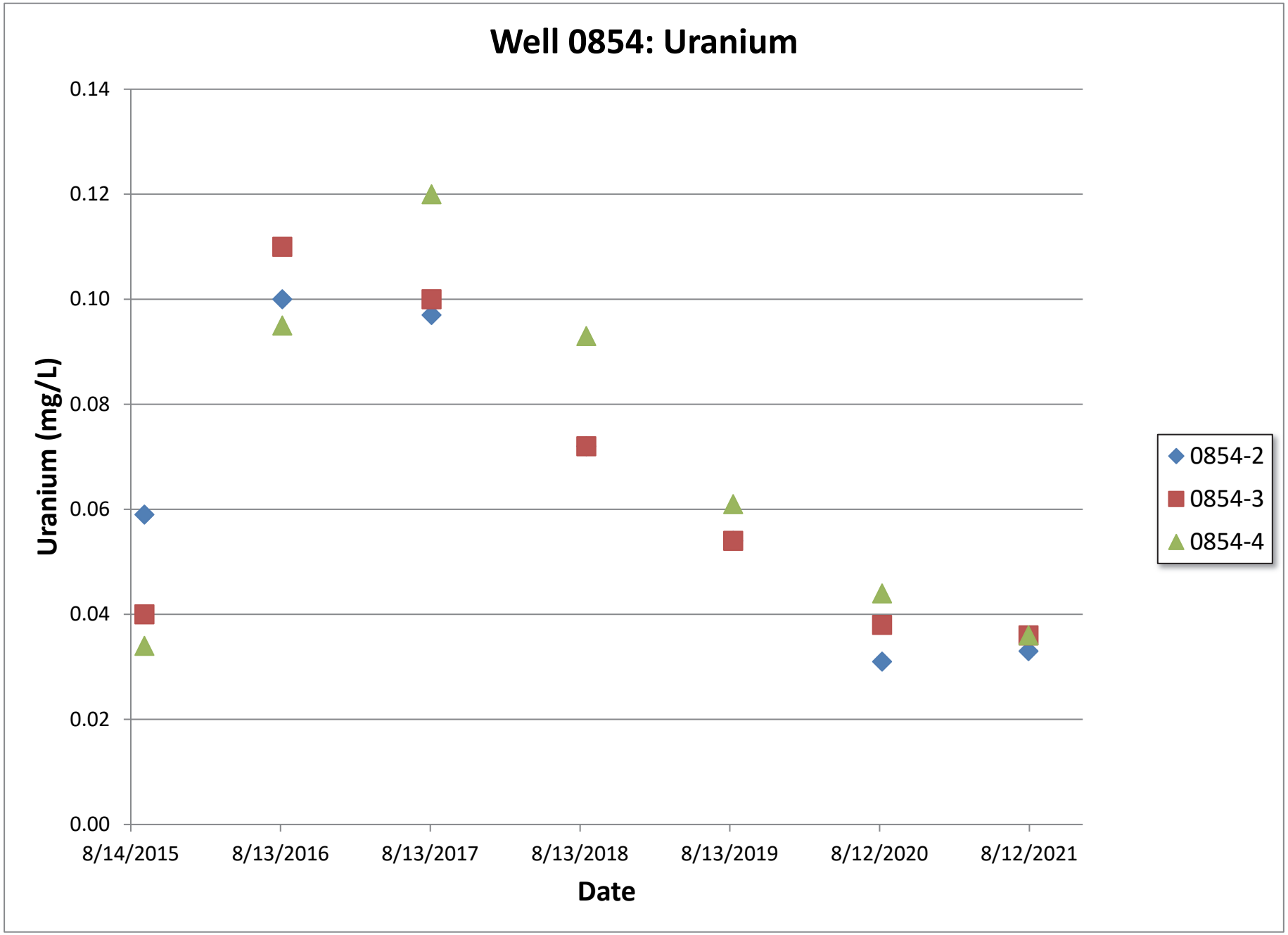
# Multilevel Monitoring Well Graphs

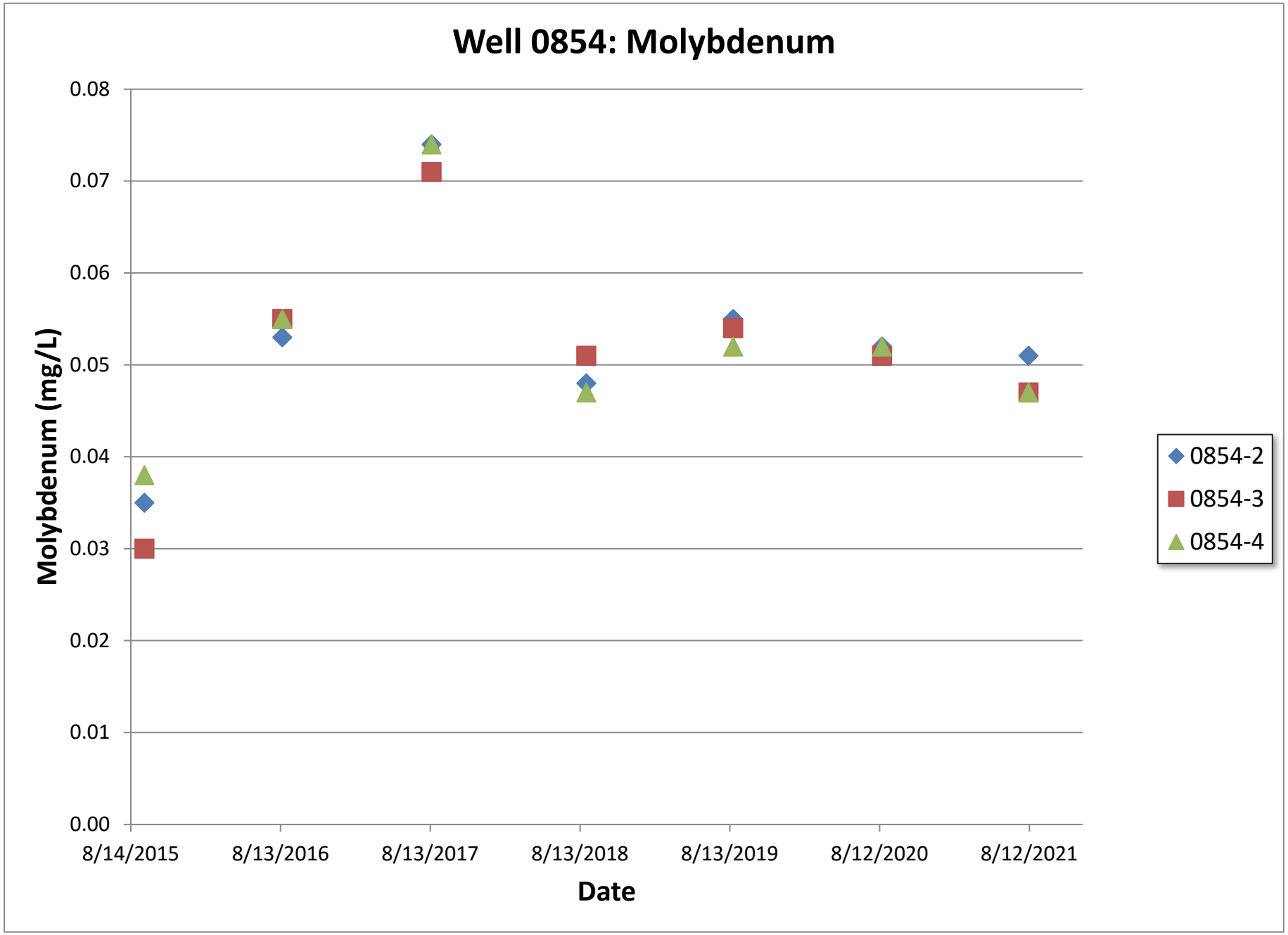

Well 0852: Uranium
Uranium (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0852-2
0852-3
0852-4

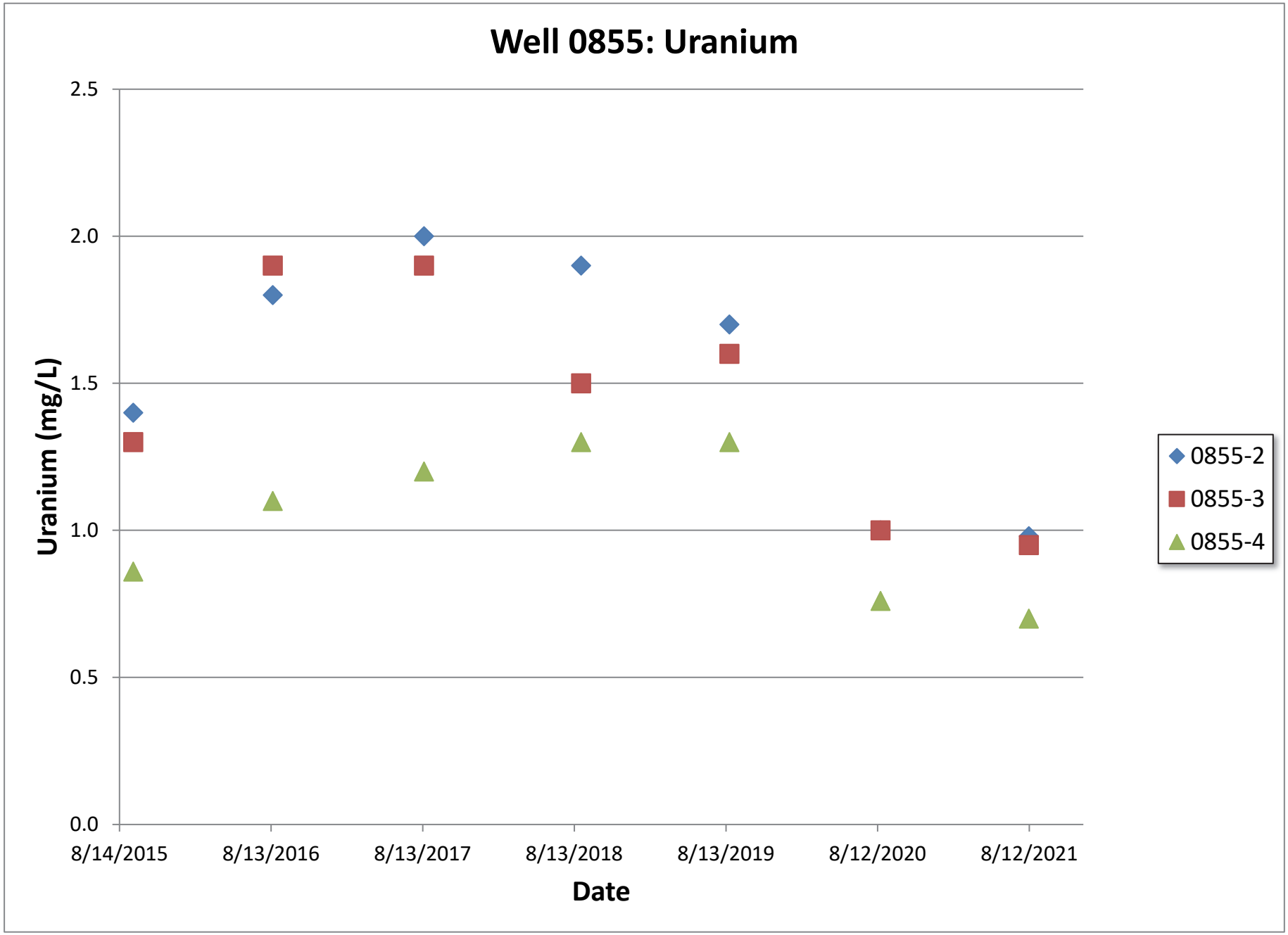

Well 0852: Molybdenum
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Molybdenum (mg/L)
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0852-2
0852-3
0852-4

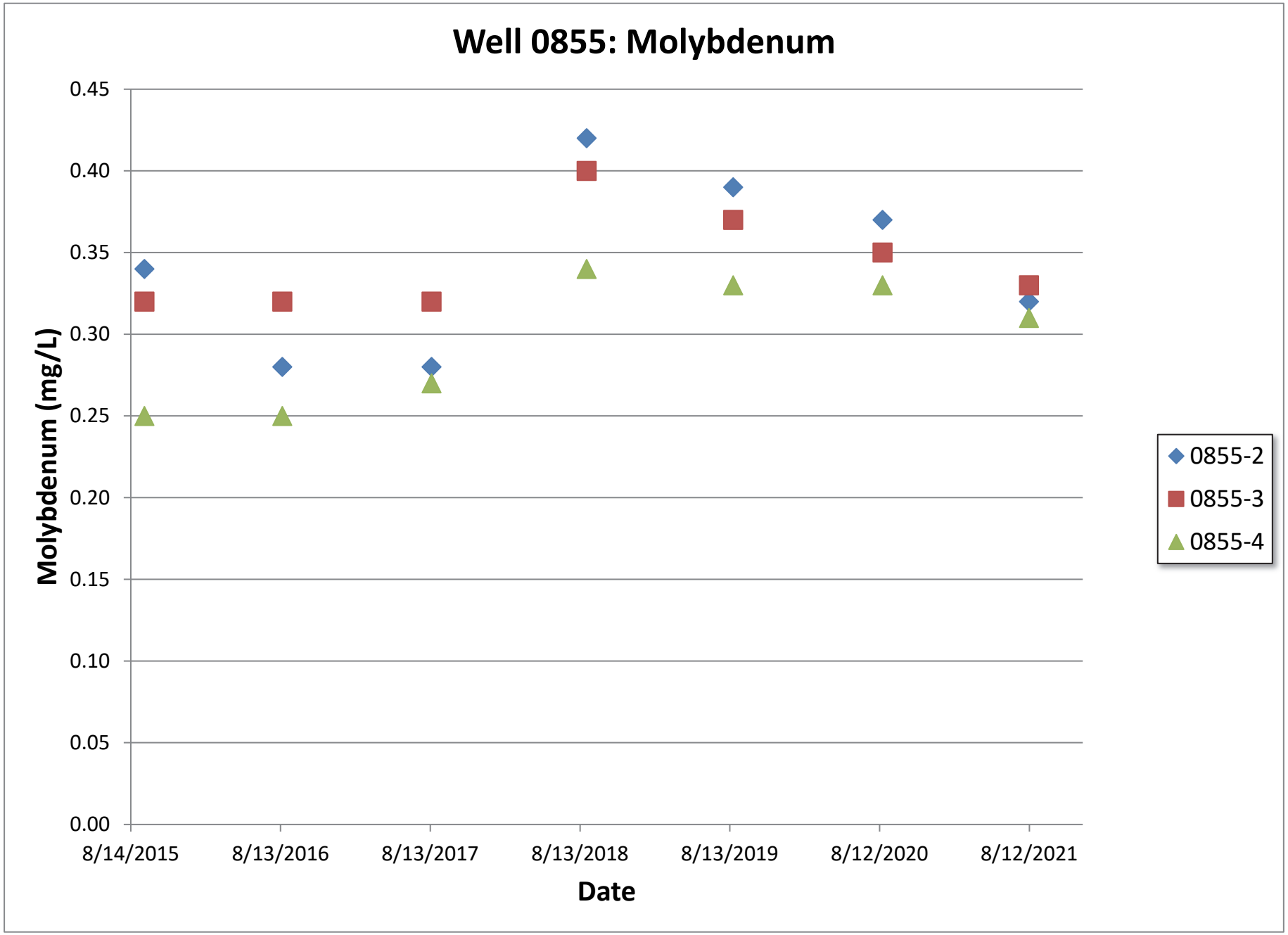

Well 0853: Uranium
Uranium (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0853-2
0853-3
0853-4

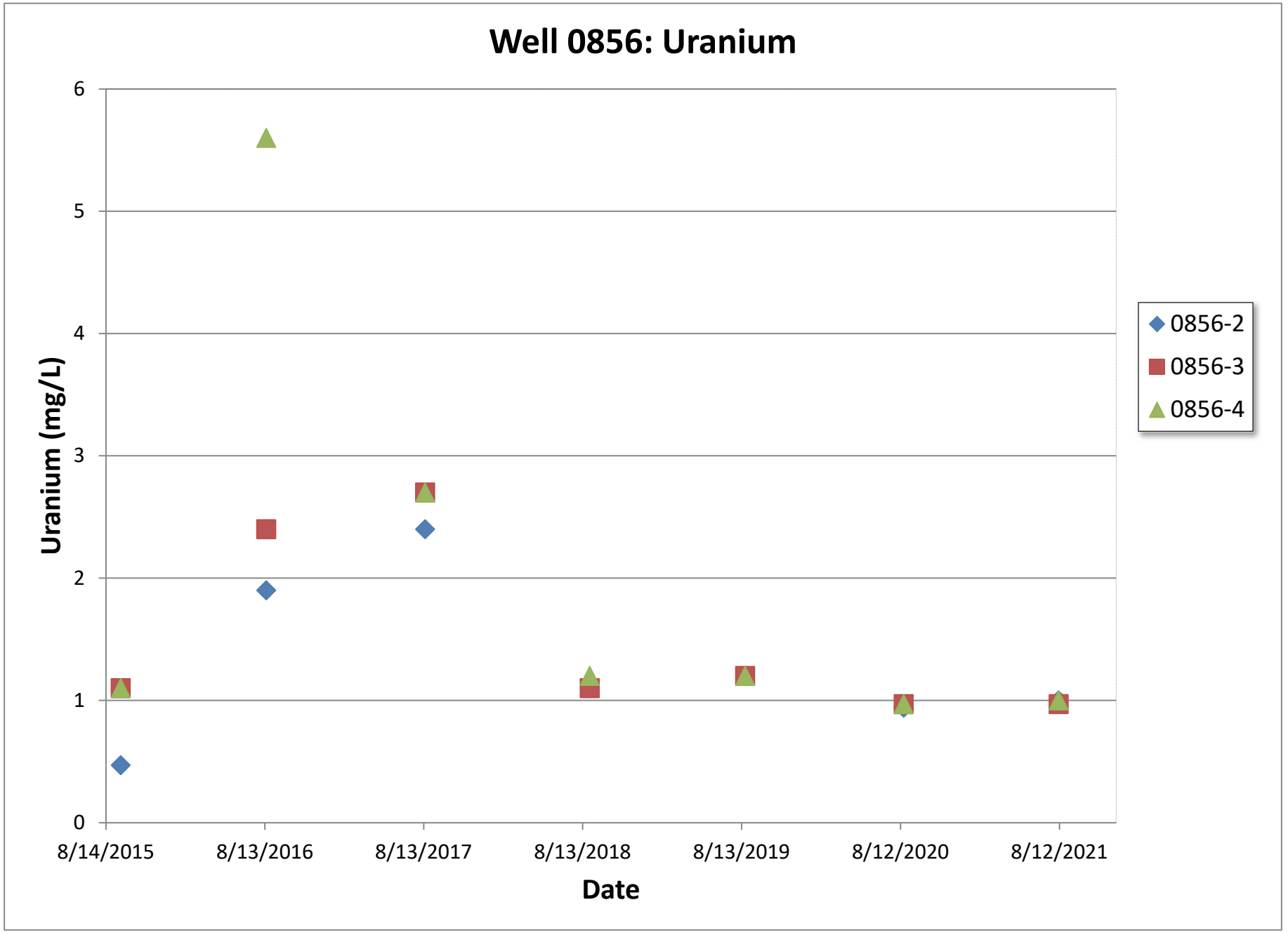

Well 0853: Molybdenum
Molybdenum (mg/L)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0853-2
0853-3
0853-4

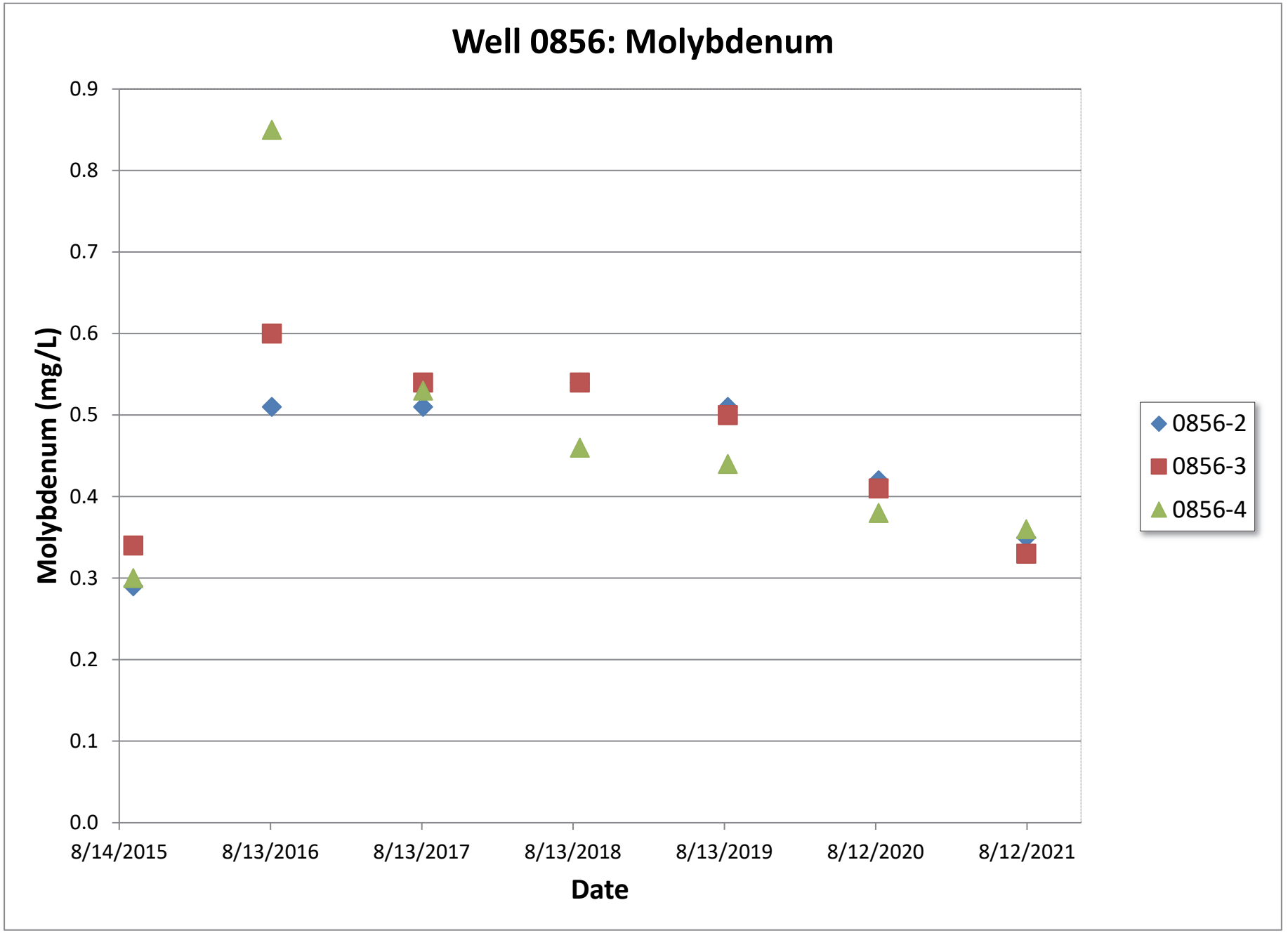

Well 0854: Uranium
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Uranium (mg/L)
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0854-2
0854-3
0854-4

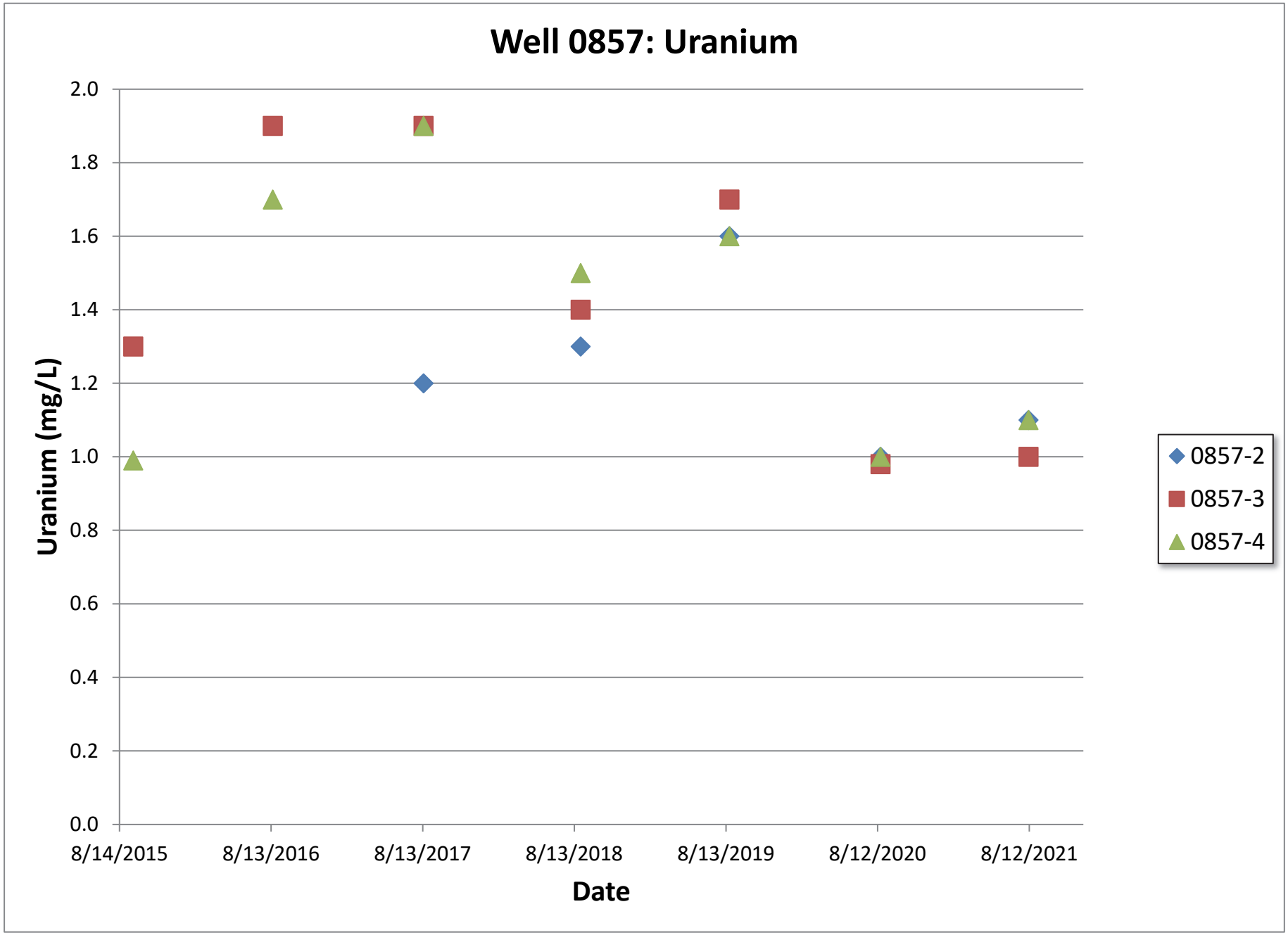

Well 0854: Molybdenum
Molybdenum (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0854-2
0854-3
0854-4

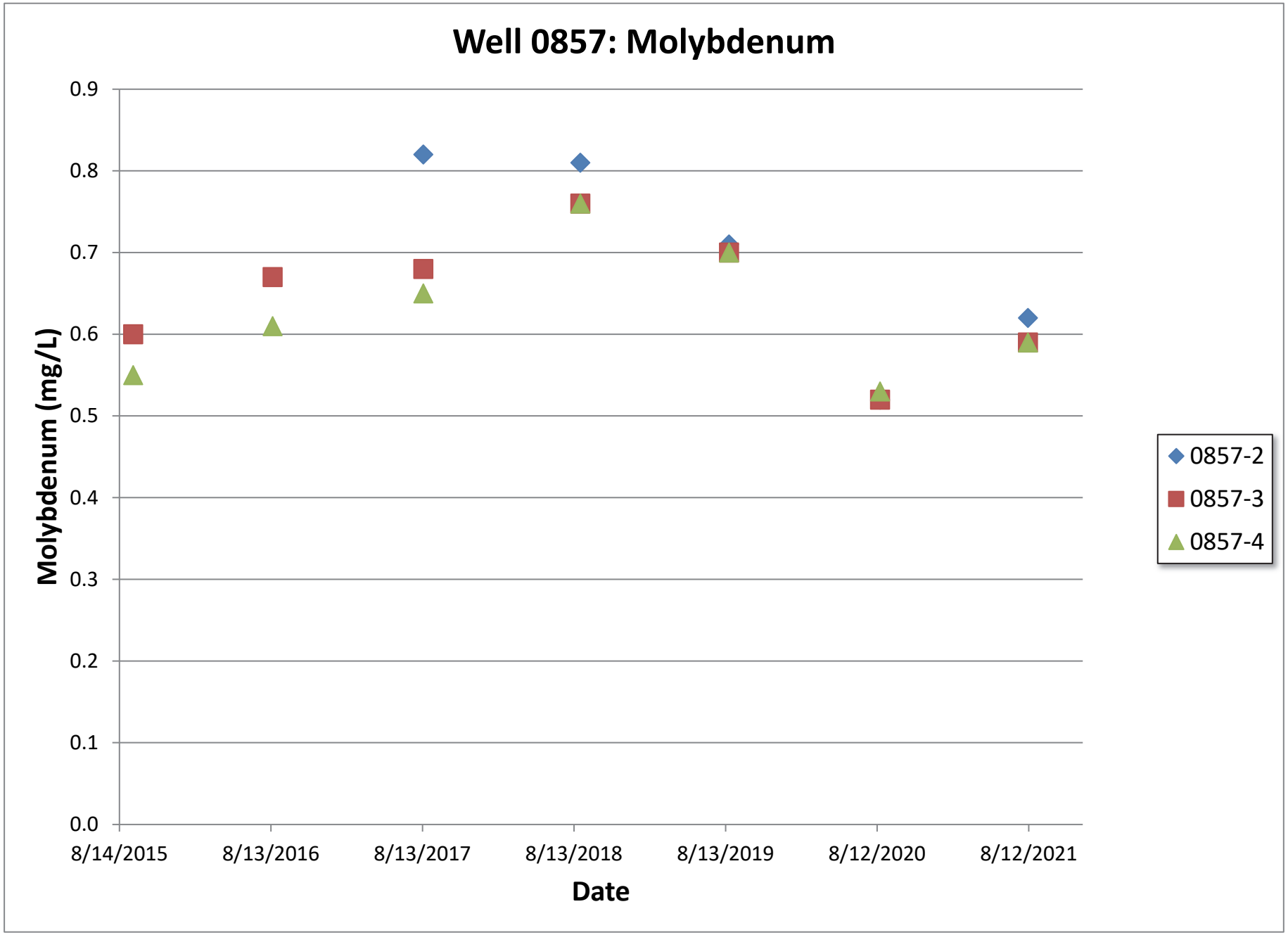

Well 0855: Uranium
Uranium (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0855-2
0855-3
0855-4

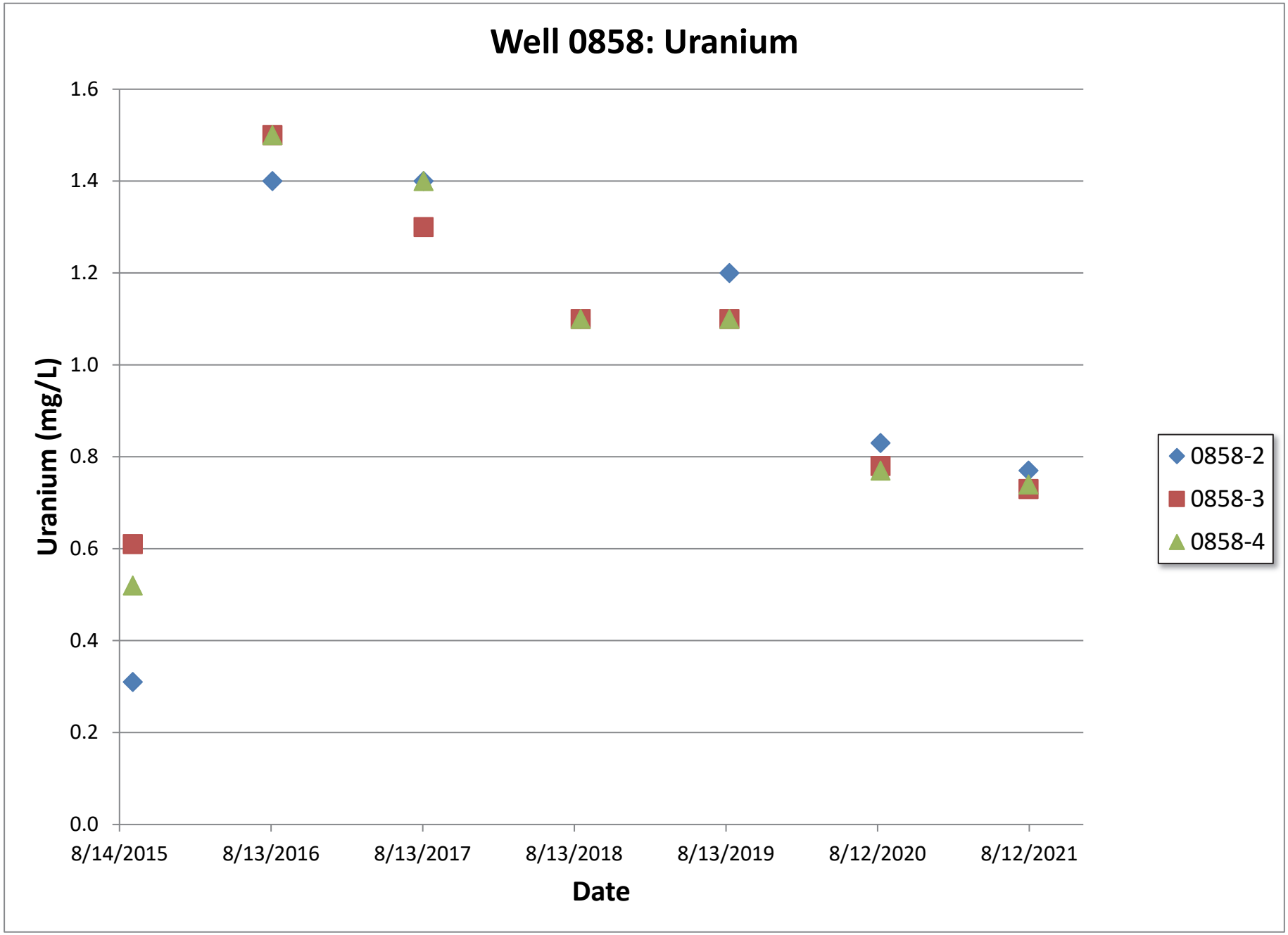

Well 0855: Molybdenum
Molybdenum (mg/L)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0855-2
0855-3
0855-4

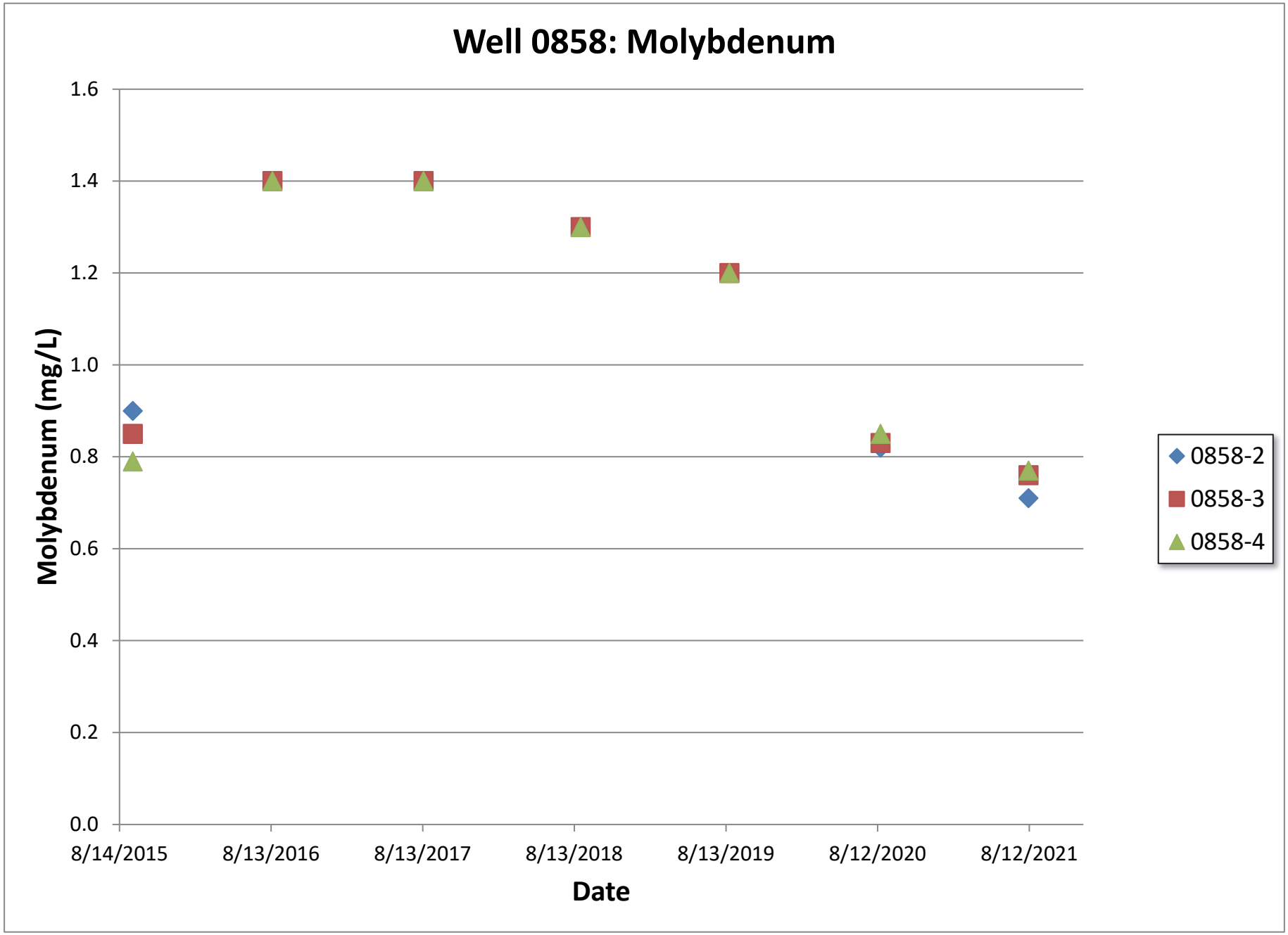

Well 0856: Uranium
Uranium (mg/L)
6
5
4
3
2
1
0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0856-2
0856-3
0856-4

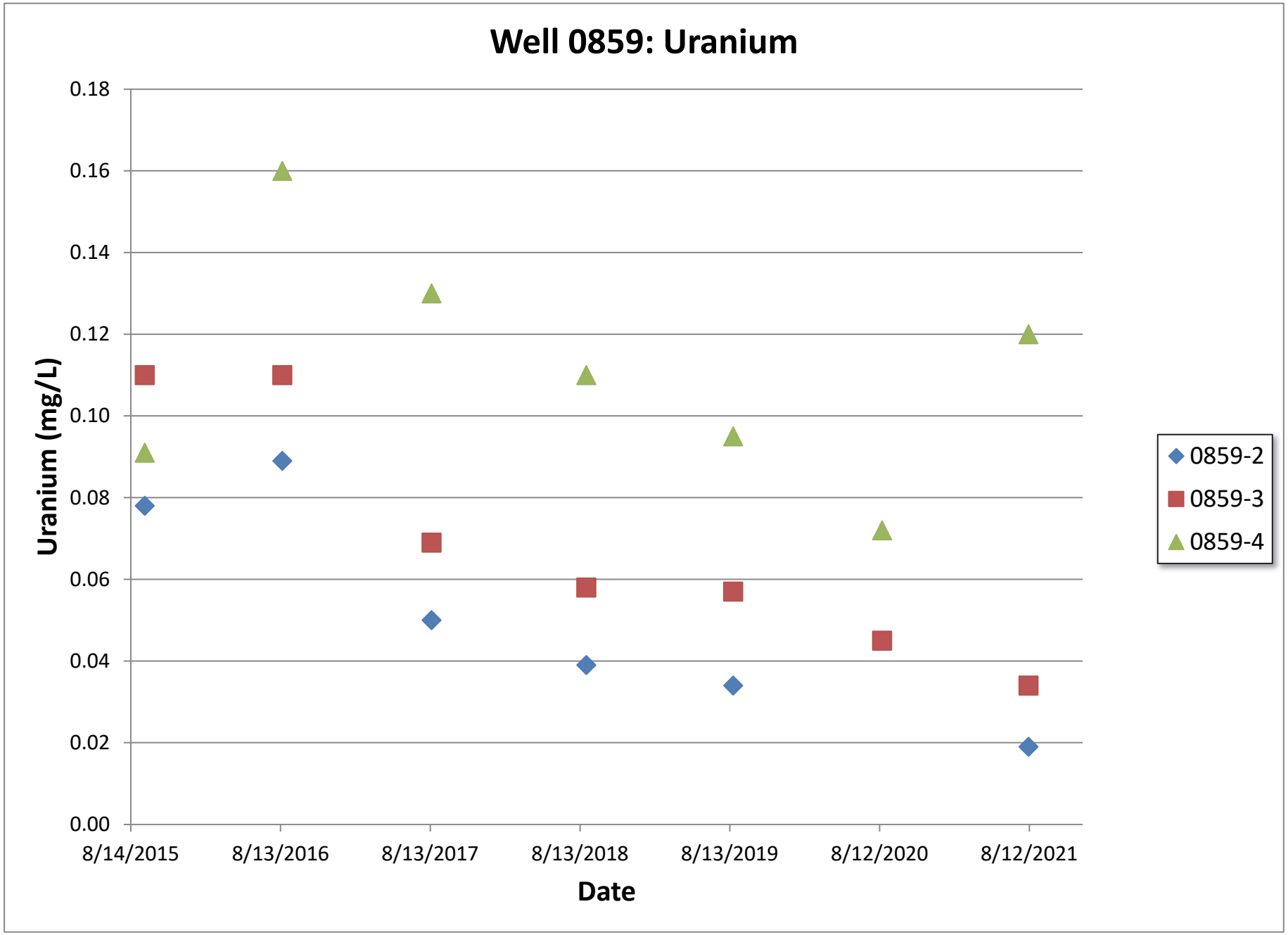

Well 0856: Molybdenum
Molybdenum (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0856-2
0856-3
0856-4

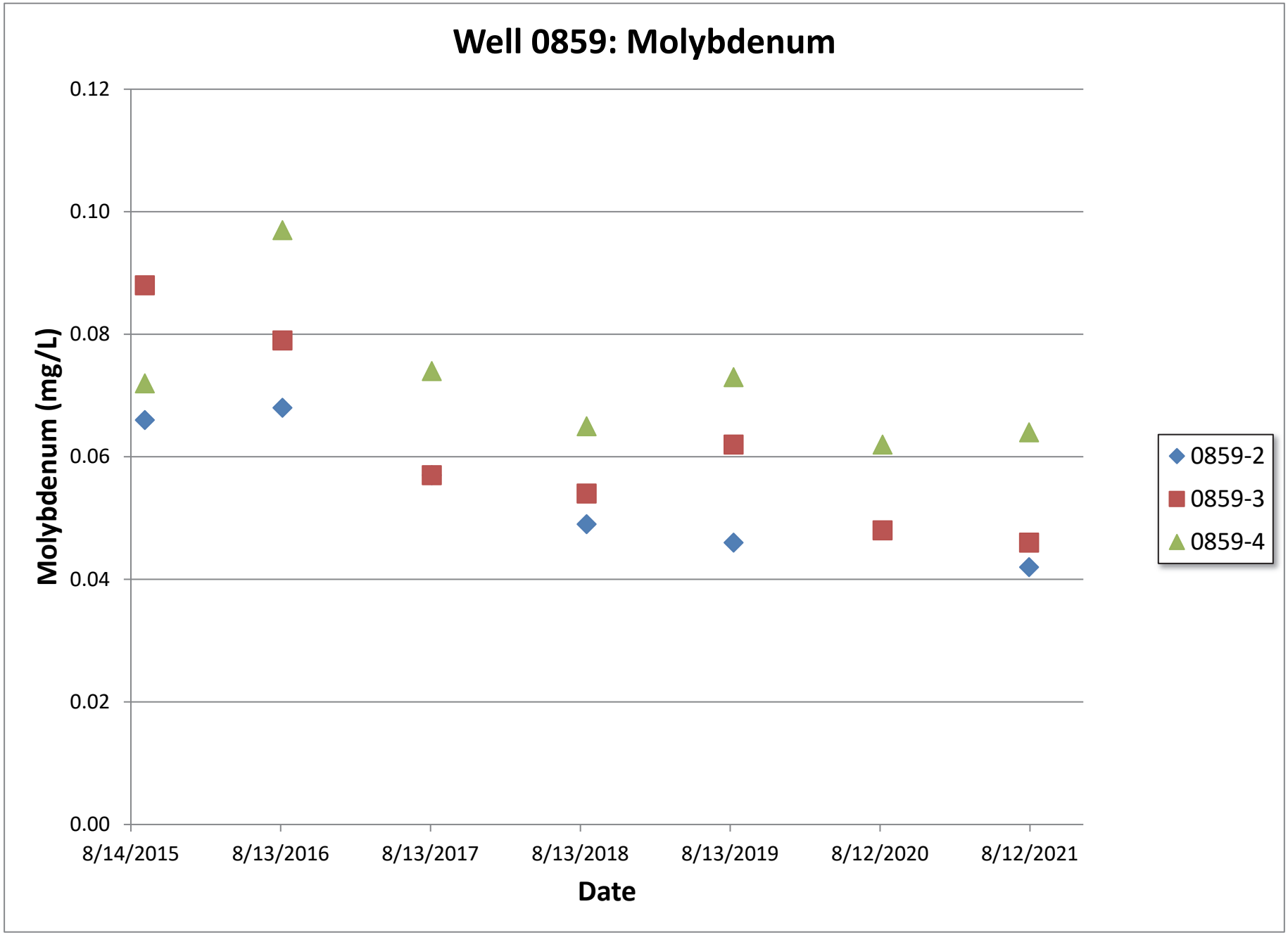

Well 0857: Uranium
Uranium (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0857-2
0857-3
0857-4

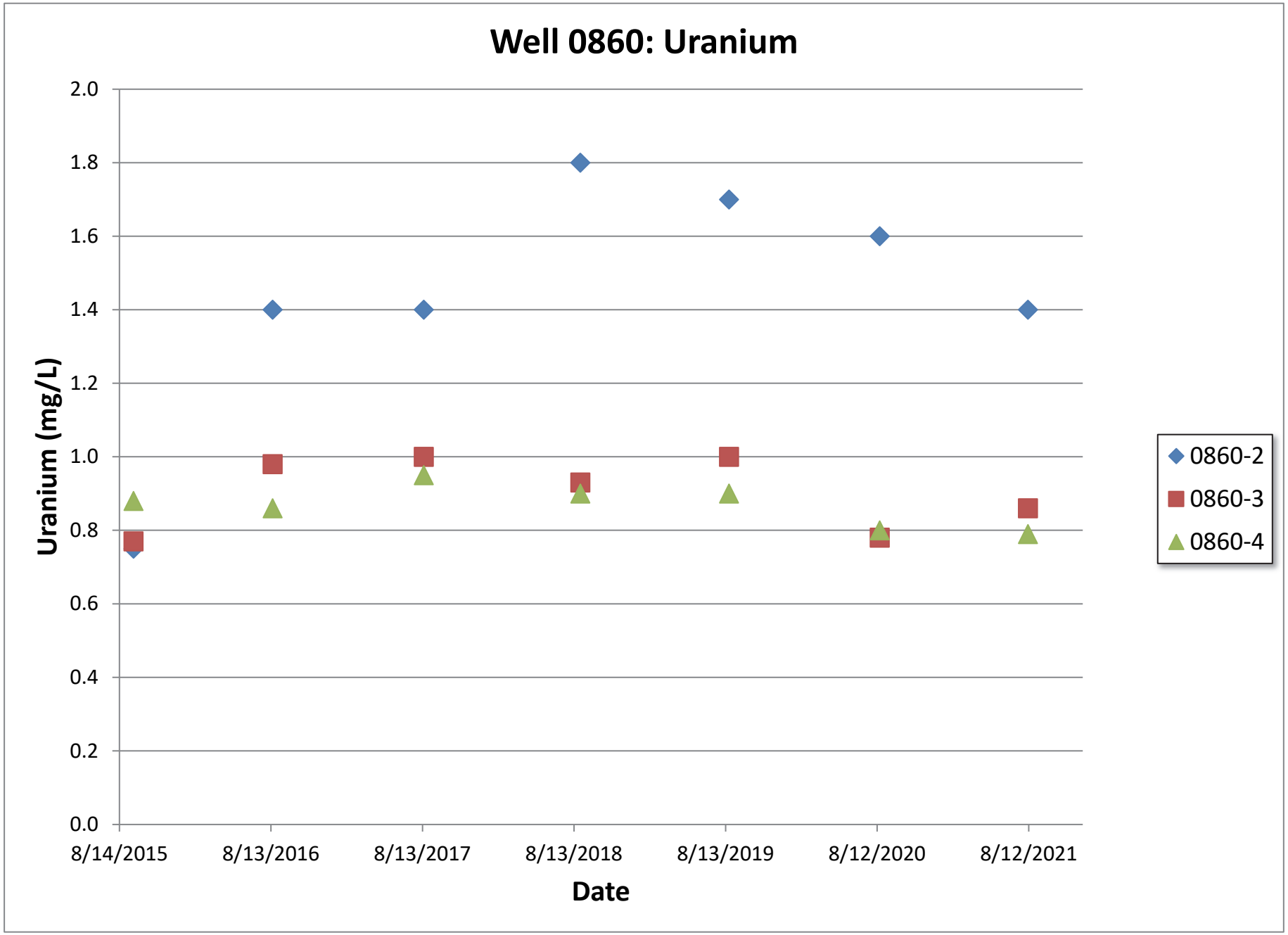

Well 0857: Molybdenum
Molybdenum (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0857-2
0857-3
0857-4

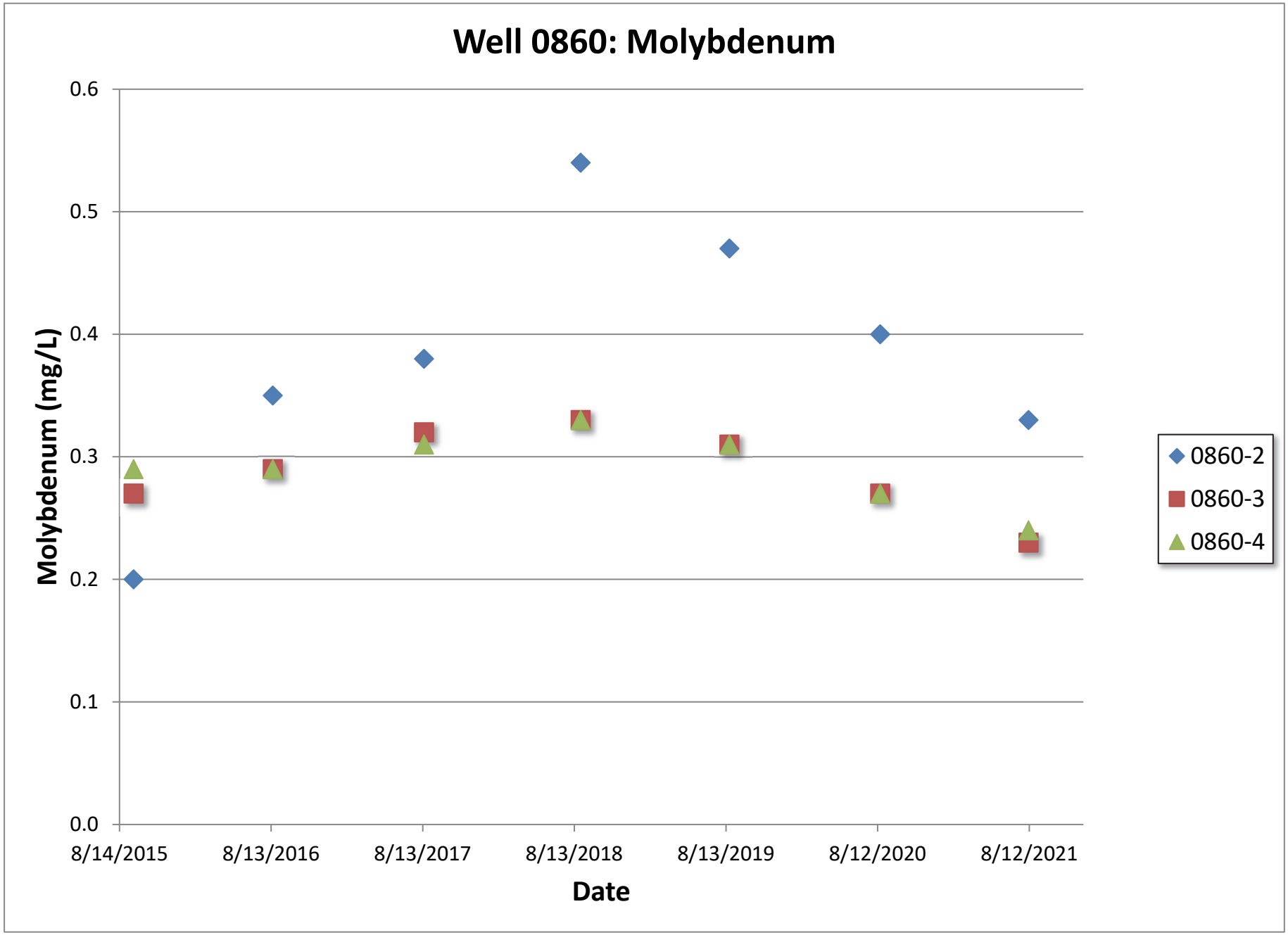

Well 0858: Uranium
Uranium (mg/L)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0858-2
0858-3
0858-4


Well 0858: Molybdenum
Molybdenum (mg/L)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0858-2
0858-3
0858-4


Well 0859: Uranium
Uranium (mg/L)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0859-2
0859-3
0859-4


Well 0859: Molybdenum
Molybdenum (mg/L)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0859-2
0859-3
0859-4


Well 0860: Uranium
Uranium (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0860-2
0860-3
0860-4


Well 0860: Molybdenum
Molybdenum (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
8/12/2021
Date
0860-2
0860-3
0860-4

# Appendix E

# Surface Water Data

**SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE RVT01, Riverton Processing Site**

**REPORT DATE: 3/11/2022 10:45:06 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) | 0747 | 8/11/2021 | (D)F | 340 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0749 | 8/10/2021 | (N)F | 80 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0794 | 8/11/2021 | (D)F | 198 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0796 | 8/11/2021 | (D)F | 208 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0810 | 8/11/2021 | (N)F | 429 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0811 | 8/11/2021 | (D)F | 153 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0812 | 8/11/2021 | (D)F | 208 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0822 | 8/11/2021 | (N)F | 247 | mg/L | | | # | - | - |
| Alkalinity, Total (As CaCO3) | 0823 | 8/11/2021 | (N)F | 105 | mg/L | | | # | - | - |
| **Manganese** | | | | | | | | | | |
| Manganese | 0747 | 8/11/2021 | (D)F | 0.39 | mg/L | | | # | 0.00074 | - |
| Manganese | 0749 | 8/10/2021 | (T)F | 0.052 | mg/L | | | # | 0.00074 | - |
| Manganese | 0794 | 8/11/2021 | (D)F | 0.025 | mg/L | | | # | 0.00074 | - |
| Manganese | 0796 | 8/11/2021 | (D)F | 0.018 | mg/L | | | # | 0.00074 | - |
| Manganese | 0810 | 8/11/2021 | (T)F | 0.0076 | mg/L | J | | # | 0.00074 | - |
| Manganese | 0811 | 8/11/2021 | (D)F | 0.029 | mg/L | | | # | 0.00074 | - |
| Manganese | 0812 | 8/11/2021 | (D)F | 0.026 | mg/L | | | # | 0.00074 | - |
| Manganese | 0822 | 8/11/2021 | (T)F | 0.13 | mg/L | | | # | 0.00074 | - |
| Manganese | 0823 | 8/11/2021 | (T)F | 0.035 | mg/L | | | # | 0.00074 | - |
| **Molybdenum** | | | | | | | | | | |
| Molybdenum | 0747 | 8/11/2021 | (D)F | 0.041 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0749 | 8/10/2021 | (T)F | 0.031 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0794 | 8/11/2021 | (D)F | 0.0019 | mg/L | J | | # | 0.00046 | - |
| Molybdenum | 0796 | 8/11/2021 | (D)F | 0.0021 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0810 | 8/11/2021 | (T)F | 0.0014 | mg/L | J | | # | 0.00046 | - |
| Molybdenum | 0811 | 8/11/2021 | (D)F | 0.0024 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0812 | 8/11/2021 | (D)F | 0.0024 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0822 | 8/11/2021 | (T)F | 0.014 | mg/L | | | # | 0.00046 | - |
| Molybdenum | 0823 | 8/11/2021 | (T)F | 0.00055 | mg/L | J | | # | 0.00046 | - |
| **Oxidation Reduction Potential** | | | | | | | | | | |
| Oxidation Reduction Potential | 0749 | 8/10/2021 | (N)F | 57 | mV | | | # | - | - |

**SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE RVT01, Riverton Processing Site**

**REPORT DATE: 3/11/2022 10:45:06 AM**

| PARAMETER | LOCATION CODE | SAMPLE DATE | SAMPLE TYPE | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECT. LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|
| Oxidation Reduction Potential | 0796 | 8/11/2021 | (N)F | 59.5 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0810 | 8/11/2021 | (N)F | 16.1 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0812 | 8/11/2021 | (N)F | 120.1 | mV | | | # | - | - |
| Oxidation Reduction Potential | 0823 | 8/11/2021 | (N)F | 204 | mV | | | # | - | - |
| **pH** | | | | | | | | | | |
| pH | 0747 | 8/11/2021 | (N)F | 7.43 | s.u. | | | # | - | - |
| pH | 0749 | 8/10/2021 | (N)F | 8.01 | s.u. | | | # | - | - |
| pH | 0794 | 8/11/2021 | (N)F | 8.4 | s.u. | | | # | - | - |
| pH | 0796 | 8/11/2021 | (N)F | 8.16 | s.u. | | | # | - | - |
| pH | 0810 | 8/11/2021 | (N)F | 9.32 | s.u. | | | # | - | - |
| pH | 0811 | 8/11/2021 | (N)F | 8.03 | s.u. | | | # | - | - |
| pH | 0812 | 8/11/2021 | (N)F | 7.93 | s.u. | | | # | - | - |
| pH | 0822 | 8/11/2021 | (N)F | 8.11 | s.u. | | | # | - | - |
| pH | 0823 | 8/11/2021 | (N)F | 8.07 | s.u. | | | # | - | - |
| **Specific Conductance** | | | | | | | | | | |
| Specific Conductance | 0747 | 8/11/2021 | (N)F | 1290 | umhos/cm | | | # | - | - |
| Specific Conductance | 0749 | 8/10/2021 | (N)F | 2084 | umhos/cm | | | # | - | - |
| Specific Conductance | 0794 | 8/11/2021 | (N)F | 899 | umhos/cm | | | # | - | - |
| Specific Conductance | 0796 | 8/11/2021 | (N)F | 877 | umhos/cm | | | # | - | - |
| Specific Conductance | 0810 | 8/11/2021 | (N)F | 1561 | umhos/cm | | | # | - | - |
| Specific Conductance | 0811 | 8/11/2021 | (N)F | 945 | umhos/cm | | | # | - | - |
| Specific Conductance | 0812 | 8/11/2021 | (N)F | 933 | umhos/cm | | | # | - | - |
| Specific Conductance | 0822 | 8/11/2021 | (N)F | 963 | umhos/cm | | | # | - | - |
| Specific Conductance | 0823 | 8/11/2021 | (N)F | 3650 | umhos/cm | | | # | - | - |
| **Sulfate** | | | | | | | | | | |
| Sulfate | 0747 | 8/11/2021 | (N)F | 320 | mg/L | | | # | 2.6 | - |
| Sulfate | 0749 | 8/10/2021 | (N)F | 1100 | mg/L | | | # | 11 | - |
| Sulfate | 0794 | 8/11/2021 | (N)F | 260 | mg/L | | | # | 2.6 | - |
| Sulfate | 0796 | 8/11/2021 | (N)F | 260 | mg/L | | | # | 2.6 | - |
| Sulfate | 0810 | 8/11/2021 | (N)F | 380 | mg/L | | | # | 2.6 | - |
| Sulfate | 0811 | 8/11/2021 | (N)F | 280 | mg/L | | | # | 2.6 | - |

**SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE RVT01, Riverton Processing Site**

**REPORT DATE: 3/11/2022 10:45:07 AM**

| PARAMETER | LOCATION CODE | SAMPLE DATE | SAMPLE TYPE | RESULT | UNITS | QUALIFIERS LAB/DATA | | QA | DETECT. LIMIT | UNCERTAINTY |
|---|---|---|---|---|---|---|---|---|---|---|
| Sulfate | 0812 | 8/11/2021 | (N)F | 280 | mg/L | | | # | 2.6 | - |
| Sulfate | 0822 | 8/11/2021 | (N)F | 260 | mg/L | | | # | 2.6 | - |
| Sulfate | 0823 | 8/11/2021 | (N)F | 1600 | mg/L | | | # | 13 | - |
| **Temperature** | | | | | | | | | | |
| Temperature | 0747 | 8/11/2021 | (N)F | 18.11 | C | | J | # | - | - |
| Temperature | 0749 | 8/10/2021 | (N)F | 21.73 | C | | | # | - | - |
| Temperature | 0794 | 8/11/2021 | (N)F | 25.2 | C | | J | # | - | - |
| Temperature | 0796 | 8/11/2021 | (N)F | 17.28 | C | | | # | - | - |
| Temperature | 0810 | 8/11/2021 | (N)F | 25.01 | C | | | # | - | - |
| Temperature | 0811 | 8/11/2021 | (N)F | 17.94 | C | | J | # | - | - |
| Temperature | 0812 | 8/11/2021 | (N)F | 17.8 | C | | | # | - | - |
| Temperature | 0822 | 8/11/2021 | (N)F | 25.77 | C | | J | # | - | - |
| Temperature | 0823 | 8/11/2021 | (N)F | 24.44 | C | | | # | - | - |
| **Turbidity** | | | | | | | | | | |
| Turbidity | 0747 | 8/11/2021 | (N)F | 14.4 | NTU | | | # | - | - |
| Turbidity | 0749 | 8/10/2021 | (N)F | 9.91 | NTU | | | # | - | - |
| Turbidity | 0794 | 8/11/2021 | (N)F | 11.4 | NTU | | | # | - | - |
| Turbidity | 0796 | 8/11/2021 | (N)F | 13.8 | NTU | | | # | - | - |
| Turbidity | 0810 | 8/11/2021 | (N)F | 3.69 | NTU | | | # | - | - |
| Turbidity | 0811 | 8/11/2021 | (N)F | 12.6 | NTU | | | # | - | - |
| Turbidity | 0812 | 8/11/2021 | (N)F | 20.7 | NTU | | | # | - | - |
| Turbidity | 0822 | 8/11/2021 | (N)F | 3.36 | NTU | | | # | - | - |
| Turbidity | 0823 | 8/11/2021 | (N)F | 1.33 | NTU | | | # | - | - |
| **Uranium** | | | | | | | | | | |
| Uranium | 0747 | 8/11/2021 | (D)F | 0.13 | mg/L | | | # | 0.00004 | - |
| Uranium | 0749 | 8/10/2021 | (T)F | 0.0013 | mg/L | | | # | 0.00004 | - |
| Uranium | 0794 | 8/11/2021 | (D)F | 0.0068 | mg/L | | | # | 0.00004 | - |
| Uranium | 0796 | 8/11/2021 | (D)F | 0.0068 | mg/L | | | # | 0.00004 | - |
| Uranium | 0810 | 8/11/2021 | (T)F | 0.0046 | mg/L | | | # | 0.00004 | - |
| Uranium | 0811 | 8/11/2021 | (D)F | 0.0073 | mg/L | | | # | 0.00004 | - |
| Uranium | 0812 | 8/11/2021 | (D)F | 0.0077 | mg/L | | | # | 0.00004 | - |
| Uranium | 0822 | 8/11/2021 | (T)F | 0.0022 | mg/L | | | # | 0.00004 | - |
| Uranium | 0823 | 8/11/2021 | (T)F | 0.0034 | mg/L | | | # | 0.00004 | - |

**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.**