LMS/RVT/S32810

2020 Verification Monitoring Report, Riverton, Wyoming, Processing Site

March 2021

U.S. DEPARTMENT OF ENERGY | Legacy Management

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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
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
SLAC	Stanford Linear Accelerator Center
UMTRCA	Uranium Mill Tailings Radiation Control Act
USGS	U.S. Geological Survey

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Executive Summary

This verification monitoring report presents data collected during calendar year 2020 and provides updates on the natural flushing compliance strategy and conceptual site model at the Riverton, Wyoming, Processing Site (Riverton site). Routine activities included monitoring institutional controls (ICs) and routine sampling of groundwater, surface water, and domestic wells. Nonroutine activities included a tracer-test study and vegetation sampling to supplement the risk assessment at the site.

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.

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 contaminants. 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, the U.S. Department of Energy Office of Legacy Management is evaluating contaminant behavior characteristics, the site conceptual model, and assessing groundwater remedy alternatives to determine an appropriate alternate compliance strategy for the site.

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1.0 Introduction

This verification monitoring report presents routine data collected during calendar year 2020 and provides updates on the natural flushing compliance strategy and conceptual site model (CSM) at the Riverton, Wyoming, Processing Site (Riverton site). Data from 2020 were generated from one routine groundwater and surface water sampling event conducted at the Riverton site during August.

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 annually 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 office 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 *Long-Term Management Plan for the Riverton, Wyoming, Processing Site* (DOE 2009), 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 2020 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 2020 confirmed the presence of an ongoing source underneath the former tailings pile that results in a persistent uranium plume with onsite concentrations up to 1.6 milligrams per liter (mg/L). The CSM 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 snow melt 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 2019). Data from 2020 also confirmed the CSM in a year without 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 Stanford Linear Accelerator Center (SLAC) 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

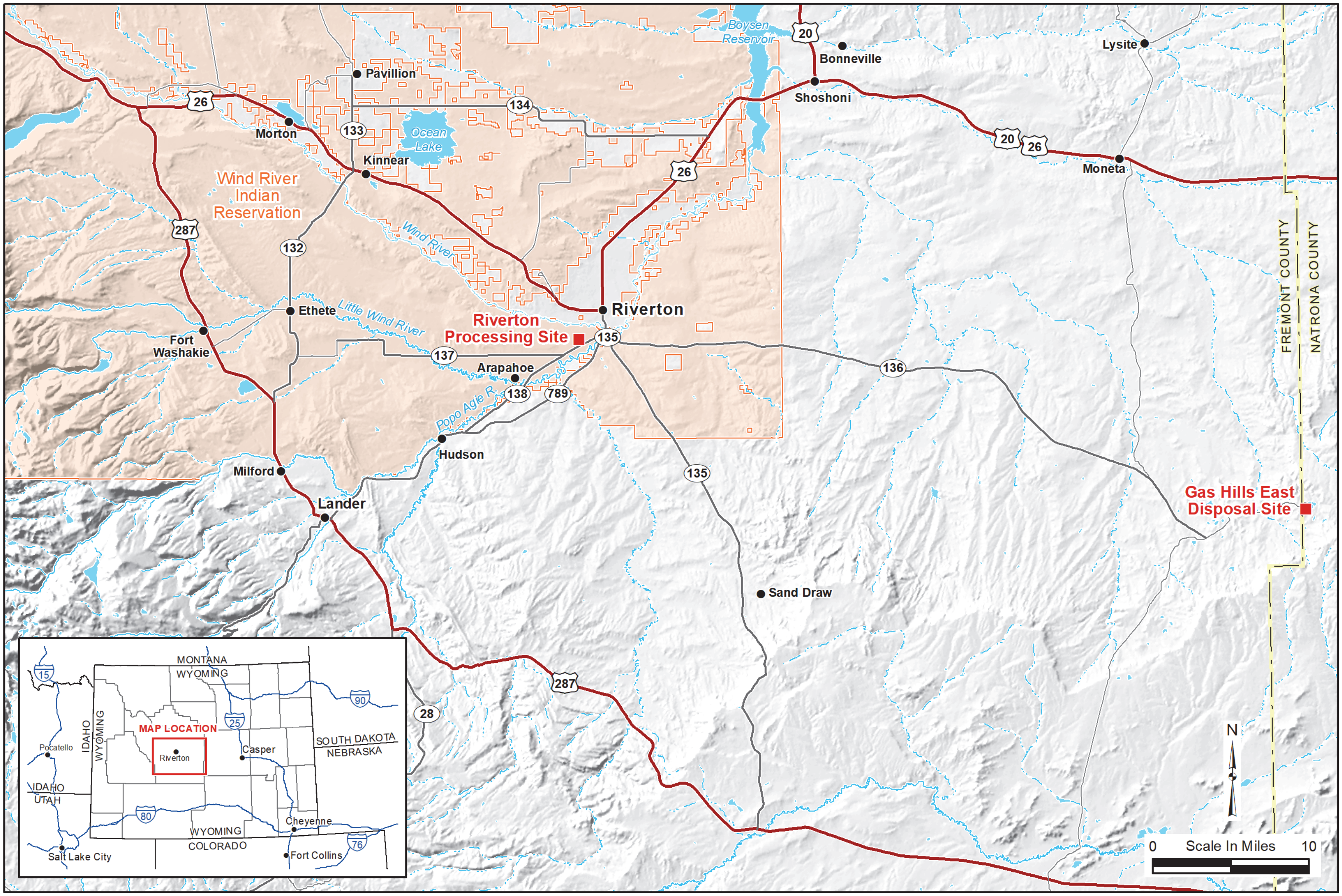

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Figure 1. Site Location Map

Significant floods of the Little Wind River that flooded portions of the site occurred 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 2020). 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 from 1958 through 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, as appropriate, 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 mg/L; 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 Institutional Controls

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.

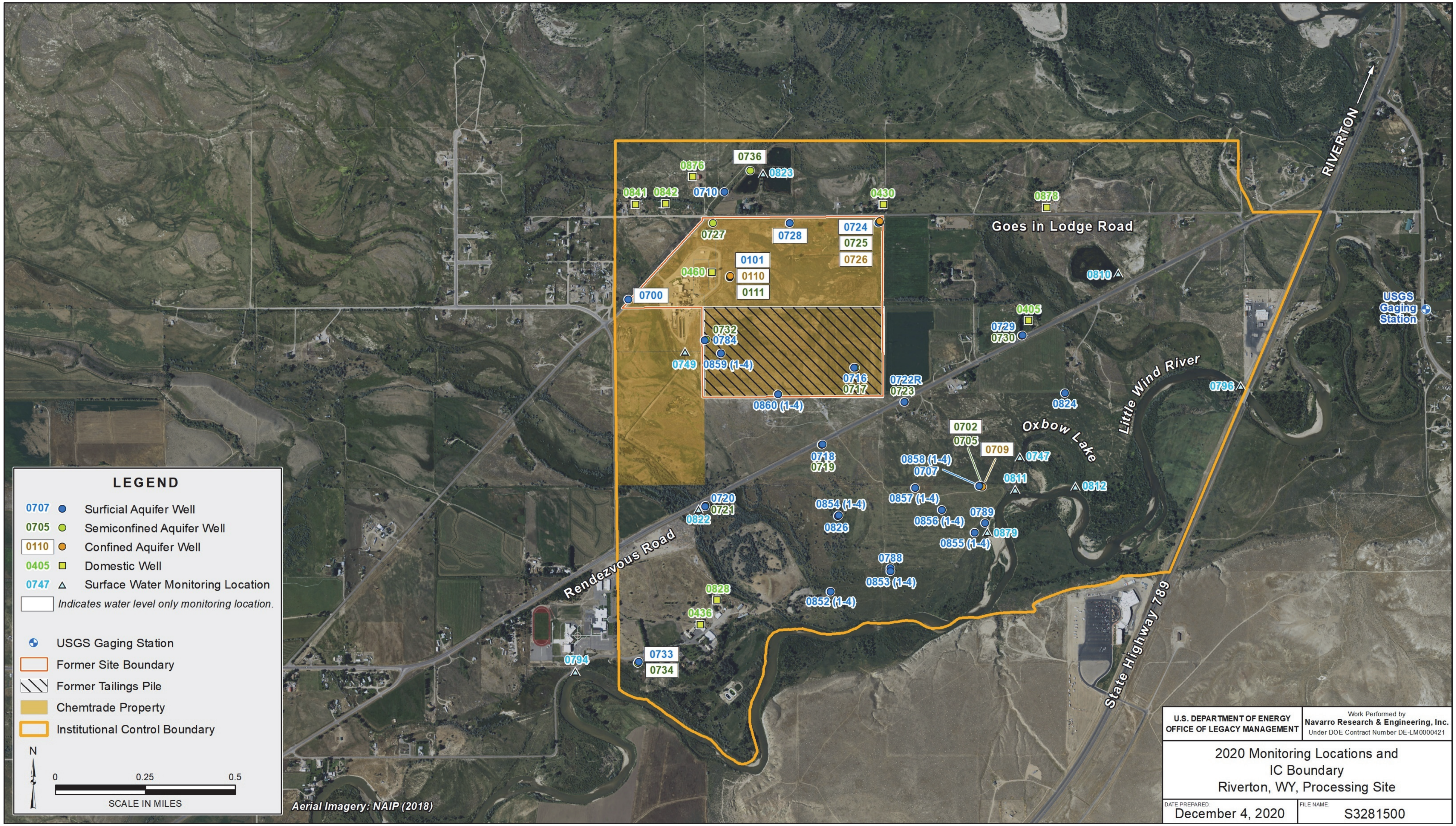

Figure 2. 2020 Monitoring Locations and IC Boundary at the Riverton Site

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3.4.1 Site Institutional Controls

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 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 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 Institutional Control 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 2020 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 in 2020 was conducted by NAW&SD.

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 2020 sampling event and by the sampling crews during the August 2020 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 20 conventional monitoring wells, nine multilevel monitoring wells, nine 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 2020 sampling event, the top ports (e.g., 0852-1) of all the multilevel monitoring wells were dry. In addition, port 2 of multilevel monitoring well 0859 (0859-2) and surface location 0879 were also dry. At each sampling location, water samples were analyzed for COCs 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 during the annual sampling event.

In addition to routine monitoring, additional studies were in progress at the Riverton site in 2020. A tracer-test study was conducted at the site to assess field-scale plume persistence. Activities for this project included well installation, multiple tracer tests on the former mill site and downgradient of the site, surveying of the new tracer test wells, and resurveying of all existing monitoring wells. Additional tracer tests are schedule for 2021, and results of the tests will be used to refine the CSM and will be presented in future scientific reports.

Figure 3. Warning Signs at the Oxbow Lake

Table 1. 2020 Sampling Network at the Riverton Site

Location ID	Description	Rationale	Comments
LM Monitoring Wells			
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 point of exposure	Private residence
0430	Confined aquifer	Potential point of exposure	Private residence
0436	Confined aquifer	Potential point of exposure	St. Stephens Mission
0460	Confined aquifer	Potential point of exposure	Chemtrade refinery
0828	Confined aquifer	Potential point of exposure	St. Stephens Mission
0841	Semiconfined aquifer	Potential point of exposure	Private residence
0842	Confined aquifer	Potential point of exposure	Private residence
0876	Confined aquifer	Potential point of exposure	Private residence
0878	Confined aquifer	Potential point of exposure	Private residence

Table 1. 2020 Sampling Network at the Riverton Site (continued)

Location ID	Description	Rationale	Comments
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

In addition to the tracer-test study, a comprehensive risk assessment at the Riverton site was completed in 2020. This risk assessment was a coordinated effort among LM, Argonne National Laboratory, and the Northern Arapaho Tribe to address any human health and environmental risk 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. In 2018, collection and analysis of 180 vegetation samples was conducted to assess this risk. A risk assessment report titled *Riverton, Wyoming, Processing Site: An Environmental Risk Assessment Update* was issued, and the report concluded that the current conditions at the Riverton site are protective of human health and the environment given the continuous monitoring, oversight, and ICs that are in place with collaborative efforts between LM and the Northern Arapaho Tribe (Argonne 2020).

As part of the collaborative risk assessment process, meetings were held among LM, Argonne National Laboratory, and the Northern Arapaho Tribe to review and discuss the results of the risk assessment prior to finalization of the risk assessment report. As a result of these meetings, a decision was made to conduct additional vegetation sampling in an area outside of the IC boundary to further assess background conditions. To this end, 80 vegetation samples were collected in August 2020 from a similar ecosystem approximately 20 miles west of the Riverton site near Ethete, Wyoming. This sampling effort was conducted with coordination among LM, Argonne National Laboratory, and the Northern Arapaho Tribe, and results will be reported in a supplement to the risk assessment report.

5.0 Results of 2020 Monitoring

5.1 Groundwater

5.1.1 Groundwater Flow

Water levels were measured at all wells (except domestic wells) 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 2020, which is consistent with 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 water and river levels were high, the groundwater flow direction reversed temporarily near the river (see well 0789 in Figure 5).

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 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 August 2020 data) from grouped monitoring wells. No vertical gradient was greater than an absolute magnitude of 0.1.

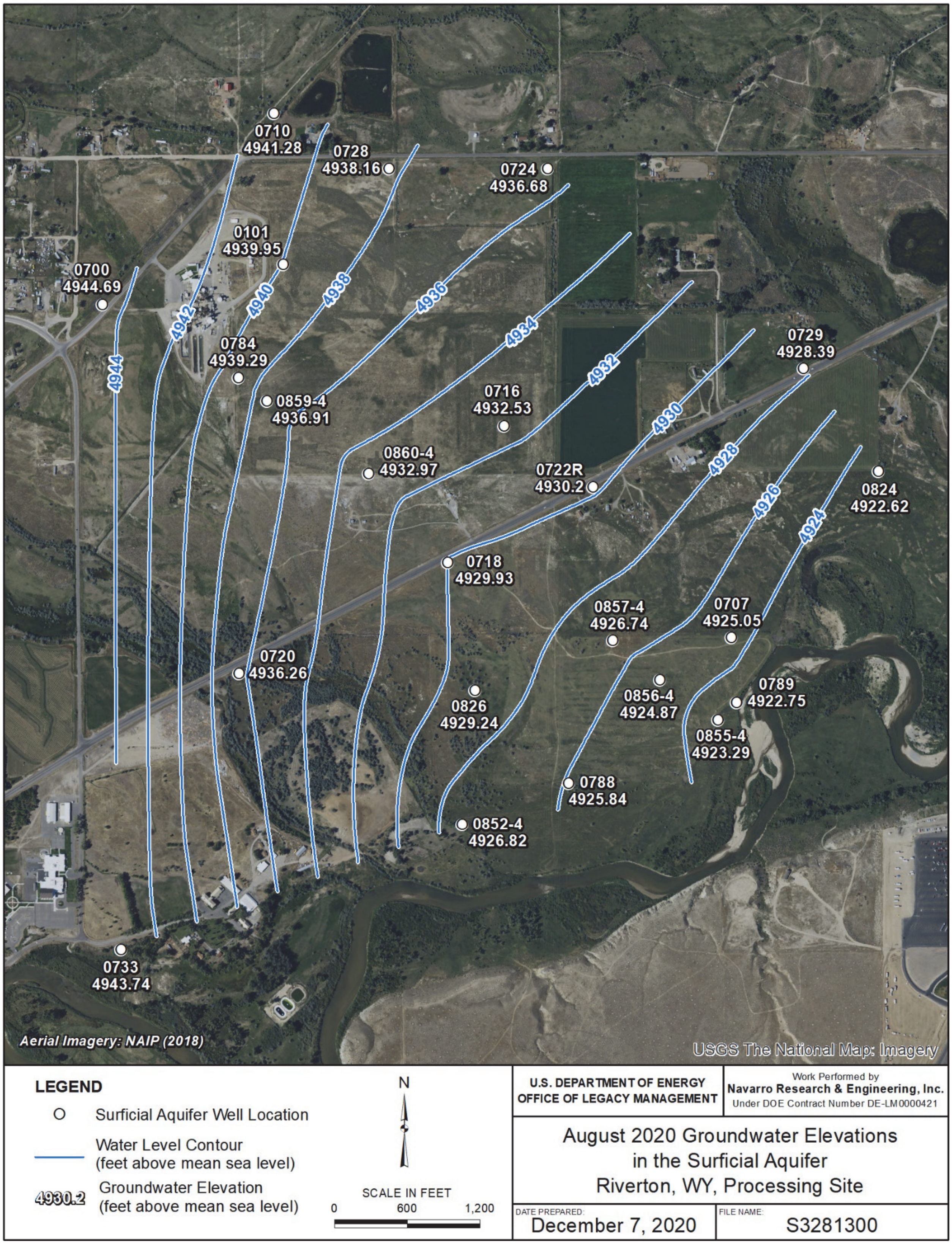


Figure 4. August 2020 Groundwater Elevations in the Surficial Aquifer at the Riverton Site

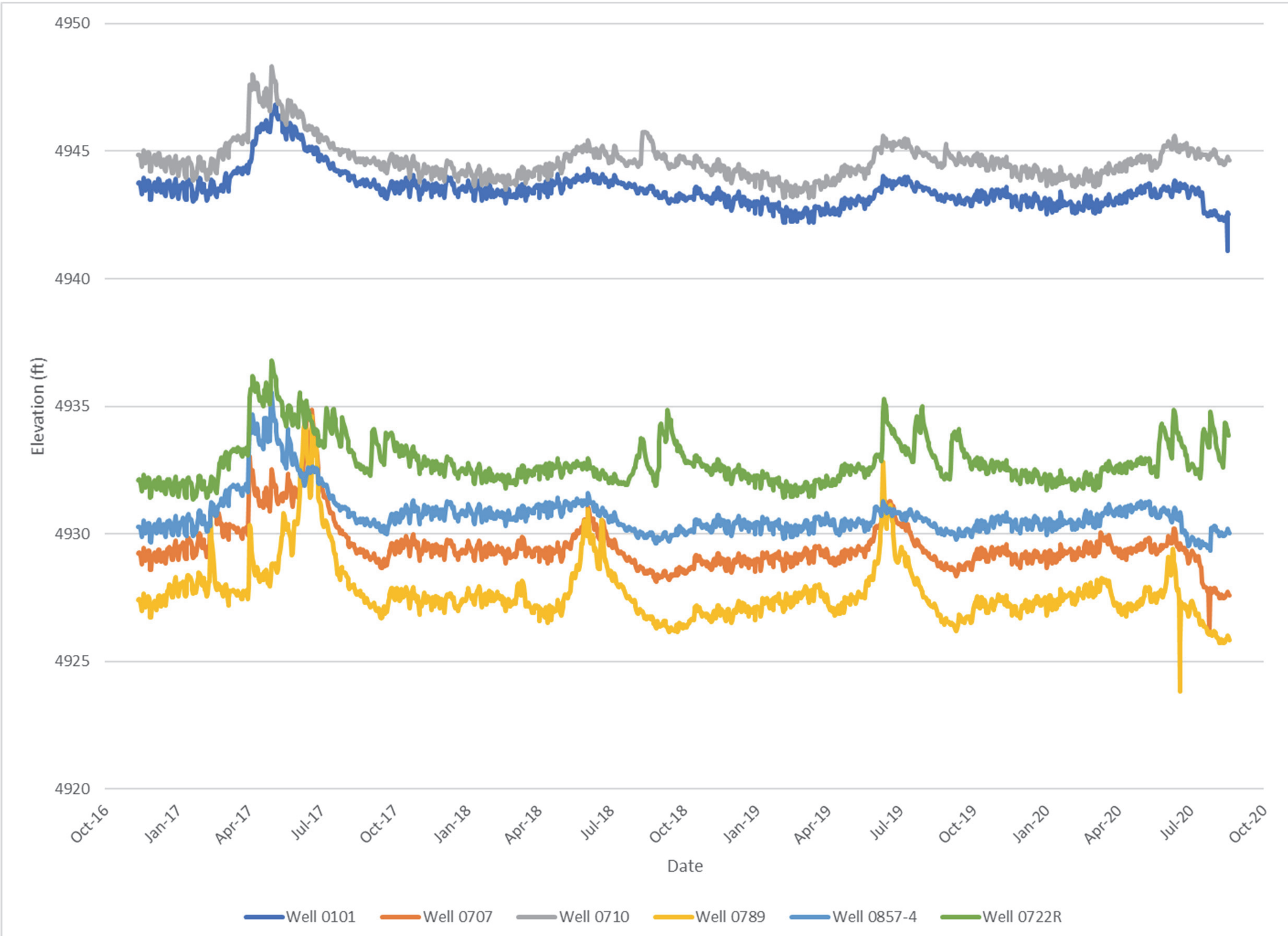


Figure 5. Continuous Water Elevations in Selected Surficial Aquifer Wells

Table 2. August 2020 Vertical Gradients at the Riverton Site

Well ID	Aquifer	Water Elevation	Vertical Gradient[a]
0724	Surficial	4945.23	
0725	Semiconfined	4941.49	−0.008
0726	Confined	4931.66	0.023
0101	Surficial	4942.43	
0111	Semiconfined	4940.99	0.053
0110	Confined	4941.05	0.026
0784	Surficial	4941.76	
0732	Semiconfined	4940.10	0.063
0716	Surficial	4934.98	
0717	Semiconfined	4935.54	−0.016
0707	Surficial	4927.50	
0705	Semiconfined	4927.14	0.013
0709	Confined	4926.81	0.009
0718	Surficial	4933.16	
0719	Semiconfined	4933.69	−0.027
0722R	Surficial	4933.51	
0723	Semiconfined	4933.51	0.00
0720	Surficial	4939.55	
0721	Semiconfined	4935.75	0.106
0729	Surficial	4931.66	
0730	Semiconfined	4931.81	−0.006
0733	Surficial	4947.00	
0734	Semiconfined	4944.21	0.123

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 2020 sampling event. The distribution of molybdenum in the surficial aquifer from the August 2020 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 2020 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, 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. 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, however, remain above preflood concentrations of 2009 for molybdenum (Figure 7 and Figure 8) and close to 2009 concentrations for 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 2020.

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, and port 2 in monitoring well 0859 was dry.

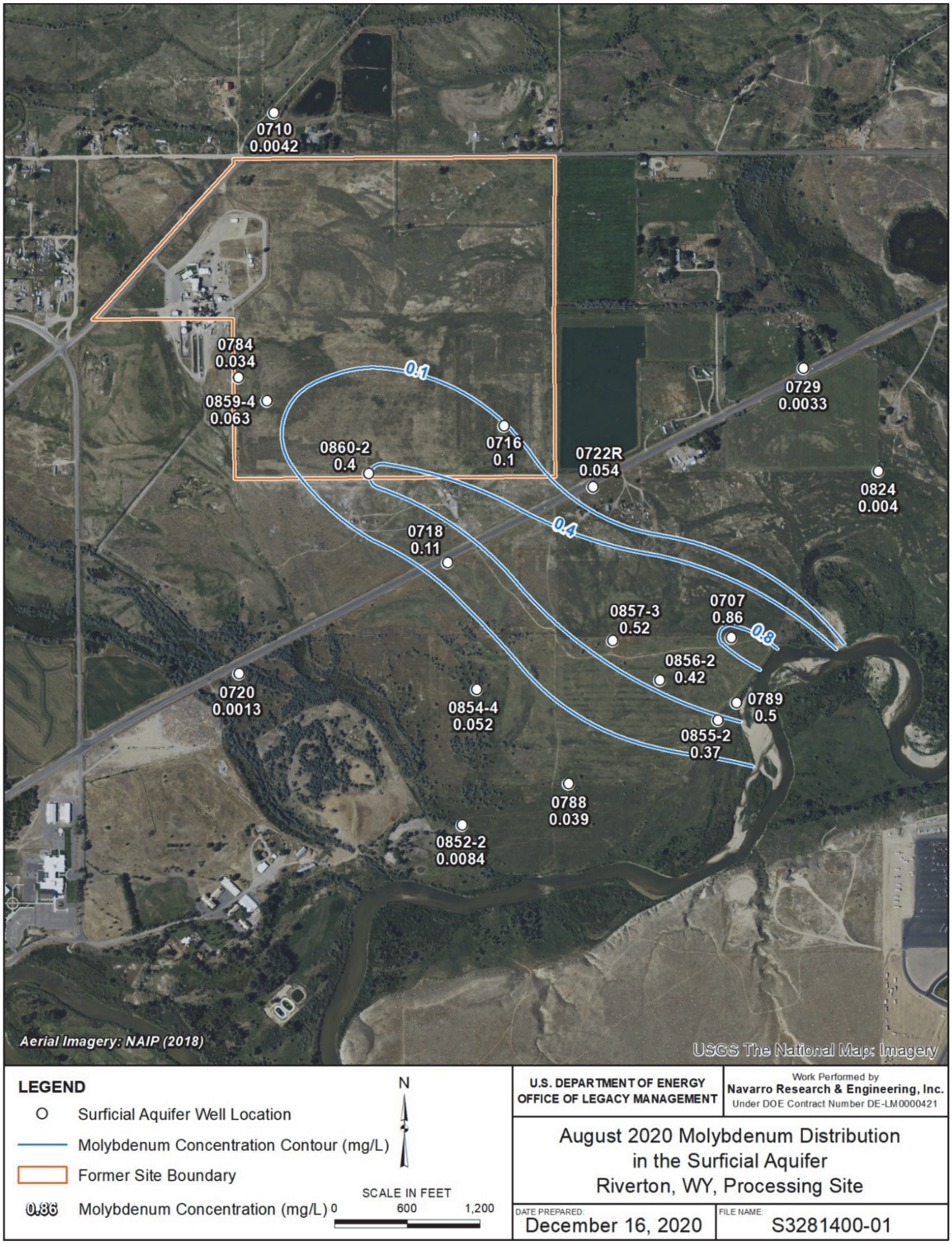


Figure 6. Molybdenum Distribution in the Surficial Aquifer at the Riverton Site in August 2020

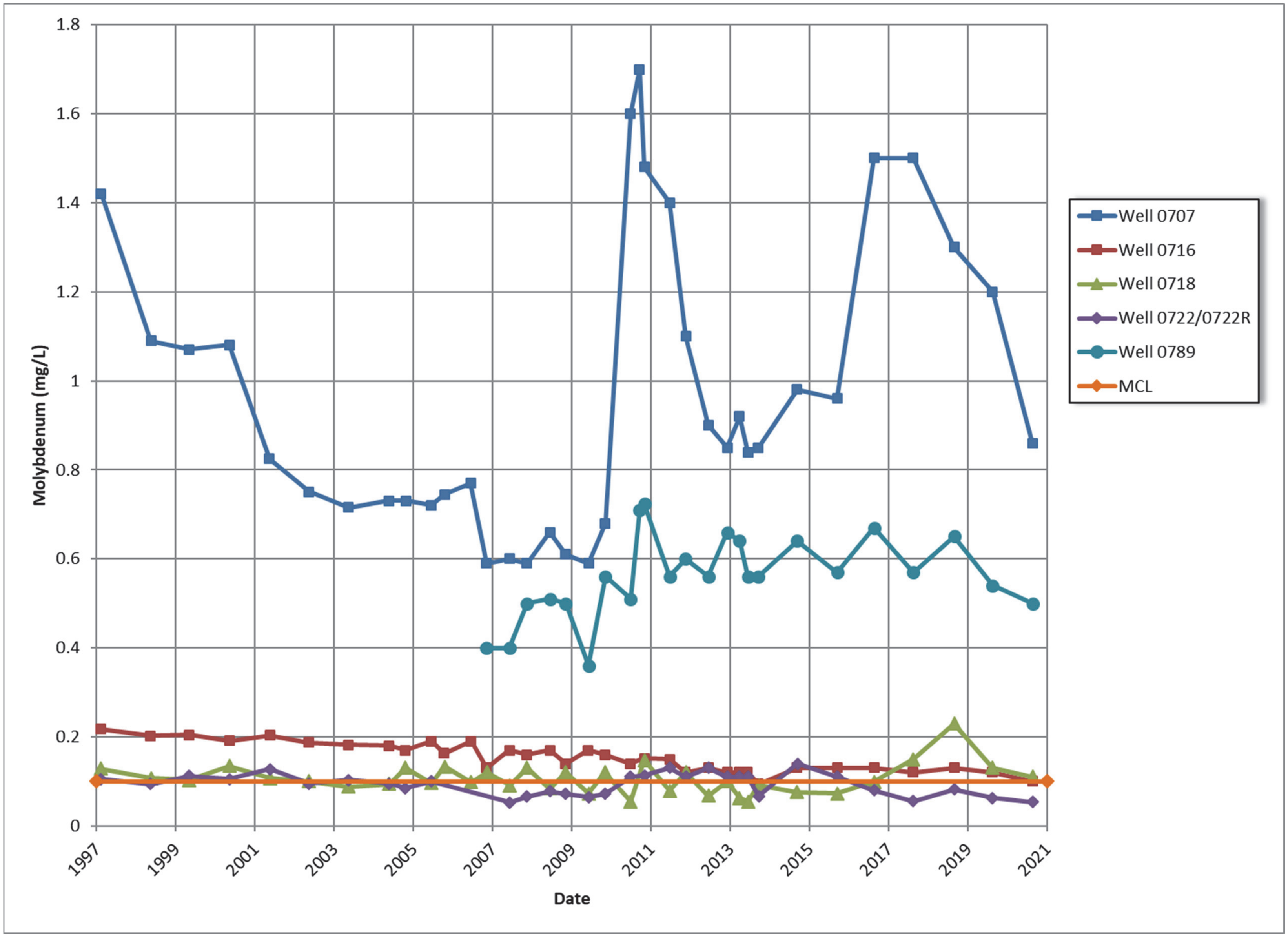


Figure 7. Molybdenum Concentrations in Surficial Aquifer Wells Within the Contaminant Plume

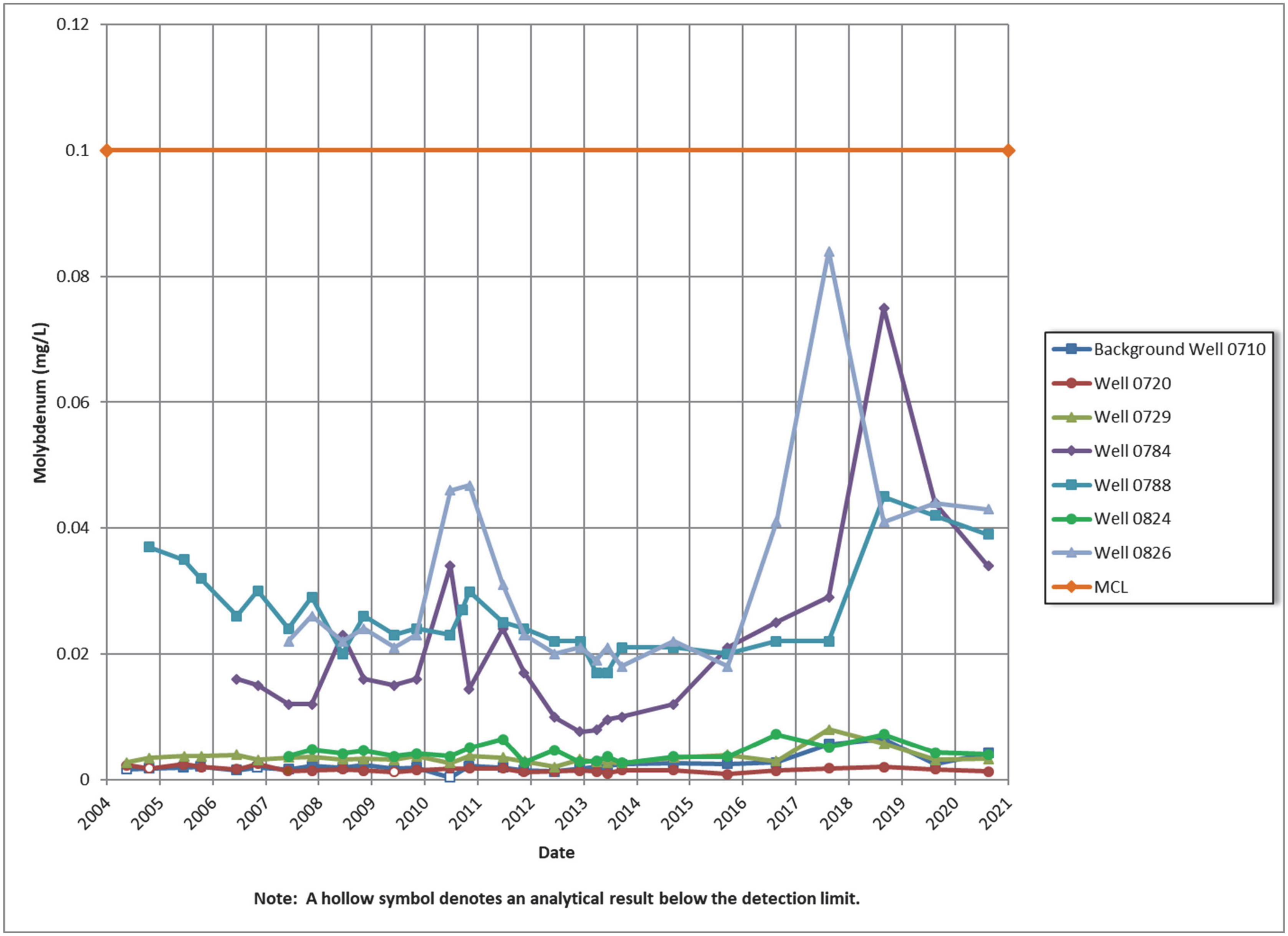


Figure 8. Molybdenum Concentrations in Surficial Aquifer Wells on the Edge and Outside of the Contaminant Plume

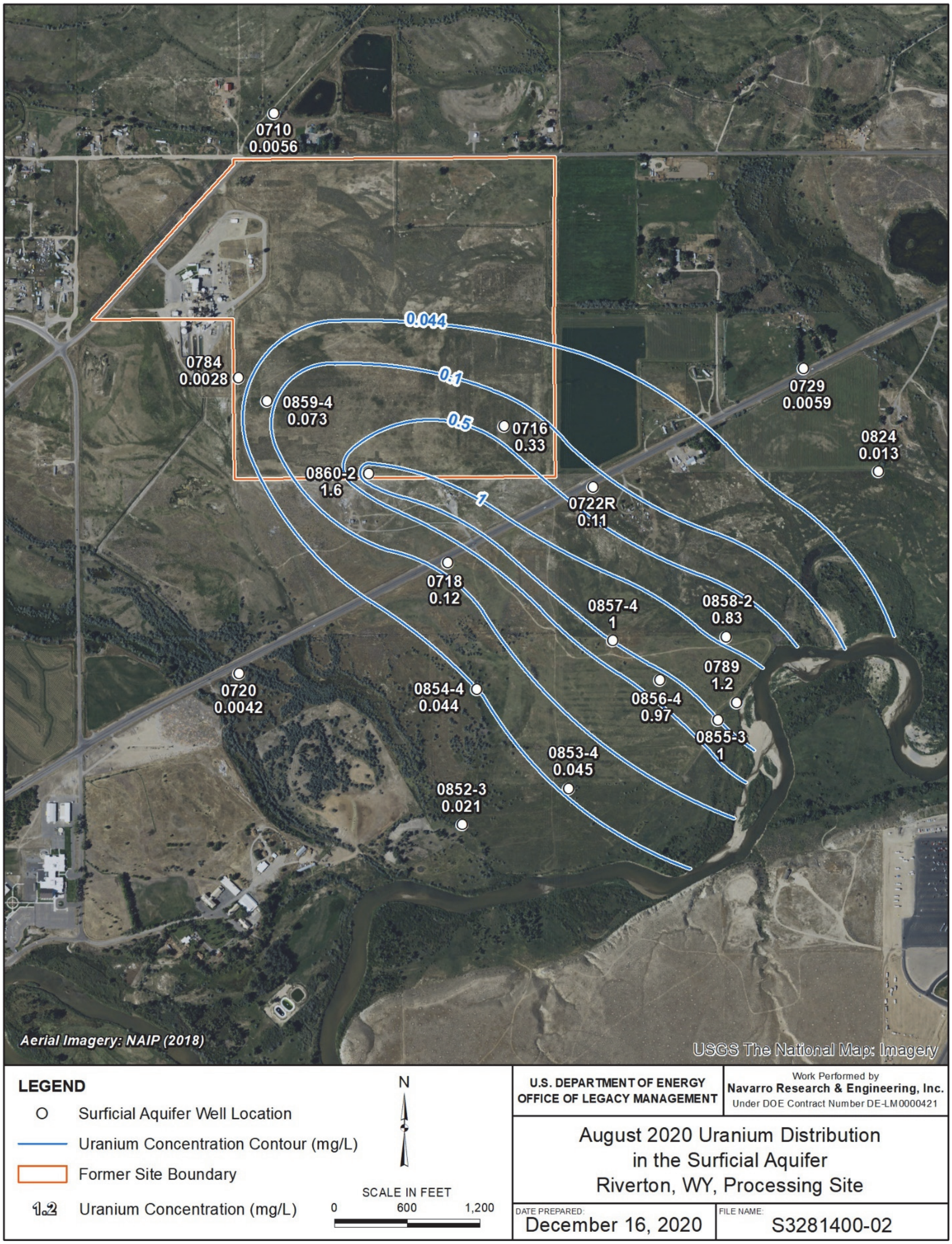


Figure 9. Uranium Distribution in the Surficial Aquifer at the Riverton Site in August 2020

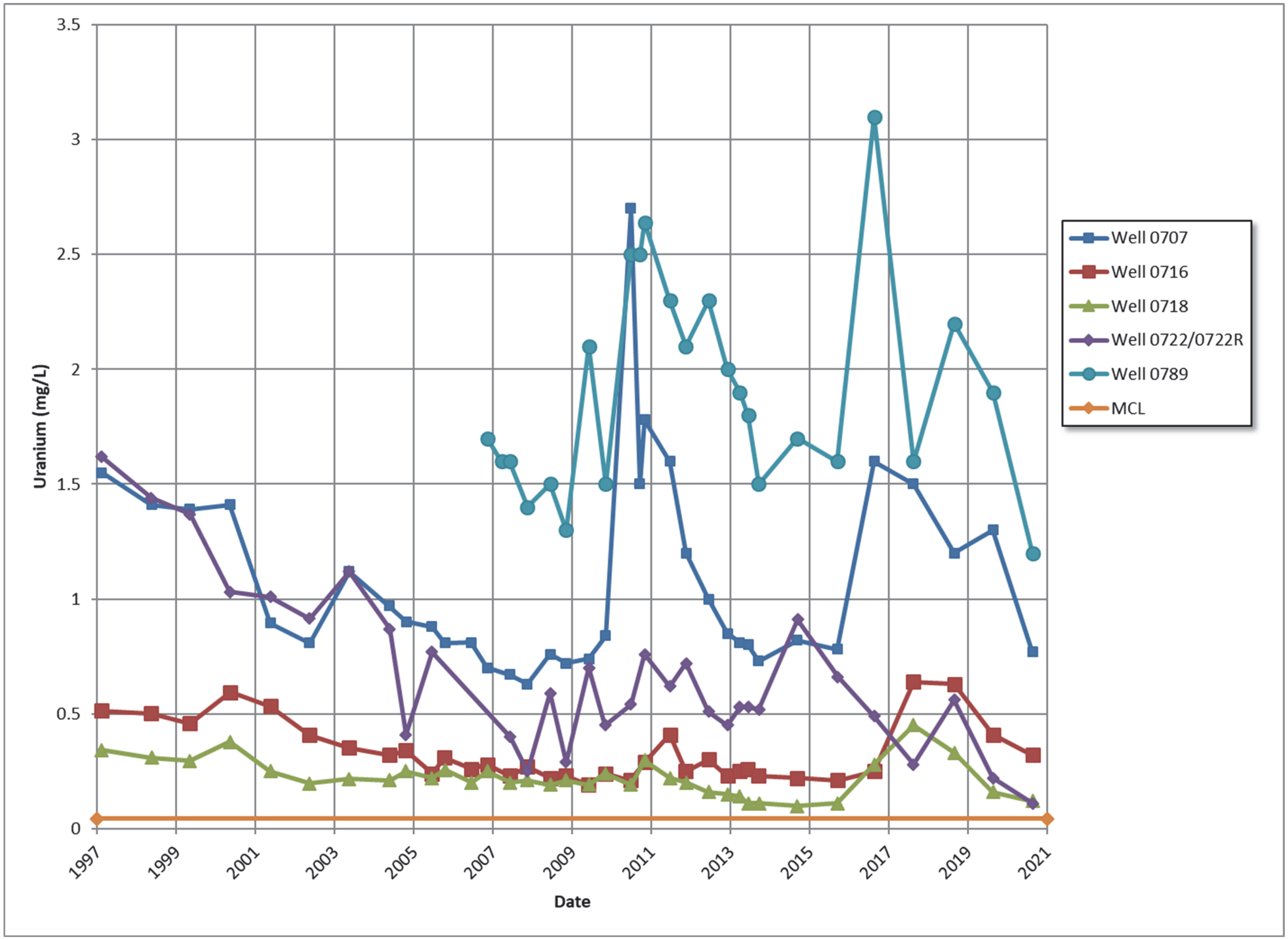


Figure 10. Uranium Concentrations in Surficial Aquifer Wells Within the Contaminant Plume

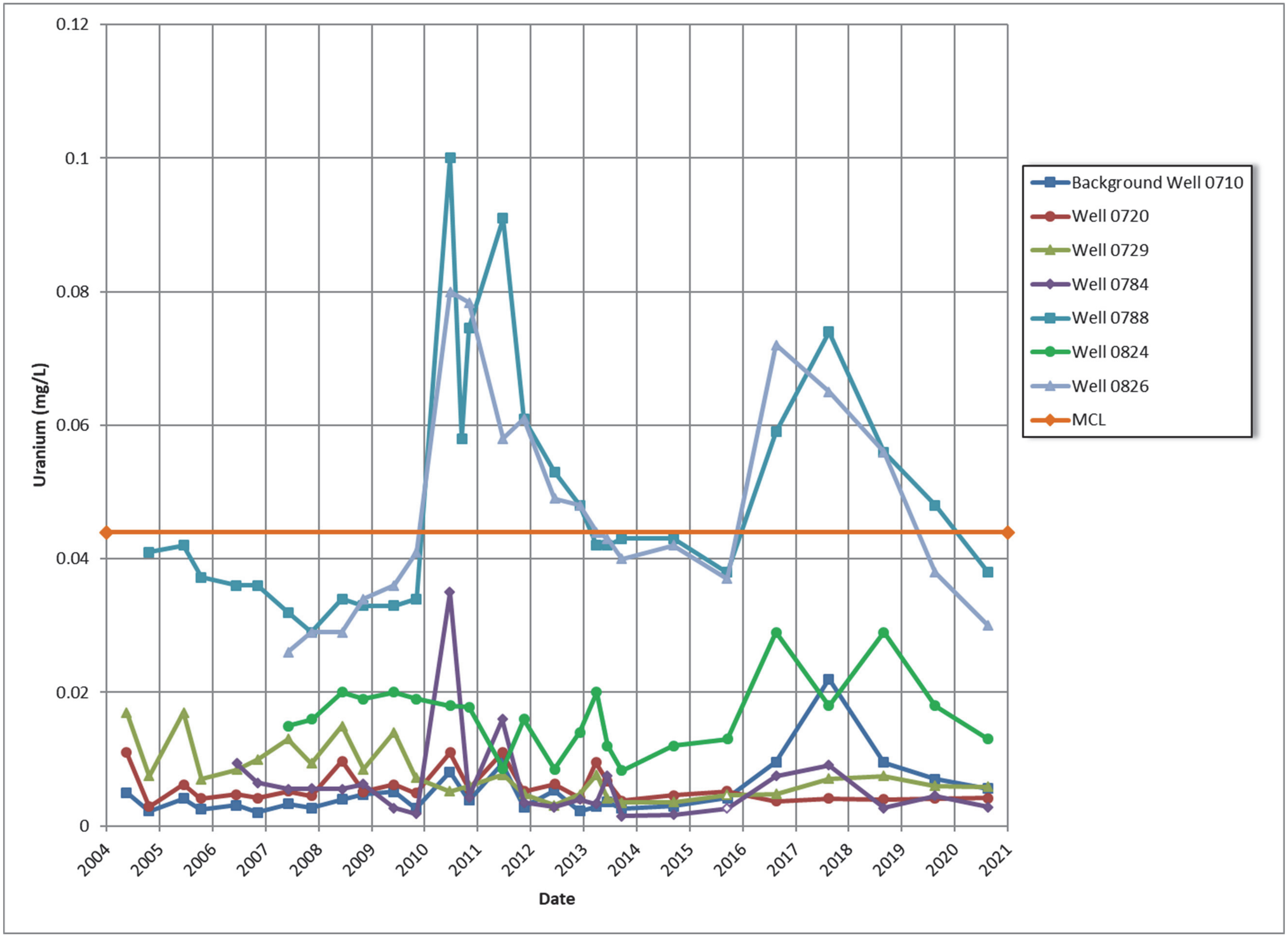
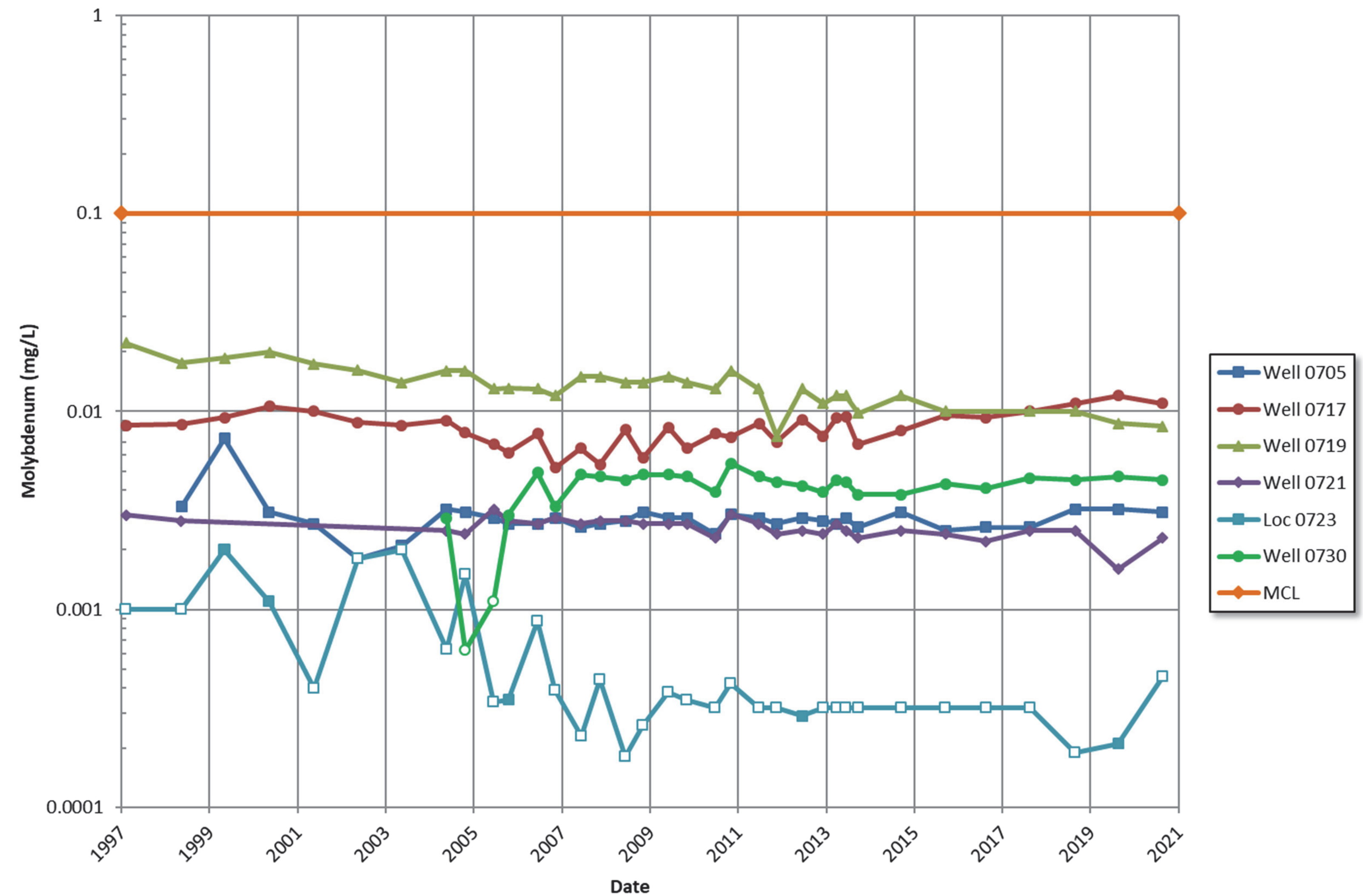


Figure 11. Uranium Concentrations in Surficial Aquifer Wells on the Edge and Outside of the Contaminant Plume



Notes: A hollow symbol denotes an analytical result below the detection limit.
Y-axis is a logarithmic scale.

Figure 12. Molybdenum Concentrations in Semiconfined Aquifer Wells

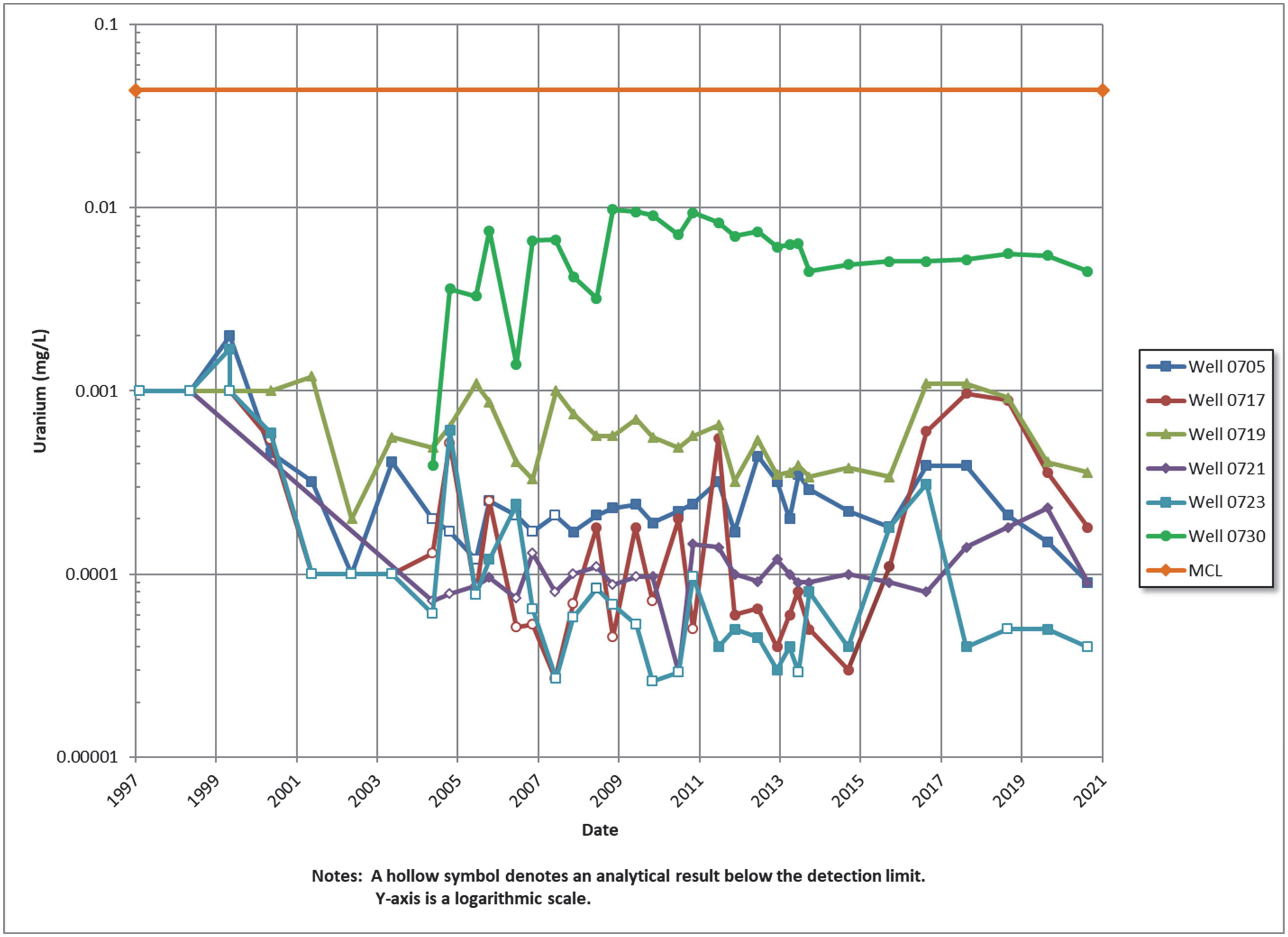


Figure 13. Uranium Concentrations in Semiconfined Aquifer Wells

Figure 14 shows molybdenum and uranium concentrations in multilevel monitoring well 0856, which is downgradient of the site 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 2020 continued to decline 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 2019); Appendix D features graphs showing molybdenum and uranium concentrations in all multilevel monitoring wells.

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 2019).

5.1.2.2 Domestic Wells

Domestic wells used as potable water sources at residences within the IC boundary were sampled in 2020. Domestic wells sampled in 2020, 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 2020.

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 in 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 (location 0879, Figure 17).

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 2020 (Table 3) (USGS 2020). The peak 2020 discharge of 3740 cfs occurred on June 7, 2020. Figure 18 shows the highest peak discharges recorded since the start of milling operations in 1958 (USGS 2020).

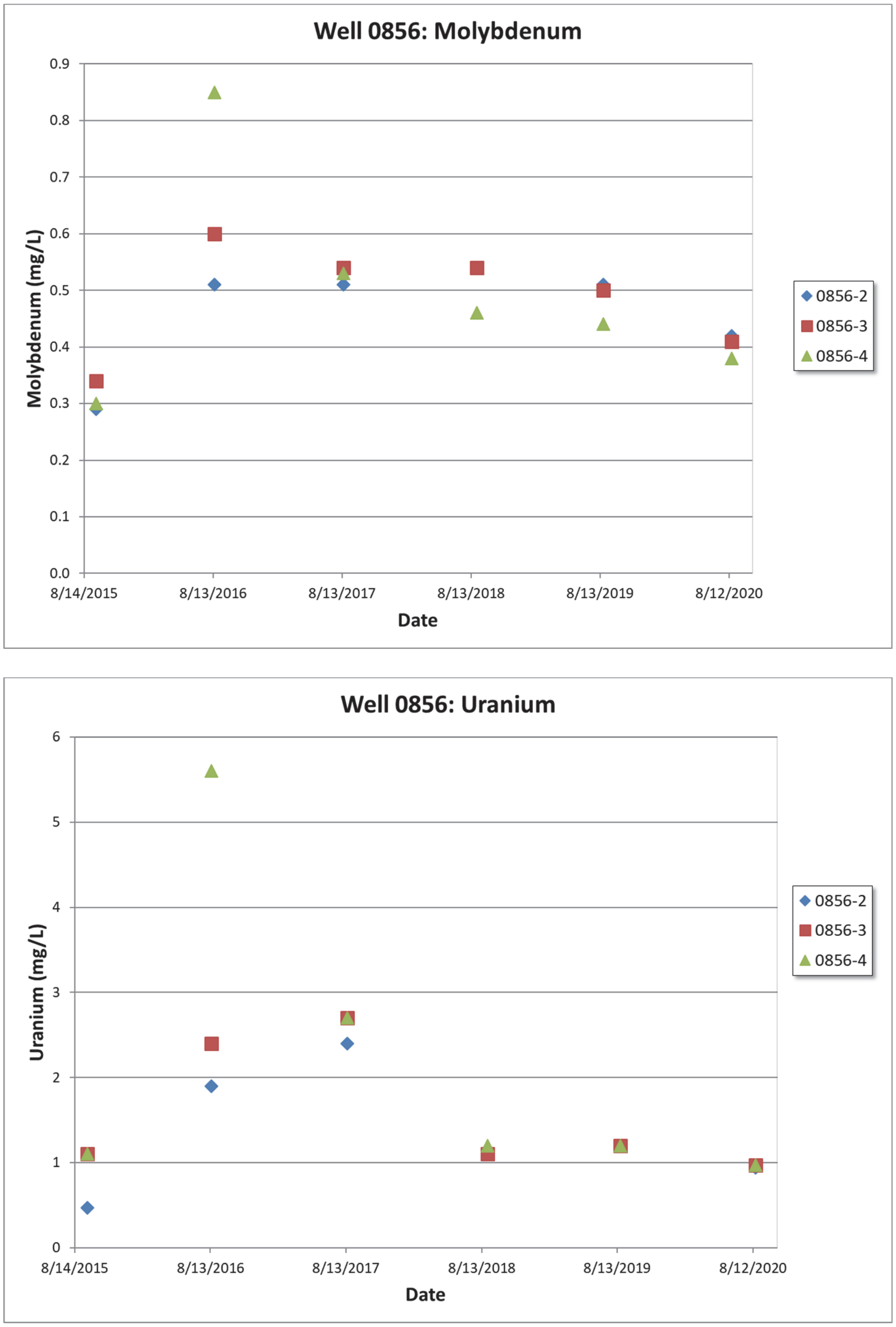


Figure 14. Molybdenum and Uranium Concentrations in Multilevel Monitoring Well 0856

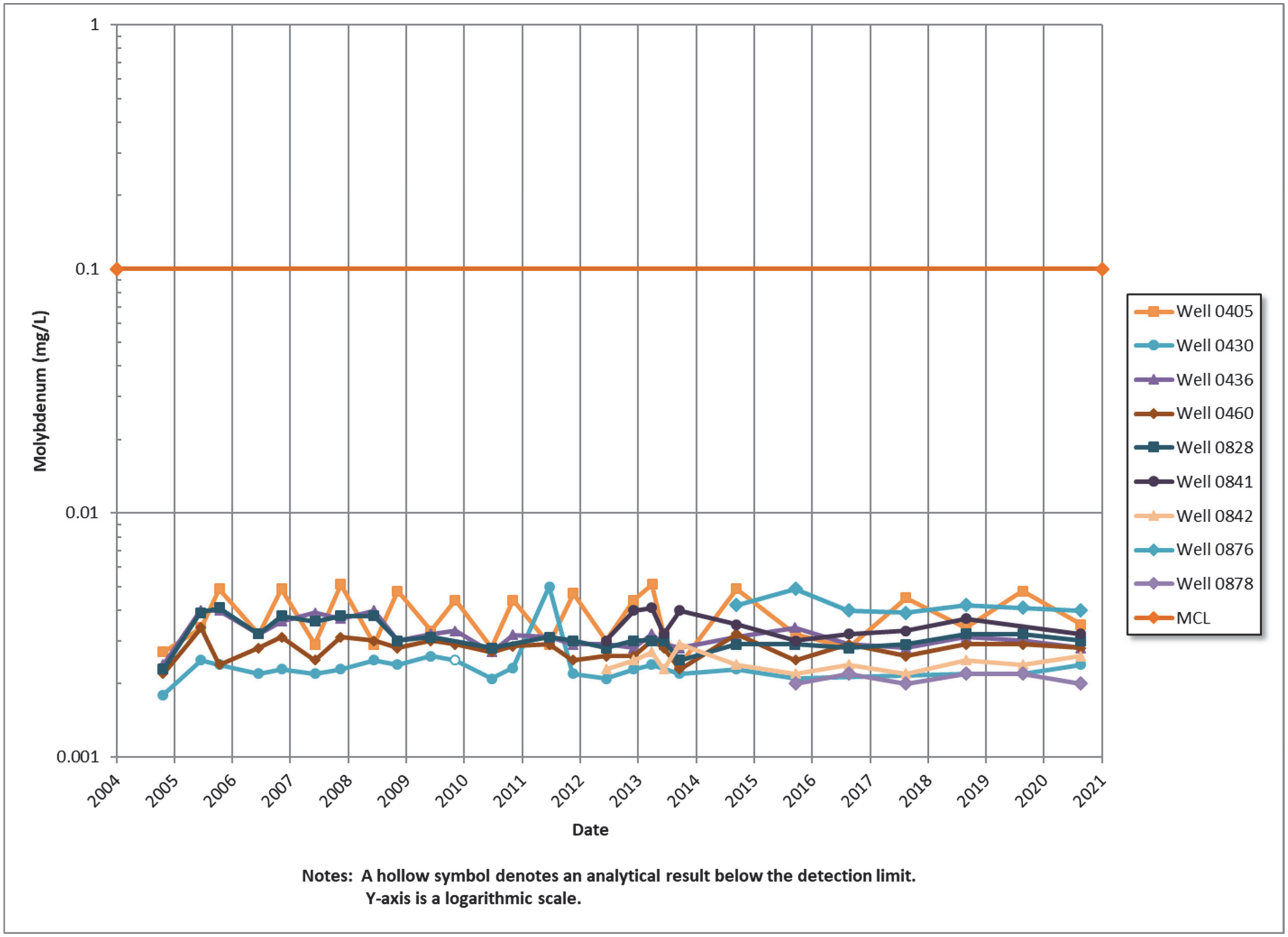


Figure 15. Molybdenum Concentrations in Domestic Wells

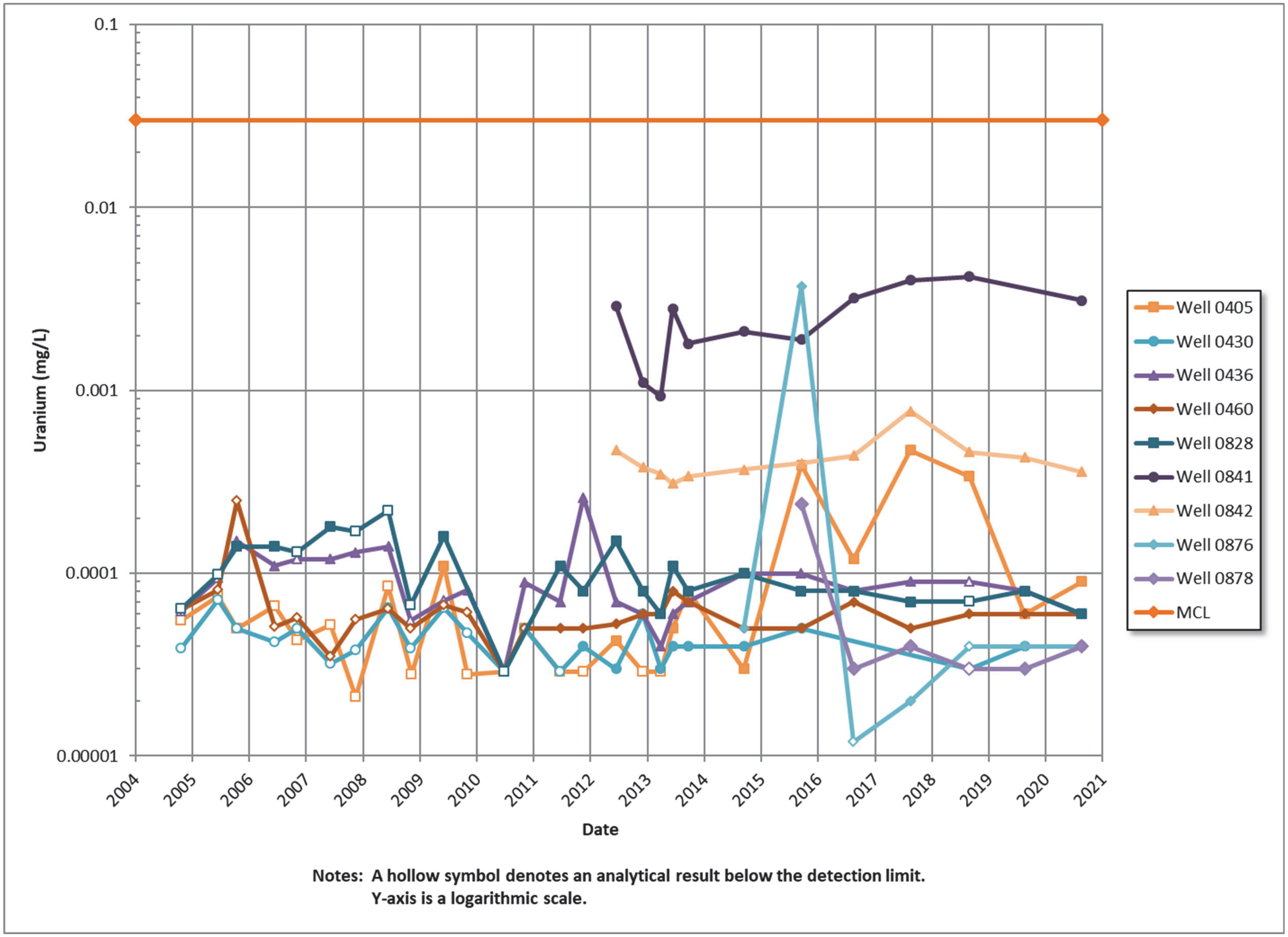


Figure 16. Uranium Concentrations in Domestic Wells

Figure 17. Surface Water Location 0879

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)
2000	1089	−1281	2720
2001	233.2	−2136.8	2090
2002	740.6	−1629.4	1930
2003	861.7	−1508.3	2490
2004	1591	−779	4120
2005	2272	−98	4520
2006	642.4	−1727.6	1710
2007	738.9	−1631.1	1910
2008	2175	−195	3730
2009	3012	642	4190
2010	5829	3459	13,300
2011	2861	491	7210
2012	594	−1776	1610
2013	587	−1783	1640
2014	1333	−1037	3140
2015	2538	168	4240
2016	3443	1073	11,200
2017	6397	4027	10,100
2018	2375	5	4600
2019	3325	955	7920
2020	500	−1870	3740

Notes:
[a] USGS gaging station statistics.
[b] Based on a mean June discharge of 2370 cfs from 1941 to 2019.

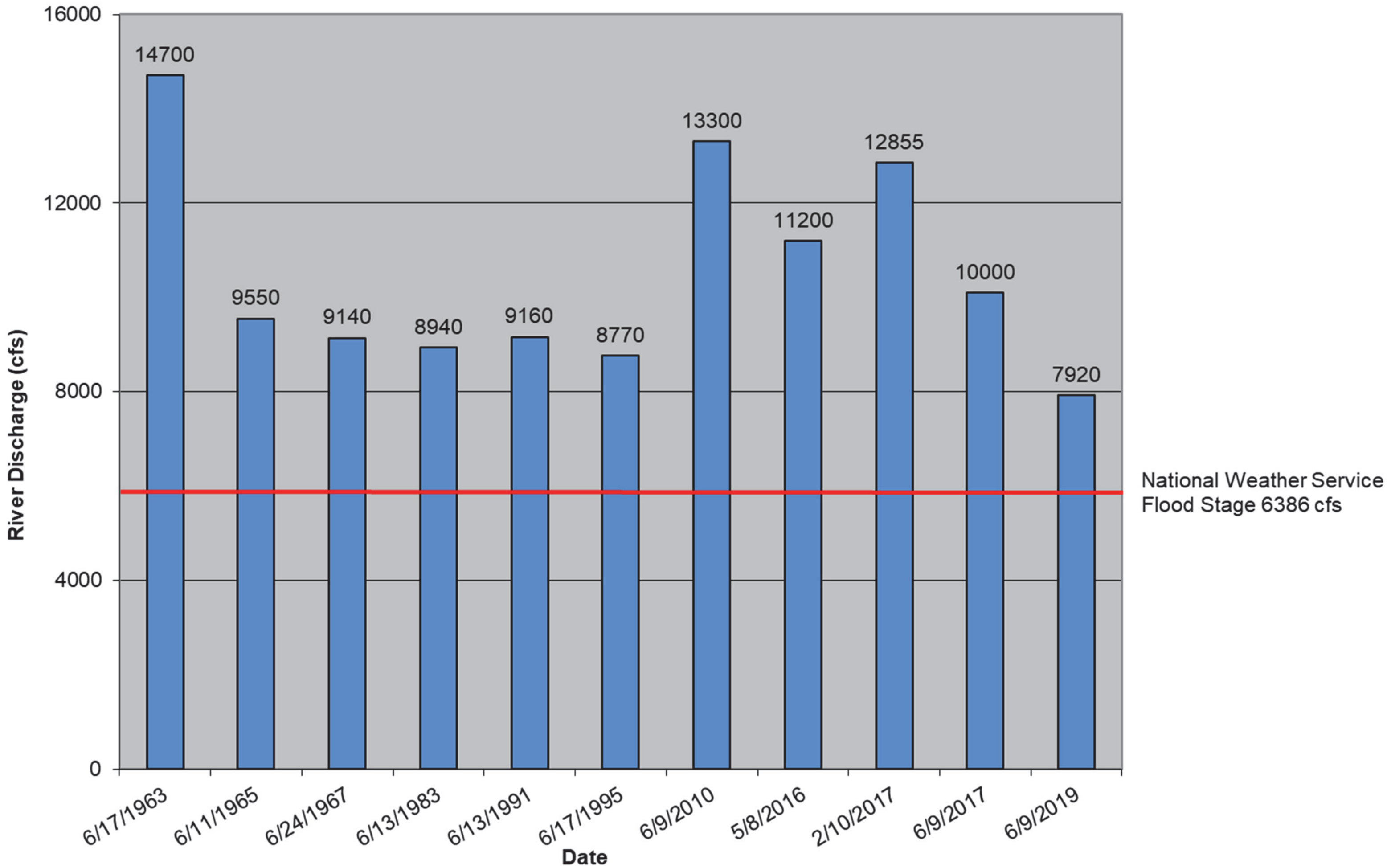


Figure 18. Historical Maximum Discharges of the Little Wind River

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 four river locations adjacent to and downstream of the groundwater plume (locations 0811, 0812, and 0796). In 2020, molybdenum and uranium concentrations measured at downstream locations were slightly higher than 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 2020 because of limited dilution from low flow in the Little Wind River (49 cfs) on the days the samples were collected. Appendix E provides surface water quality data by parameter for all surface water locations sampled during 2020.

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. 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 2020, 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 for molybdenum and were again in 2020 (Figure 21).

In 2020, the Little Wind River was not flowing into the oxbow lake during the August sampling event when low-flow conditions were observed. 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 2020, respectively, which illustrates the progress of the vegetation and sedimentation filling in the ponded water.

Surface water location 0879 is 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 2020 (Figure 17).

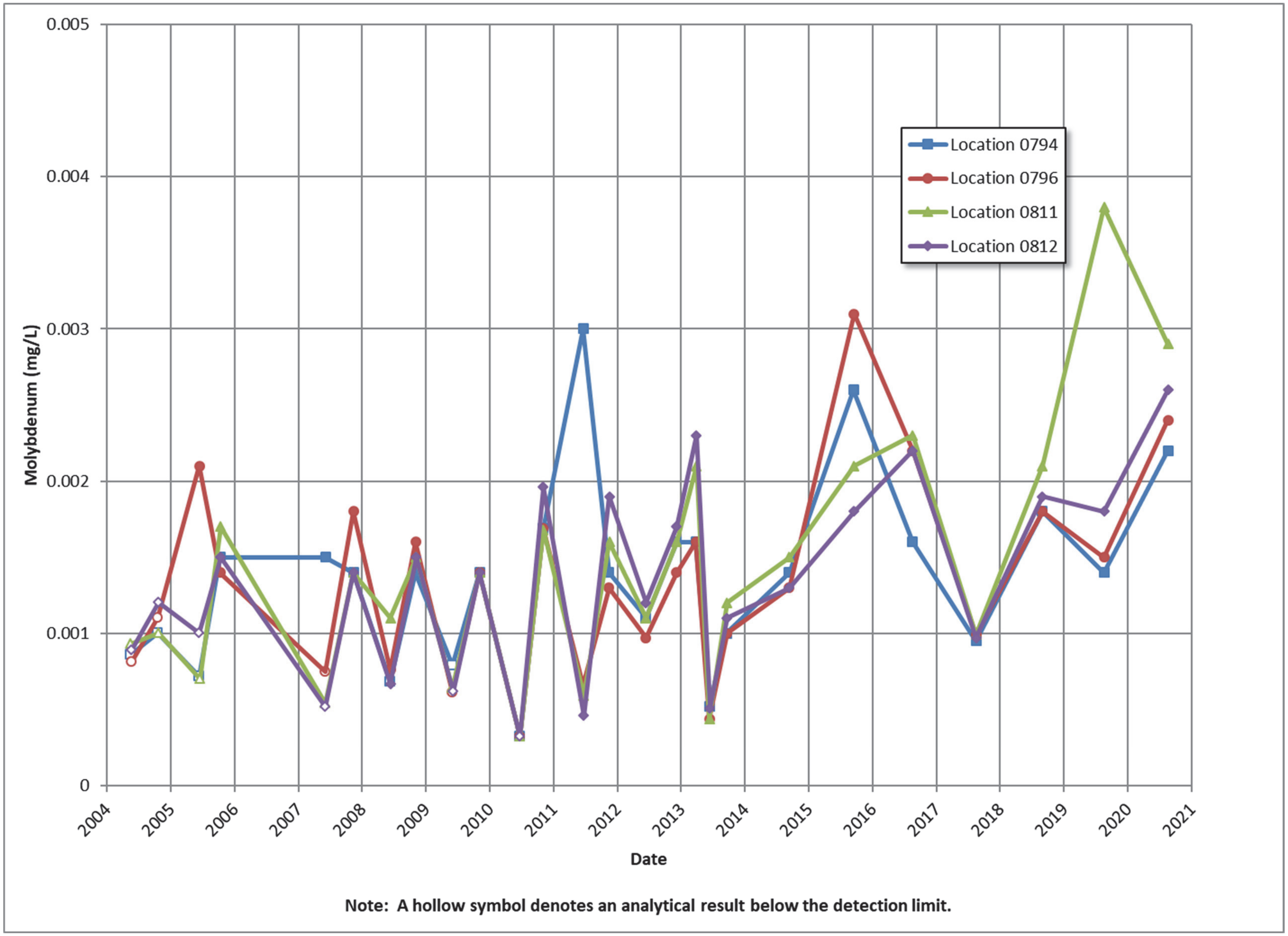


Figure 19. Molybdenum Concentrations in Little Wind River Locations

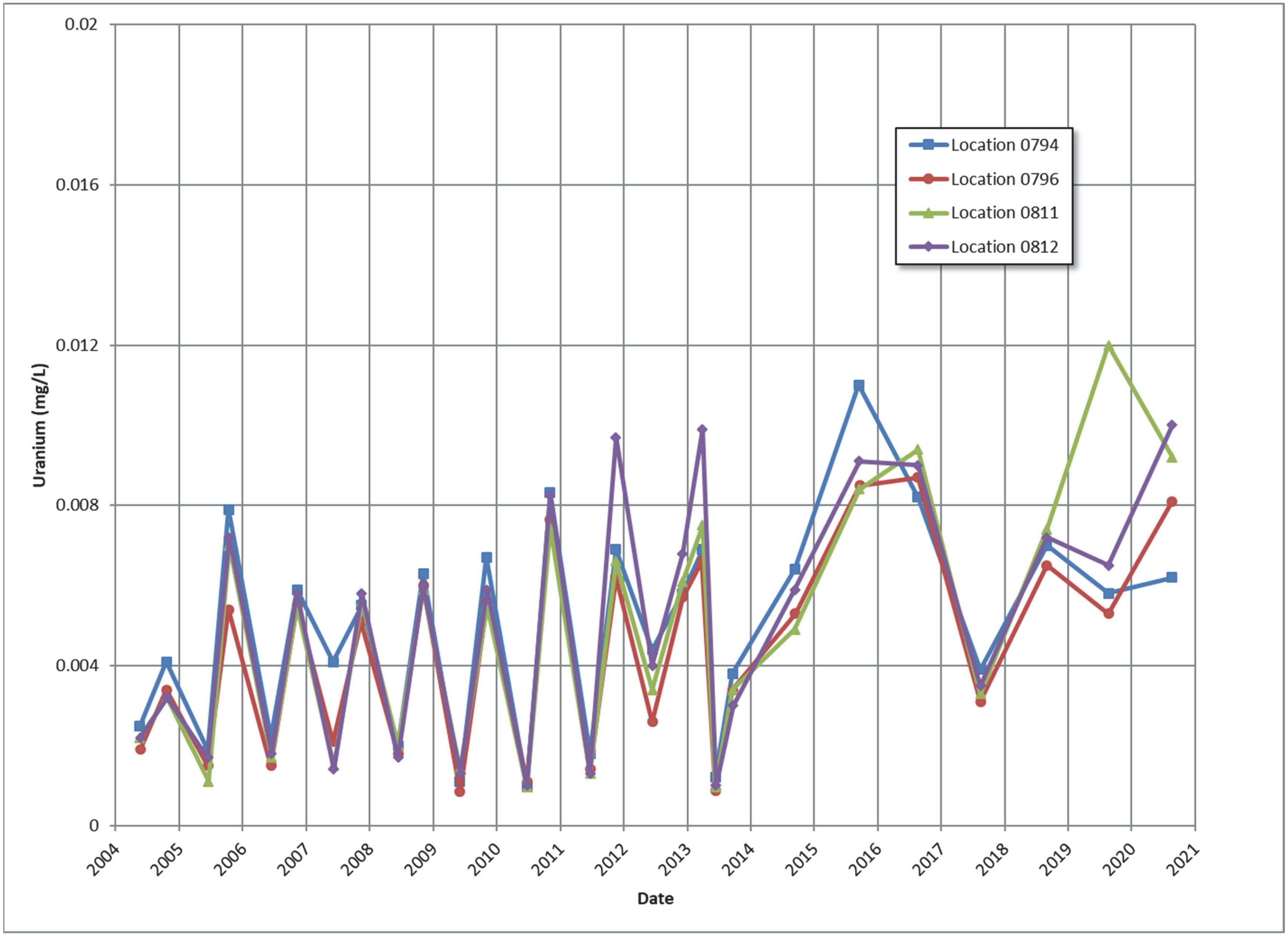


Figure 20. Uranium Concentrations in Little Wind River Locations

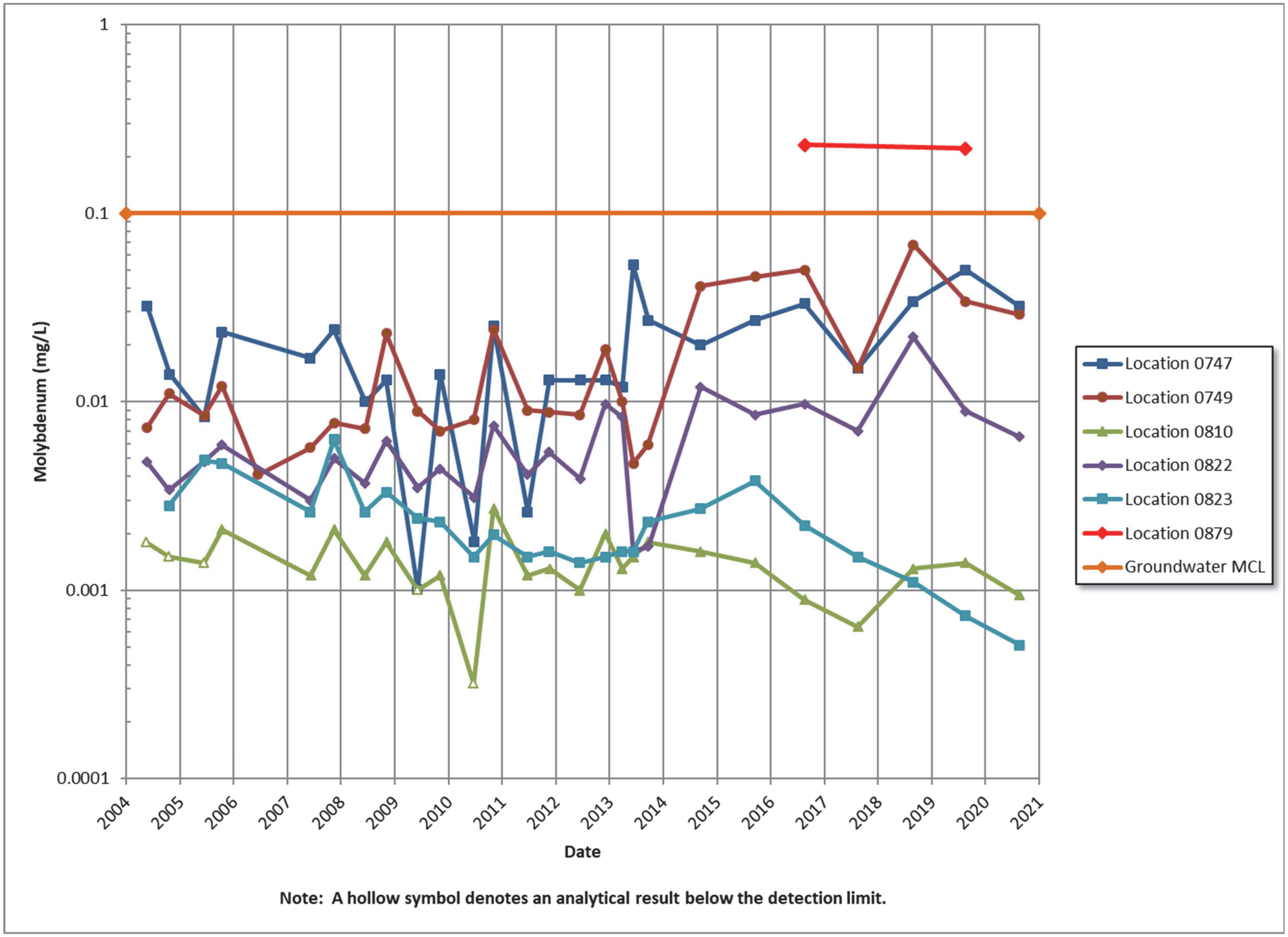


Figure 21. Molybdenum Concentrations in Ponds, Ditches, and Seeps

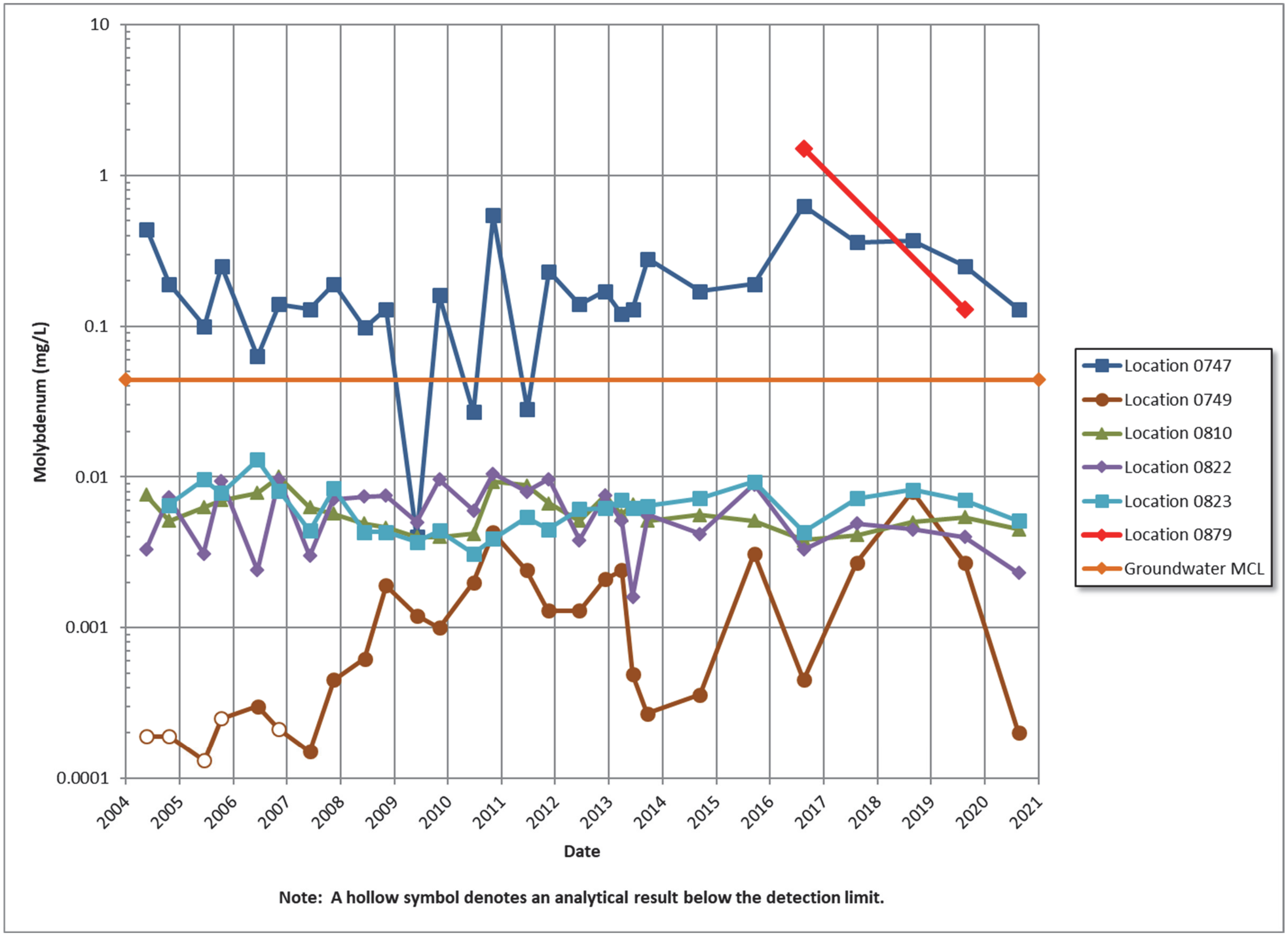


Figure 22. Uranium Concentrations in Ponds and Ditches

Figure 23. Oxbow Lake in May 2002

Figure 24. Oxbow Lake in August 2020

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 higher but variable (Figure 25), with a concentration of 250 mg/L measured in August 2020. The unlined ditch will continue to be monitored because it is a continual source of sulfate to the surficial aquifer.

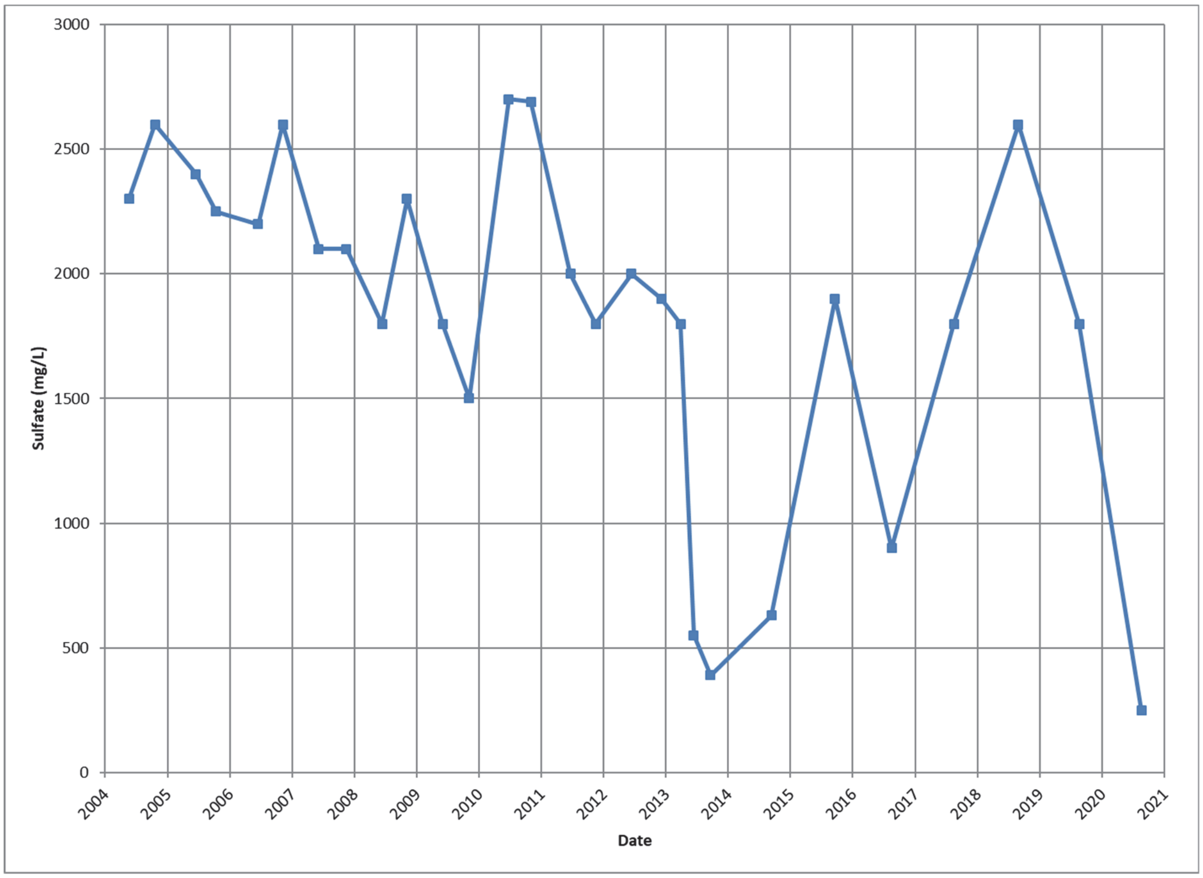


Figure 25. Sulfate Concentrations at Location 0749

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 (0.029 mg/L) was elevated compared to the molybdenum concentration in process water used by the sulfuric acid plant that is supplied by well 0460 (0.0028 mg/L); this indicates some molybdenum input from plant processes. The concentration of uranium in the sample collected from the ditch was low (0.00019 mg/L) but elevated compared to concentrations of the process water used at the plant (0.00006 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 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 that have always been 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 these constituents generally remained high after the 2016 and 2017 floods compared to preflood levels but declined again in 2020 to near 2015 levels after 3 years without a significant flood (Table 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 1.6 mg/L was measured in groundwater beneath the former mill site in 2020. 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 2020, which is very high compared to 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).
- Graphs of time versus concentration for average concentrations and for individual wells at the Riverton site show that concentrations of contaminants are either declining more slowly than in the past or have leveled out.
- 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. Data collection to date has provided a better understanding of the Riverton site, including aquifer properties, geochemistry, and potential additional contaminant sources. However, these data will need to be thoroughly interpreted, evaluated, and presented to document that natural flushing is not a viable compliance strategy and to select and present a new compliance strategy. Ongoing work includes development of new groundwater flow and transport models that reflect the current site conceptual model. This work will result in a recommendation for a new compliance strategy that will be detailed in a new Groundwater Compliance Action Plan (GCAP).

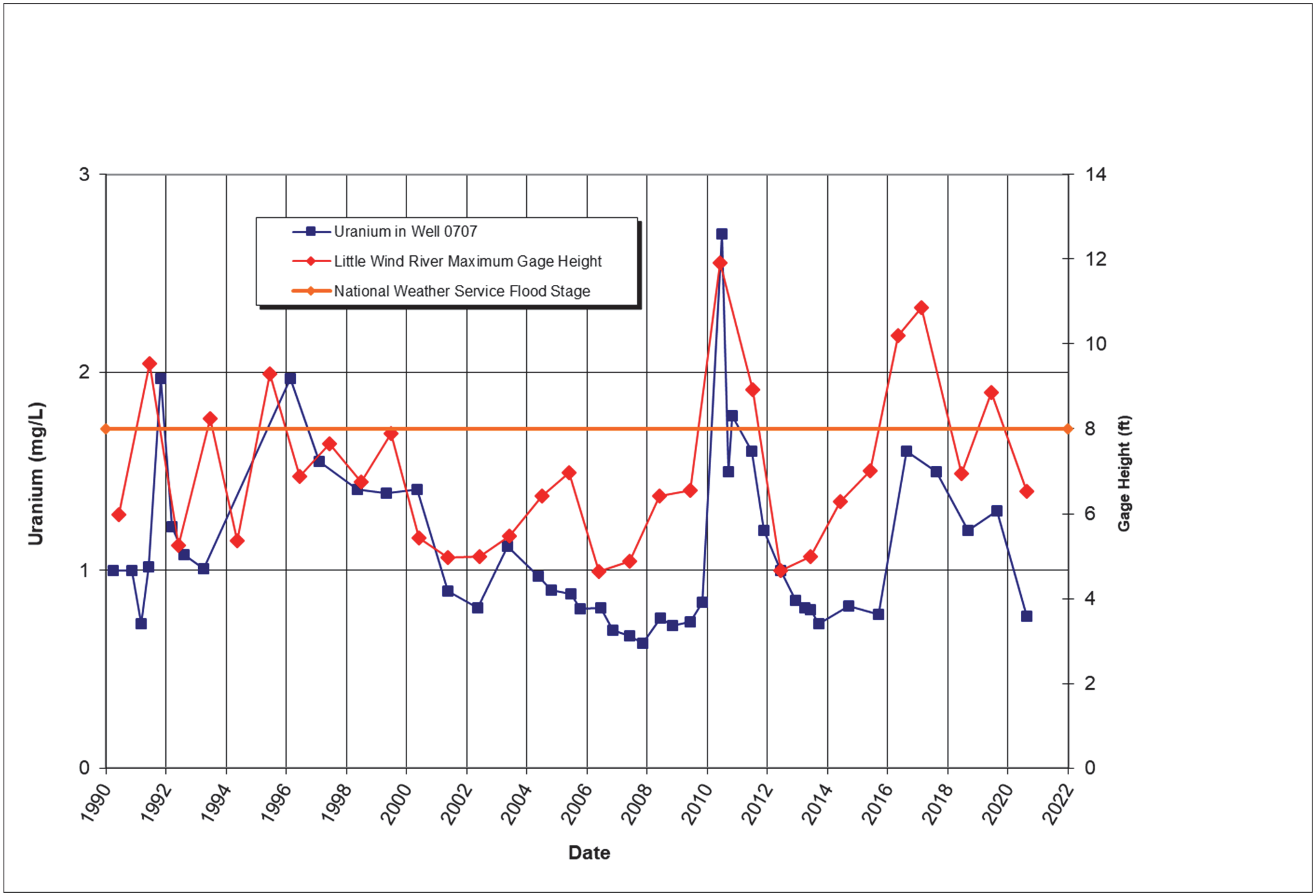


Figure 26. Uranium Concentrations in Monitoring Well 0707 Versus Little Wind River Stage

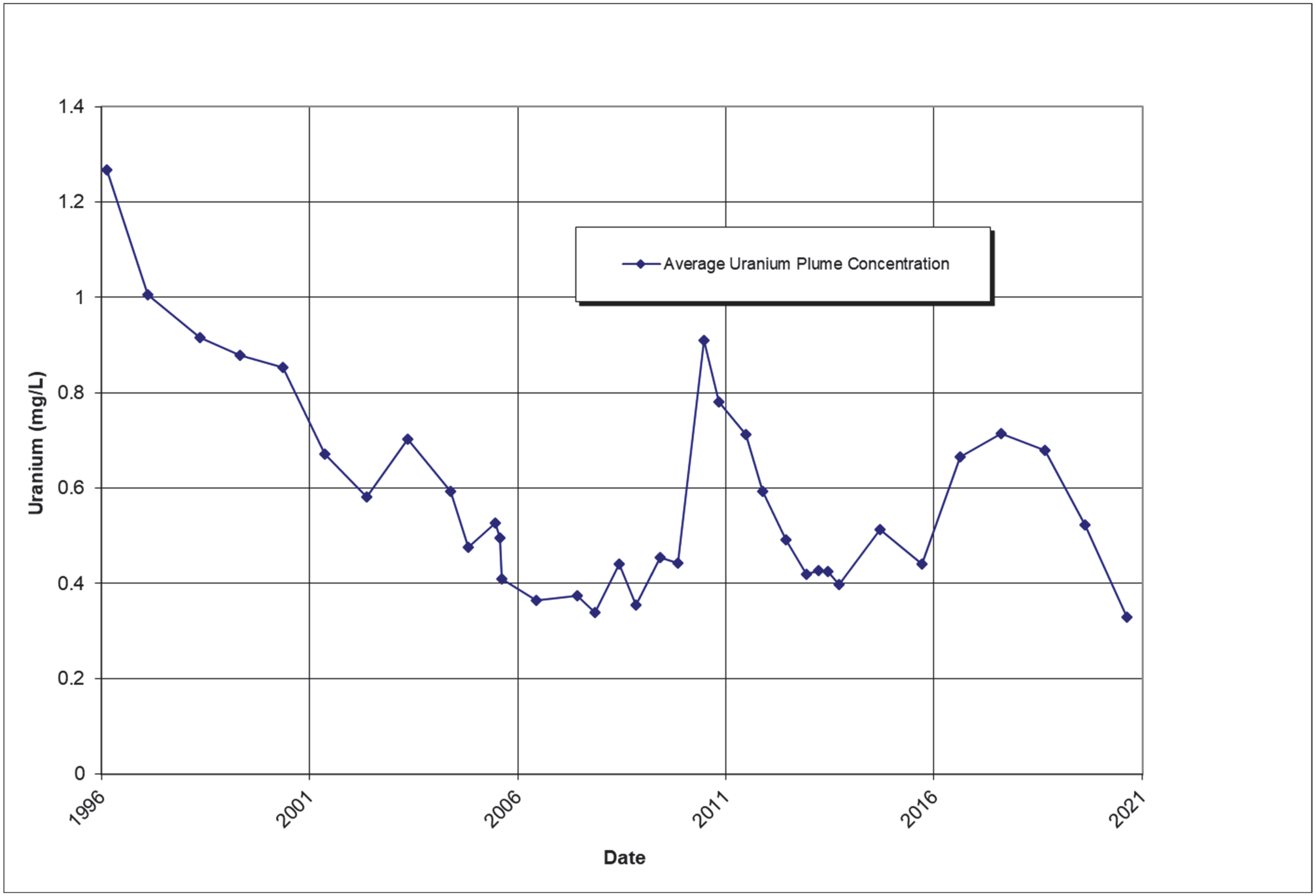


Figure 27. Average Uranium Concentrations in Surficial Aquifer Wells 0707, 0716, 0718, and 0722/0722R

Table 4. Comparison of Preflood (2015) and Flood (2016) and 2020 Results

Well	Molybdenum[a]			Uranium[a]			Sulfate[a]		
	Preflood 2015	Flood 2016	2020	Preflood 2015	Flood 2016	2020	Preflood 2015	Flood 2016	2020
0707	0.96	1.5	0.86	0.78	1.6	0.77	2700	5800	2900
0788	0.02	0.022	0.039	0.038	0.059	0.038	1400	2800	1700
0789	0.57	0.67	0.5	1.6	3.1	1.2	4700	11,000	4900
0826	0.018	0.041	0.043	0.037	0.072	0.03	1300	3400	1600
0855-4	0.25	0.25	0.33	0.86	1.1	0.76	5100	6600	5400
0856-4	0.3	0.83	0.38	1.1	5.6	0.97	4000	14,000	NA[b]

Notes:
[a] Units are in mg/L.
[b] Not available—sulfate analysis not conducted in 2020.

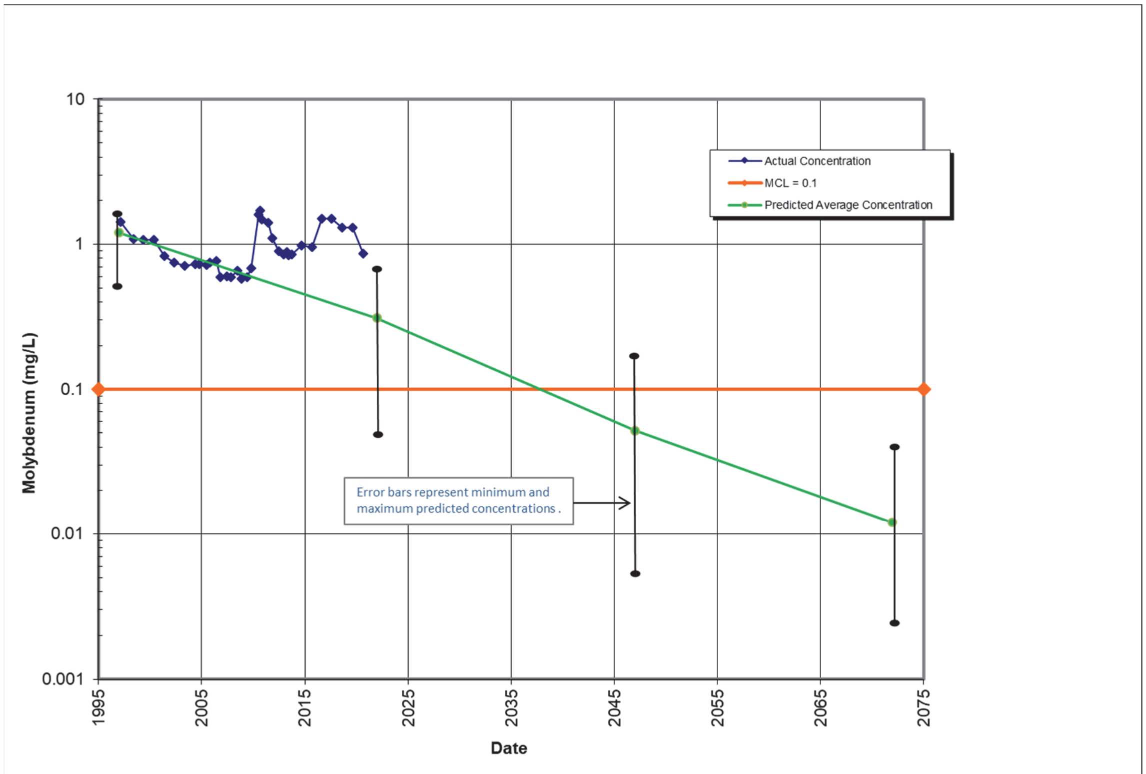


Figure 28. Predicted Versus Measured Molybdenum Concentrations in Well 0707

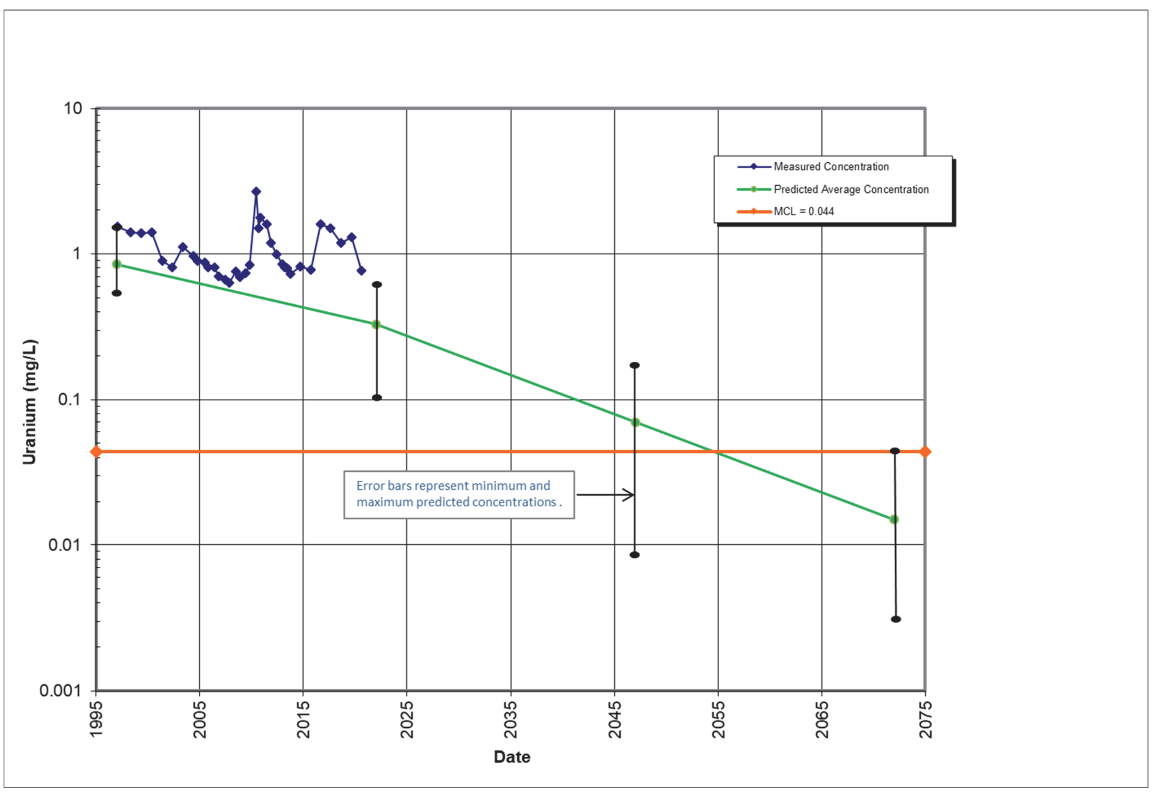


Figure 29. Predicated Versus Measured Uranium Concentrations in Well 0707

7.0 Conclusion and Recommendations

Verification monitoring results from 2020 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 from the groundwater contamination. In addition, verification monitoring results continue to verify that mill-related contamination has not impacted any potable domestic wells within the IC boundary installed in the semiconfined aquifer or the confined aquifer 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 given the continuous monitoring, oversight, and ICs that are in place (Argonne 2020).

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 2020, contaminant concentrations continued to decline after 3 years without significant flooding of the Little Wind River. Numerous lines of evidence indicate that the rate of natural flushing will not be rapid enough to meet the 100-year regulatory limit.

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.

Ongoing work at the Riverton site involves collaboration with Argonne National Laboratory, SLAC, and USGS to complete ongoing investigations and thorough interpretations and evaluations of existing data. This collaboration is designed to further evaluate risk, further define the conceptual model, and better understand geochemical processes that control contaminant fate and transport. These investigations will be the subject of future scientific publications produced by Argonne National Laboratory, USGS, SLAC, and LM. In addition, a tracer-test study is in progress and new groundwater flow and transport models are being developed that will refine the current site conceptual model. These evaluations and modeling will assist with the scientific basis for making decisions on a path-forward compliance strategy and development of a new GCAP for the Riverton site that will ensure continued protection of human health and the environment.

8.0 References

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Appendix A

Domestic Well Data

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE RVT01, Riverton Processing Site

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			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	DOM	8/19/2020	(N)F			86.8	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0430	WL	DOM	8/19/2020	(N)F			159.2	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0436	WL	DOM	8/18/2020	(N)F			137	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0460	WL	DOM	8/18/2020	(N)F			177	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0828	WL	DOM	8/18/2020	(N)F			150	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0841	WL	DOM	8/19/2020	(N)F			169	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0842	WL	DOM	8/19/2020	(N)F			161	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0876	WL	DOM	8/19/2020	(N)F			48	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0878	WL	DOM	8/19/2020	(N)F			119.6	mg/L			#	-	-
Manganese														
Manganese	0405	WL	DOM	8/19/2020	(T)F			0.0073	mg/L	J		#	0.00074	-
Manganese	0430	WL	DOM	8/19/2020	(T)F			0.0038	mg/L	J		#	0.00074	-
Manganese	0436	WL	DOM	8/18/2020	(T)F			0.0015	mg/L	J		#	0.00074	-
Manganese	0460	WL	DOM	8/18/2020	(T)F			0.0017	mg/L	J		#	0.00074	-
Manganese	0828	WL	DOM	8/18/2020	(T)F			0.0016	mg/L	J		#	0.00074	-
Manganese	0841	WL	DOM	8/19/2020	(T)F			0.091	mg/L			#	0.00074	-
Manganese	0842	WL	DOM	8/19/2020	(T)F			0.048	mg/L			#	0.00074	-
Manganese	0876	WL	DOM	8/19/2020	(T)F			0.00074	mg/L	U		#	0.00074	-
Manganese	0878	WL	DOM	8/19/2020	(T)F			0.0071	mg/L	J		#	0.00074	-
Molybdenum														
Molybdenum	0405	WL	DOM	8/19/2020	(T)F			0.0035	mg/L			#	0.00046	-
Molybdenum	0430	WL	DOM	8/19/2020	(T)F			0.0024	mg/L			#	0.00046	-
Molybdenum	0436	WL	DOM	8/18/2020	(T)F			0.0028	mg/L			#	0.00046	-
Molybdenum	0460	WL	DOM	8/18/2020	(T)F			0.0028	mg/L			#	0.00046	-

PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Molybdenum	0828	WL	DOM	8/18/2020	(T)F			0.003	mg/L			#	0.00046	-
Molybdenum	0841	WL	DOM	8/19/2020	(T)F			0.0032	mg/L			#	0.00046	-
Molybdenum	0842	WL	DOM	8/19/2020	(T)F			0.0026	mg/L			#	0.00046	-
Molybdenum	0876	WL	DOM	8/19/2020	(T)F			0.004	mg/L			#	0.00046	-
Molybdenum	0878	WL	DOM	8/19/2020	(T)F			0.002	mg/L			#	0.00046	-
pH														
pH	0405	WL	DOM	8/19/2020	(N)F			8.85	s.u.			#	-	-
pH	0430	WL	DOM	8/19/2020	(N)F			8.74	s.u.			#	-	-
pH	0436	WL	DOM	8/18/2020	(N)F			8.8	s.u.			#	-	-
pH	0460	WL	DOM	8/18/2020	(N)F			8.79	s.u.			#	-	-
pH	0828	WL	DOM	8/18/2020	(N)F			8.66	s.u.			#	-	-
pH	0841	WL	DOM	8/19/2020	(N)F			7.61	s.u.			#	-	-
pH	0842	WL	DOM	8/19/2020	(N)F			8.11	s.u.			#	-	-
pH	0876	WL	DOM	8/19/2020	(N)F			9.33	s.u.			#	-	-
pH	0878	WL	DOM	8/19/2020	(N)F			9.17	s.u.			#	-	-
Specific Conductance														
Specific Conductance	0405	WL	DOM	8/19/2020	(N)F			971	umhos/cm			#	-	-
Specific Conductance	0430	WL	DOM	8/19/2020	(N)F			773	umhos/cm			#	-	-
Specific Conductance	0436	WL	DOM	8/18/2020	(N)F			856	umhos/cm			#	-	-
Specific Conductance	0460	WL	DOM	8/18/2020	(N)F			748	umhos/cm			#	-	-
Specific Conductance	0828	WL	DOM	8/18/2020	(N)F			852	umhos/cm			#	-	-
Specific Conductance	0841	WL	DOM	8/19/2020	(N)F			857	umhos/cm			#	-	-
Specific Conductance	0842	WL	DOM	8/19/2020	(N)F			719	umhos/cm			#	-	-
Specific Conductance	0876	WL	DOM	8/19/2020	(N)F			911	umhos/cm			#	-	-
Specific Conductance	0878	WL	DOM	8/19/2020	(N)F			885	umhos/cm			#	-	-

PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Sulfate														
Sulfate	0405	WL	DOM	8/19/2020	(N)F			270	mg/L			#	2.6	-
Sulfate	0430	WL	DOM	8/19/2020	(N)F			180	mg/L			#	1.1	-
Sulfate	0436	WL	DOM	8/18/2020	(N)F			200	mg/L			#	2.6	-
Sulfate	0460	WL	DOM	8/18/2020	(N)F			170	mg/L			#	1.1	-
Sulfate	0828	WL	DOM	8/18/2020	(N)F			230	mg/L			#	2.1	-
Sulfate	0841	WL	DOM	8/19/2020	(N)F			220	mg/L			#	2.1	-
Sulfate	0842	WL	DOM	8/19/2020	(N)F			160	mg/L			#	1.1	-
Sulfate	0876	WL	DOM	8/19/2020	(N)F			270	mg/L			#	2.1	-
Sulfate	0878	WL	DOM	8/19/2020	(N)F			250	mg/L			#	2.1	-
Temperature														
Temperature	0405	WL	DOM	8/19/2020	(N)F			14.77	C			#	-	-
Temperature	0430	WL	DOM	8/19/2020	(N)F			18.14	C			#	-	-
Temperature	0436	WL	DOM	8/18/2020	(N)F			17.47	C			#	-	-
Temperature	0460	WL	DOM	8/18/2020	(N)F			24.44	C			#	-	-
Temperature	0828	WL	DOM	8/18/2020	(N)F			21	C			#	-	-
Temperature	0841	WL	DOM	8/19/2020	(N)F			19.75	C			#	-	-
Temperature	0842	WL	DOM	8/19/2020	(N)F			14.48	C			#	-	-
Temperature	0876	WL	DOM	8/19/2020	(N)F			17.72	C			#	-	-
Temperature	0878	WL	DOM	8/19/2020	(N)F			15.11	C			#	-	-
Turbidity														
Turbidity	0405	WL	DOM	8/19/2020	(N)F			2.68	NTU			#	-	-
Turbidity	0430	WL	DOM	8/19/2020	(N)F			8.36	NTU			#	-	-
Turbidity	0436	WL	DOM	8/18/2020	(N)F			9.33	NTU			#	-	-
Turbidity	0460	WL	DOM	8/18/2020	(N)F			0.77	NTU			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE RVT01, Riverton Processing Site

REPORT DATE: 12/4/2020 3:20:29 PM

PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Turbidity	0828	WL	DOM	8/18/2020	(N)F			3.45	NTU			#	-	-
Turbidity	0841	WL	DOM	8/19/2020	(N)F			1.22	NTU			#	-	-
Turbidity	0842	WL	DOM	8/19/2020	(N)F			1.03	NTU			#	-	-
Turbidity	0876	WL	DOM	8/19/2020	(N)F			2.28	NTU			#	-	-
Turbidity	0878	WL	DOM	8/19/2020	(N)F			1.47	NTU			#	-	-
Uranium														
Uranium	0405	WL	DOM	8/19/2020	(T)F			0.00009	mg/L	J		#	0.00004	-
Uranium	0430	WL	DOM	8/19/2020	(T)F			0.00004	mg/L	J		#	0.00004	-
Uranium	0436	WL	DOM	8/18/2020	(T)F			0.00006	mg/L	J		#	0.00004	-
Uranium	0460	WL	DOM	8/18/2020	(T)F			0.00006	mg/L	J		#	0.00004	-
Uranium	0828	WL	DOM	8/18/2020	(T)F			0.00006	mg/L	J		#	0.00004	-
Uranium	0841	WL	DOM	8/19/2020	(T)F			0.0031	mg/L			#	0.00004	-
Uranium	0842	WL	DOM	8/19/2020	(T)F			0.00036	mg/L			#	0.00004	-
Uranium	0876	WL	DOM	8/19/2020	(T)F			0.00004	mg/L	U		#	0.00004	-
Uranium	0878	WL	DOM	8/19/2020	(T)F			0.00004	mg/L	J		#	0.00004	-

LOCATION TYPE:

WL WELL

LOCATION SUBTYPES:

DOM Domestic 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

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

REPORT DATE: 12/22/2020 10:03:28 AM

LOCATION CODE	MEASUREMENT DATE/TIME	TOP OF CASING ELEVATION (FT)	DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
0101	08/18/2020 10:45	4953.16	10.73	4942.43	
0110	08/18/2020 10:25	4954.58	13.53	4941.05	
0111	08/18/2020 10:15	4951.26	10.27	4940.99	
0700	08/18/2020 11:50	4955.27	7.28	4947.99	
0705	08/19/2020 12:13	4934.32	7.18	4927.14	
0707	08/19/2020 12:24	4933.75	6.25	4927.50	
0709	08/19/2020 10:30	4934.17	7.36	4926.81	
0710	08/19/2020 13:30	4950.97	6.41	4944.56	
0716	08/18/2020 10:10	4943.14	8.16	4934.98	
0717	08/18/2020 09:48	4942.79	7.25	4935.54	
0718	08/19/2020 15:32	4941.35	8.19	4933.16	
0719	08/19/2020 15:58	4941.44	7.75	4933.69	
0720	08/18/2020 14:14	4944.44	4.89	4939.55	
0721	08/18/2020 14:28	4944.37	8.62	4935.75	
0722R	08/20/2020 07:55	4941.14	7.63	4933.51	
0723	08/20/2020 08:12	4939.94	6.43	4933.51	
0724	08/18/2020 09:27	4945.14	5.25	4939.89	
0725	08/18/2020 09:25	4945.44	5.41	4940.03	
0726	08/18/2020 09:20	4945.43	8.15	4937.28	
0727	08/18/2020 12:04	4955.62	10.39	4945.23	
0728	08/18/2020 10:05	4949.96	8.47	4941.49	
0729	08/20/2020 08:55	4936.65	4.99	4931.66	
0730	08/20/2020 08:30	4937.16	5.35	4931.81	
0732	08/18/2020 11:45	4949.06	8.96	4940.10	
0733	08/18/2020 12:00	4950.72	3.72	4947.00	
0734	08/18/2020 12:05	4950.33	6.12	4944.21	
0736	08/18/2020 13:00	4949.69	8.01	4941.68	
0784	08/18/2020 11:31	4949.47	7.71	4941.76	
0788	08/18/2020 16:12	4937.96	9.59	4928.37	
0789	08/19/2020 14:11	4936.39	10.33	4926.06	
0824	08/19/2020 16:43	4932.94	6.76	4926.18	
0826	08/18/2020 14:58	4939.89	8.12	4931.77	
0852-1	08/19/2020 08:48	4940.51			D
0852-2	08/19/2020 08:48	4940.51			I
0852-3	08/19/2020 08:57	4940.51			I

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

REPORT DATE: 12/22/2020 10:03:29 AM

LOCATION CODE	MEASUREMENT DATE/TIME	TOP OF CASING ELEVATION (FT)	DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
0852-4	08/19/2020 08:47	4940.80	11.48	4929.32	
0853-1	08/19/2020 07:55	4938.33			D
0853-2	08/19/2020 07:55	4938.33			I
0853-3	08/19/2020 08:10	4938.33			I
0853-4	08/19/2020 07:55	4938.49	10.12	4928.37	
0854-1	08/18/2020 15:19	4939.71			D
0854-2	08/18/2020 15:18	4939.71			I
0854-3	08/18/2020 15:33	4939.71			I
0854-4	08/18/2020 15:18	4939.95	8.20	4931.75	
0855-1	08/19/2020 14:31	4934.55			D
0855-2	08/19/2020 14:32	4934.55			I
0855-3	08/19/2020 14:46	4934.55			I
0855-4	08/19/2020 14:31	4934.79	8.19	4926.60	
0856-1	08/19/2020 10:32	4936.99			D
0856-2	08/19/2020 10:33	4936.99			I
0856-3	08/19/2020 10:44	4936.99			I
0856-4	08/19/2020 10:32	4937.23	9.00	4928.23	
0857-1	08/19/2020 09:42	4938.85			D
0857-2	08/19/2020 09:41	4938.85			I
0857-3	08/19/2020 09:57	4938.85			I
0857-4	08/19/2020 09:41	4939.11	9.02	4930.09	
0858-1	08/19/2020 11:17	4935.44			D
0858-2	08/19/2020 11:18	4935.44			I
0858-3	08/19/2020 11:32	4935.44			I
0858-4	08/19/2020 11:17	4935.69	7.94	4927.75	
0859-1	08/18/2020 10:36	4948.41			D
0859-2	08/18/2020 10:39	4948.41			D
0859-3	08/18/2020 10:39	4948.41			I
0859-4	08/18/2020 10:37	4948.69	9.35	4939.34	
0860-1	08/18/2020 08:53	4946.55			D
0860-2	08/18/2020 08:53	4946.55			I
0860-3	08/18/2020 09:10	4946.55			I
0860-4	08/18/2020 08:53	4946.82	11.41	4935.41	

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				

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Appendix C

Monitoring Well Data

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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)	0705	WL	8/19/2020	(N)F			62	mg/L		FQ	#	-	-
Alkalinity, Total (As CaCO3)	0707	WL	8/19/2020	(N)F			376	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0710	WL	8/19/2020	(N)F			198	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0716	WL	8/18/2020	(N)F			311	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0717	WL	8/18/2020	(N)F			197.917	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0718	WL	8/19/2020	(N)F			276	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0719	WL	8/19/2020	(N)F			100	mg/L		FQ	#	-	-
Alkalinity, Total (As CaCO3)	0720	WL	8/18/2020	(N)F			263	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0721	WL	8/18/2020	(N)F			117	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0722R	WL	8/20/2020	(N)F			280	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0723	WL	8/20/2020	(N)F			308	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0727	WL	8/18/2020	(N)F			192.391	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0729	WL	8/20/2020	(N)F			321	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0730	WL	8/20/2020	(N)F			317	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0732	WL	8/18/2020	(N)F			238	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0784	WL	8/18/2020	(N)F			147	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0788	WL	8/18/2020	(N)F			427	mg/L		F	#	-	-

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	8/19/2020	(N)F			488	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0824	WL	8/19/2020	(N)F			353	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0826	WL	8/18/2020	(N)F			395	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0852-2	WL	8/19/2020	(N)F			412	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0852-3	WL	8/19/2020	(N)F			420	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0852-4	WL	8/19/2020	(N)F			368	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0853-2	WL	8/19/2020	(N)F			448	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0853-3	WL	8/19/2020	(N)F			468	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0853-4	WL	8/19/2020	(N)F			474	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0854-2	WL	8/18/2020	(N)F			403	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0854-3	WL	8/18/2020	(N)F			374	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0854-4	WL	8/18/2020	(N)F			401	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0855-2	WL	8/19/2020	(N)F			547.5	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0855-3	WL	8/19/2020	(N)F			535	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0855-4	WL	8/19/2020	(N)F			430	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0856-2	WL	8/19/2020	(N)F			412	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0856-3	WL	8/19/2020	(N)F			414	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0856-4	WL	8/19/2020	(N)F			422	mg/L		F	#	-	-

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	8/19/2020	(N)F			390	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0857-3	WL	8/19/2020	(N)F			378	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0857-4	WL	8/19/2020	(N)F			394	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0858-2	WL	8/19/2020	(N)F			398	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0858-3	WL	8/19/2020	(N)F			344	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0858-4	WL	8/19/2020	(N)F			378	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0859-3	WL	8/18/2020	(N)F			195	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0859-4	WL	8/18/2020	(N)F			204	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0860-2	WL	8/18/2020	(N)F			276.042	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0860-3	WL	8/18/2020	(N)F			264	mg/L		F	#	-	-
Alkalinity, Total (As CaCO3)	0860-4	WL	8/18/2020	(N)F			270	mg/L		F	#	-	-
Manganese													
Manganese	0705	WL	8/19/2020	(T)F			0.0089	mg/L	J	FQ	#	0.00074	-
Manganese	0707	WL	8/19/2020	(T)F			0.95	mg/L		F	#	0.00074	-
Manganese	0710	WL	8/19/2020	(T)F			0.11	mg/L		F	#	0.00074	-
Manganese	0716	WL	8/18/2020	(T)F			0.28	mg/L		F	#	0.00074	-
Manganese	0716	WL	8/18/2020	(T)D			0.28	mg/L		F	#	0.00074	-
Manganese	0717	WL	8/18/2020	(T)F			0.15	mg/L		F	#	0.00074	-
Manganese	0717	WL	8/18/2020	(T)D			0.15	mg/L		F	#	0.00074	-
Manganese	0718	WL	8/19/2020	(T)F			0.29	mg/L		F	#	0.00074	-
Manganese	0719	WL	8/19/2020	(T)F			0.059	mg/L		FQ	#	0.00074	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Manganese	0720	WL	8/18/2020	(T)F			0.00074	mg/L	U	F	#	0.00074	-
Manganese	0721	WL	8/18/2020	(T)F			0.0027	mg/L	J	F	#	0.00074	-
Manganese	0722R	WL	8/20/2020	(T)F			0.00074	mg/L	U	F	#	0.00074	-
Manganese	0723	WL	8/20/2020	(T)F			0.38	mg/L		F	#	0.00074	-
Manganese	0727	WL	8/18/2020	(T)F			0.067	mg/L		F	#	0.00074	-
Manganese	0729	WL	8/20/2020	(T)F			1.5	mg/L		F	#	0.00074	-
Manganese	0730	WL	8/20/2020	(T)F			0.035	mg/L		F	#	0.00074	-
Manganese	0732	WL	8/18/2020	(T)F			0.31	mg/L		F	#	0.00074	-
Manganese	0784	WL	8/18/2020	(T)F			1	mg/L		F	#	0.00074	-
Manganese	0788	WL	8/18/2020	(T)F			0.72	mg/L		F	#	0.00074	-
Manganese	0789	WL	8/19/2020	(T)F			0.35	mg/L		F	#	0.00074	-
Manganese	0824	WL	8/19/2020	(T)F			0.0065	mg/L	J	F	#	0.00074	-
Manganese	0826	WL	8/18/2020	(T)F			2.3	mg/L		F	#	0.00074	-
Manganese	0852-2	WL	8/19/2020	(T)F			0.68	mg/L		F	#	0.00074	-
Manganese	0852-3	WL	8/19/2020	(T)F			0.68	mg/L		F	#	0.00074	-
Manganese	0852-4	WL	8/19/2020	(T)F			1.1	mg/L		F	#	0.00074	-
Manganese	0853-2	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00074	-
Manganese	0853-3	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00074	-
Manganese	0853-4	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00074	-
Manganese	0854-2	WL	8/18/2020	(T)F			2.6	mg/L		F	#	0.00074	-
Manganese	0854-3	WL	8/18/2020	(T)F			2.6	mg/L		F	#	0.00074	-
Manganese	0854-4	WL	8/18/2020	(T)F			2.4	mg/L		F	#	0.00074	-
Manganese	0855-2	WL	8/19/2020	(T)F			0.42	mg/L		F	#	0.00074	-
Manganese	0855-3	WL	8/19/2020	(T)F			0.91	mg/L		F	#	0.00074	-
Manganese	0855-4	WL	8/19/2020	(T)F			1.3	mg/L		F	#	0.00074	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Manganese	0856-2	WL	8/19/2020	(T)F			0.23	mg/L		F	#	0.00074	-
Manganese	0856-3	WL	8/19/2020	(T)F			0.39	mg/L		F	#	0.00074	-
Manganese	0856-4	WL	8/19/2020	(T)F			0.92	mg/L		F	#	0.00074	-
Manganese	0857-2	WL	8/19/2020	(T)F			2.1	mg/L		F	#	0.00074	-
Manganese	0857-3	WL	8/19/2020	(T)F			2.1	mg/L		F	#	0.00074	-
Manganese	0857-4	WL	8/19/2020	(T)F			2.1	mg/L		F	#	0.00074	-
Manganese	0858-2	WL	8/19/2020	(T)F			0.8	mg/L		F	#	0.00074	-
Manganese	0858-3	WL	8/19/2020	(T)F			0.94	mg/L		F	#	0.00074	-
Manganese	0858-4	WL	8/19/2020	(T)F			0.96	mg/L		F	#	0.00074	-
Manganese	0859-3	WL	8/18/2020	(T)F			0.93	mg/L		F	#	0.00074	-
Manganese	0859-4	WL	8/18/2020	(T)D			1.7	mg/L		F	#	0.00074	-
Manganese	0859-4	WL	8/18/2020	(T)F			1.6	mg/L		F	#	0.00074	-
Manganese	0860-2	WL	8/18/2020	(T)F			0.034	mg/L		F	#	0.00074	-
Manganese	0860-3	WL	8/18/2020	(T)F			1.2	mg/L		F	#	0.00074	-
Manganese	0860-4	WL	8/18/2020	(T)F			1.3	mg/L		F	#	0.00074	-
Molybdenum													
Molybdenum	0705	WL	8/19/2020	(T)F			0.0031	mg/L		FQ	#	0.00046	-
Molybdenum	0707	WL	8/19/2020	(T)F			0.86	mg/L		F	#	0.00046	-
Molybdenum	0710	WL	8/19/2020	(T)F			0.0042	mg/L		F	#	0.00046	-
Molybdenum	0716	WL	8/18/2020	(T)F			0.1	mg/L		F	#	0.00046	-
Molybdenum	0716	WL	8/18/2020	(T)D			0.1	mg/L		F	#	0.00046	-
Molybdenum	0717	WL	8/18/2020	(T)F			0.011	mg/L		F	#	0.00046	-
Molybdenum	0717	WL	8/18/2020	(T)D			0.012	mg/L		F	#	0.00046	-
Molybdenum	0718	WL	8/19/2020	(T)F			0.11	mg/L		F	#	0.00046	-
Molybdenum	0719	WL	8/19/2020	(T)F			0.0084	mg/L		FQ	#	0.00046	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Molybdenum	0720	WL	8/18/2020	(T)F			0.0013	mg/L	J	F	#	0.00046	-
Molybdenum	0721	WL	8/18/2020	(T)F			0.0023	mg/L		F	#	0.00046	-
Molybdenum	0722R	WL	8/20/2020	(T)F			0.054	mg/L		F	#	0.00046	-
Molybdenum	0723	WL	8/20/2020	(T)F			0.00046	mg/L	U	F	#	0.00046	-
Molybdenum	0727	WL	8/18/2020	(T)F			0.0048	mg/L		F	#	0.00046	-
Molybdenum	0729	WL	8/20/2020	(T)F			0.0033	mg/L		F	#	0.00046	-
Molybdenum	0730	WL	8/20/2020	(T)F			0.0045	mg/L		F	#	0.00046	-
Molybdenum	0732	WL	8/18/2020	(T)F			0.024	mg/L		F	#	0.00046	-
Molybdenum	0784	WL	8/18/2020	(T)F			0.034	mg/L		F	#	0.00046	-
Molybdenum	0788	WL	8/18/2020	(T)F			0.039	mg/L		F	#	0.00046	-
Molybdenum	0789	WL	8/19/2020	(T)F			0.5	mg/L		F	#	0.00046	-
Molybdenum	0824	WL	8/19/2020	(T)F			0.004	mg/L		F	#	0.00046	-
Molybdenum	0826	WL	8/18/2020	(T)F			0.043	mg/L		F	#	0.00046	-
Molybdenum	0852-2	WL	8/19/2020	(T)F			0.0084	mg/L		F	#	0.00046	-
Molybdenum	0852-3	WL	8/19/2020	(T)F			0.0077	mg/L		F	#	0.00046	-
Molybdenum	0852-4	WL	8/19/2020	(T)F			0.0076	mg/L		F	#	0.00046	-
Molybdenum	0853-2	WL	8/19/2020	(T)F			0.03	mg/L		F	#	0.00046	-
Molybdenum	0853-3	WL	8/19/2020	(T)F			0.032	mg/L		F	#	0.00046	-
Molybdenum	0853-4	WL	8/19/2020	(T)F			0.03	mg/L		F	#	0.00046	-
Molybdenum	0854-2	WL	8/18/2020	(T)F			0.052	mg/L		F	#	0.00046	-
Molybdenum	0854-3	WL	8/18/2020	(T)F			0.051	mg/L		F	#	0.00046	-
Molybdenum	0854-4	WL	8/18/2020	(T)F			0.052	mg/L		F	#	0.00046	-
Molybdenum	0855-2	WL	8/19/2020	(T)F			0.37	mg/L		F	#	0.00046	-
Molybdenum	0855-3	WL	8/19/2020	(T)F			0.35	mg/L		F	#	0.00046	-
Molybdenum	0855-4	WL	8/19/2020	(T)F			0.33	mg/L		F	#	0.00046	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Molybdenum	0856-2	WL	8/19/2020	(T)F			0.42	mg/L		F	#	0.00046	-
Molybdenum	0856-3	WL	8/19/2020	(T)F			0.41	mg/L		F	#	0.00046	-
Molybdenum	0856-4	WL	8/19/2020	(T)F			0.38	mg/L		F	#	0.00046	-
Molybdenum	0857-2	WL	8/19/2020	(T)F			0.52	mg/L		F	#	0.00046	-
Molybdenum	0857-3	WL	8/19/2020	(T)F			0.52	mg/L		F	#	0.00046	-
Molybdenum	0857-4	WL	8/19/2020	(T)F			0.53	mg/L		F	#	0.00046	-
Molybdenum	0858-2	WL	8/19/2020	(T)F			0.82	mg/L		F	#	0.00046	-
Molybdenum	0858-3	WL	8/19/2020	(T)F			0.83	mg/L		F	#	0.00046	-
Molybdenum	0858-4	WL	8/19/2020	(T)F			0.85	mg/L		F	#	0.00046	-
Molybdenum	0859-3	WL	8/18/2020	(T)F			0.048	mg/L		F	#	0.00046	-
Molybdenum	0859-4	WL	8/18/2020	(T)D			0.063	mg/L		F	#	0.00046	-
Molybdenum	0859-4	WL	8/18/2020	(T)F			0.062	mg/L		F	#	0.00046	-
Molybdenum	0860-2	WL	8/18/2020	(T)F			0.4	mg/L		F	#	0.00046	-
Molybdenum	0860-3	WL	8/18/2020	(T)F			0.27	mg/L		F	#	0.00046	-
Molybdenum	0860-4	WL	8/18/2020	(T)F			0.27	mg/L		F	#	0.00046	-
pH													
pH	0705	WL	8/19/2020	(N)F			8.01	s.u.		FQ	#	-	-
pH	0707	WL	8/19/2020	(N)F			7.05	s.u.		F	#	-	-
pH	0710	WL	8/19/2020	(N)F			7.14	s.u.		F	#	-	-
pH	0716	WL	8/18/2020	(N)F			7.05	s.u.		F	#	-	-
pH	0717	WL	8/18/2020	(N)F			7.67	s.u.		F	#	-	-
pH	0718	WL	8/19/2020	(N)F			6.95	s.u.		F	#	-	-
pH	0719	WL	8/19/2020	(N)F			7.74	s.u.		FQ	#	-	-
pH	0720	WL	8/18/2020	(N)F			7.03	s.u.		F	#	-	-
pH	0721	WL	8/18/2020	(N)F			8.74	s.u.		F	#	-	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
pH	0722R	WL	8/20/2020	(N)F			7.02	s.u.		F	#	-	-
pH	0723	WL	8/20/2020	(N)F			6.98	s.u.		F	#	-	-
pH	0727	WL	8/18/2020	(N)F			7.69	s.u.		F	#	-	-
pH	0729	WL	8/20/2020	(N)F			7.11	s.u.		F	#	-	-
pH	0730	WL	8/20/2020	(N)F			7.33	s.u.		F	#	-	-
pH	0732	WL	8/18/2020	(N)F			7.16	s.u.		F	#	-	-
pH	0784	WL	8/18/2020	(N)F			7.28	s.u.		F	#	-	-
pH	0788	WL	8/18/2020	(N)F			7.11	s.u.		F	#	-	-
pH	0789	WL	8/19/2020	(N)F			7.06	s.u.		F	#	-	-
pH	0824	WL	8/19/2020	(N)F			6.82	s.u.		F	#	-	-
pH	0826	WL	8/18/2020	(N)F			7.18	s.u.		F	#	-	-
pH	0852-2	WL	8/19/2020	(N)F			7.43	s.u.		F	#	-	-
pH	0852-3	WL	8/19/2020	(N)F			7.4	s.u.		F	#	-	-
pH	0852-4	WL	8/19/2020	(N)F			7.44	s.u.		F	#	-	-
pH	0853-2	WL	8/19/2020	(N)F			7.04	s.u.		F	#	-	-
pH	0853-3	WL	8/19/2020	(N)F			7.1	s.u.		F	#	-	-
pH	0853-4	WL	8/19/2020	(N)F			7.13	s.u.		F	#	-	-
pH	0854-2	WL	8/18/2020	(N)F			7.14	s.u.		F	#	-	-
pH	0854-3	WL	8/18/2020	(N)F			7.15	s.u.		F	#	-	-
pH	0854-4	WL	8/18/2020	(N)F			7.18	s.u.		F	#	-	-
pH	0855-2	WL	8/19/2020	(N)F			7.06	s.u.		F	#	-	-
pH	0855-3	WL	8/19/2020	(N)F			7.08	s.u.		F	#	-	-
pH	0855-4	WL	8/19/2020	(N)F			7.03	s.u.		F	#	-	-
pH	0856-2	WL	8/19/2020	(N)F			7.08	s.u.		F	#	-	-
pH	0856-3	WL	8/19/2020	(N)F			7.07	s.u.		F	#	-	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
pH	0856-4	WL	8/19/2020	(N)F			7.07	s.u.		F	#	-	-
pH	0857-2	WL	8/19/2020	(N)F			7.03	s.u.		F	#	-	-
pH	0857-3	WL	8/19/2020	(N)F			7.01	s.u.		F	#	-	-
pH	0857-4	WL	8/19/2020	(N)F			7.02	s.u.		F	#	-	-
pH	0858-2	WL	8/19/2020	(N)F			7.02	s.u.		F	#	-	-
pH	0858-3	WL	8/19/2020	(N)F			7.03	s.u.		F	#	-	-
pH	0858-4	WL	8/19/2020	(N)F			7.03	s.u.		F	#	-	-
pH	0859-3	WL	8/18/2020	(N)F			6.86	s.u.		F	#	-	-
pH	0859-4	WL	8/18/2020	(N)F			6.88	s.u.		F	#	-	-
pH	0860-2	WL	8/18/2020	(N)F			6.91	s.u.		F	#	-	-
pH	0860-3	WL	8/18/2020	(N)F			6.89	s.u.		F	#	-	-
pH	0860-4	WL	8/18/2020	(N)F			6.91	s.u.		F	#	-	-
Specific Conductance													
Specific Conductance	0705	WL	8/19/2020	(N)F			1295	umhos/cm		FQ	#	-	-
Specific Conductance	0707	WL	8/19/2020	(N)F			5638	umhos/cm		F	#	-	-
Specific Conductance	0710	WL	8/19/2020	(N)F			611	umhos/cm		F	#	-	-
Specific Conductance	0716	WL	8/18/2020	(N)F			2123	umhos/cm		F	#	-	-
Specific Conductance	0717	WL	8/18/2020	(N)F			1906	umhos/cm		F	#	-	-
Specific Conductance	0718	WL	8/19/2020	(N)F			4509	umhos/cm		F	#	-	-
Specific Conductance	0719	WL	8/19/2020	(N)F			1471	umhos/cm		FQ	#	-	-
Specific Conductance	0720	WL	8/18/2020	(N)F			615	umhos/cm		F	#	-	-
Specific Conductance	0721	WL	8/18/2020	(N)F			884	umhos/cm		F	#	-	-
Specific Conductance	0722R	WL	8/20/2020	(N)F			786	umhos/cm		F	#	-	-
Specific Conductance	0723	WL	8/20/2020	(N)F			3863	umhos/cm		F	#	-	-
Specific Conductance	0727	WL	8/18/2020	(N)F			640	umhos/cm		F	#	-	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Specific Conductance	0729	WL	8/20/2020	(N)F			756	umhos/cm		F	#	-	-
Specific Conductance	0730	WL	8/20/2020	(N)F			834	umhos/cm		F	#	-	-
Specific Conductance	0732	WL	8/18/2020	(N)F			2894	umhos/cm		F	#	-	-
Specific Conductance	0784	WL	8/18/2020	(N)F			3479	umhos/cm		F	#	-	-
Specific Conductance	0788	WL	8/18/2020	(N)F			3812	umhos/cm		F	#	-	-
Specific Conductance	0789	WL	8/19/2020	(N)F			9151	umhos/cm		F	#	-	-
Specific Conductance	0824	WL	8/19/2020	(N)F			856	umhos/cm		F	#	-	-
Specific Conductance	0826	WL	8/18/2020	(N)F			3606	umhos/cm		F	#	-	-
Specific Conductance	0852-2	WL	8/19/2020	(N)F			1950	umhos/cm		F	#	-	-
Specific Conductance	0852-3	WL	8/19/2020	(N)F			1867	umhos/cm		F	#	-	-
Specific Conductance	0852-4	WL	8/19/2020	(N)F			1863	umhos/cm		F	#	-	-
Specific Conductance	0853-2	WL	8/19/2020	(N)F			3727	umhos/cm		F	#	-	-
Specific Conductance	0853-3	WL	8/19/2020	(N)F			3959	umhos/cm		F	#	-	-
Specific Conductance	0853-4	WL	8/19/2020	(N)F			4022	umhos/cm		F	#	-	-
Specific Conductance	0854-2	WL	8/18/2020	(N)F			4040	umhos/cm		F	#	-	-
Specific Conductance	0854-3	WL	8/18/2020	(N)F			3982	umhos/cm		F	#	-	-
Specific Conductance	0854-4	WL	8/18/2020	(N)F			4104	umhos/cm		F	#	-	-
Specific Conductance	0855-2	WL	8/19/2020	(N)F			10510	umhos/cm		F	#	-	-
Specific Conductance	0855-3	WL	8/19/2020	(N)F			10849	umhos/cm		F	#	-	-
Specific Conductance	0855-4	WL	8/19/2020	(N)F			10036	umhos/cm		F	#	-	-
Specific Conductance	0856-2	WL	8/19/2020	(N)F			7539	umhos/cm		F	#	-	-
Specific Conductance	0856-3	WL	8/19/2020	(N)F			7592	umhos/cm		F	#	-	-
Specific Conductance	0856-4	WL	8/19/2020	(N)F			7570	umhos/cm		F	#	-	-
Specific Conductance	0857-2	WL	8/19/2020	(N)F			7300	umhos/cm		F	#	-	-
Specific Conductance	0857-3	WL	8/19/2020	(N)F			7258	umhos/cm		F	#	-	-

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

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PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Specific Conductance	0857-4	WL	8/19/2020	(N)F			7430	umhos/cm		F	#	-	-
Specific Conductance	0858-2	WL	8/19/2020	(N)F			5396	umhos/cm		F	#	-	-
Specific Conductance	0858-3	WL	8/19/2020	(N)F			5539	umhos/cm		F	#	-	-
Specific Conductance	0858-4	WL	8/19/2020	(N)F			5574	umhos/cm		F	#	-	-
Specific Conductance	0859-3	WL	8/18/2020	(N)F			3736	umhos/cm		F	#	-	-
Specific Conductance	0859-4	WL	8/18/2020	(N)F			4159	umhos/cm		F	#	-	-
Specific Conductance	0860-2	WL	8/18/2020	(N)F			5252	umhos/cm		F	#	-	-
Specific Conductance	0860-3	WL	8/18/2020	(N)F			4172	umhos/cm		F	#	-	-
Specific Conductance	0860-4	WL	8/18/2020	(N)F			4168	umhos/cm		F	#	-	-
Sulfate													
Sulfate	0705	WL	8/19/2020	(N)F			410	mg/L		FQ	#	2.6	-
Sulfate	0707	WL	8/19/2020	(N)F			2900	mg/L		F	#	21	-
Sulfate	0710	WL	8/19/2020	(N)F			110	mg/L		F	#	1.1	-
Sulfate	0716	WL	8/18/2020	(N)F			790	mg/L		F	#	5.3	-
Sulfate	0716	WL	8/18/2020	(N)D			780	mg/L		F	#	5.3	-
Sulfate	0717	WL	8/18/2020	(N)F			690	mg/L		F	#	5.3	-
Sulfate	0717	WL	8/18/2020	(N)D			680	mg/L		F	#	5.3	-
Sulfate	0718	WL	8/19/2020	(N)F			2200	mg/L		F	#	21	-
Sulfate	0719	WL	8/19/2020	(N)F			520	mg/L		FQ	#	5.3	-
Sulfate	0720	WL	8/18/2020	(N)F			66	mg/L		F	#	0.53	-
Sulfate	0721	WL	8/18/2020	(N)F			270	mg/L		F	#	2.6	-
Sulfate	0722R	WL	8/20/2020	(N)F			88	mg/L		F	#	0.53	-
Sulfate	0723	WL	8/20/2020	(N)F			1800	mg/L		F	#	11	-
Sulfate	0727	WL	8/18/2020	(N)F			120	mg/L		F	#	1.1	-
Sulfate	0729	WL	8/20/2020	(N)F			64	mg/L		F	#	0.53	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Sulfate	0730	WL	8/20/2020	(N)F			110	mg/L		F	#	1.1	-
Sulfate	0732	WL	8/18/2020	(N)F			1500	mg/L		F	#	11	-
Sulfate	0784	WL	8/18/2020	(N)F			2000	mg/L		F	#	11	-
Sulfate	0788	WL	8/18/2020	(N)F			1700	mg/L		F	#	11	-
Sulfate	0789	WL	8/19/2020	(N)F			4900	mg/L		F	#	26	-
Sulfate	0824	WL	8/19/2020	(N)F			110	mg/L		F	#	1.1	-
Sulfate	0826	WL	8/18/2020	(N)F			1600	mg/L		F	#	11	-
Sulfate	0852-2	WL	8/19/2020	(N)F			580	mg/L		F	#	5.3	-
Sulfate	0852-3	WL	8/19/2020	(N)F			550	mg/L		F	#	5.3	-
Sulfate	0852-4	WL	8/19/2020	(N)F			540	mg/L		F	#	5.3	-
Sulfate	0853-2	WL	8/19/2020	(N)F			1600	mg/L		F	#	11	-
Sulfate	0853-3	WL	8/19/2020	(N)F			1800	mg/L		F	#	11	-
Sulfate	0853-4	WL	8/19/2020	(N)F			1800	mg/L		F	#	11	-
Sulfate	0854-2	WL	8/18/2020	(N)F			1800	mg/L		F	#	11	-
Sulfate	0854-3	WL	8/18/2020	(N)F			1700	mg/L		F	#	11	-
Sulfate	0854-4	WL	8/18/2020	(N)F			1800	mg/L		F	#	11	-
Sulfate	0855-2	WL	8/19/2020	(N)F			5800	mg/L		F	#	33	-
Sulfate	0855-3	WL	8/19/2020	(N)F			6000	mg/L		F	#	53	-
Sulfate	0855-4	WL	8/19/2020	(N)F			5400	mg/L		F	#	53	-
Sulfate	0856-2	WL	8/19/2020	(N)F			3900	mg/L		F	#	26	-
Sulfate	0856-3	WL	8/19/2020	(N)F			4000	mg/L		F	#	26	-
Sulfate	0857-2	WL	8/19/2020	(N)F			3800	mg/L		F	#	26	-
Sulfate	0857-3	WL	8/19/2020	(N)F			3800	mg/L		F	#	26	-
Sulfate	0857-4	WL	8/19/2020	(N)F			3900	mg/L		F	#	26	-
Sulfate	0858-2	WL	8/19/2020	(N)F			2800	mg/L		F	#	26	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Sulfate	0858-3	WL	8/19/2020	(N)F			2900	mg/L		F	#	26	-
Sulfate	0858-4	WL	8/19/2020	(N)F			2900	mg/L		F	#	26	-
Sulfate	0859-3	WL	8/18/2020	(N)F			2200	mg/L		F	#	21	-
Sulfate	0859-4	WL	8/18/2020	(N)D			2300	mg/L		F	#	21	-
Sulfate	0859-4	WL	8/18/2020	(N)F			2400	mg/L		F	#	21	-
Sulfate	0860-2	WL	8/18/2020	(N)F			2800	mg/L		F	#	26	-
Sulfate	0860-3	WL	8/18/2020	(N)F			2200	mg/L		F	#	21	-
Sulfate	0860-4	WL	8/18/2020	(N)F			2200	mg/L		F	#	21	-
Temperature													
Temperature	0705	WL	8/19/2020	(N)F			11.99	C		FQ	#	-	-
Temperature	0707	WL	8/19/2020	(N)F			12.92	C		F	#	-	-
Temperature	0710	WL	8/19/2020	(N)F			13.75	C		F	#	-	-
Temperature	0716	WL	8/18/2020	(N)F			14.47	C		F	#	-	-
Temperature	0717	WL	8/18/2020	(N)F			12.16	C		F	#	-	-
Temperature	0718	WL	8/19/2020	(N)F			14.91	C		F	#	-	-
Temperature	0719	WL	8/19/2020	(N)F			19.06	C		FQ	#	-	-
Temperature	0720	WL	8/18/2020	(N)F			14.7	C		F	#	-	-
Temperature	0721	WL	8/18/2020	(N)F			12.53	C		F	#	-	-
Temperature	0722R	WL	8/20/2020	(N)F			15.16	C		F	#	-	-
Temperature	0723	WL	8/20/2020	(N)F			12.63	C		F	#	-	-
Temperature	0727	WL	8/18/2020	(N)F			16.77	C		F	#	-	-
Temperature	0729	WL	8/20/2020	(N)F			16.38	C		F	#	-	-
Temperature	0730	WL	8/20/2020	(N)F			14.24	C		F	#	-	-
Temperature	0732	WL	8/18/2020	(N)F			13.16	C		F	#	-	-
Temperature	0784	WL	8/18/2020	(N)F			19.11	C		F	#	-	-

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

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PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Temperature	0788	WL	8/18/2020	(N)F			14.01	C		F	#	-	-
Temperature	0789	WL	8/19/2020	(N)F			14.2	C		F	#	-	-
Temperature	0824	WL	8/19/2020	(N)F			15.63	C		F	#	-	-
Temperature	0826	WL	8/18/2020	(N)F			12.54	C		F	#	-	-
Temperature	0852-2	WL	8/19/2020	(N)F			11.89	C		F	#	-	-
Temperature	0852-3	WL	8/19/2020	(N)F			11.46	C		F	#	-	-
Temperature	0852-4	WL	8/19/2020	(N)F			11.55	C		F	#	-	-
Temperature	0853-2	WL	8/19/2020	(N)F			13.58	C		F	#	-	-
Temperature	0853-3	WL	8/19/2020	(N)F			12.19	C		F	#	-	-
Temperature	0853-4	WL	8/19/2020	(N)F			11.65	C		F	#	-	-
Temperature	0854-2	WL	8/18/2020	(N)F			14.65	C		F	#	-	-
Temperature	0854-3	WL	8/18/2020	(N)F			12.92	C		F	#	-	-
Temperature	0854-4	WL	8/18/2020	(N)F			11.64	C		F	#	-	-
Temperature	0855-2	WL	8/19/2020	(N)F			15.41	C		F	#	-	-
Temperature	0855-3	WL	8/19/2020	(N)F			15.79	C		F	#	-	-
Temperature	0855-4	WL	8/19/2020	(N)F			12.42	C		F	#	-	-
Temperature	0856-2	WL	8/19/2020	(N)F			16.35	C		F	#	-	-
Temperature	0856-3	WL	8/19/2020	(N)F			15.52	C		F	#	-	-
Temperature	0856-4	WL	8/19/2020	(N)F			14.58	C		F	#	-	-
Temperature	0857-2	WL	8/19/2020	(N)F			19.04	C		F	#	-	-
Temperature	0857-3	WL	8/19/2020	(N)F			17.63	C		F	#	-	-
Temperature	0857-4	WL	8/19/2020	(N)F			16.88	C		F	#	-	-
Temperature	0858-2	WL	8/19/2020	(N)F			13.76	C		F	#	-	-
Temperature	0858-3	WL	8/19/2020	(N)F			12.78	C		F	#	-	-
Temperature	0858-4	WL	8/19/2020	(N)F			12.73	C		F	#	-	-

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

REPORT DATE: 12/4/2020 3:45:48 PM

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Temperature	0859-3	WL	8/18/2020	(N)F			17.03	C		F	#	-	-
Temperature	0859-4	WL	8/18/2020	(N)F			16.13	C		F	#	-	-
Temperature	0860-2	WL	8/18/2020	(N)F			16.48	C		F	#	-	-
Temperature	0860-3	WL	8/18/2020	(N)F			15.65	C		F	#	-	-
Temperature	0860-4	WL	8/18/2020	(N)F			14.99	C		F	#	-	-
Turbidity													
Turbidity	0705	WL	8/19/2020	(N)F			9.08	NTU		FQ	#	-	-
Turbidity	0707	WL	8/19/2020	(N)F			4.69	NTU		F	#	-	-
Turbidity	0710	WL	8/19/2020	(N)F			1.79	NTU		F	#	-	-
Turbidity	0716	WL	8/18/2020	(N)F			4.29	NTU		F	#	-	-
Turbidity	0717	WL	8/18/2020	(N)F			2.46	NTU		F	#	-	-
Turbidity	0718	WL	8/19/2020	(N)F			1.66	NTU		F	#	-	-
Turbidity	0719	WL	8/19/2020	(N)F			9.03	NTU		FQ	#	-	-
Turbidity	0720	WL	8/18/2020	(N)F			0.61	NTU		F	#	-	-
Turbidity	0721	WL	8/18/2020	(N)F			0.41	NTU		F	#	-	-
Turbidity	0722R	WL	8/20/2020	(N)F			0.54	NTU		F	#	-	-
Turbidity	0723	WL	8/20/2020	(N)F			0.43	NTU		F	#	-	-
Turbidity	0727	WL	8/18/2020	(N)F			2.38	NTU		F	#	-	-
Turbidity	0729	WL	8/20/2020	(N)F			4.75	NTU		F	#	-	-
Turbidity	0730	WL	8/20/2020	(N)F			1.89	NTU		F	#	-	-
Turbidity	0732	WL	8/18/2020	(N)F			1.35	NTU		F	#	-	-
Turbidity	0784	WL	8/18/2020	(N)F			2.53	NTU		F	#	-	-
Turbidity	0788	WL	8/18/2020	(N)F			8.44	NTU		F	#	-	-
Turbidity	0789	WL	8/19/2020	(N)F			0.88	NTU		F	#	-	-
Turbidity	0824	WL	8/19/2020	(N)F			1.6	NTU		F	#	-	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Turbidity	0826	WL	8/18/2020	(N)F			3.36	NTU		F	#	-	-
Turbidity	0852-2	WL	8/19/2020	(N)F			1.69	NTU		F	#	-	-
Turbidity	0852-3	WL	8/19/2020	(N)F			0.51	NTU		F	#	-	-
Turbidity	0852-4	WL	8/19/2020	(N)F			2.85	NTU		F	#	-	-
Turbidity	0853-2	WL	8/19/2020	(N)F			1.23	NTU		F	#	-	-
Turbidity	0853-3	WL	8/19/2020	(N)F			0.51	NTU		F	#	-	-
Turbidity	0853-4	WL	8/19/2020	(N)F			3.11	NTU		F	#	-	-
Turbidity	0854-2	WL	8/18/2020	(N)F			0.43	NTU		F	#	-	-
Turbidity	0854-3	WL	8/18/2020	(N)F			0.33	NTU		F	#	-	-
Turbidity	0854-4	WL	8/18/2020	(N)F			2.73	NTU		F	#	-	-
Turbidity	0855-2	WL	8/19/2020	(N)F			0.8	NTU		F	#	-	-
Turbidity	0855-3	WL	8/19/2020	(N)F			1.46	NTU		F	#	-	-
Turbidity	0855-4	WL	8/19/2020	(N)F			0.53	NTU		F	#	-	-
Turbidity	0856-2	WL	8/19/2020	(N)F			0.44	NTU		F	#	-	-
Turbidity	0856-3	WL	8/19/2020	(N)F			0.48	NTU		F	#	-	-
Turbidity	0856-4	WL	8/19/2020	(N)F			2.65	NTU		F	#	-	-
Turbidity	0857-2	WL	8/19/2020	(N)F			1.44	NTU		F	#	-	-
Turbidity	0857-3	WL	8/19/2020	(N)F			0.58	NTU		F	#	-	-
Turbidity	0857-4	WL	8/19/2020	(N)F			8.65	NTU		F	#	-	-
Turbidity	0858-2	WL	8/19/2020	(N)F			0.48	NTU		F	#	-	-
Turbidity	0858-3	WL	8/19/2020	(N)F			0.5	NTU		F	#	-	-
Turbidity	0858-4	WL	8/19/2020	(N)F			3.19	NTU		F	#	-	-
Turbidity	0859-3	WL	8/18/2020	(N)F			0.5	NTU		F	#	-	-
Turbidity	0859-4	WL	8/18/2020	(N)F			2.28	NTU		F	#	-	-
Turbidity	0860-2	WL	8/18/2020	(N)F			5.71	NTU		F	#	-	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Turbidity	0860-3	WL	8/18/2020	(N)F			1	NTU		F	#	-	-
Turbidity	0860-4	WL	8/18/2020	(N)F			4.9	NTU		F	#	-	-
Uranium													
Uranium	0705	WL	8/19/2020	(T)F			0.00009	mg/L	J	FQ	#	0.00004	-
Uranium	0707	WL	8/19/2020	(T)F			0.77	mg/L		F	#	0.00004	-
Uranium	0710	WL	8/19/2020	(T)F			0.0056	mg/L		F	#	0.00004	-
Uranium	0716	WL	8/18/2020	(T)F			0.32	mg/L		F	#	0.00004	-
Uranium	0716	WL	8/18/2020	(T)D			0.33	mg/L		F	#	0.00004	-
Uranium	0717	WL	8/18/2020	(T)F			0.00018	mg/L		F	#	0.00004	-
Uranium	0717	WL	8/18/2020	(T)D			0.00012	mg/L		F	#	0.00004	-
Uranium	0718	WL	8/19/2020	(T)F			0.12	mg/L		F	#	0.00004	-
Uranium	0719	WL	8/19/2020	(T)F			0.00036	mg/L		FQ	#	0.00004	-
Uranium	0720	WL	8/18/2020	(T)F			0.0042	mg/L		F	#	0.00004	-
Uranium	0721	WL	8/18/2020	(T)F			0.00009	mg/L	J	F	#	0.00004	-
Uranium	0722R	WL	8/20/2020	(T)F			0.11	mg/L		F	#	0.00004	-
Uranium	0723	WL	8/20/2020	(T)F			0.00004	mg/L	U	F	#	0.00004	-
Uranium	0727	WL	8/18/2020	(T)F			0.0037	mg/L		F	#	0.00004	-
Uranium	0729	WL	8/20/2020	(T)F			0.0059	mg/L		F	#	0.00004	-
Uranium	0730	WL	8/20/2020	(T)F			0.0045	mg/L		F	#	0.00004	-
Uranium	0732	WL	8/18/2020	(T)F			0.0046	mg/L		F	#	0.00004	-
Uranium	0784	WL	8/18/2020	(T)F			0.0028	mg/L		F	#	0.00004	-
Uranium	0788	WL	8/18/2020	(T)F			0.038	mg/L		F	#	0.00004	-
Uranium	0789	WL	8/19/2020	(T)F			1.2	mg/L		F	#	0.00004	-
Uranium	0824	WL	8/19/2020	(T)F			0.013	mg/L		F	#	0.00004	-
Uranium	0826	WL	8/18/2020	(T)F			0.03	mg/L		F	#	0.00004	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Uranium	0852-2	WL	8/19/2020	(T)F			0.021	mg/L		F	#	0.00004	-
Uranium	0852-3	WL	8/19/2020	(T)F			0.021	mg/L		F	#	0.00004	-
Uranium	0852-4	WL	8/19/2020	(T)F			0.02	mg/L		F	#	0.00004	-
Uranium	0853-2	WL	8/19/2020	(T)F			0.038	mg/L		F	#	0.00004	-
Uranium	0853-3	WL	8/19/2020	(T)F			0.043	mg/L		F	#	0.00004	-
Uranium	0853-4	WL	8/19/2020	(T)F			0.045	mg/L		F	#	0.00004	-
Uranium	0854-2	WL	8/18/2020	(T)F			0.031	mg/L		F	#	0.00004	-
Uranium	0854-3	WL	8/18/2020	(T)F			0.038	mg/L		F	#	0.00004	-
Uranium	0854-4	WL	8/18/2020	(T)F			0.044	mg/L		F	#	0.00004	-
Uranium	0855-2	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00004	-
Uranium	0855-3	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00004	-
Uranium	0855-4	WL	8/19/2020	(T)F			0.76	mg/L		F	#	0.00004	-
Uranium	0856-2	WL	8/19/2020	(T)F			0.94	mg/L		F	#	0.00004	-
Uranium	0856-3	WL	8/19/2020	(T)F			0.97	mg/L		F	#	0.00004	-
Uranium	0856-4	WL	8/19/2020	(T)F			0.97	mg/L		F	#	0.00004	-
Uranium	0857-2	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00004	-
Uranium	0857-3	WL	8/19/2020	(T)F			0.98	mg/L		F	#	0.00004	-
Uranium	0857-4	WL	8/19/2020	(T)F			1	mg/L		F	#	0.00004	-
Uranium	0858-2	WL	8/19/2020	(T)F			0.83	mg/L		F	#	0.00004	-
Uranium	0858-3	WL	8/19/2020	(T)F			0.78	mg/L		F	#	0.00004	-
Uranium	0858-4	WL	8/19/2020	(T)F			0.77	mg/L		F	#	0.00004	-
Uranium	0859-3	WL	8/18/2020	(T)F			0.045	mg/L		F	#	0.00004	-
Uranium	0859-4	WL	8/18/2020	(T)D			0.073	mg/L		F	#	0.00004	-
Uranium	0859-4	WL	8/18/2020	(T)F			0.072	mg/L		F	#	0.00004	-
Uranium	0860-2	WL	8/18/2020	(T)F			1.6	mg/L		F	#	0.00004	-

PARAMETER	LOCATION CODE/TYPE		SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Uranium	0860-3	WL	8/18/2020	(T)F			0.78	mg/L		F	#	0.00004	-
Uranium	0860-4	WL	8/18/2020	(T)F			0.8	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

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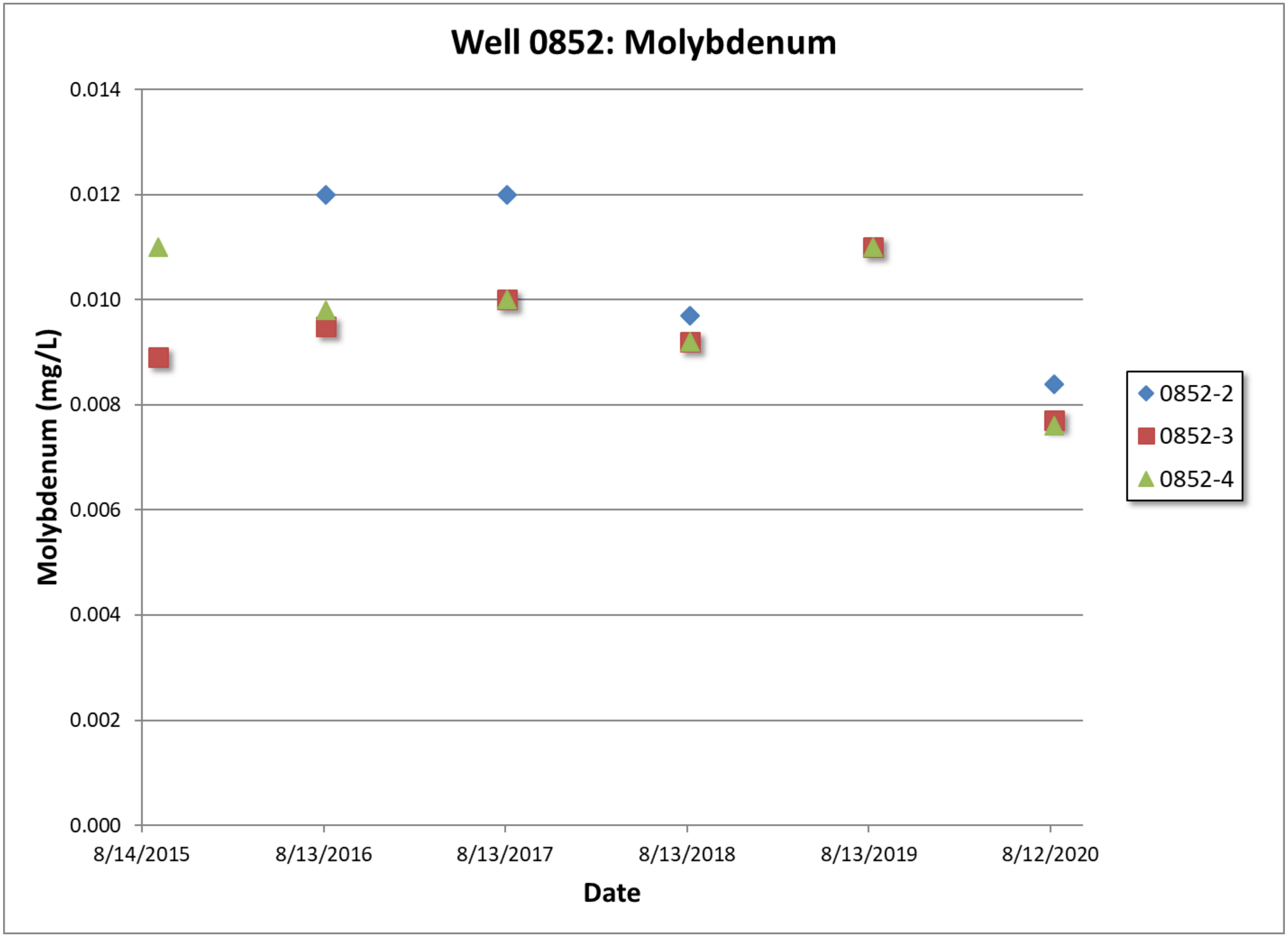
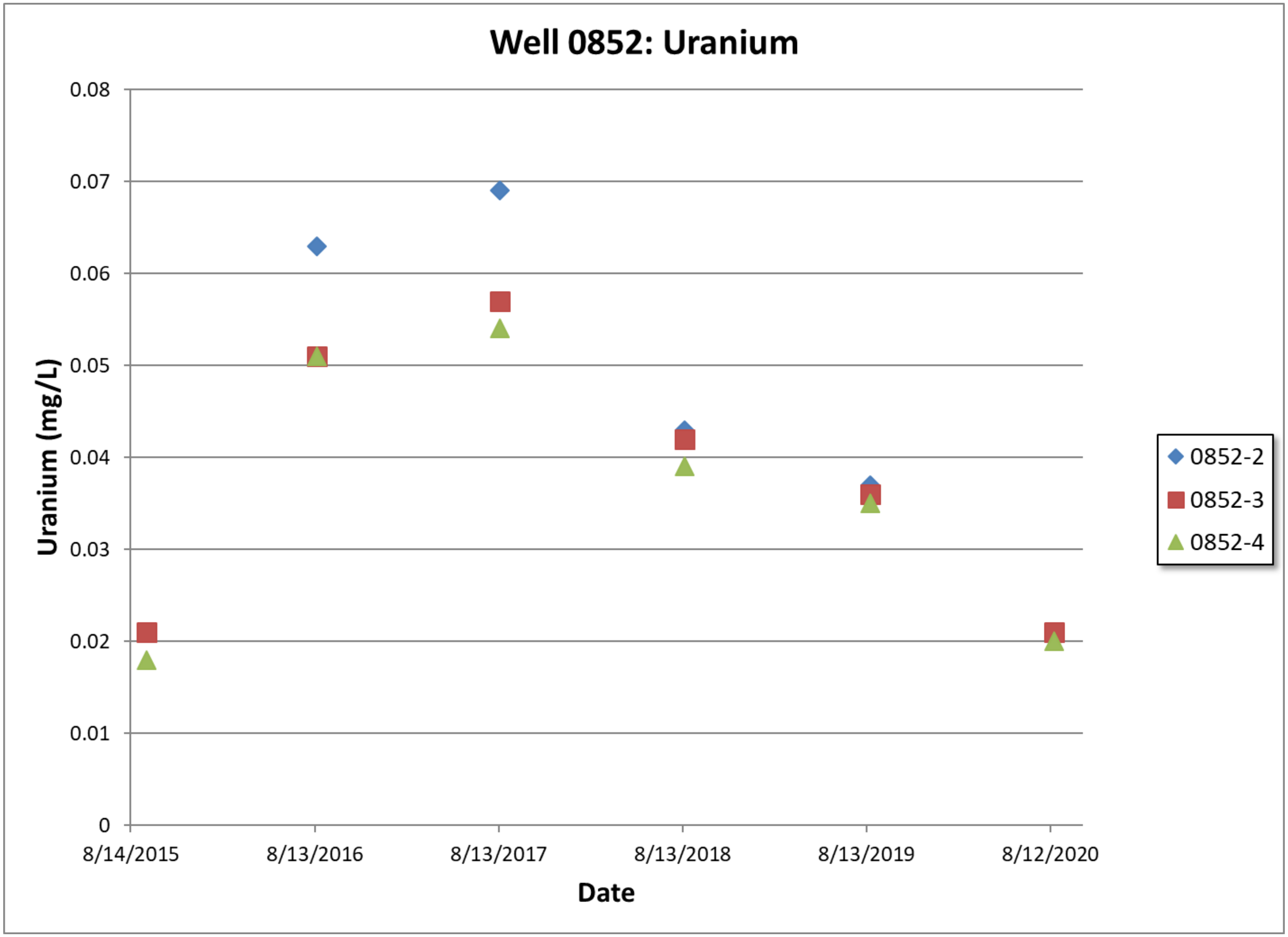
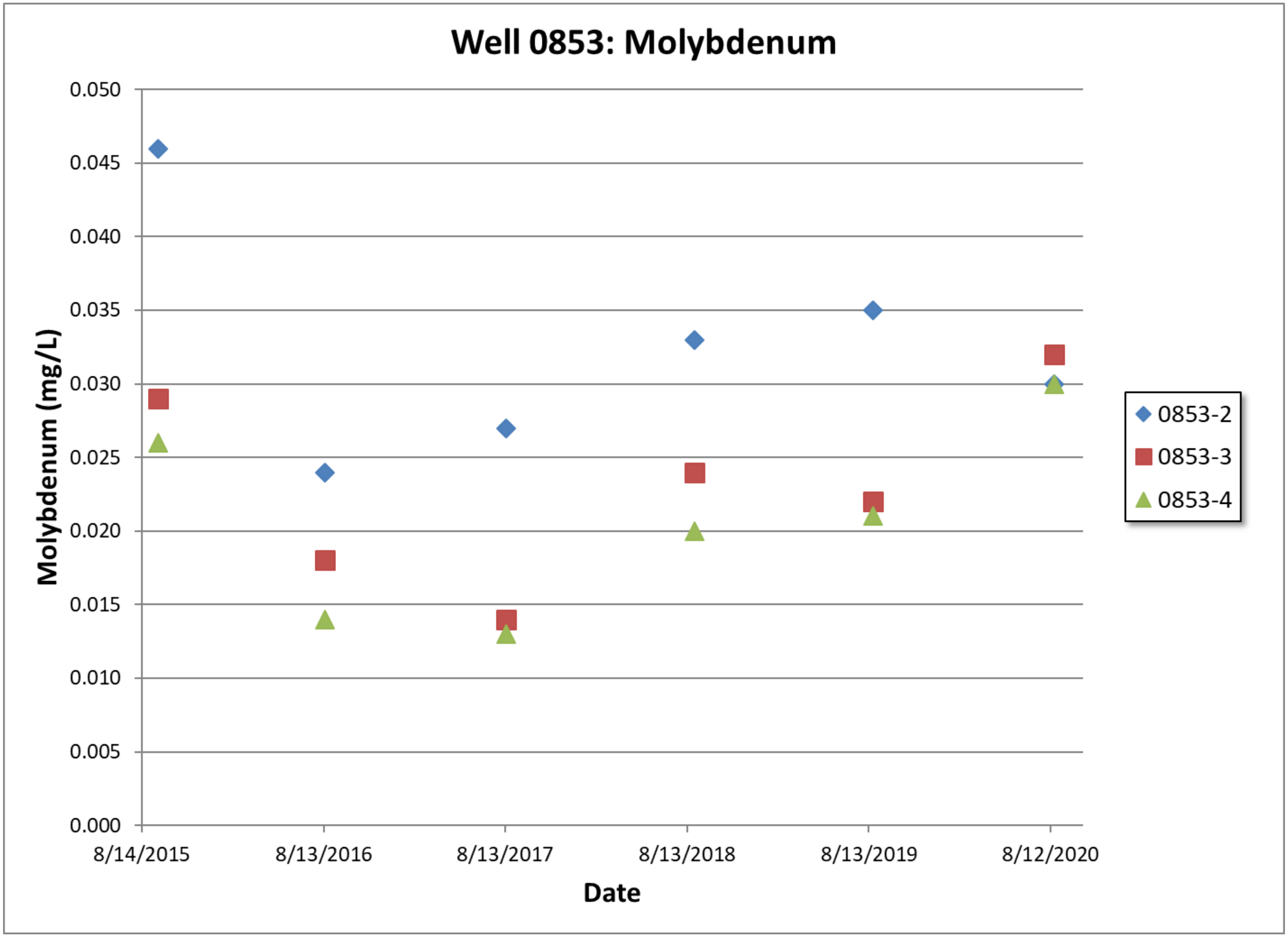
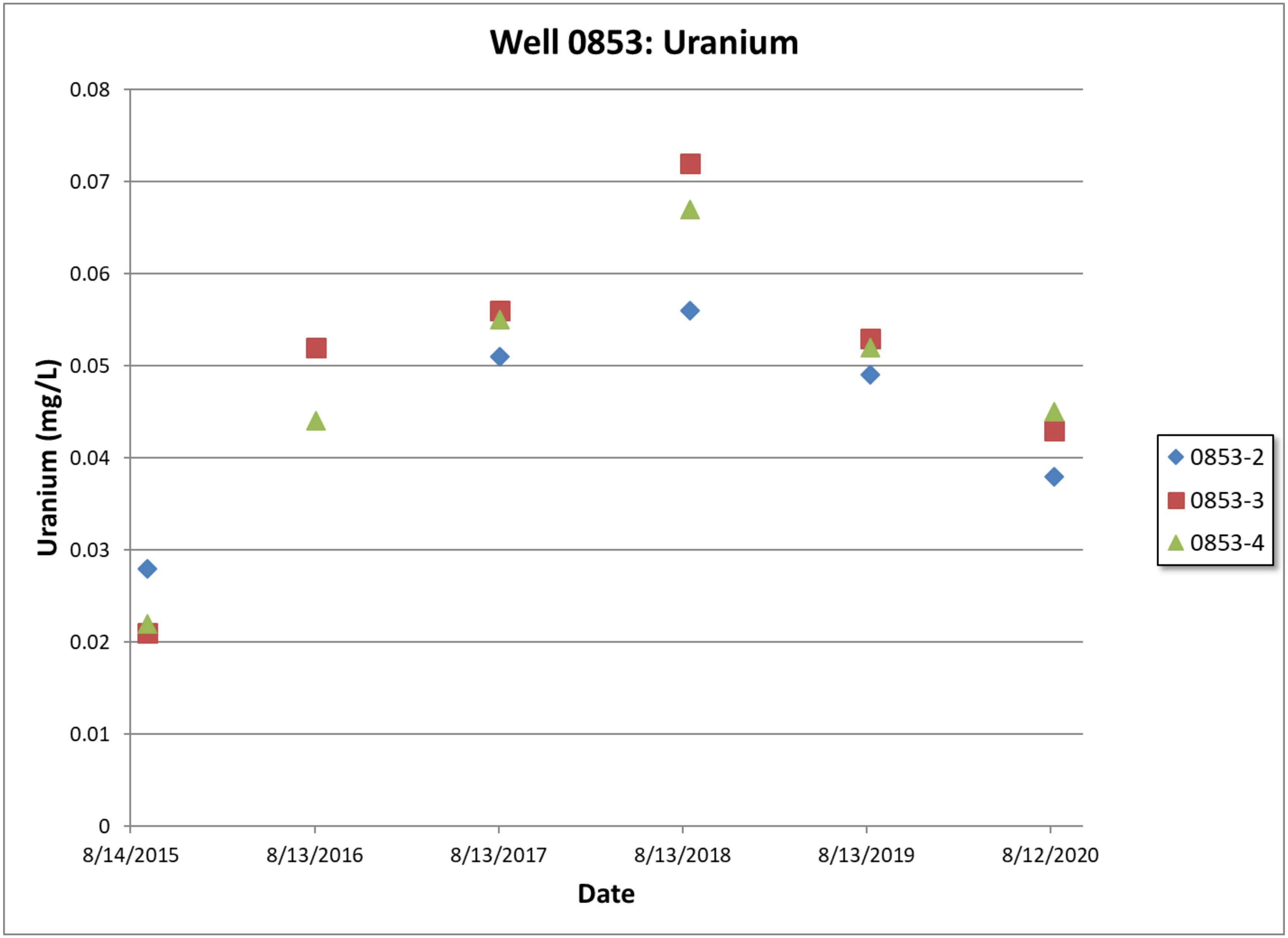
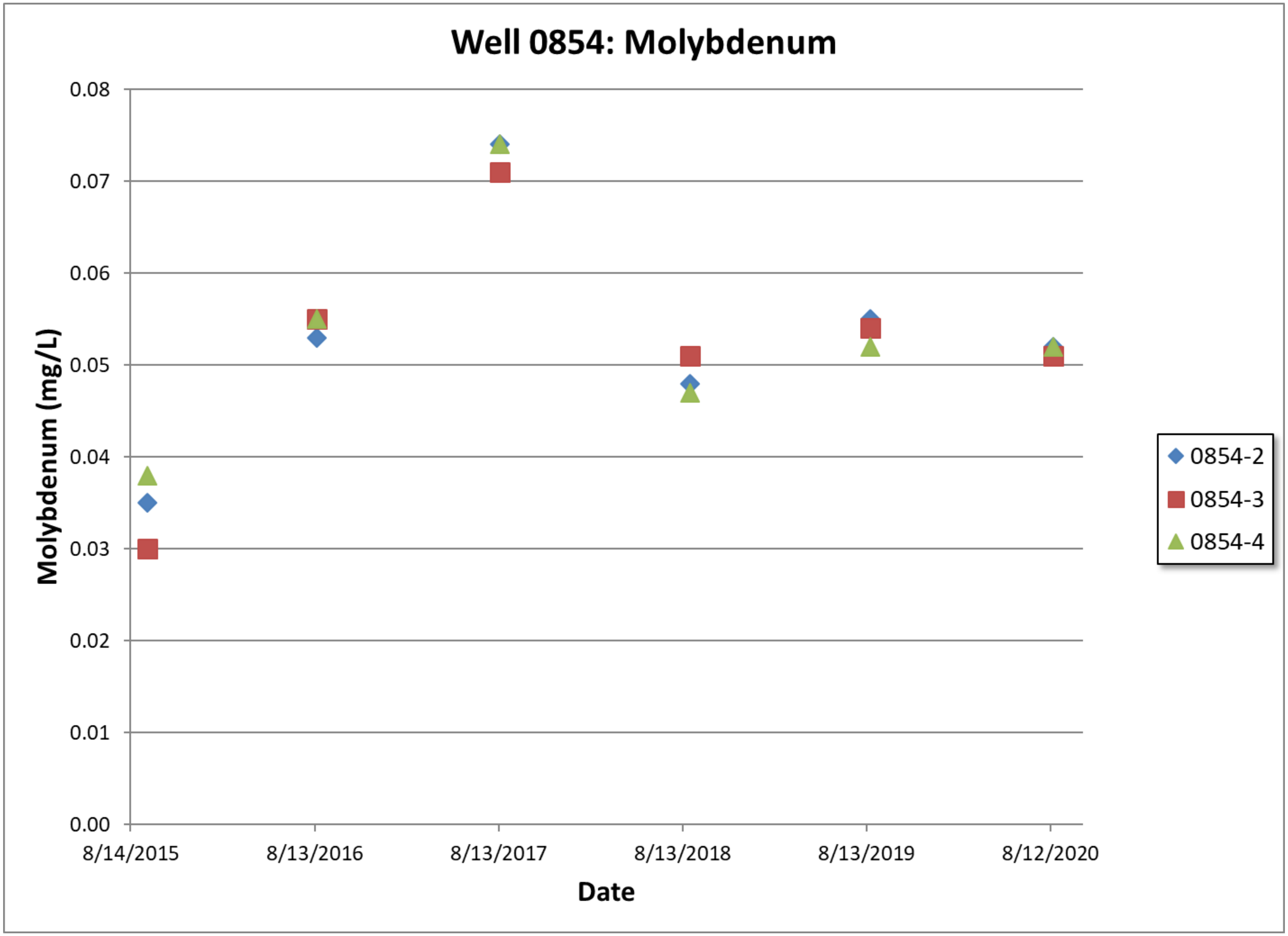

Well 0852: Molybdenum
Molybdenum (mg/L)
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0852-2
0852-3
0852-4


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
Date
0852-2
0852-3
0852-4

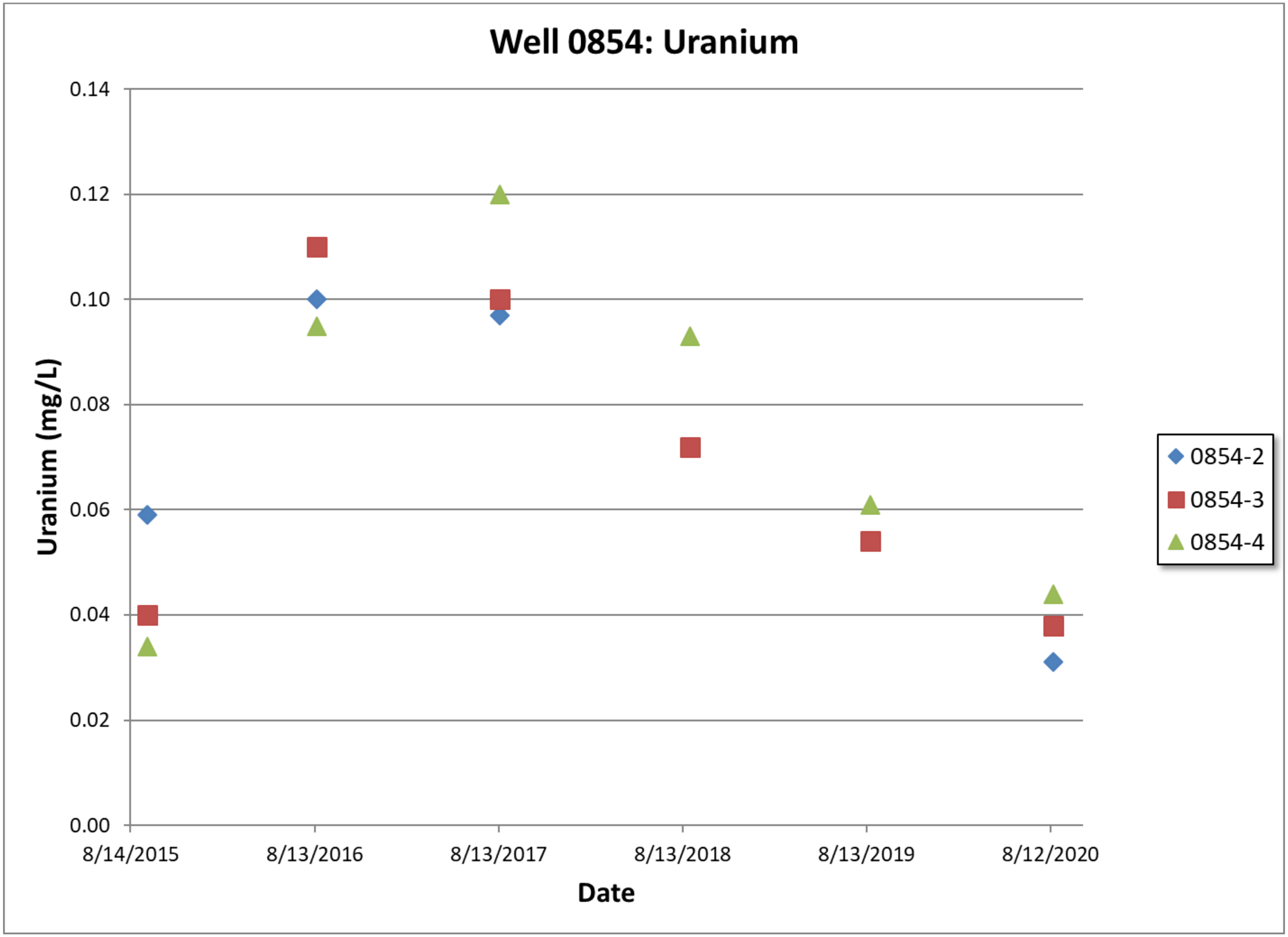


Well 0853: Molybdenum
Molybdenum (mg/L)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0853-2
0853-3
0853-4

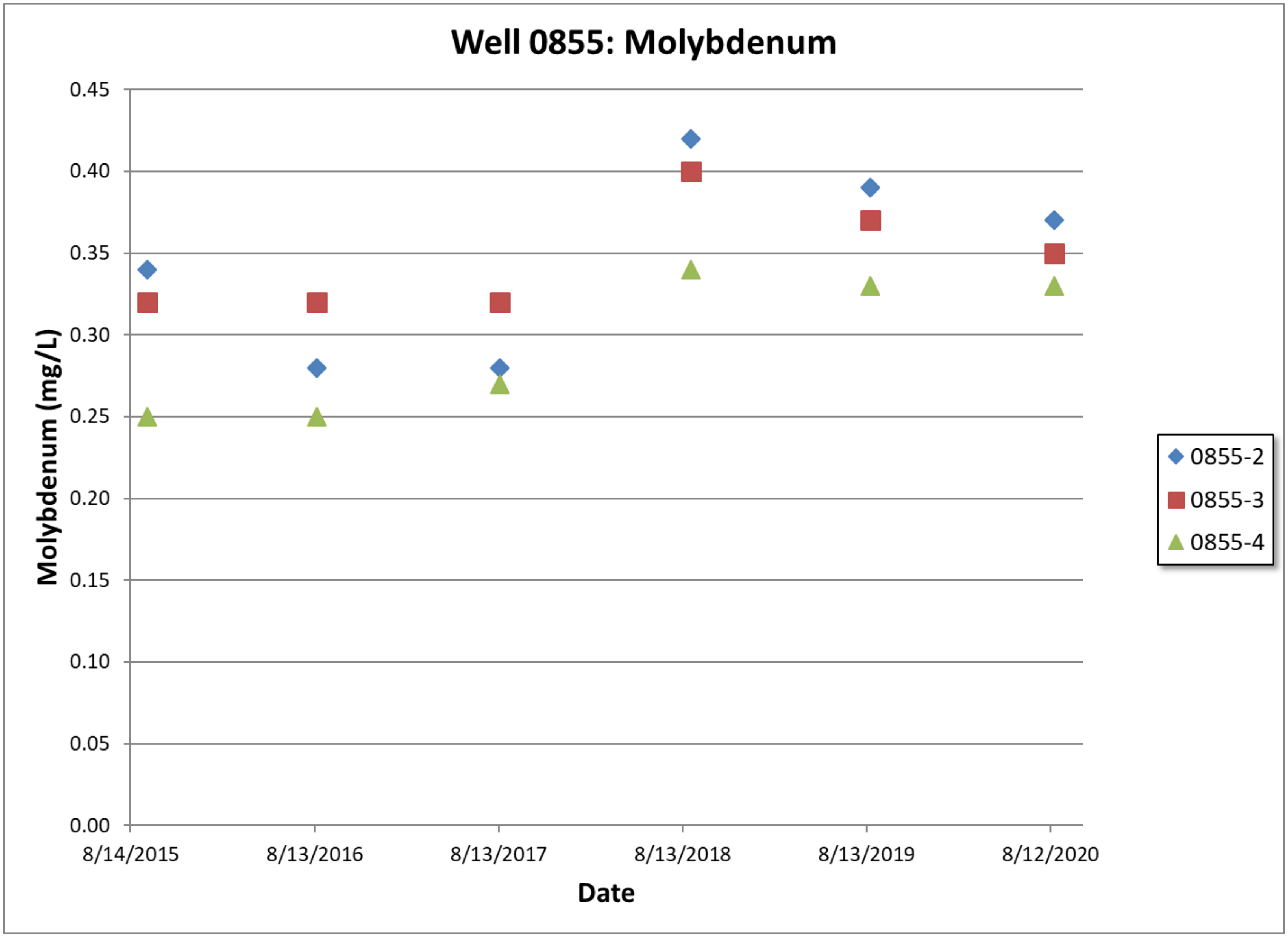

Well 0853: Uranium
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Uranium (mg/L)
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0853-2
0853-3
0853-4

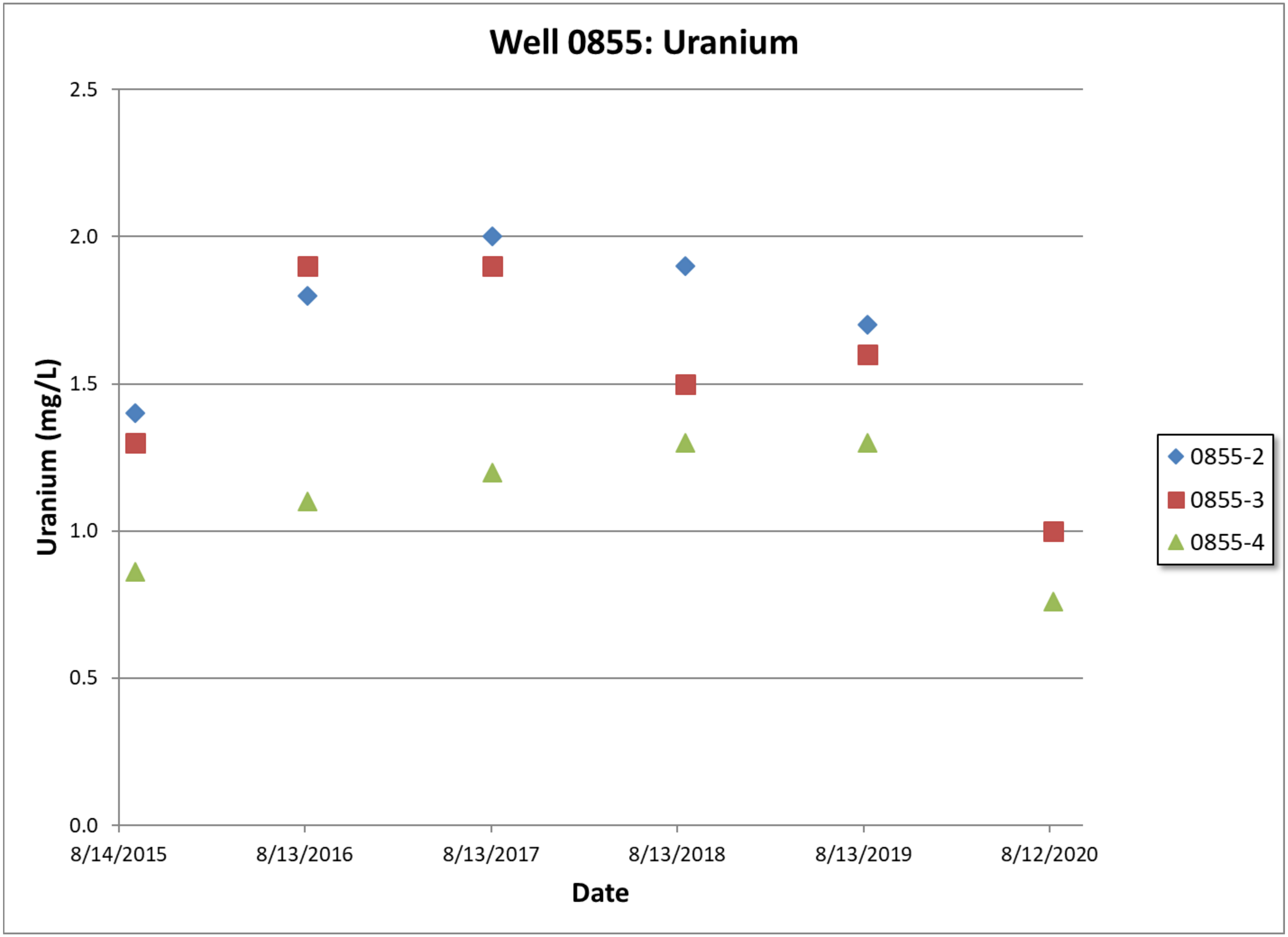


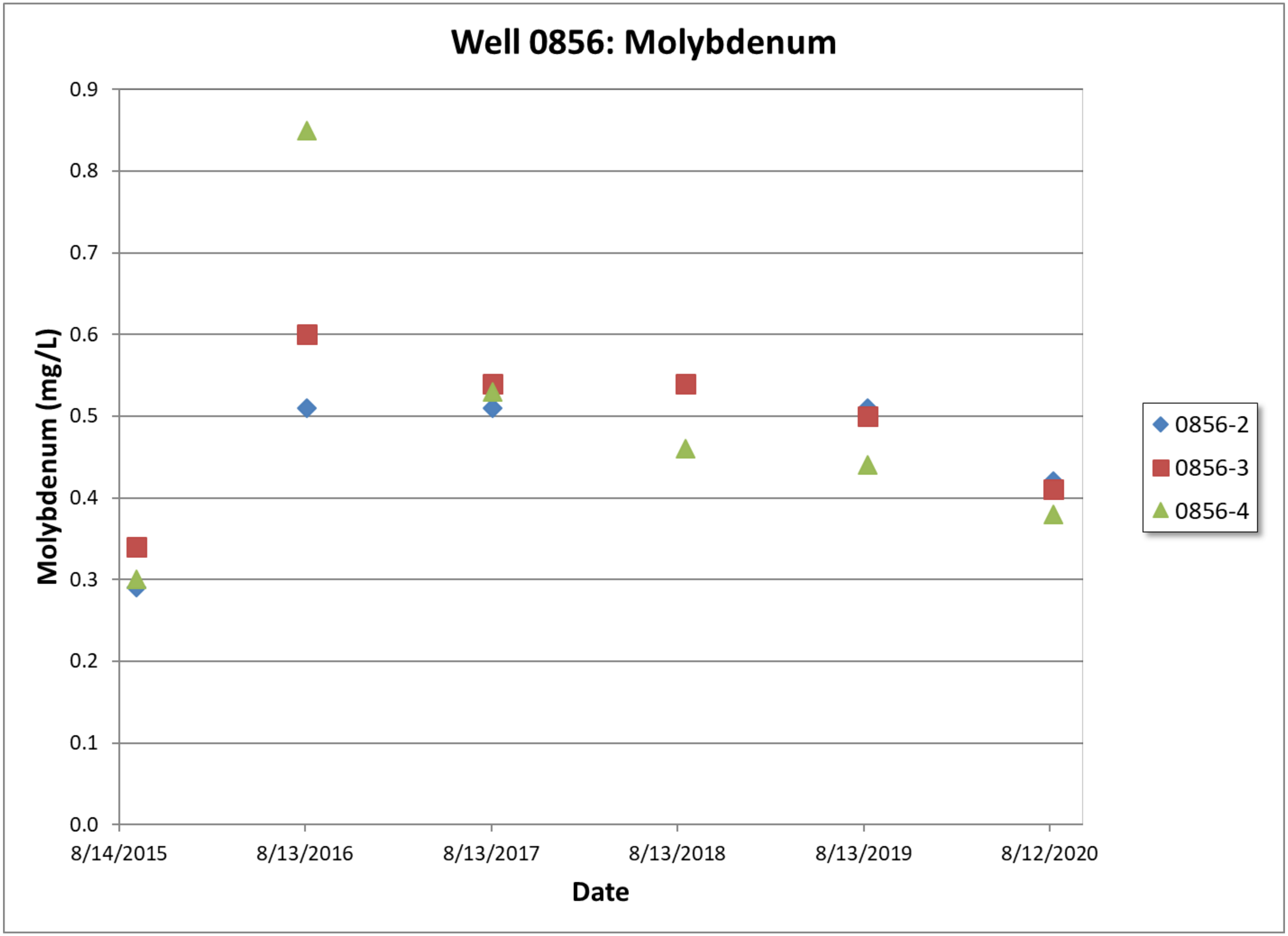
Well 0854: Molybdenum
Molybdenum (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0854-2
0854-3
0854-4

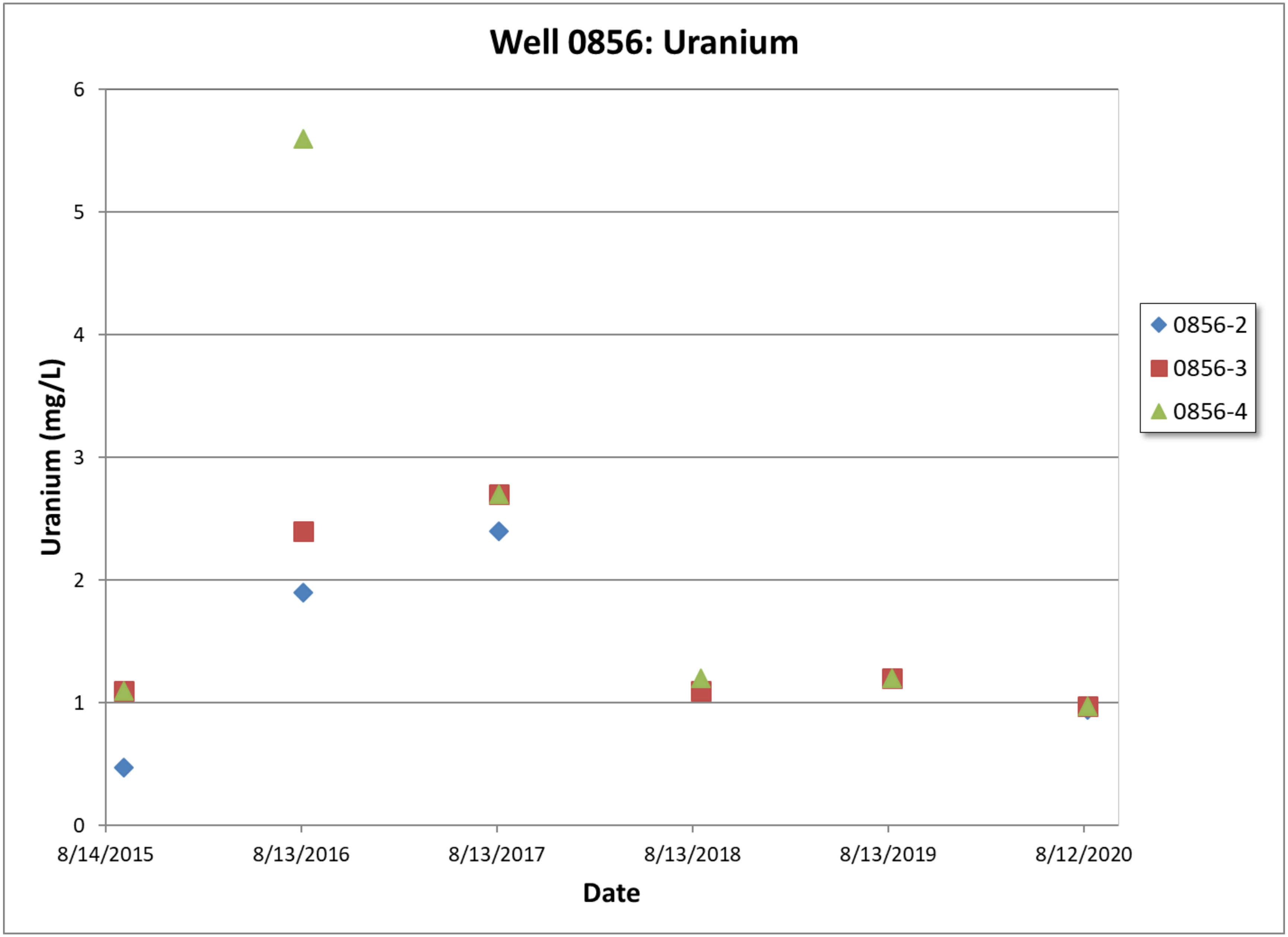


Well 0854: Uranium
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Uranium (mg/L)
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0854-2
0854-3
0854-4

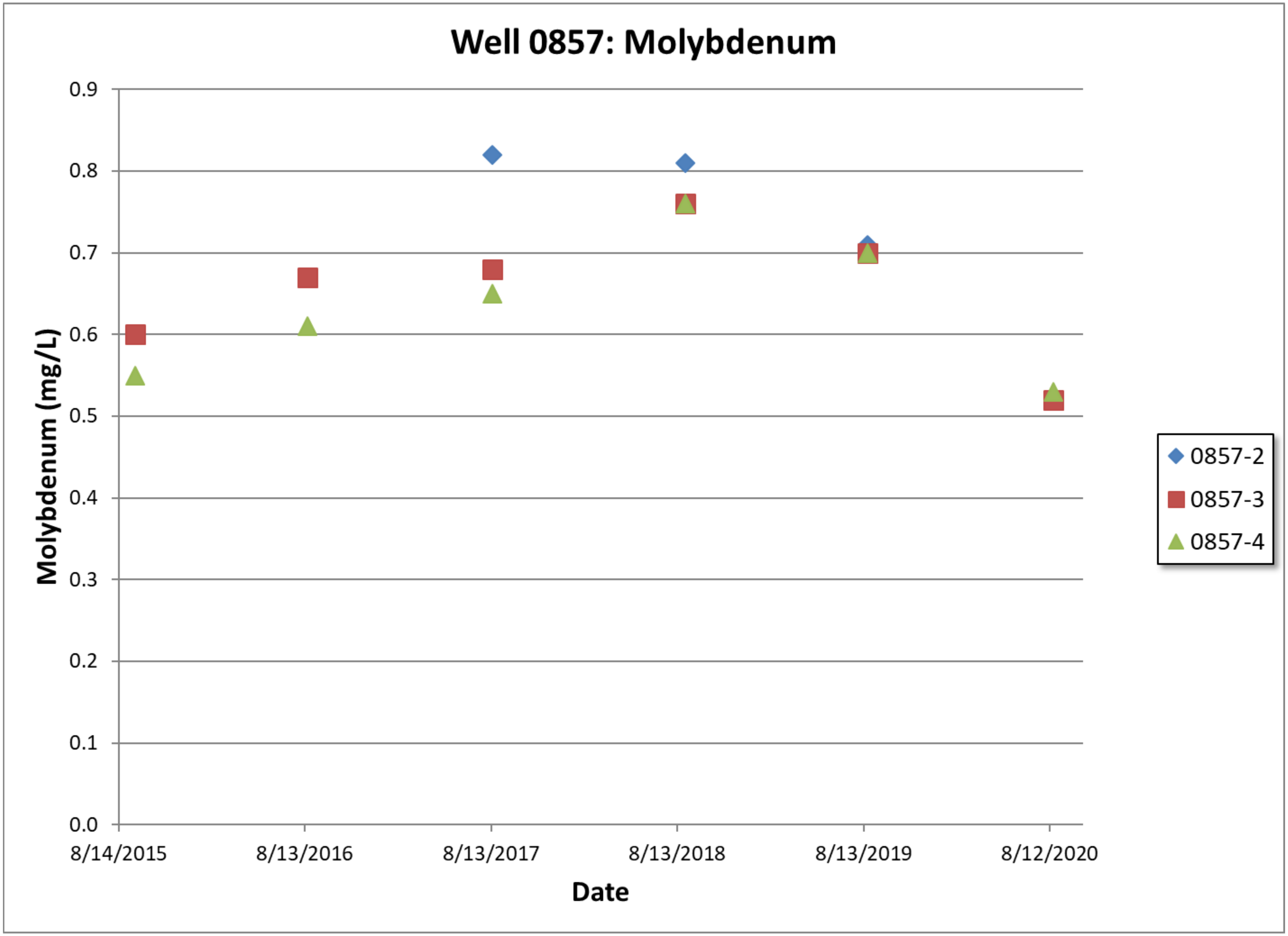

Well 0855: Molybdenum
Molybdenum (mg/L)
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0855-2
0855-3
0855-4

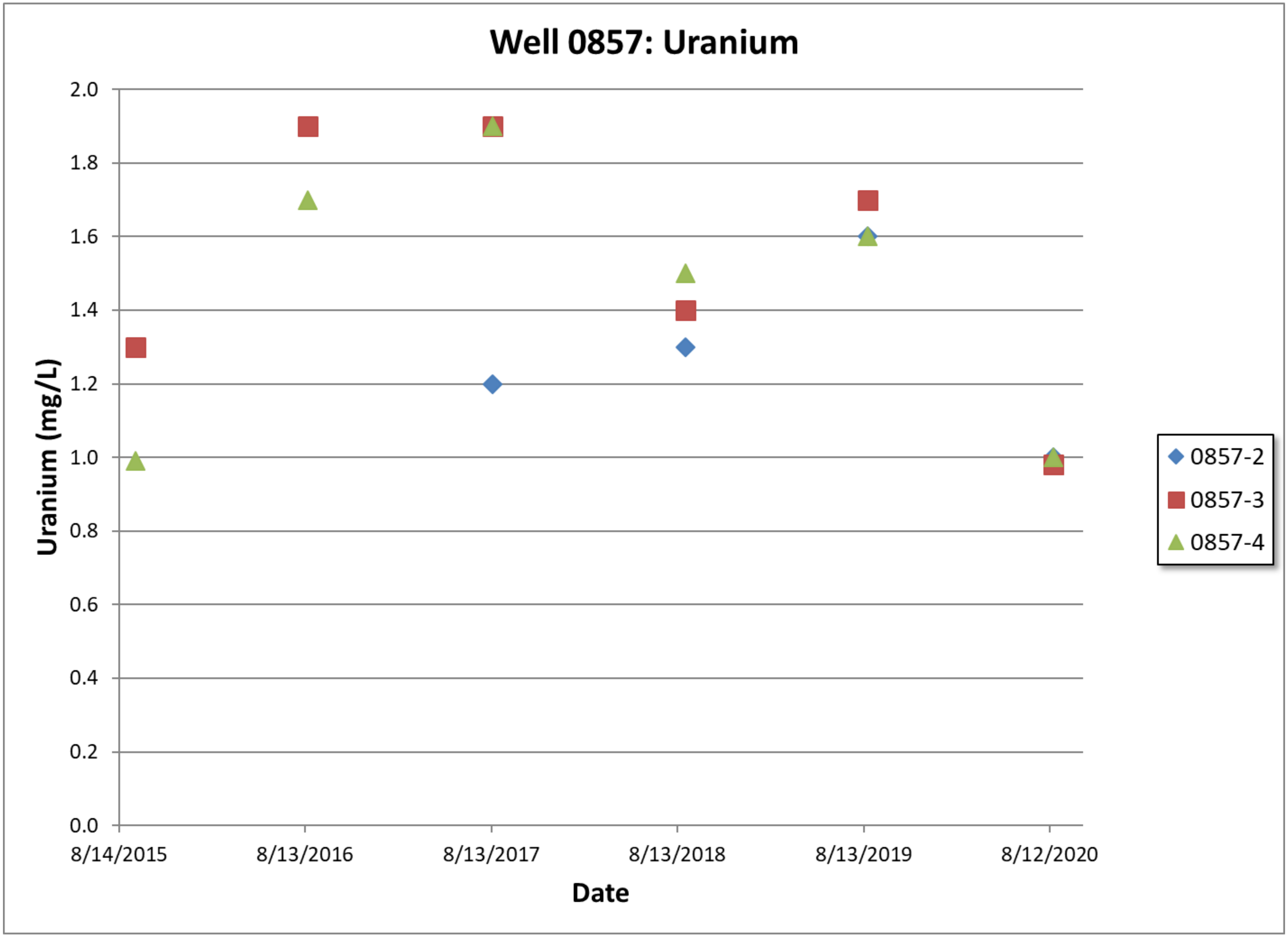

Well 0855: Uranium
Uranium (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0855-2
0855-3
0855-4

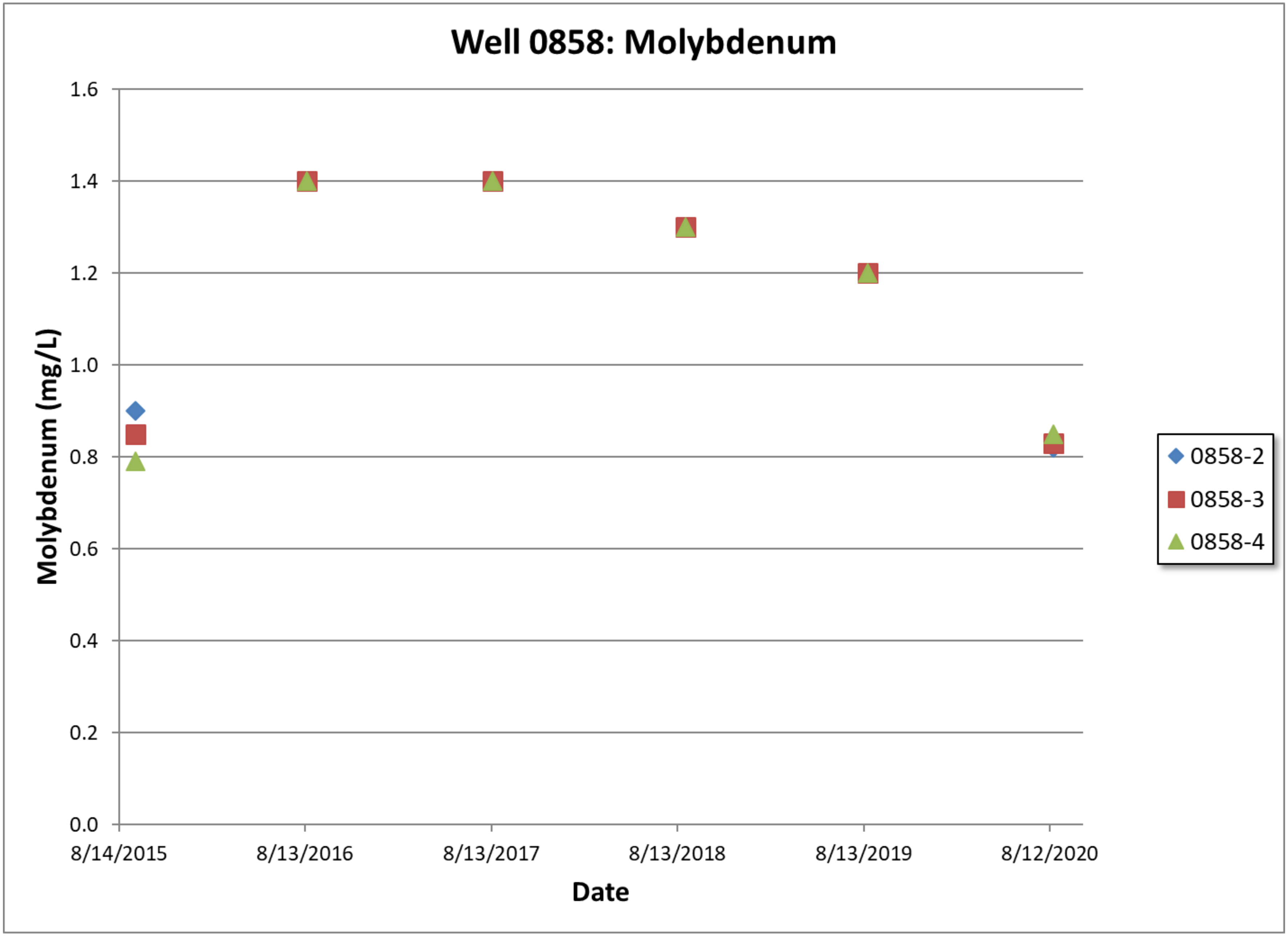

Well 0856: Molybdenum
Molybdenum (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0856-2
0856-3
0856-4

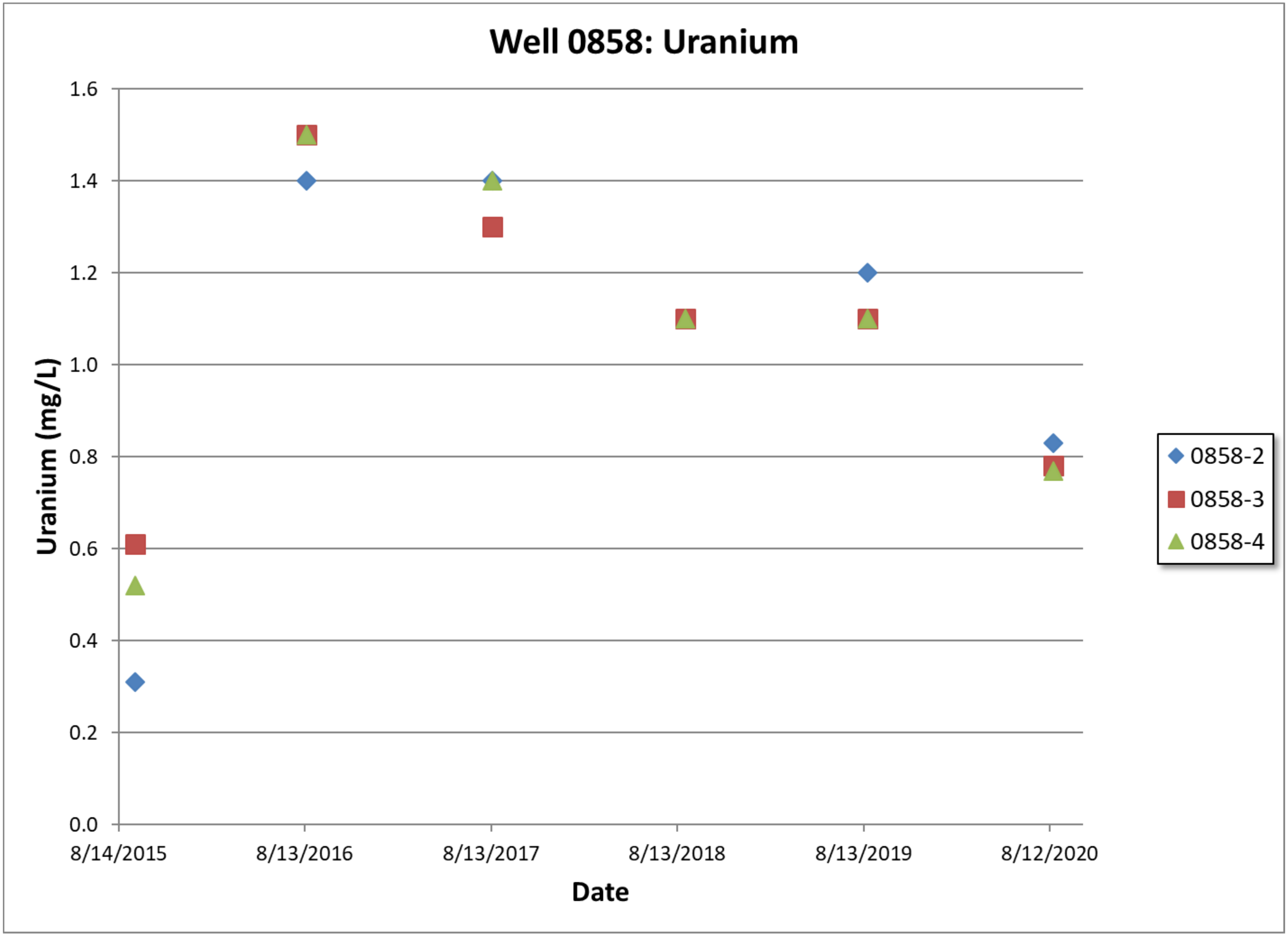


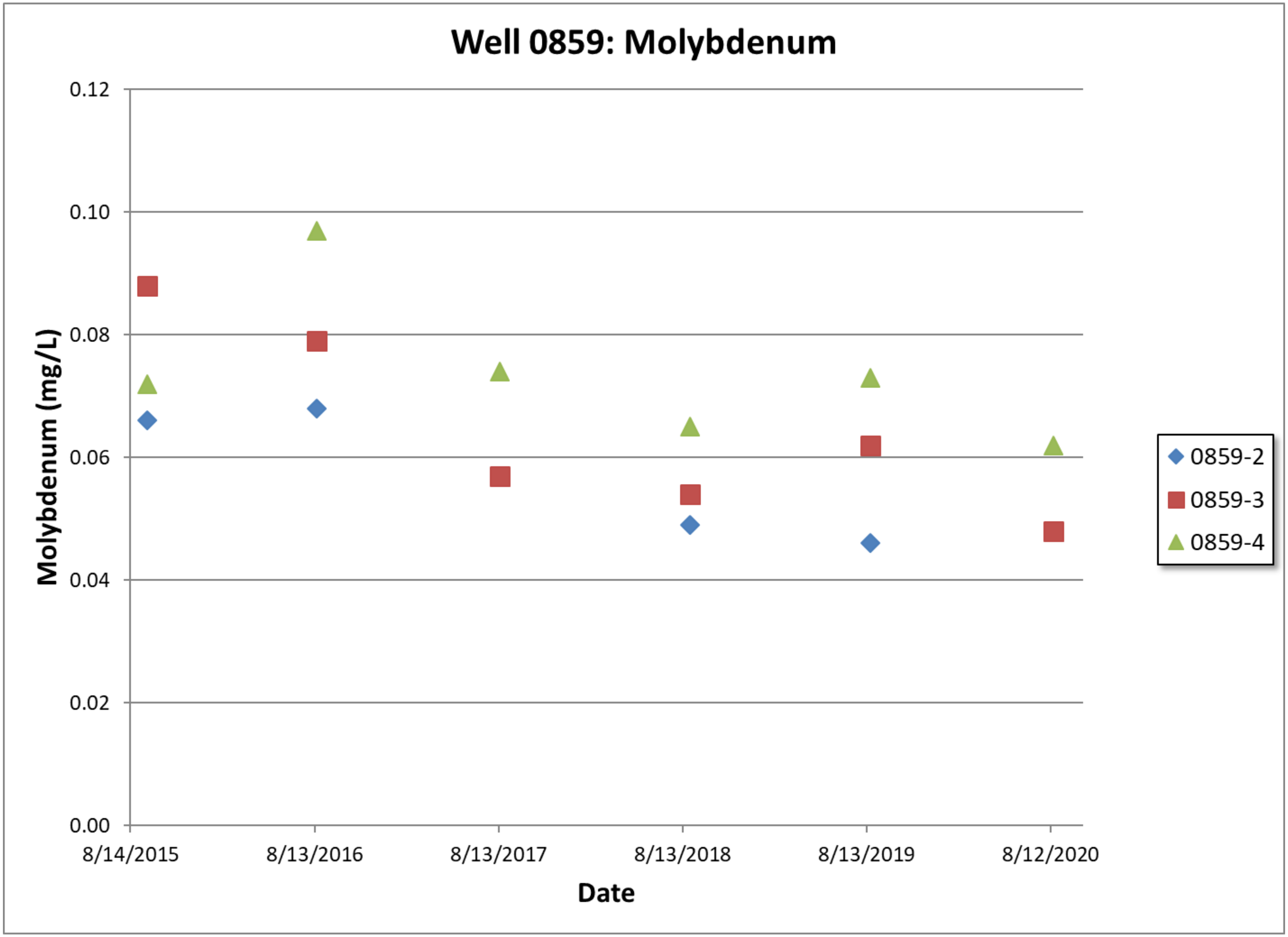
Well 0856: Uranium
Uranium (mg/L)
6
5
4
3
2
1
0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0856-2
0856-3
0856-4

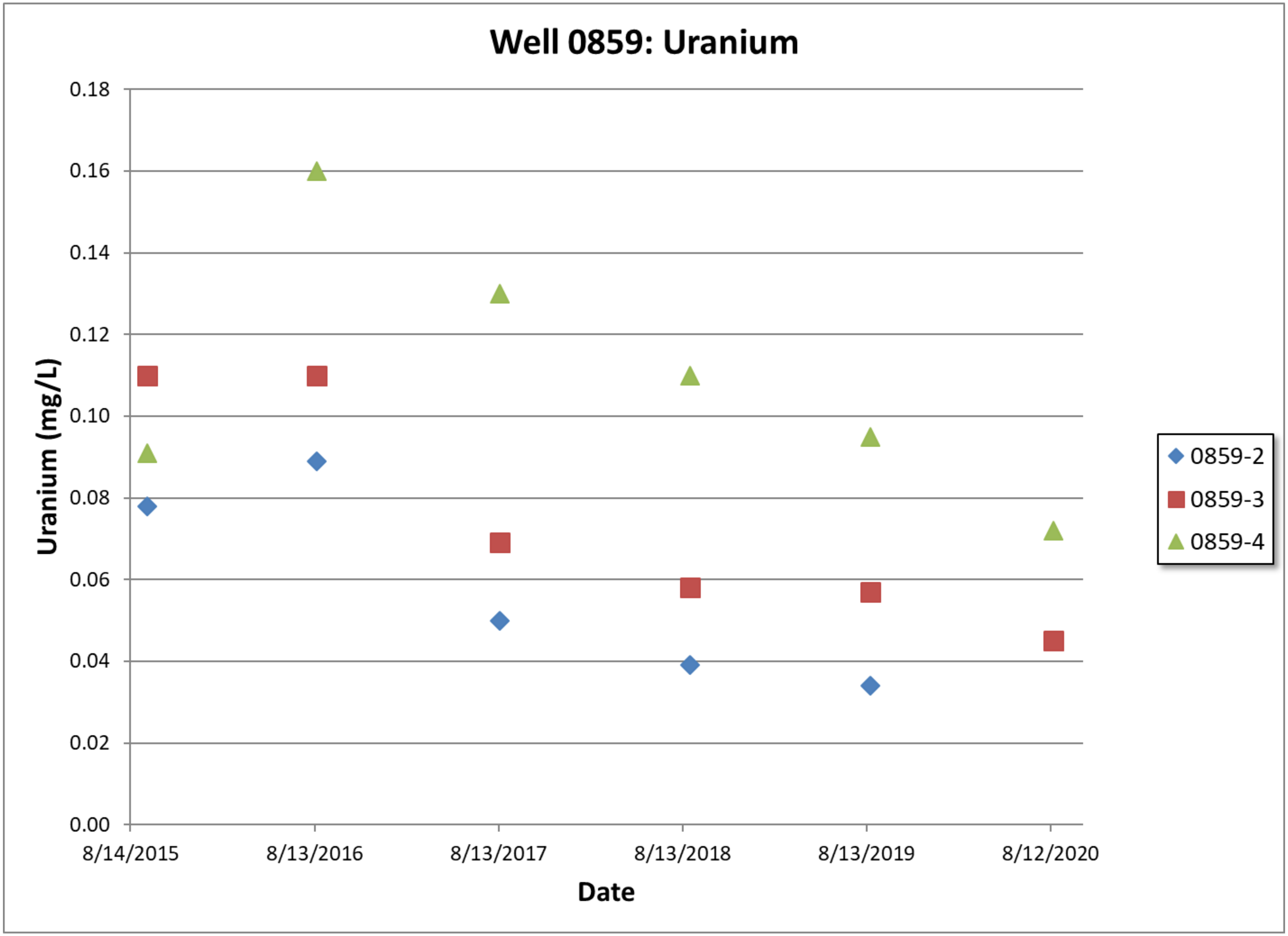

Well 0857: Molybdenum
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Molybdenum (mg/L)
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0857-2
0857-3
0857-4

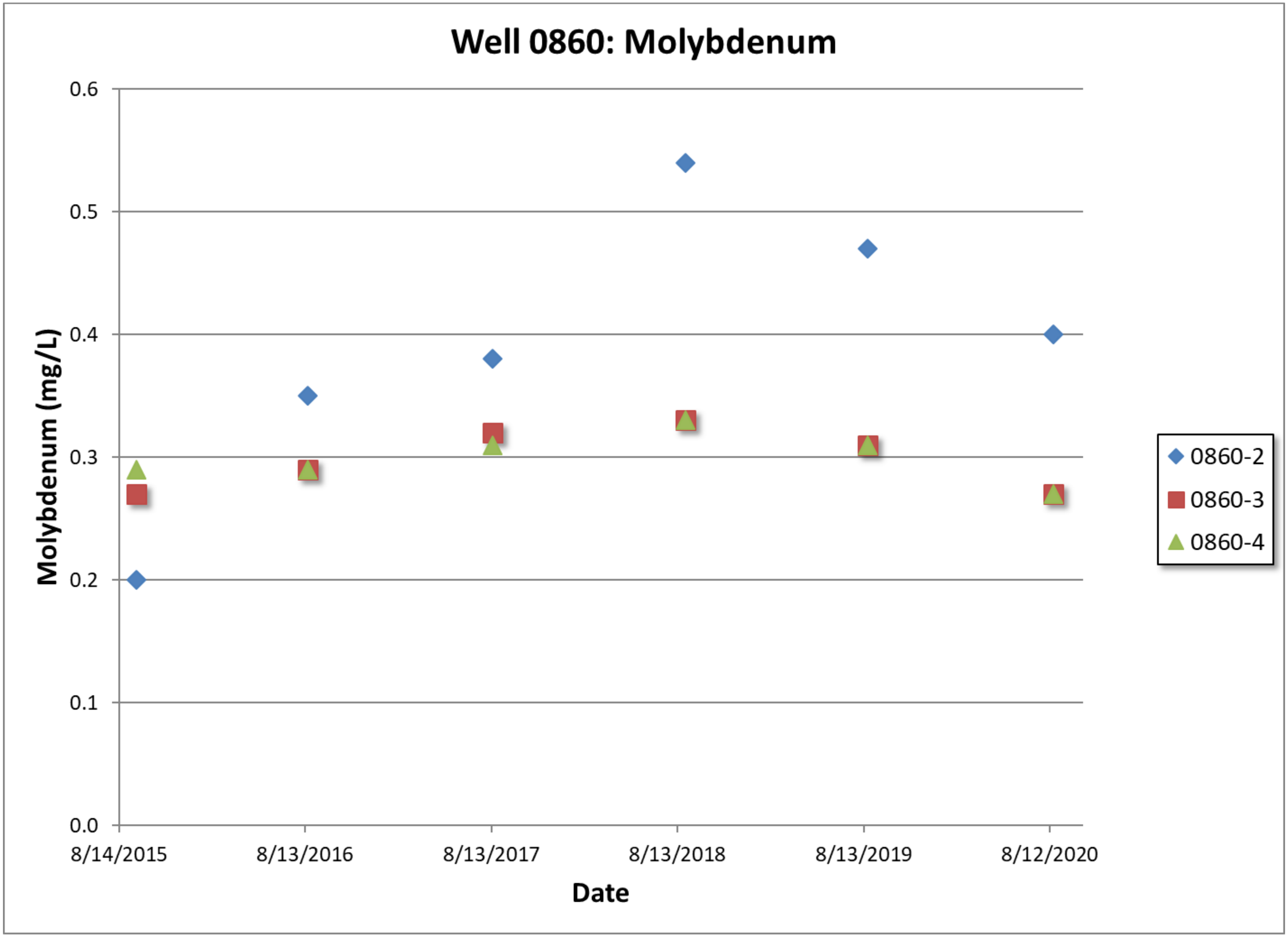

Well 0857: Uranium
Uranium (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0857-2
0857-3
0857-4

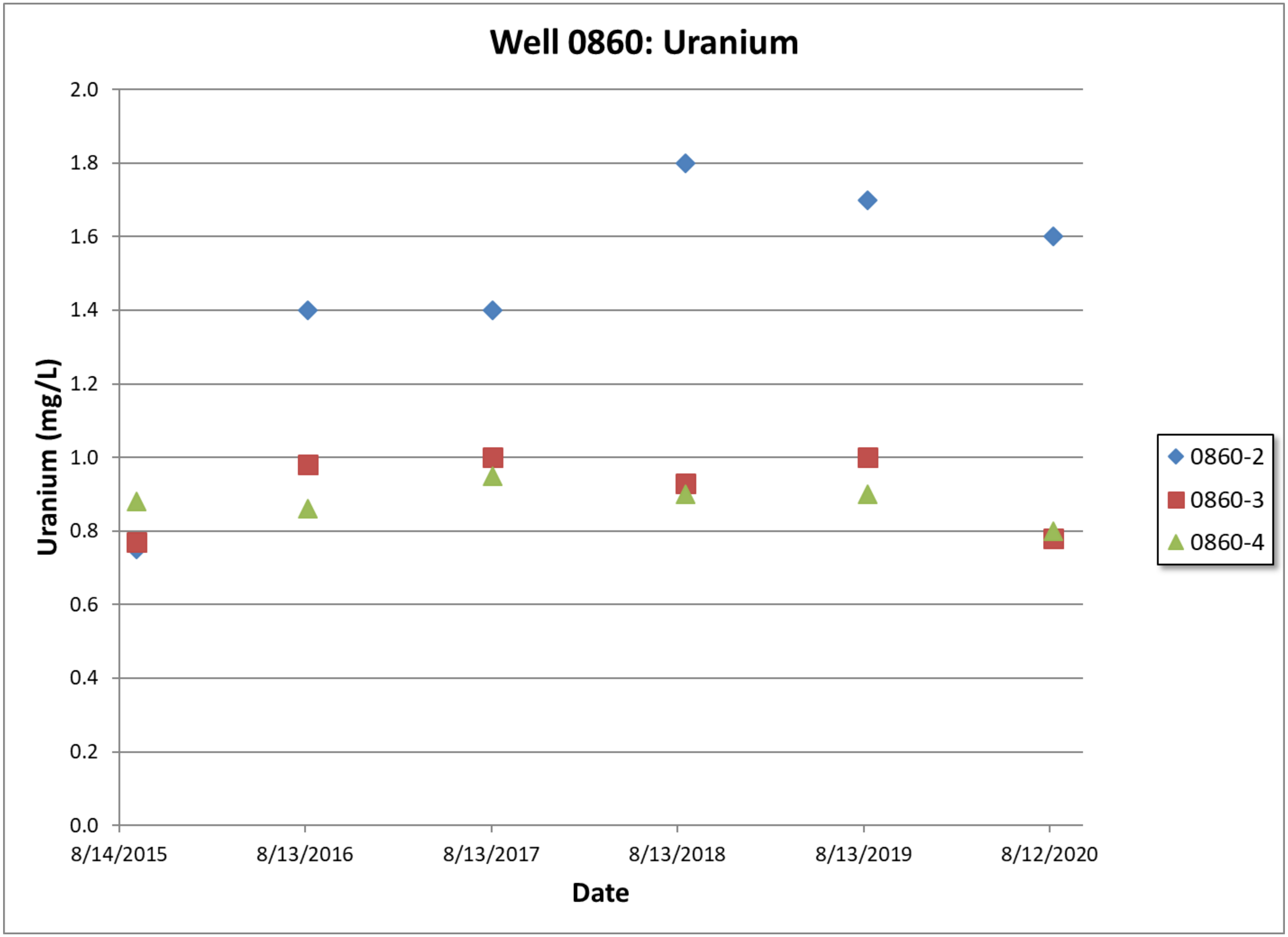

Well 0858: Molybdenum
Molybdenum (mg/L)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
8/14/2015
8/13/2016
8/13/2017
8/13/2018
8/13/2019
8/12/2020
Date
0858-2
0858-3
0858-4


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
Date
0858-2
0858-3
0858-4


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


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
Date
0859-2
0859-3
0859-4


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


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
Date
0860-2
0860-3
0860-4

Appendix E

Surface Water Data

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

REPORT DATE: 12/4/2020 3:31:57 PM

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	8/19/2020	(D)F	375	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0747	8/19/2020	(N)F	375	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0749	8/18/2020	(N)F	134	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0794	8/18/2020	(N)F	203	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0796	8/20/2020	(D)F	185.2	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0810	8/19/2020	(N)F	368.8	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0811	8/19/2020	(N)F	235	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0811	8/19/2020	(D)F	235	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0812	8/19/2020	(D)F	182	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0812	8/19/2020	(N)F	182	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0822	8/18/2020	(N)F	234	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0823	8/19/2020	(N)F	68	mg/L			#	-	-
Manganese										
Manganese	0747	8/19/2020	(D)F	0.43	mg/L			#	0.00074	-
Manganese	0749	8/18/2020	(T)F	0.013	mg/L			#	0.00074	-
Manganese	0749	8/18/2020	(T)D	0.013	mg/L			#	0.00074	-
Manganese	0794	8/18/2020	(T)F	0.054	mg/L			#	0.00074	-
Manganese	0796	8/20/2020	(D)F	0.087	mg/L			#	0.00074	-
Manganese	0810	8/19/2020	(T)F	0.013	mg/L			#	0.00074	-
Manganese	0811	8/19/2020	(D)F	0.033	mg/L			#	0.00074	-
Manganese	0812	8/19/2020	(D)F	0.026	mg/L			#	0.00074	-
Manganese	0822	8/18/2020	(T)F	0.025	mg/L			#	0.00074	-
Manganese	0823	8/19/2020	(T)F	0.014	mg/L			#	0.00074	-
Molybdenum										
Molybdenum	0747	8/19/2020	(D)F	0.032	mg/L			#	0.00046	-
Molybdenum	0749	8/18/2020	(T)F	0.029	mg/L			#	0.00046	-
Molybdenum	0749	8/18/2020	(T)D	0.03	mg/L			#	0.00046	-
Molybdenum	0794	8/18/2020	(T)F	0.0022	mg/L			#	0.00046	-
Molybdenum	0796	8/20/2020	(D)F	0.0024	mg/L			#	0.00046	-
Molybdenum	0810	8/19/2020	(T)F	0.00094	mg/L	J		#	0.00046	-

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Molybdenum	0811	8/19/2020	(D)F	0.0029	mg/L			#	0.00046	-
Molybdenum	0812	8/19/2020	(D)F	0.0026	mg/L			#	0.00046	-
Molybdenum	0822	8/18/2020	(T)F	0.0065	mg/L			#	0.00046	-
Molybdenum	0823	8/19/2020	(T)F	0.00051	mg/L	J		#	0.00046	-
pH										
pH	0747	8/19/2020	(N)F	7.58	s.u.			#	-	-
pH	0749	8/18/2020	(N)F	7.58	s.u.			#	-	-
pH	0794	8/18/2020	(N)F	8.17	s.u.			#	-	-
pH	0796	8/20/2020	(N)F	7.65	s.u.			#	-	-
pH	0810	8/19/2020	(N)F	9.37	s.u.			#	-	-
pH	0811	8/19/2020	(N)F	7.99	s.u.			#	-	-
pH	0812	8/19/2020	(N)F	8.23	s.u.			#	-	-
pH	0822	8/18/2020	(N)F	7.9	s.u.			#	-	-
pH	0823	8/19/2020	(N)F	8.73	s.u.			#	-	-
Specific Conductance										
Specific Conductance	0747	8/19/2020	(N)F	1596	umhos/cm			#	-	-
Specific Conductance	0749	8/18/2020	(N)F	903	umhos/cm			#	-	-
Specific Conductance	0794	8/18/2020	(N)F	910	umhos/cm			#	-	-
Specific Conductance	0796	8/20/2020	(N)F	952	umhos/cm			#	-	-
Specific Conductance	0810	8/19/2020	(N)F	1802	umhos/cm			#	-	-
Specific Conductance	0811	8/19/2020	(N)F	998	umhos/cm			#	-	-
Specific Conductance	0812	8/19/2020	(N)F	996	umhos/cm			#	-	-
Specific Conductance	0822	8/18/2020	(N)F	614	umhos/cm			#	-	-
Specific Conductance	0823	8/19/2020	(N)F	4473	umhos/cm			#	-	-
Sulfate										
Sulfate	0747	8/19/2020	(N)F	430	mg/L			#	2.6	-
Sulfate	0749	8/18/2020	(N)F	250	mg/L			#	2.1	-
Sulfate	0749	8/18/2020	(N)D	250	mg/L			#	2.1	-
Sulfate	0794	8/18/2020	(N)F	250	mg/L			#	2.1	-
Sulfate	0796	8/20/2020	(N)F	280	mg/L			#	2.6	-
Sulfate	0810	8/19/2020	(N)F	510	mg/L			#	5.3	-
Sulfate	0811	8/19/2020	(N)F	290	mg/L			#	2.6	-

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB	QUALIFIERS DATA	QA	DETECT. LIMIT	UNCERTAINTY
Sulfate	0812	8/19/2020	(N)F	280	mg/L			#	2.6	-
Sulfate	0822	8/18/2020	(N)F	94	mg/L			#	0.53	-
Sulfate	0823	8/19/2020	(N)F	1900	mg/L			#	11	-
Temperature										
Temperature	0747	8/19/2020	(N)F	18.17	C			#	-	-
Temperature	0749	8/18/2020	(N)F	21.05	C			#	-	-
Temperature	0794	8/18/2020	(N)F	23.81	C			#	-	-
Temperature	0796	8/20/2020	(N)F	18.29	C			#	-	-
Temperature	0810	8/19/2020	(N)F	25.85	C			#	-	-
Temperature	0811	8/19/2020	(N)F	21.5	C			#	-	-
Temperature	0812	8/19/2020	(N)F	26.6	C			#	-	-
Temperature	0822	8/18/2020	(N)F	24.73	C			#	-	-
Temperature	0823	8/19/2020	(N)F	24.89	C			#	-	-
Turbidity										
Turbidity	0747	8/19/2020	(N)F	39	NTU			#	-	-
Turbidity	0749	8/18/2020	(N)F	7.29	NTU			#	-	-
Turbidity	0794	8/18/2020	(N)F	8.92	NTU			#	-	-
Turbidity	0796	8/20/2020	(N)F	15.4	NTU			#	-	-
Turbidity	0810	8/19/2020	(N)F	1.39	NTU			#	-	-
Turbidity	0811	8/19/2020	(N)F	16.3	NTU			#	-	-
Turbidity	0812	8/19/2020	(N)F	14.1	NTU			#	-	-
Turbidity	0822	8/18/2020	(N)F	2.47	NTU			#	-	-
Turbidity	0823	8/19/2020	(N)F	2.32	NTU			#	-	-
Uranium										
Uranium	0747	8/19/2020	(D)F	0.13	mg/L			#	0.00004	-
Uranium	0749	8/18/2020	(T)F	0.00019	mg/L			#	0.00004	-
Uranium	0749	8/18/2020	(T)D	0.0002	mg/L			#	0.00004	-
Uranium	0794	8/18/2020	(T)F	0.0062	mg/L			#	0.00004	-
Uranium	0796	8/20/2020	(D)F	0.0081	mg/L			#	0.00004	-
Uranium	0810	8/19/2020	(T)F	0.0045	mg/L			#	0.00004	-
Uranium	0811	8/19/2020	(D)F	0.0092	mg/L			#	0.00004	-
Uranium	0812	8/19/2020	(D)F	0.01	mg/L			#	0.00004	-
Uranium	0822	8/18/2020	(T)F	0.0023	mg/L			#	0.00004	-
Uranium	0823	8/19/2020	(T)F	0.0051	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.