

2021 Verification Monitoring Report for the Old and New Rifle, Colorado, Processing Sites

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U.S. DEPARTMENT OF
ENERGY

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Abbreviations

ACL	alternate concentration limit
CCR	<i>Code of Colorado Regulations</i>
CDPHE	Colorado Department of Public Health and Environment
CFR	<i>Code of Federal Regulations</i>
COC	contaminant of concern
DOE	U.S. Department of Energy
EC	Environmental Covenant
EPA	U.S. Environmental Protection Agency
ft	feet
GCAP	Groundwater Compliance Action Plan
GEMS	Geospatial Environmental Mapping System
IC	institutional control
IFRC	Integrated Field Research Challenge
LBNL	Lawrence Berkeley National Laboratory
LM	Office of Legacy Management
LOESS	locally estimated scatterplot smoothing
MCL	maximum concentration limit
mg/L	milligrams per liter
<i>n</i>	number of samples
NRC	U.S. Nuclear Regulatory Commission
POC	point of compliance
POE	point of exposure
RAI	request for additional information
RBC	risk-based concentration
SDWA	Safe Drinking Water Act
SNL	Sandia National Laboratories
SOP	standard operating procedure
SOWP	Site Observational Work Plan
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act
USC	<i>United States Code</i>
VMR	Verification Monitoring Report

Executive Summary

This Verification Monitoring Report presents and interprets groundwater and surface water monitoring data collected at the Old and New Rifle, Colorado, Processing Sites. These two former vanadium and uranium-ore processing sites are near the city of Rifle, Colorado, on a floodplain of the Colorado River. Both sites are managed by the U.S. Department of Energy (DOE) Office of Legacy Management (LM) under the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I program. Surface remediation at both sites was completed in 1996. Verification monitoring in 2021 at the Old and New Rifle sites entailed routine semiannual sampling of groundwater and surface water and monitoring of institutional controls (ICs).

Compliance strategies for the Old and New Rifle sites, formalized in corresponding Groundwater Compliance Action Plans (GCAPs) issued in 2001 and 2003, respectively, were developed based on site characterization conducted in the late 1990s and subsequent modeling efforts. For both sites, the initial selected strategy was natural flushing for selected contaminants of concern (COCs) in tandem with ICs. Subsequent reevaluation of the conceptual site models indicated that some contaminants (e.g., uranium and vanadium) were projected to persist in groundwater at concentrations above corresponding regulatory limits for longer than 100 years, the time frame permitted under UMTRCA regulations for a natural flushing strategy. Based on those observations, LM developed revised compliance strategies for both sites, as documented in revised GCAPs issued in 2016 and 2017. LM is currently responding to U.S. Nuclear Regulatory Commission requests for additional technical information on both draft GCAPs.

Compliance monitoring at the Old Rifle site includes sampling of eight monitoring wells (including two background wells) and five surface water locations. In accordance with the GCAP, samples are routinely analyzed for three COCs: uranium, selenium, and vanadium. Uranium is the most prevalent milling-related contaminant occurring in alluvial aquifer groundwater at the site. Concentrations continue to exceed the UMTRCA standard of 0.044 milligrams per liter (mg/L) in five of the six onsite monitoring wells. Selenium and vanadium concentrations exceed relevant benchmarks in two wells (0305 and 0655) coinciding with the former tailings area.

Compliance monitoring at the New Rifle site consists of sampling 16 onsite or downgradient monitoring wells screened in the alluvium, one background well, and eight surface water locations. Of the six COCs currently monitored in alluvial aquifer groundwater, uranium, molybdenum, and vanadium are present at the most elevated concentrations relative to the applicable benchmarks. Although levels of these constituents have generally decreased across the monitoring network, they are still elevated relative to corresponding benchmarks in most onsite and adjacent downgradient wells. Concentrations of remaining COCs—arsenic, nitrate, and selenium—also exceed corresponding benchmarks, but in a smaller percentage of wells. Although ammonia (total, as nitrogen) is not considered a COC, it is monitored because of its association with nitrate and because of historically elevated concentrations in onsite and adjacent downgradient wells.

Surface water quality of the Colorado River, a point of exposure (POE) at both the Old and New Rifle sites, remains unaffected by groundwater discharge from either site. Concentrations of COCs in river samples adjacent to and downstream of both sites have been similar to those in background (upstream) samples.

In addition to the Colorado River, other surface water features at or near the New Rifle site include the Roaring Fork gravel pit ponds, proposed as POE locations in the 2016 draft GCAP, and the mitigation wetland. COC concentrations in the gravel pit ponds have been well below corresponding risk-based concentrations derived for a conservative recreational swimming scenario. Potential exposures to contaminants in the Roaring Fork ponds are therefore unlikely to pose any potential risk that would warrant additional controls or restrictions. Restrictions have been placed on use of the surface water and groundwater for agricultural purposes, so that exposure pathway is incomplete.

At both the Old and New Rifle sites, multiple ICs prevent domestic use of groundwater and ensure protection of human health and the environment. Three ICs—a zone overlay, a quitclaim deed, and an Environmental Covenant (EC)—are in place at the Old Rifle site. These overlapping measures restrict a number of activities at the site and limit access to the subsurface and groundwater without written permission from the Colorado Department of Public Health and Environment (CDPHE) and DOE.

At the New Rifle site, DOE, CDPHE, the city of Rifle, and Garfield County, Colorado, have enacted a series of four ICs to prevent humans and livestock from being exposed to site-related contaminants on the former mill site and downgradient properties. These controls consist of a quitclaim deed on the site proper, a large zone overlay to restrict consumption of contaminated groundwater, an EC to limit access to groundwater and prevent livestock from accessing water in former gravel pit ponds, and an overlay zone district that further limits activities on the former mill site.

1.0 Introduction

This Verification Monitoring Report (VMR) presents and interprets groundwater and surface water monitoring data collected at the Old and New Rifle, Colorado, Processing Sites. These two former vanadium and uranium-ore processing sites are near the city of Rifle in Garfield County, Colorado, on a floodplain of the Colorado River near the northeastern edge of the Colorado Plateau physiographic province (Figure 1). Both sites are managed by the U.S. Department of Energy (DOE) Office of Legacy Management (LM) under the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I program. Surface remediation at both sites was completed in 1996, and tailings were stabilized in an engineered repository about 6 miles north of Rifle (the Rifle, Colorado, Disposal Site).

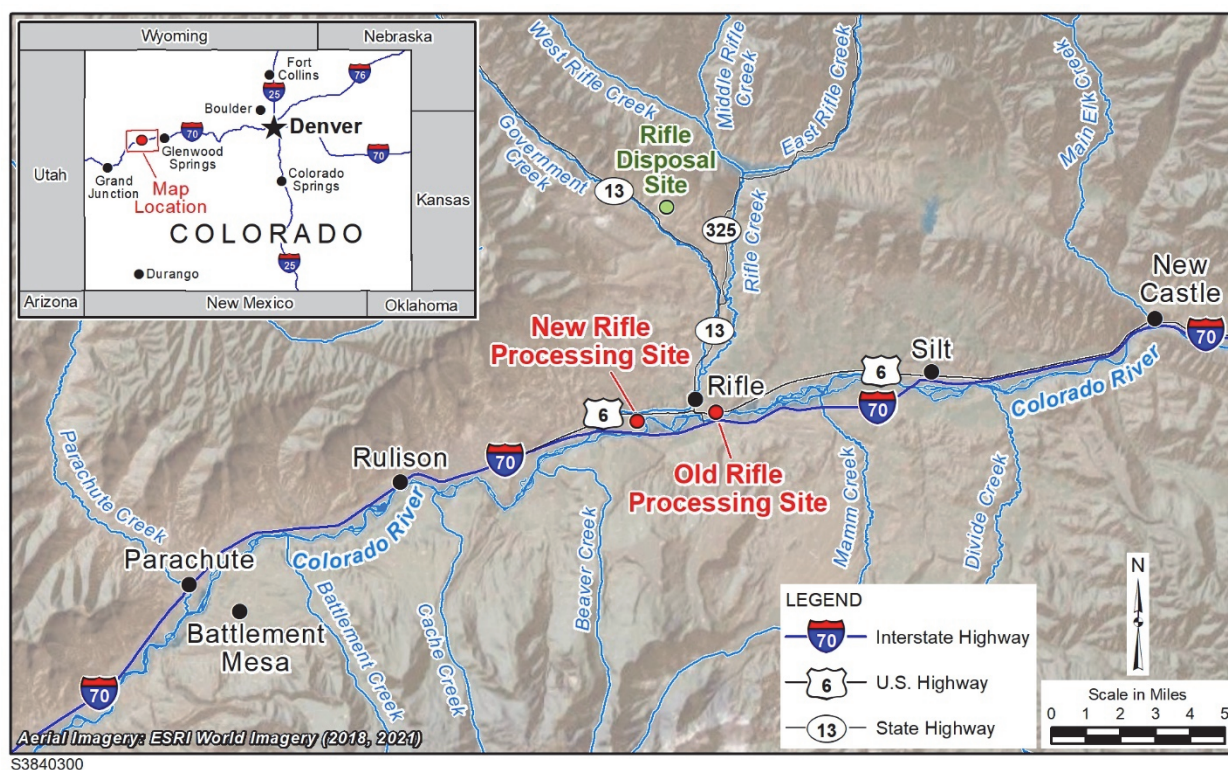


Figure 1. Locations of the Old and New Rifle, Colorado, Processing Sites

DOE has conducted regular water quality monitoring at both sites since 1998—semiannually at the Old Rifle site (typically June and November) and annually or semiannually at the New Rifle site. Monitoring locations are shown in Figure 2 and Figure 3, respectively. This report documents the most recent (2021) monitoring results and summarizes key findings and contaminant trends since the last (2020) VMR (DOE 2021) was issued. Detailed analytical results for the 2021 monitoring period are provided in Appendix A and Appendix B for the Old and New Rifle sites, respectively.

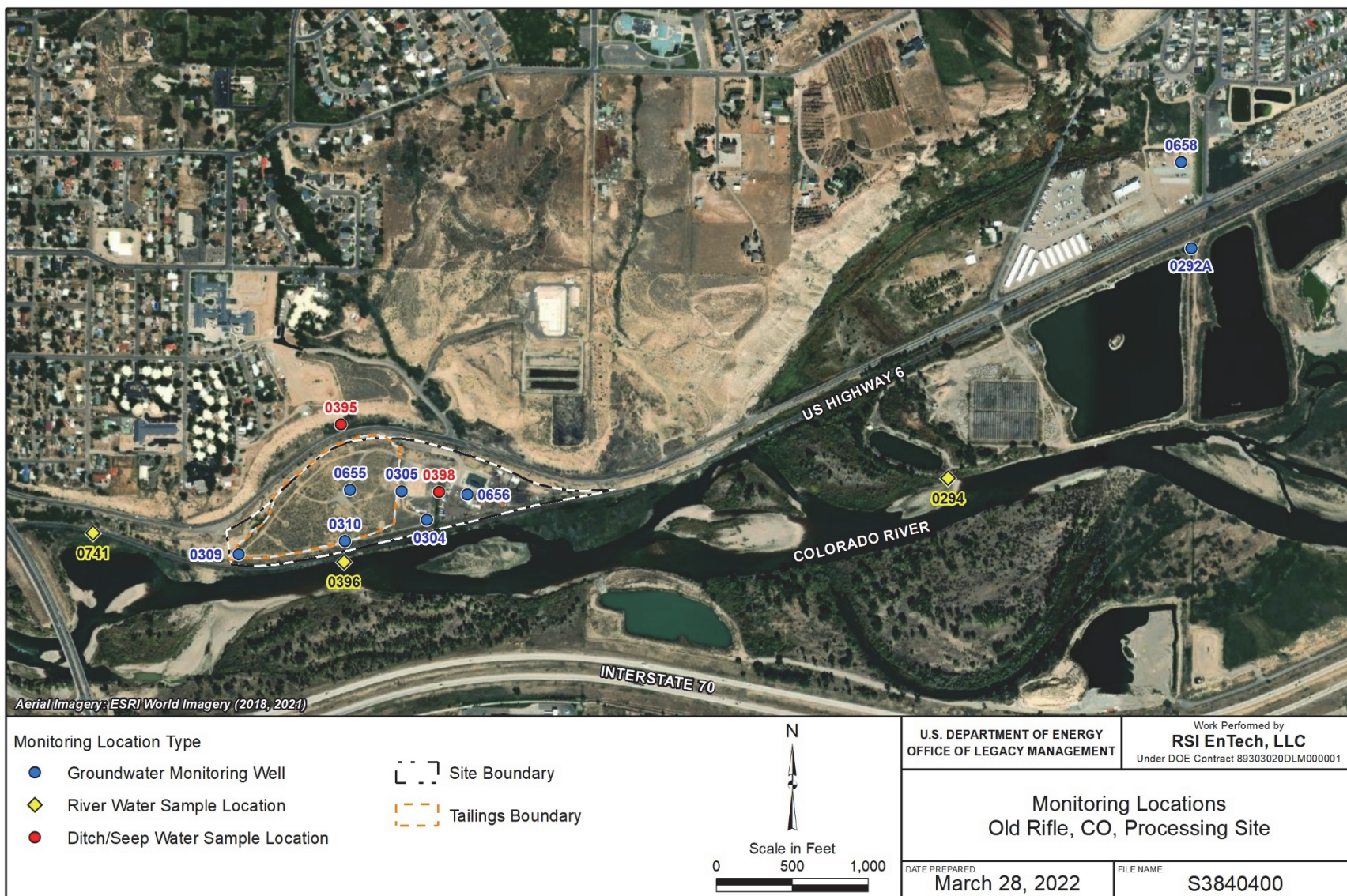
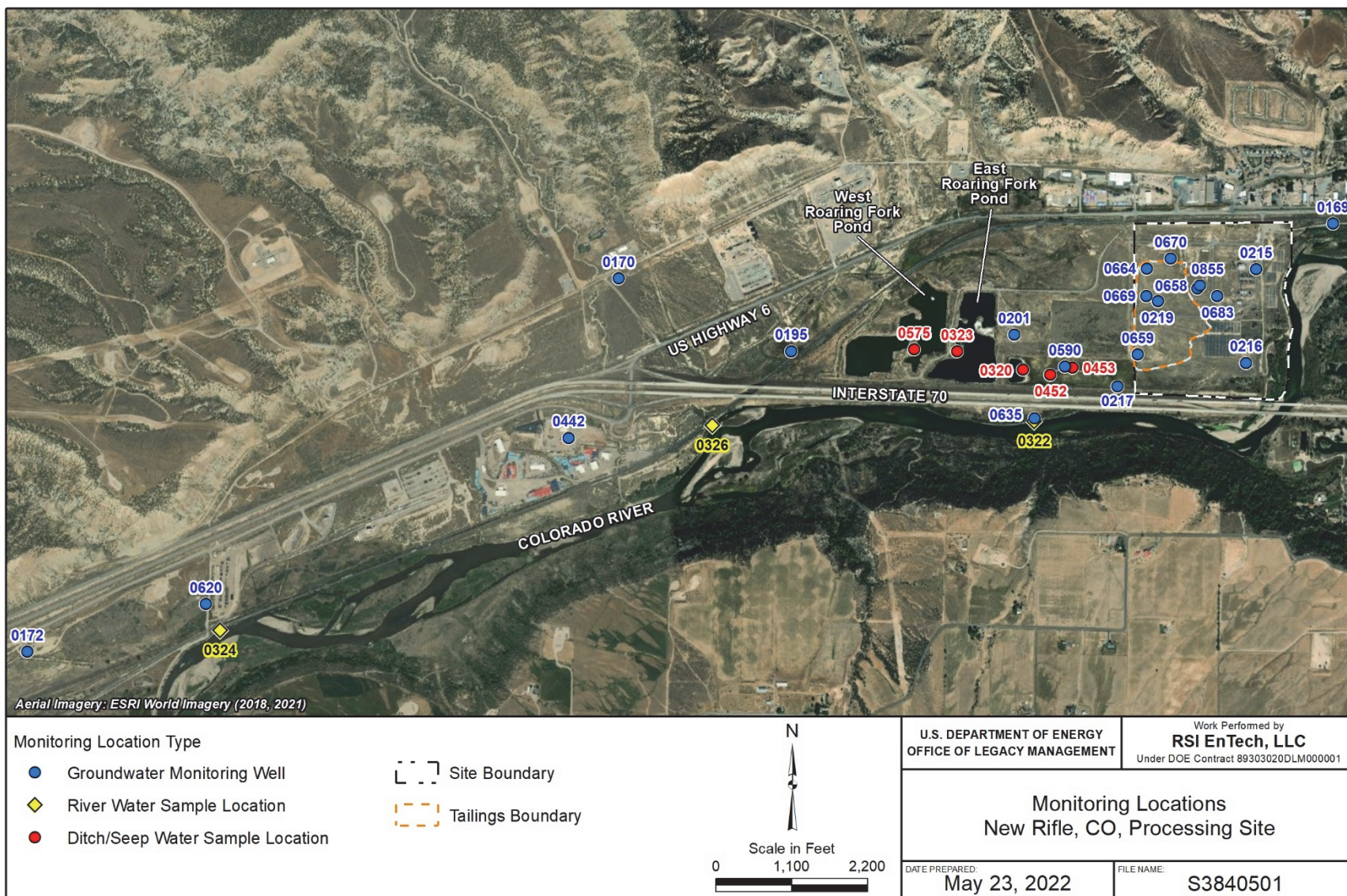


Figure 2. Monitoring Locations at the Old Rifle Site



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled but were sampled in 2021.

Figure 3. Monitoring Locations at the New Rifle Site

1.1 Background

Primary historical site documents for the Old and New Rifle sites include the Site Observational Work Plan (SOWP), a detailed report documenting historical water quality data and the conceptual model developed for each site (DOE 1999a; DOE 1999b); the Groundwater Compliance Action Plan (GCAP), which documents the proposed strategy for groundwater cleanup (DOE 2016; DOE 2017; DOE 2001; DOE 2003a), and previous VMRs, which assess the progress of the groundwater remedy in achieving cleanup goals at both sites (DOE 2014; DOE 2020; DOE 2021). This section briefly summarizes relevant background information for the Old and New Rifle sites. Additional details can be found in the key site documents cited above. Numerous reports documenting each site's history and previous characterization and monitoring efforts can be accessed via LM's website.¹

1.1.1 Old Rifle Site

The Old Rifle site is a former vanadium- and uranium-ore processing mill approximately 0.3 mile east of Rifle, Colorado, a city on the north bank of the Colorado River (Figure 1 and Figure 2). The mill operated on the 21-acre site during two separate periods between 1924 and 1958. U.S. Vanadium Company constructed the original mill in 1924 to produce vanadium (Merritt 1971). Union Carbide Corporation purchased the assets of the U.S. Vanadium Company in 1926 and established U.S. Vanadium Corporation as a subsidiary (Chenoweth 1982). The subsidiary operated the former Old Rifle plant intermittently until 1946, when it was modified to include the recovery of uranium, as well as vanadium. Production continued until 1958, when the old plant was replaced with a new mill approximately 2.3 miles west of Rifle, now referred to as the New Rifle site. In 1967, approximately 13 acres of tailings were stabilized at the Old Rifle site in accordance with State of Colorado regulations. Surface remediation began in spring 1992 and was completed in October 1996. Legacy contamination from the milling resides in sediments and groundwater within a shallow alluvial aquifer that overlies sedimentary bedrock.

The Old Rifle site was previously established as an Integrated Field Research Challenge (IFRC) site through DOE's Office of Science. Experiments were conducted at the site between 2003 and 2015 to better understand the behavior of uranium in the alluvial aquifer. Observations and findings stemming from this work were considered in developing the draft GCAP (DOE 2017). A pilot study performed by Sandia National Laboratories (SNL), Lawrence Berkeley National Laboratory (LBNL), and DOE is currently active and involves uranium sequestration in a permeable reactive barrier. Chemical injections, intended to form the mineral apatite in the subsurface, were performed in November 2017 in an existing research well plot. Since that time, LBNL and SNL researchers have conducted routine sampling in support of the apatite study.

1.1.2 New Rifle Site

The 142-acre New Rifle site is approximately 2.3 miles west of Rifle (Figure 1 and Figure 3), adjacent to and north of the Colorado River. Historical site activities included vanadium- and uranium-ore processing (1958–1972), lignite ash processing (1964–1967), and vanadium processing (1973–1984), which did not produce tailings but may have produced milling

¹ <https://www.energy.gov/lm/rifle-colorado-disposal-site-and-processing-sites>. Site data and sample location information, including well construction logs, can be found on LM's Geospatial Environmental Mapping System (GEMS) website (<https://gems.lm.doe.gov/#site=RFO>; <https://gems.lm.doe.gov/#site=RFN>).

solutions. All tailings, contaminated materials, and associated process buildings and structures were removed from the site during the surface remedial action completed in 1996. Prompted by the identification of contamination in the surficial alluvial aquifer beneath the site, characterization investigations in support of the SOWP began in 1997. Results of those investigations indicated the presence of site-related contamination in groundwater downgradient (west) of the site on private land.

Several historical non-milling activities at or adjacent to the New Rifle site affected local groundwater conditions. For a while (start of operations not documented), Roaring Fork Resources operated a gravel mine on the property adjacent to and downgradient of the site. Water was pumped from an active onsite mining pit, where excavation was occurring, to another onsite pit for storage and infiltration. These pits are now referred to as the Roaring Fork ponds (locations shown in Figure 3). This pumping ultimately affected groundwater flow downgradient of the New Rifle site (DOE 1999a). The Roaring Fork gravel pit ceased operations in 2003, and the ponds have since filled with groundwater and equilibrated with the local water table. The State of Colorado subsequently transferred the site property to the city of Rifle in 2004. In 2008, the city began dewatering the aquifer in the eastern portion of the site (on city property) to provide dry footing for constructing foundations for a wastewater treatment plant. Dewatering created a cone of depression that extended west into areas of vanadium-contaminated sediments; the water table was lowered by 5 to 8 feet (ft) in places. The draft GCAP (DOE 2016) provides a more detailed discussion of historical site activities.

1.2 Compliance Strategies

Initial GCAPs for the Old and New Rifle sites were issued shortly after the SOWPs and corresponding conceptual site models were developed (DOE 2001; DOE 2003a). In both cases, results of early site characterization and modeling efforts supported a compliance strategy of natural flushing for selected contaminants of concern (COCs)—in particular, uranium—in tandem with institutional controls (ICs). Subsequent reevaluation of the conceptual site models indicated that some contaminants (e.g., uranium and vanadium) were projected to persist in groundwater at concentrations above corresponding regulatory limits for longer than 100 years, the time frame permitted under UMTRCA regulations for a natural flushing strategy. Based on those observations, LM developed revised compliance strategies for the Old and New Rifle sites, as documented in the corresponding recently updated GCAPs (DOE 2016; DOE 2017).

Current (based on the 2001 and 2003 GCAPs) and recent proposed compliance strategies for each site are summarized below. For both sites, the compliance strategy requires formal concurrence from the U.S. Nuclear Regulatory Commission (NRC) and consultation with the Colorado Department of Public Health and Environment (CDPHE). To date, only the initial Old Rifle site GCAP (DOE 2001) has received concurrence from NRC (Gillen 2002).

1.2.1 Old Rifle Site

Alluvial aquifer groundwater beneath the Old Rifle site was contaminated by former uranium- and vanadium-ore processing operations conducted from 1924 to 1958. The initial NRC-approved compliance strategy (DOE 2001) was a combination of natural flushing for uranium, the primary contaminant in terms of plume extent, and no remediation with the application of alternate concentration limits (ACLs) for selenium and vanadium, the other two site COCs.

The conditions of the natural flushing compliance strategy were to maintain ICs at the site and conduct routine monitoring until concentrations of COCs decreased to acceptable levels. Because subsequent evaluations revealed that the natural flushing compliance strategy was not performing as expected, LM issued a revised GCAP in 2017.² The revised (recommended) compliance strategy is no remediation with the application of ACLs for all three COCs—uranium, selenium, and vanadium. COCs currently monitored at the Old Rifle site are summarized in Table 1 along with corresponding benchmarks and proposed ACLs. All onsite wells were considered point of compliance (POC) wells (i.e., the wells to which ACLs would be applied), and the Colorado River was considered the point of exposure (POE) (DOE 2017).

Table 1. Groundwater COCs for the Old Rifle Site, Benchmarks, and Proposed ACLs

Contaminant ^a	40 CFR 192 (UMTRCA) MCL	Benchmark	Background Range ^b	ACL Proposed in 2017 ^c	Comments
Selenium	0.01	0.05 ^d	0.00004–0.041	0.122	Benchmark historically exceeded in two wells—0305 and 0655—coinciding with the former tailings area.
Uranium	0.044	0.044 ^e	0.007–0.067	0.36	Uranium concentrations have been elevated relative to the 0.044 mg/L MCL in all site wells except 0309 (far western boundary).
Vanadium	—	0.33 ^f	0.0002–0.0023	1.0	As observed for selenium, vanadium concentrations have exceeded the corresponding benchmark in two wells, 0305 and 0655.

Notes:

All units are milligrams per liter (mg/L).

^a Arsenic was initially identified as a COC (DOE 2001) but later eliminated from the monitoring program because levels in all wells were consistently below the 0.05 mg/L MCL established in Title 40 *Code of Federal Regulations* Section 192 (40 CFR 192).

^b Data are from background wells 0292A and 0658 (Figure 2); cited ranges reflect detections only.

^c ACL proposed in the draft GCAP (DOE 2017) based on data from well 0305, the well with the highest historical concentrations for the three constituents. ACLs for selenium and uranium are nonparametric 95% upper simultaneous limits (DOE 2017, Table 4). The proposed ACL for vanadium is the currently approved ACL from the 2001 GCAP (DOE 2001; DOE 2017). These ACLs are notably lower than those cited in the previous VMR (DOE 2014): 12.3 mg/L, 44.4 mg/L, and 126 mg/L for selenium, uranium, and vanadium, respectively.

^d U.S. Environmental Protection Agency (EPA) “Safe Drinking Water Act” (Title 42 *United States Code* Section 300f [42 USC 300f]) maximum contaminant level, the ACL proposed for selenium in the 2001 NRC-approved GCAP (DOE 2001).

^e Some earlier VMRs (e.g., DOE 2014, Table 1) cited a benchmark for uranium of 0.067 mg/L, based on the maximum background concentration measured at background well 0658. Because uranium trends at this well have not been stable, LM now applies the more conservative UMTRCA standard.

^f Risk-based concentration for vanadium from the NRC-approved GCAP (DOE 2001) based on an EPA residential screening value developed in 2000. The draft GCAP (DOE 2017) cited an updated risk-based concentration for vanadium of 0.15 mg/L based on EPA data available at that time. Note that the most recent EPA Regional Screening Level table (May 2022) cites an even lower risk-based value (for tap water) of 0.086 mg/L (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>).

Abbreviations:

— = not applicable (contaminant does not have an MCL in 40 CFR 192)

MCL = maximum concentration limit

² On October 31, 2019, LM received comments from NRC requesting additional information (Saxton 2019).

1.2.2 New Rifle Site

The compliance strategy for the New Rifle site has undergone several iterations over the years as more data have been collected and the conceptual site model has been updated. A draft GCAP recommending a natural flushing compliance strategy (DOE 2003a) has been the basis for continued semiannual monitoring at the site. COCs initially identified for the underlying alluvial aquifer were ammonia, arsenic, fluoride, manganese, molybdenum, nitrate, selenium, uranium, and vanadium (DOE 2003a). Based on discussions with CDPHE, fluoride and manganese were deemed to be of little concern at the site and were eliminated from the monitoring program (DOE 2014). Cleanup goals for the site were initially established as UMTRCA (Title 40 *Code of Federal Regulations* Section 192 [40 CFR 192]) maximum concentration limits (MCLs) or risk-based goals that would allow future unrestricted use of groundwater.

Because more recent evaluations demonstrated that the natural flushing compliance strategy was not performing as expected, LM issued a revised GCAP in 2016. The proposed compliance strategy for the alluvial aquifer at the New Rifle site for all COCs is no remediation with the application of ACLs, implementation of ICs, and continued groundwater monitoring (DOE 2016).³ Four wells—three onsite wells and one offsite downgradient well—were selected as POC wells, and the Roaring Fork gravel pit ponds were identified as the proposed POE. COCs currently monitored at the New Rifle site are summarized in Table 2 along with corresponding current benchmarks and proposed ACLs.

1.3 Institutional Controls

At both the Old and New Rifle sites, the contaminated medium is alluvial aquifer groundwater. ICs are measures to control access to a site and minimize disturbances to engineered measures established by the licensee to control the residual radioactivity. ICs include administrative mechanisms (e.g., land use restrictions) and may include, but are not limited to, physical controls (e.g., signs, markers, landscaping, and fences). Durable ICs are reliable and sustainable for the period, in accordance with NUREG-1757 (NRC 2020).

To be effective, ICs must mitigate or prevent intrusion into contaminated groundwater and restrict access to or use of contaminated groundwater for unacceptable purposes. ICs are required to (1) protect public health and the environment, (2) have a high degree of permanence, (3) satisfy beneficial uses of groundwater, (4) be enforceable by administrative or judicial branches of government entities, and (5) be implemented in a manner that can be effectively maintained and verified.

³ The draft GCAP (DOE 2016) was submitted January 19, 2017. NRC responded by letter dated July 21, 2017, determining that “additional information is required to complete its review” (Koenick 2017). LM responded to NRC’s request for additional information (RAI) in September 2019 (Jasso 2019). NRC responded to LM’s 2019 submittal on February 6, 2020, concluding that LM’s responses to 12 of NRC’s 15 comments in the RAI were adequate. NRC requested that LM provide additional technical justification for the remaining three interrelated comments regarding groundwater quality west of the Roaring Fork ponds, groundwater levels, and spatial and temporal variations in groundwater flow in the alluvial aquifer (Saxton 2020). LM responded to NRC’s comments on December 31, 2020 (Jasso 2020); along with this submittal, LM proposed a technical scope for future evaluations required to update the conceptual site model.

Table 2. Groundwater COCs for the New Rifle Site, Benchmarks, and Proposed ACLs

Constituent ^a	40 CFR 192 (UMTRCA) MCL	Benchmark ^b	Background Range ^c	ACL Proposed in 2016 ^d	Comments
Ammonia as N	–	–	0.004–0.11	–	No longer considered a COC but monitored to understand nitrate behavior (DOE 2014).
Arsenic	0.05	0.05	0.0001–0.0026	0.313	Elevated arsenic (>0.05 mg/L) is currently limited to two onsite wells, 0658 and 0855.
Molybdenum	0.10	0.10	0.0028–0.023	7.3	Molybdenum remains elevated in most onsite wells and downgradient wells adjacent to the site, but decreasing trends are apparent in many of these wells.
Nitrate as N (Nitrate + Nitrite as Nitrogen)	10	10	0.022–5.3	75	Nitrate levels in most site wells are below the 10 mg/L standard. In 2020, the highest level measured was 18 mg/L in adjacent offsite well 0201.
Selenium	0.01	0.05 ^e	0.0015–0.028	1.43	Selenium remains elevated relative to background in most onsite wells.
Uranium	0.044	0.067 ^c (no longer applied)	0.016–0.042	0.364	Elevated uranium concentrations persist throughout the monitoring network. The UMTRCA standard is exceeded as far downgradient as well 0620.
Vanadium ^f	–	0.33 (DOE 2016) 0.086 (updated)	0.00045– 0.0037	52	Historically, elevated vanadium concentrations have been measured in onsite or immediately downgradient wells.

Notes:

All units are milligrams per liter (mg/L).

^a Fluoride and manganese, initially identified as COCs in the 2003 GCAP, are not listed because they were subsequently eliminated from the monitoring program (DOE 2014). Monitoring for fluoride ceased in 2007.

^b Benchmarks are from Table 1 of the draft GCAP (DOE 2016) and the 2014 VMR (DOE 2014).

^c Data from New Rifle site background well 0169 (Figure 3). Previous evaluations (DOE 2014; DOE 2016) had also considered Old Rifle site background wells 0292A and 0658 (RFO-0658, distinct from New Rifle onsite well 0658) as suitable New Rifle site background locations. As such, the maximum uranium concentration measured in RFO-0658 (0.067 mg/L) was previously applied as a background context for evaluating New Rifle site alluvial aquifer groundwater data. Because of hydrologic considerations and significant trends in uranium concentrations, RFO-0658 is no longer used as a background well for the New Rifle site (Jasso 2020).

^d ACLs proposed in draft GCAP (DOE 2016, Table 8). In all cases, the values are nonparametric 95% upper simultaneous limit values based on data from New Rifle site well 0658.

^e “Safe Drinking Water Act” (Title 42 *United States Code* Section 300f [42 USC 300f]) maximum contaminant level (benchmark used in draft GCAP [DOE 2016]). The previous VMR (DOE 2014) cited a benchmark of 0.041 mg/L, the maximum selenium concentration measured in Old Rifle site background well 0658.

^f The draft GCAP cites a benchmark for vanadium of 0.33 mg/L, an older EPA risk-based concentration dating back to the 2001 Old Rifle site GCAP (DOE 2001). EPA’s regional screening level for tap water (0.086 mg/L) is also used as a conservative reference point for interpreting corresponding time-trend plots and monitoring results (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>).

Abbreviations:

– = not applicable or not established

N = nitrogen

Ultimately, the city of Rifle, CDPHE, and (for the New Rifle site) Garfield County are the regulatory agencies with the responsibility and authority to enforce the ICs. LM continues to work closely, in a supporting role, with the city, state, and county toward the successful implementation of ICs. As demonstrated in the following sections, the ICs at the Old and New Rifle processing sites are robust and layered, thereby providing ample protection.

1.3.1 Old Rifle Site

Residual contamination will remain in the groundwater for an extended period; therefore, it is critical that restrictions on groundwater use be maintained to ensure protectiveness of the remedy. ICs are enforceable mechanisms for implementing these restrictions. Groundwater contamination at the Old Rifle site has not migrated into any offsite aquifers. Rather, it discharges directly into the Colorado River, the only POE to site-related contamination, where it rapidly mixes with river water. Constituent concentrations in samples of river water collected adjacent to and downstream of the former mill site are indistinguishable from those in background samples collected upstream of the site. Given these conditions, ICs only need to be applied within the site boundary (Figure 4). Multiple layers of ICs restricting groundwater use have been established for the Old Rifle site, including the following:

- Quitclaim deed restrictions
- Environmental Covenant (EC)
- The Uranium Mill Tailings Remedial Action (UMTRA) Project (UMTRA Project) overlay zone district

These ICs are discussed in greater detail in the draft GCAP (DOE 2017, Section 4.2), along with the general performance requirements; Appendix A of that report documents the ICs in their entirety.

1.3.2 New Rifle Site

A comprehensive ICs program has been implemented to prevent future use of contaminated groundwater associated with the New Rifle site. Figure 5 shows the areas impacted by various overlapping ICs. The IC program consists of several enforceable mechanisms that can be combined into the following four types of administrative categories:

- (1) Quitclaim deed restrictions covering the former mill site property
- (2) Zone overlays from the city of Rifle and Garfield County covering uses of groundwater in an expanded area of potentially contaminated groundwater
- (3) State of Colorado EC with Umetco Minerals Corporation covering agricultural uses of groundwater at an adjacent and downgradient vicinity property
- (4) City of Rifle UMTRA Project zone overlay to address potential future development at the former mill site

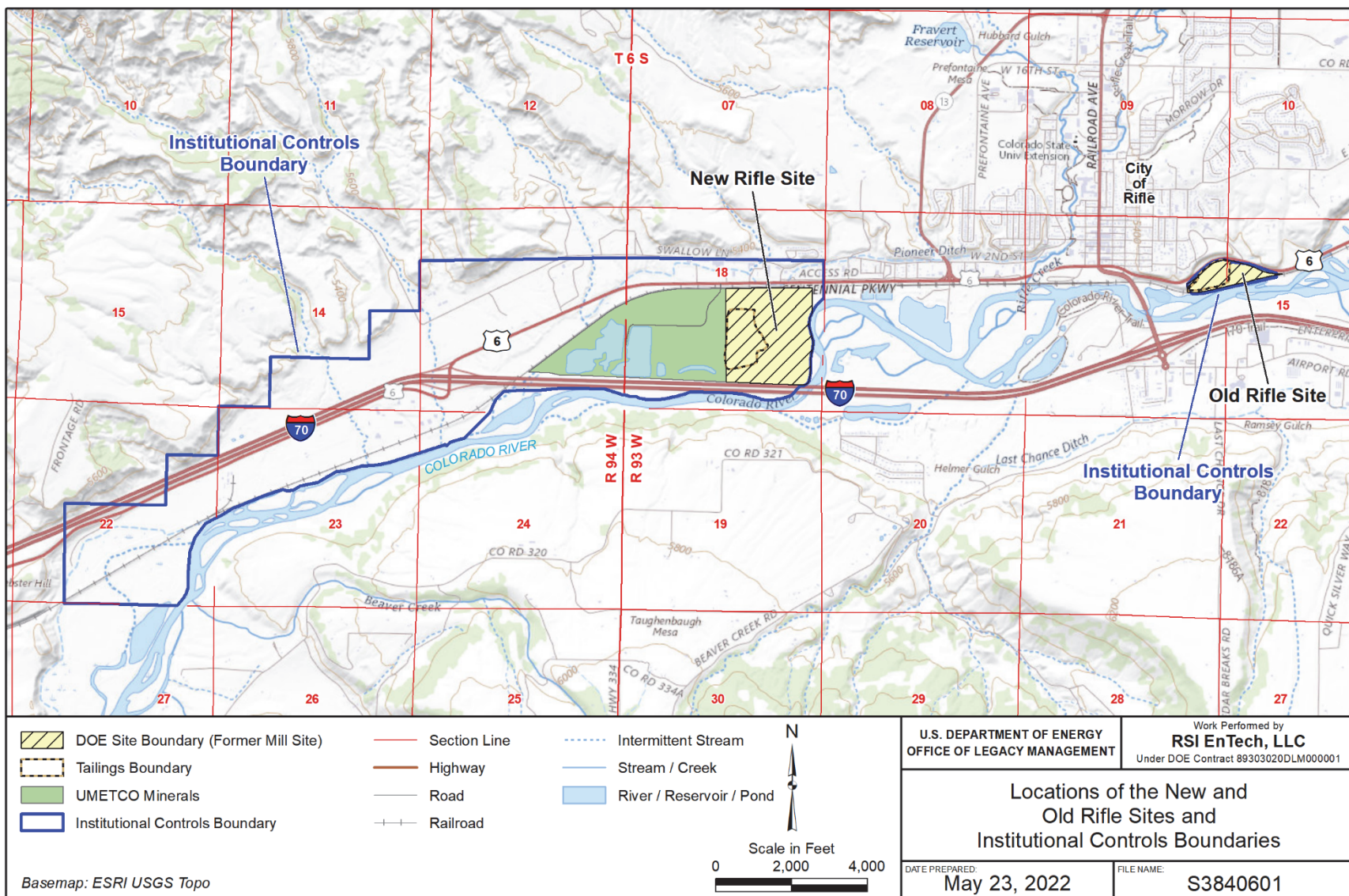
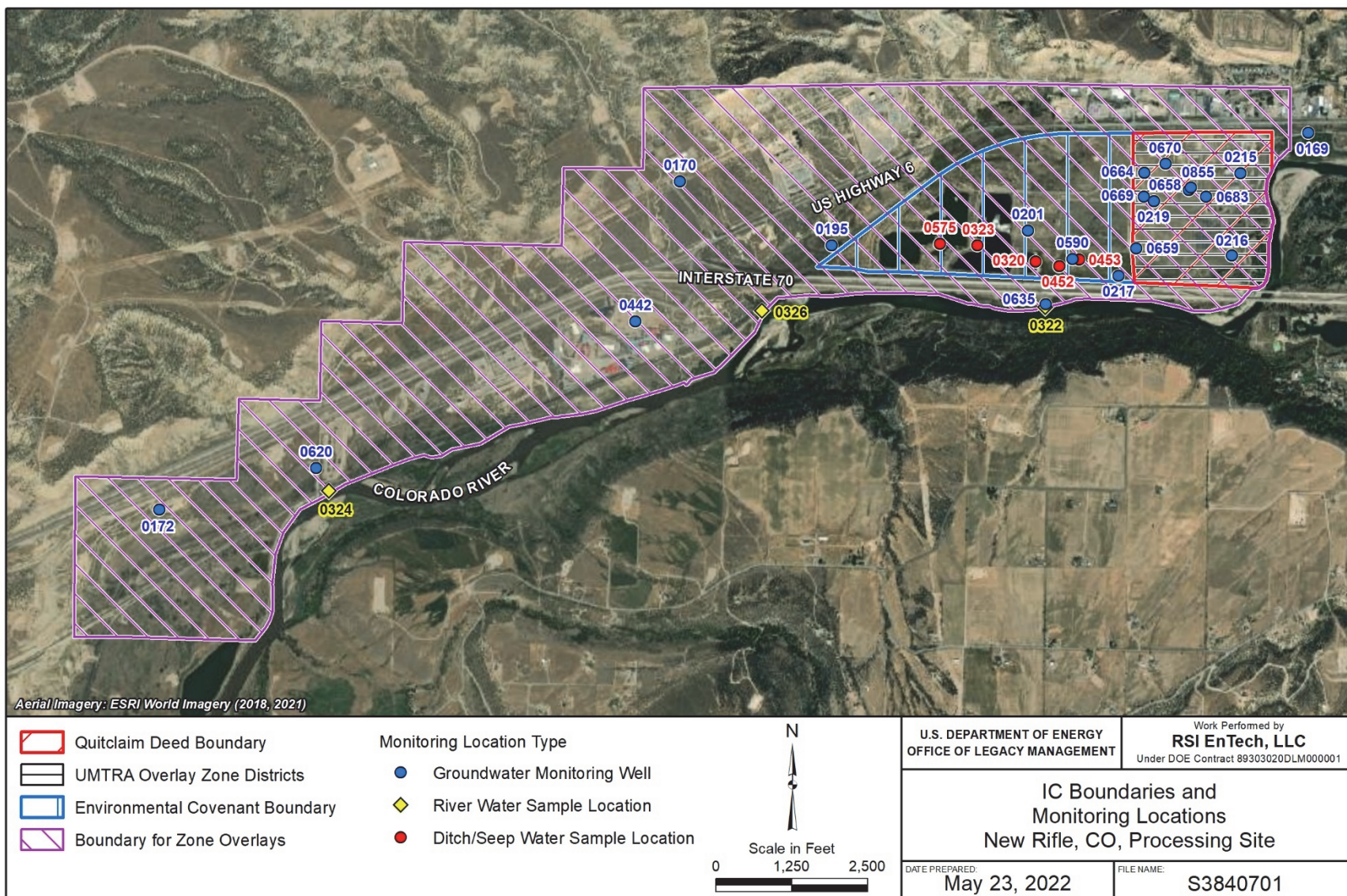


Figure 4. IC Boundaries Established for the Old and New Rifle Sites



Note: The UMTRA Project overlay zone district overlaps almost directly with the quitclaim deed boundary.

Figure 5. IC Boundaries, New Rifle Site

Where these restrictions are required, DOE must ensure that the beneficial uses of the groundwater, had they not been restricted, could be satisfied. DOE funded two water line extensions to the current municipal system to ensure the availability of potable water to properties affected by site-related contamination. Because the water line extension did not cover the full extent of the contaminated groundwater plume, DOE also provides funding for reverse osmosis systems for users who are within the ICs boundary but beyond the reach of the water line. In the past few years, the city limit boundary was expanded west along the water line extension, and residents were required to use municipal water.

New Rifle site ICs are discussed in greater detail in the draft GCAP (DOE 2016, Section 4.2); Appendix A of that report documents the ICs in their entirety.⁴

⁴ Summaries of ECs and use restrictions for both the Old and New Rifle sites are provided on the following CDPHE website (refer to Garfield County listings): <https://cdphe.colorado.gov/sites-environmental-covenants-and-use-restriction>.

2.0 Hydrogeology

This section summarizes hydrological conditions at both the Old and New Rifle sites based on DOE's early site characterizations (DOE 1999a; DOE 1999b) and is consistent with descriptions provided in previous VMRs. More detailed descriptions of flow systems and contaminant transport are provided in the most recent GCAPs (DOE 2016; DOE 2017).

2.1 Old Rifle Site

The Old Rifle processing site is 0.3 mile southeast of the city of Rifle, situated on a floodplain north of the Colorado River (Figure 2). Groundwater is unconfined in the uppermost aquifer, which consists of river alluvium and the upper weathered portion of the bedrock, the Wasatch Formation of Tertiary age. The uppermost aquifer is 5 to 25 ft thick; saturation occurs from 5 to 10 ft below ground surface. The uppermost aquifer is composed of poorly sorted sediments that range from clay-sized material to cobbles and occasional boulders. Groundwater in the alluvial aquifer flows to the west-southwest. Hydraulic conductivity estimates for the alluvial aquifer range from 100 to 125 ft per day; estimates for the weathered Wasatch Formation of Tertiary age are about 0.02 ft per day (DOE 1999b).

Recharge to the alluvial aquifer is from an unlined irrigation return ditch that flows across the middle of the site, subsurface inflow from north of U.S. Highway 6, and precipitation. The Colorado River and the alluvial aquifer probably interact, but the monitoring network is insufficient to fully characterize the interaction (DOE 2011). Groundwater discharge is mainly to the Colorado River. At the Old Rifle site, alluvium pinches out against bedrock outcrops at the downgradient end of the site (DOE 2011). The alluvial aquifer at the Old Rifle site has no hydraulic connection to the alluvial aquifer at the New Rifle site (DOE 2014).

The Old Rifle SOWP (DOE 1999b) provides additional data regarding the hydrogeology of the Old Rifle site and the conceptual site model. Results of subsequent IFRC studies indicated that the conceptual site model was more complex than that developed based on initial modeling conducted for the SOWP. DOE revised the conceptual site model in 2011 to reflect IFRC's findings and to account for groundwater inputs from north of the site (DOE 2011).

2.2 New Rifle Site

The New Rifle former processing site is about 2.3 miles west of the city of Rifle and is also on the north floodplain of the Colorado River (Figure 3). As with the Old Rifle site, the uppermost aquifer consists of poorly sorted river alluvium and the upper weathered portion of the Wasatch Formation. Estimated hydraulic conductivities for the alluvial aquifer range from 53 to 275 ft per day with an average of 114 ft per day (DOE 1999a). Alluvium is thickest along the western and southern portions of the site and is continuous for at least 4 miles downgradient of the site. Recharge to the alluvial aquifer is from ephemeral streams from the north, precipitation, inflow from the Colorado River along the east side of the site (DOE 1999a), and potentially from discharge of Wasatch Formation groundwater along the alluvial aquifer's northern border (DOE 2016). Groundwater discharge is primarily to the Colorado River; groundwater also discharges to other surface water features, including the wetland area and Roaring Fork gravel pit ponds. Additionally, groundwater discharge occurs through evapotranspiration at parts of the site and at the IC boundary populated with phreatophytes (DOE 2016).

At one time, Roaring Fork Resources operated a gravel mine on the property adjacent to and downgradient of the New Rifle site. Water was pumped from an active onsite mining pit, where excavation was occurring, to another onsite pit for storage and infiltration. These pits are now referred to as the Roaring Fork ponds (Figure 3) (DOE 2016). During Roaring Fork Resources' period of operation, the pumping affected groundwater flow downgradient of the New Rifle site, creating a cone of depression in—and a groundwater mound on—the alluvial aquifer water table (DOE 1999a). Although operation of the gravel mine ceased in early 2003, the effects of active pumping and injection into the ponds on the distribution of dissolved nitrate and uranium persist today (DOE 2003b; DOE 2014).

3.0 Old Rifle Site Monitoring Results

In accordance with the NRC-approved GCAP (DOE 2001), semiannual monitoring has been performed at the Old Rifle site since 2003. This section summarizes the Old Rifle site monitoring requirements and documents the results of groundwater and surface water sampling conducted in June and November 2021. During both events, eight monitoring wells and five surface water locations, including three Colorado River locations, were sampled (Figure 3). Appendix A documents corresponding analytical results. Historical contaminant trends are also evaluated for 1998–2021, the period since postremediation site characterization activities were initiated.

3.1 Monitoring Network

Table 3 lists the wells and surface water locations that constitute the routine monitoring network at the Old Rifle processing site. The network consists of eight monitoring wells—six onsite wells and two background wells—and five surface water locations (Figure 2). As indicated in Section 1.2.1, the draft GCAP (DOE 2017) considered all onsite wells as POC wells (i.e., wells to which ACLs would be applied). The Colorado River, where groundwater discharges from the site, was considered the POE for milling-related contamination.

Table 3. Summary of GCAP Monitoring Requirements for the Old Rifle Site

Locations ^a	Monitoring Purpose	Analytes	Frequency
0305, 0655	Center of uranium plume, west side of ditch	Uranium Selenium Vanadium	Semiannually ^c
0656	Center of plume, east side of ditch		
0304, 0309, 0310	Downgradient edge of plume		
0292A, RFO-0658 ^b	Background groundwater quality; upgradient monitoring wells		
0395, 0398	Monitor surface water recharging aquifer; seep and onsite ditch		
0294 (replaced 0538), 0396, 0741	Upgradient, adjacent to site, and downgradient locations along the Colorado River, respectively		

Notes:

^a Locations shown in Figure 2.

^b RFO is a prefix used to distinguish Old Rifle site well 0658 from New Rifle site monitoring well 0658 (RFN-0658).

^c Semiannual frequency listed here is consistent with the current sampling frequency, previous VMRs (DOE 2014), and the early regime proposed in the NRC-approved GCAP (DOE 2001). In the most recent draft GCAP (DOE 2017), a reduced frequency was proposed: annually for the first 5 years (following acceptance of the GCAP), then at least every 5 years for the next 30 years.

3.2 Groundwater Monitoring Results

Uranium is the most prevalent milling-related contaminant in alluvial aquifer groundwater at the Old Rifle site. Levels continue to exceed the UMTRCA standard in five of the six onsite wells currently monitored. Selenium and vanadium concentrations have exceeded corresponding benchmarks in two wells in the center of the former tailings area. This section begins with a discussion of uranium, the most persistent contaminant at the site, followed by an evaluation of selenium and vanadium trends. This section concludes with a summary of Mann-Kendall trend tests run for each well and analyte combination.

Time-concentration plots presented in this section and in the remainder of this report were developed using a faceting approach, whereby data are partitioned into a matrix of panels, with each panel plotting data for a single well.⁵ In each facet, a nonparametric smoothing method—locally estimated scatterplot smoothing (LOESS)—is used. The surrounding shaded area represents the 95% pointwise confidence interval. Using this approach, overall trends in the data are more apparent and not obscured by “noise” or random variation. Because of the wide range in contaminant concentrations measured across site wells, most data are plotted using a semilogarithmic scale.

To facilitate review of the time-concentration plots, Mann-Kendall trend analysis results (Section 3.2.4; Table 4) are reflected on each figure. For well-analyte combinations identified as having statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Trend tests were initially run for the period 1998–2021, corresponding to a fairly large dataset (number of samples [n] = 52–53), including data collected since postremediation monitoring began. For several Old Rifle site wells, statistically significant (increasing or decreasing) trends were identified. Because COC concentrations in some of these wells appear to have stabilized more recently, a second set of Mann-Kendall trend tests was run using only data since 2010. Both (1998–2021 and 2010–2021) Mann-Kendall test runs are documented in Appendix C along with corresponding linear regression results.

3.2.1 Uranium

Figure 6 plots the most recent (November 2021) uranium results for Old Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are plotted in Figure 7. Uranium concentrations in most site wells have exceeded both the UMTRCA standard (0.044 milligrams per liter [mg/L]) and the maximum concentration measured in background well 0658 (0.067 mg/L). Based on the most recent (November 2021) results, this is still the case; uranium concentrations in most onsite wells are approximately 0.1 mg/L, ranging from 0.09–0.12 mg/L. Well 0309, in the southwest corner of the site, continues to be the exception; uranium levels have consistently been below the UMTRCA MCL (most recent result of 0.017 mg/L). In all wells, uranium concentrations are below the proposed ACL of 0.36 mg/L. Although Mann-Kendall trend tests identified statistically significant increasing trends for wells 0305 and 0656 using all monitoring data (1998–2021), no trend was indicated for the more recent 2010–2021 sampling period. The latter test did identify a significant increasing trend in uranium concentrations for well 0304.

⁵ Figure 7 and subsequent similar facet plot figures were developed using R, version 4.1.2 (R Core Team 2022), and the ggplot2 package, version 3.3.5 (Wickham 2016).

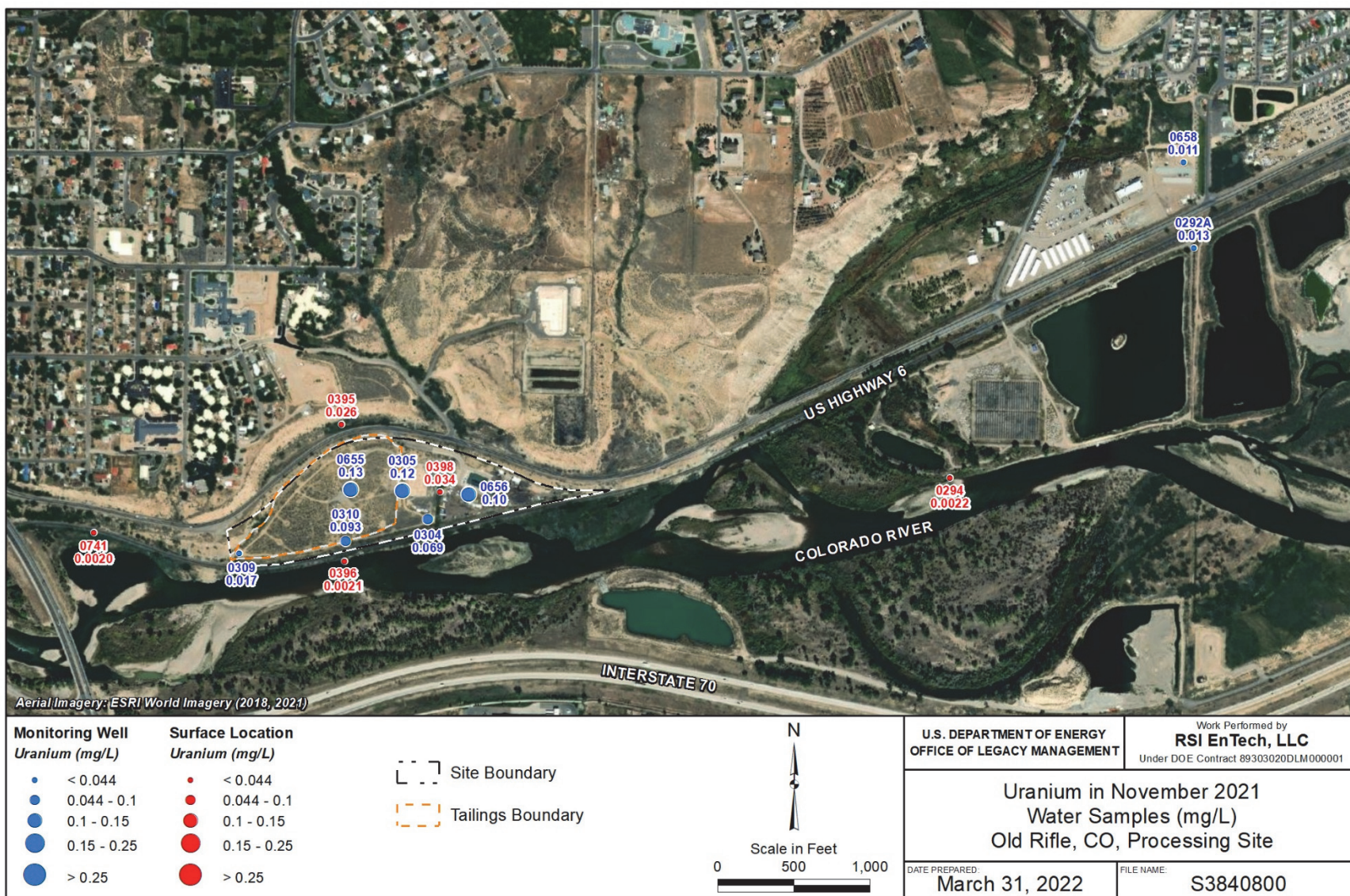
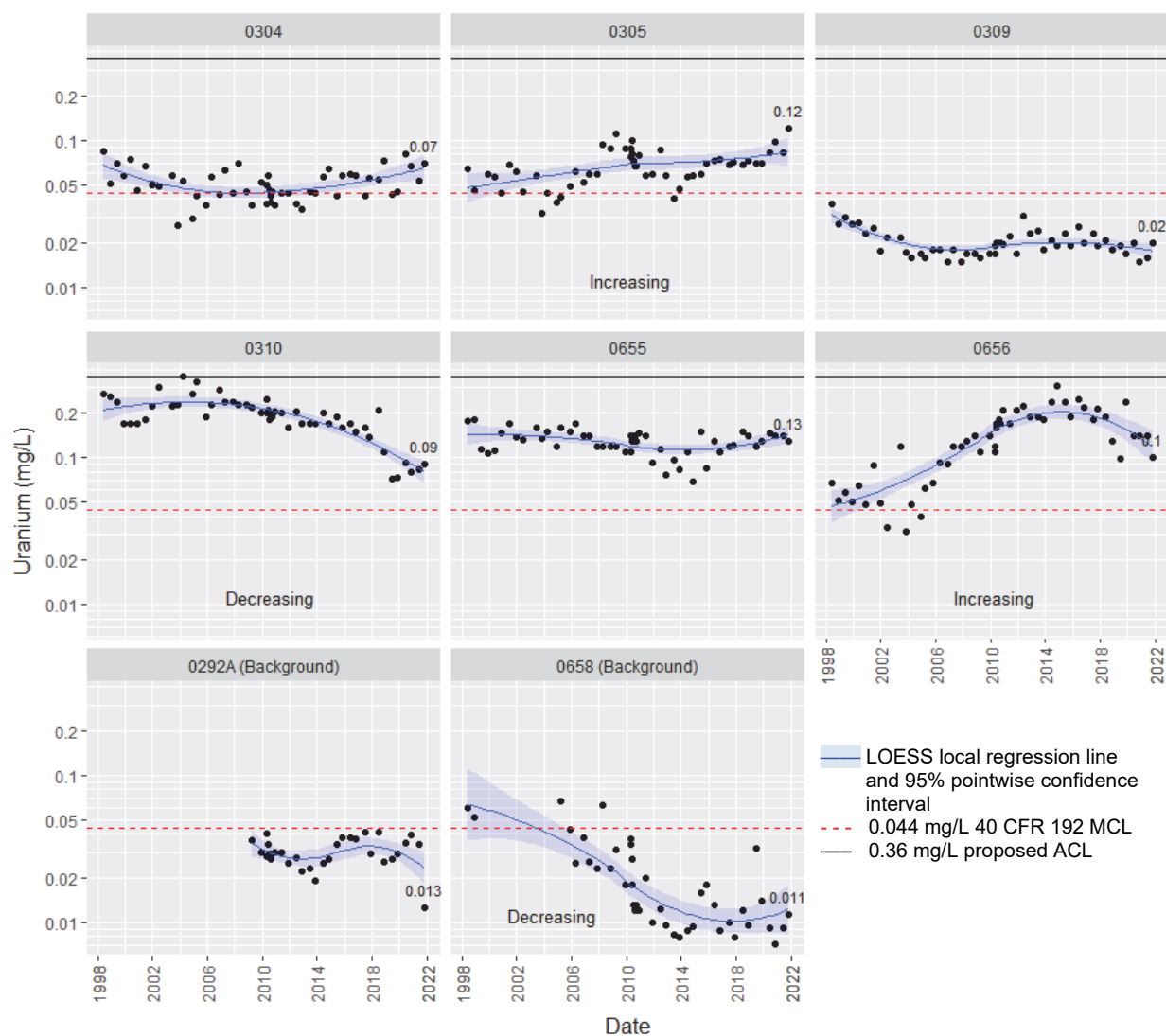


Figure 6. Uranium Concentrations in Old Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

The most recent (November 2021) results are labeled in each plot. Mann-Kendall trend tests were run for the period 1998–2021 (Section 3.2.4; Table 4). For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information, including results of trend tests conducted for the 2010–2021 sampling period, is provided in Appendix C, Tables C-1 and C-2.

Figure 7. Time-Concentration Plots of Uranium in Old Rifle Site Monitoring Wells

3.2.2 Selenium

Figure 8 plots the most recent (November 2021) selenium results for Old Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are plotted in Figure 9. Selenium concentrations have exceeded the 0.05 mg/L benchmark in two wells—0305 and 0655. Both wells are close to the center of the former tailings area and west of the north-south trending ditch that conveys surface runoff from north of the site to the Colorado River. Currently, the 0.05 mg/L benchmark—the U.S. Environmental Protection Agency (EPA) “Safe Drinking Water Act” (Title 42 *United States Code* Section 300f [42 USC 300f]) (SDWA) maximum contaminant level (Table 1)—is exceeded (slightly) in well 0655 (0.056 mg/L). In all wells, selenium concentrations are below the proposed ACL of 0.122 mg/L.

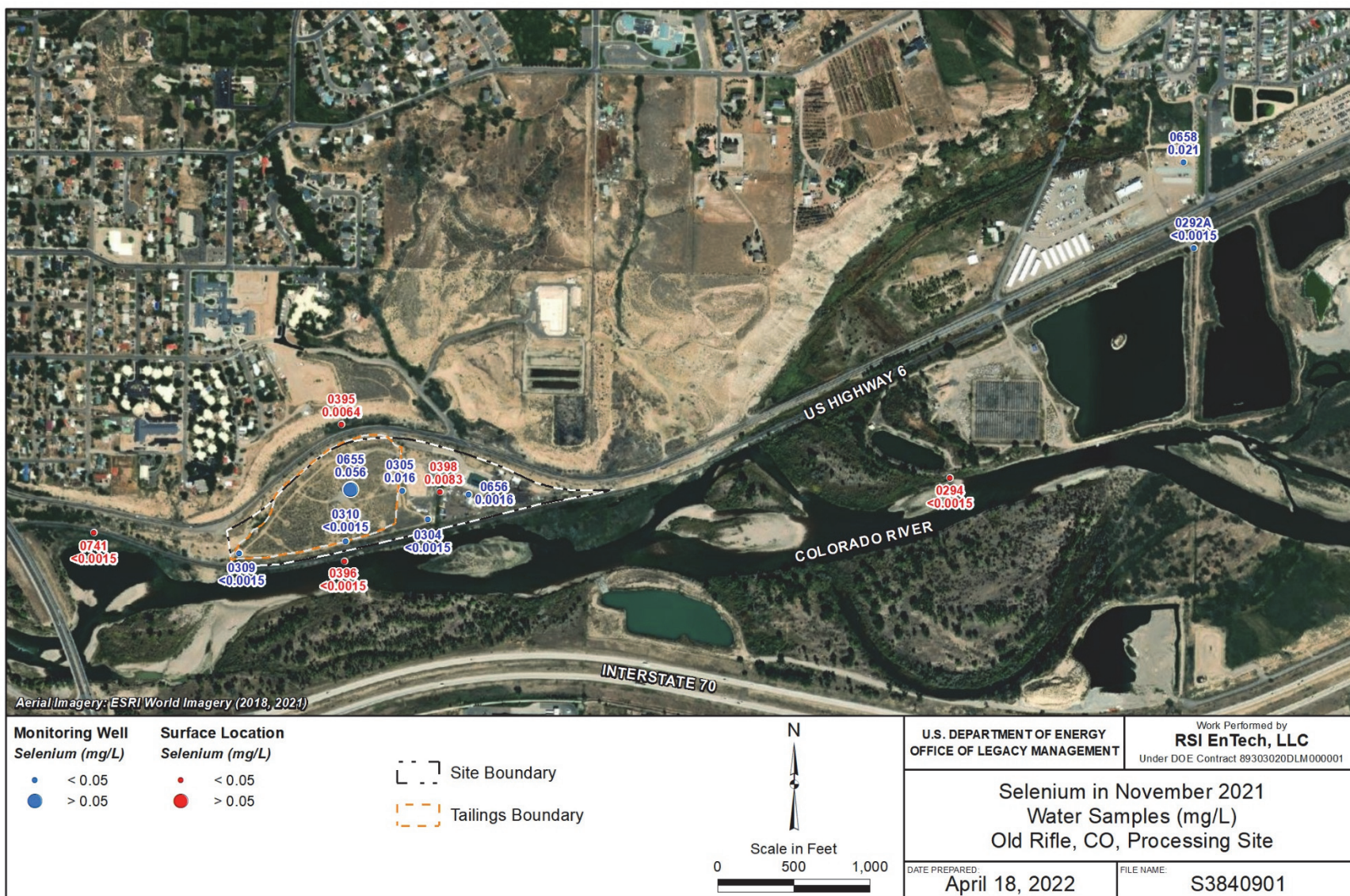
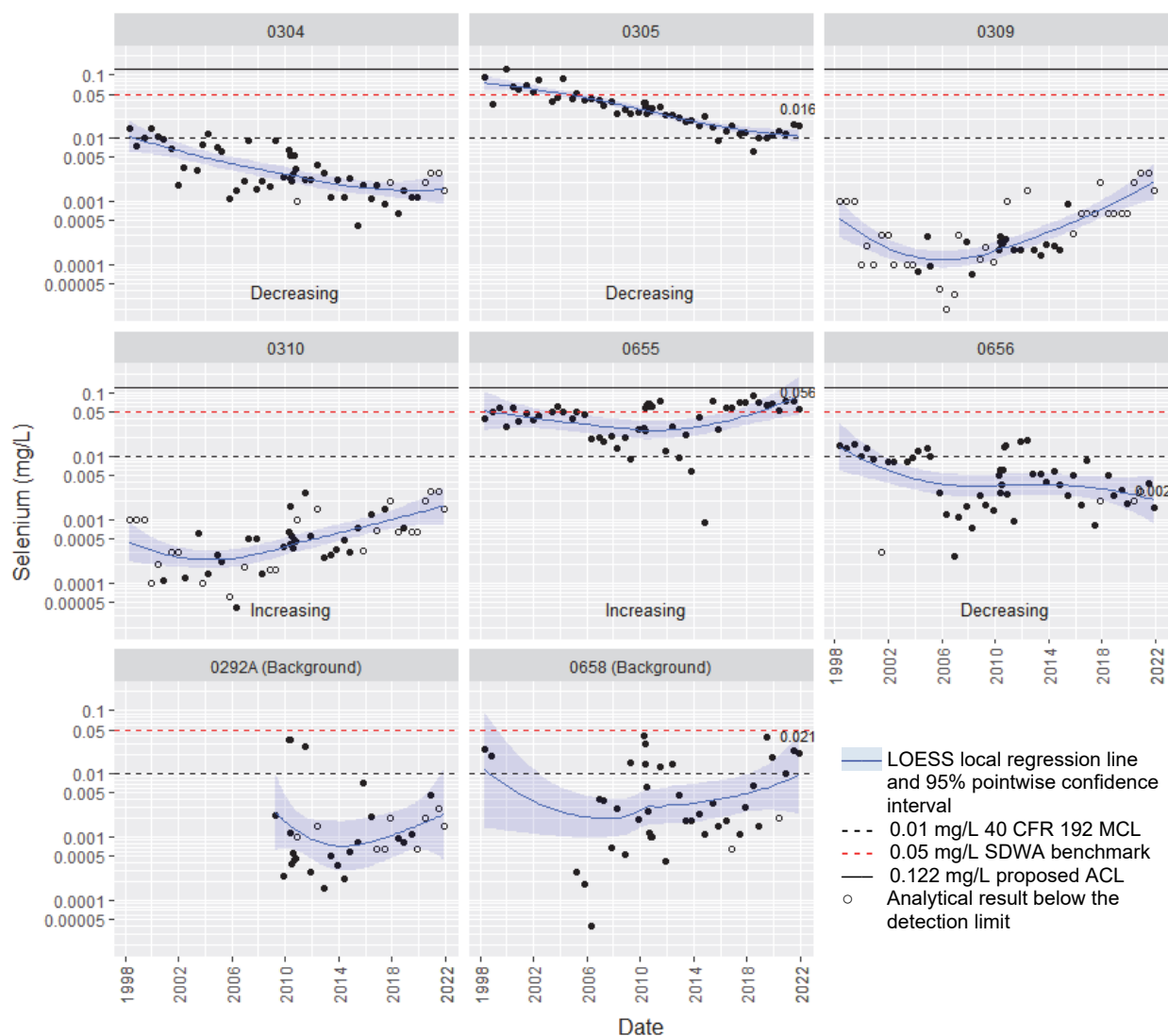


Figure 8. Selenium Concentrations in Old Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

For measurements above the detection limit, the most recent (November 2021) results are labeled (rounded to 3 decimal places). Mann-Kendall trend tests were run for the sampling period 1998–2021 (Section 3.2.4; Table 4). For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information is provided in Appendix C.

Figure 9. Time-Concentration Plots of Selenium in Old Rifle Site Monitoring Wells

3.2.3 Vanadium

Figure 10 plots the most recent vanadium results for Old Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are plotted in Figure 11. Overall trends are similar to those observed for selenium in that wells 0305 and 0655 are the only locations where vanadium concentrations have exceeded the 0.33 mg/L benchmark. Currently, this benchmark is exceeded in well 0305 (0.504 mg/L). In all wells, vanadium concentrations have been below the proposed ACL of 1.0 mg/L.

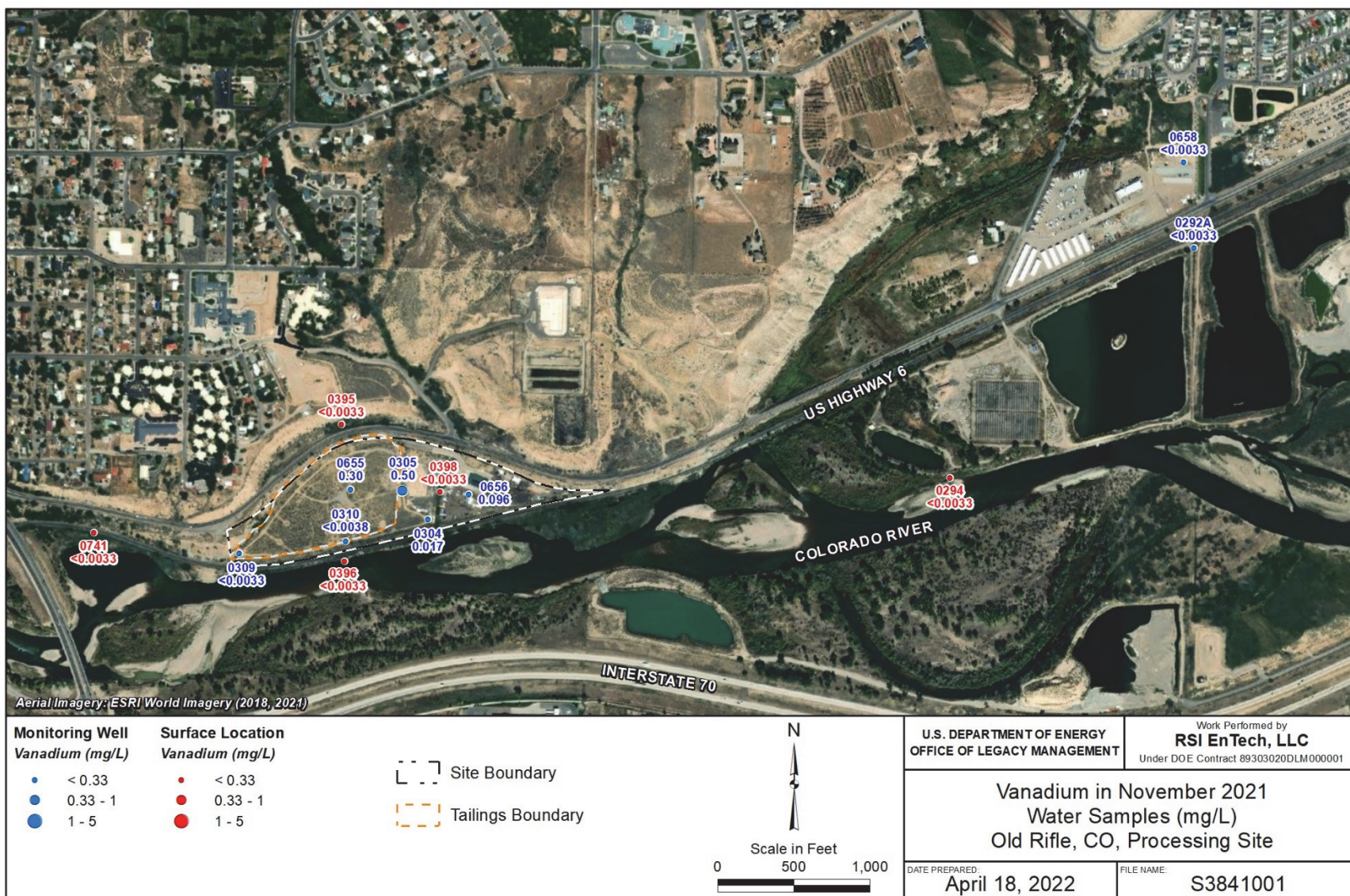
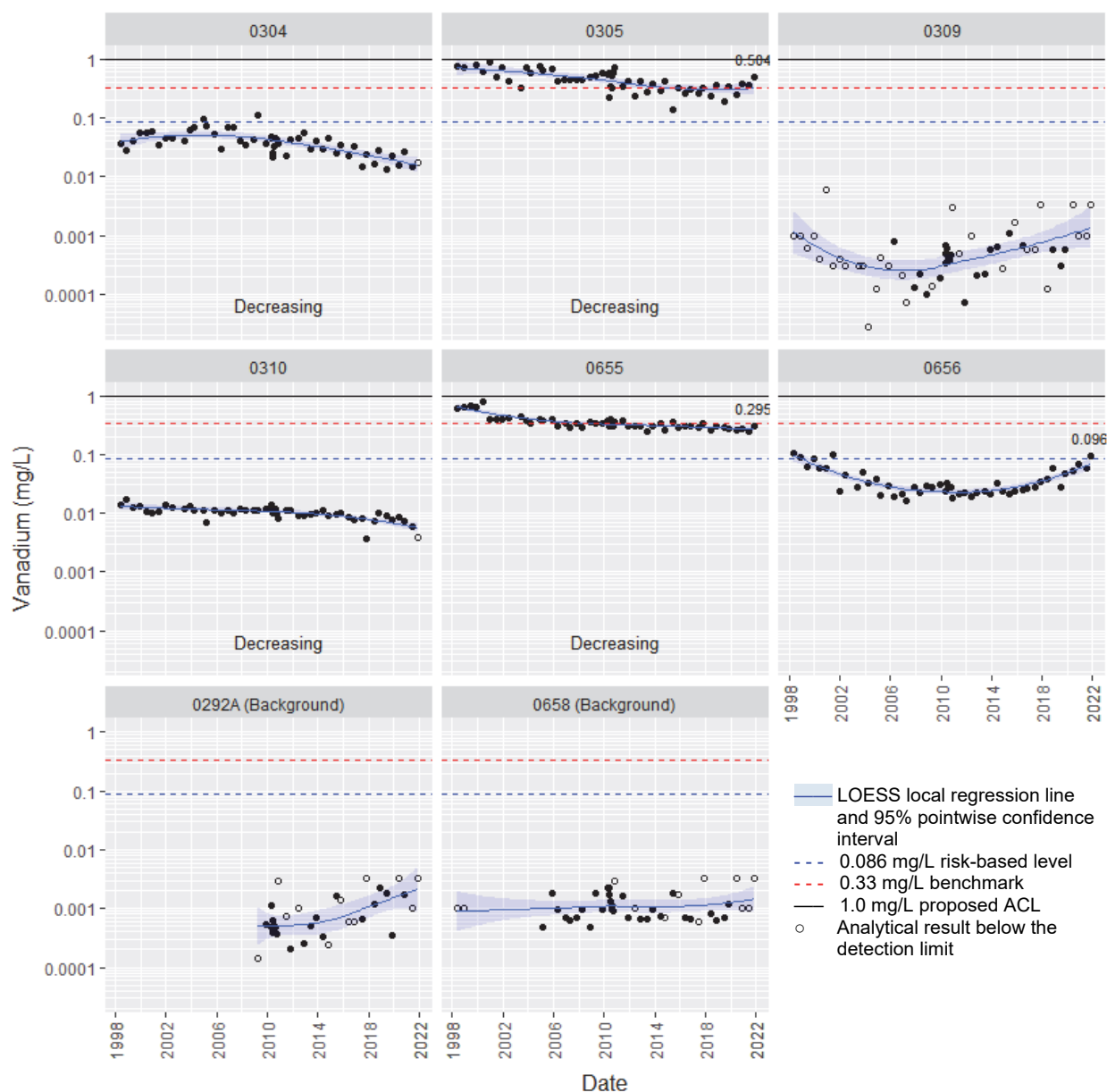


Figure 10. Vanadium Concentrations in Old Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

For measurements above the detection limit, the most recent (November 2021) results are labeled. Mann-Kendall trend tests were run for the sampling period 1998–2021 (Section 3.2.4; Table 4). For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information is provided in Appendix C.

Figure 11. Time-Concentration Plots of Vanadium in Old Rifle Site Monitoring Wells

3.2.4 Mann-Kendall Trend Analysis

The Mann-Kendall nonparametric test is used to statistically assess if there is a monotonic upward or downward trend of the variable of interest over time. As shown in Table 4, several well and analyte combinations have statistically significant decreasing trends, as indicated by negative Kendall's tau values and p values < 0.05 . Exceptions are uranium in wells 0305 and 0656 and selenium in wells 0309 and 0310, for which statistically significant increasing trends were identified using data from 1998–2021. In both of these cases, no trend was indicated based on Mann-Kendall tests conducted for the more recent 2010–2021 sampling period. Detailed Mann-Kendall trend test results and corresponding linear regression analyses are documented in Appendix C (Tables C-1 and C-2).

Table 4. Mann-Kendall Trend Test Results for Old Rifle Site Wells

Parameter	Location	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results		
							Kendall's tau	p-value	Trend
Uranium	0304	5/19/1998	11/15/2021	53	0	0.07	0.025	0.79	No Trend
	0305	5/19/1998	11/15/2021	52	0	0.12	0.307	0.001	Increasing
	0309	5/19/1998	11/15/2021	53	0	0.02	-0.086	0.36	No Trend
	0310	5/19/1998	11/15/2021	53	0	0.09	-0.561	<0.0001	Decreasing
	0655	5/18/1998	11/15/2021	53	0	0.13	-0.174	0.065	No Trend
	0656	5/20/1998	11/15/2021	53	0	0.10	0.554	<0.0001	Increasing
	0292A	4/14/2009	11/15/2021	32	0	0.0125	0.016	0.91	No Trend
	0658	5/21/1998	11/15/2021	42	0	0.0113	-0.583	<0.0001	Decreasing
Selenium	0304	5/19/1998	11/15/2021	53	6	<0.0015	-0.527	<0.0001	Decreasing
	0305	5/19/1998	11/15/2021	52	0	0.0159	-0.771	<0.0001	Decreasing
	0309	5/19/1998	11/15/2021	53	33	<0.0015	0.128	0.17	No Trend
	0310	5/19/1998	11/15/2021	53	24	<0.0015	0.221	0.018	Increasing
	0655	5/18/1998	11/15/2021	53	0	0.0562	0.216	0.023	Increasing
	0656	5/20/1998	11/15/2021	53	4	0.00156	-0.259	0.006	Decreasing
	0292A	4/14/2009	11/15/2021	32	9	<0.0015	-0.044	0.73	No Trend
	0658	5/21/1998	11/15/2021	42	3	0.0209	0.074	0.49	No Trend
Vanadium	0304	5/19/1998	11/15/2021	53	1	<0.017	-0.448	<0.0001	Decreasing
	0305	5/19/1998	11/15/2021	52	0	0.504	-0.487	<0.0001	Decreasing
	0309	5/19/1998	11/15/2021	53	31	<0.0033	0.168	0.069	No Trend
	0310	5/19/1998	11/15/2021	53	1	<0.00383	-0.562	<0.0001	Decreasing
	0655	5/18/1998	11/15/2021	53	0	0.295	-0.599	<0.0001	Decreasing
	0656	5/20/1998	11/15/2021	53	0	0.0959	-0.070	0.46	No Trend
	0292A	4/14/2009	11/15/2021	32	12	<0.0033	0.125	0.31	No Trend
	0658	5/21/1998	11/15/2021	42	12	<0.0033	-0.105	0.32	No Trend

Shaded values denote most recent result less than the corresponding benchmark: 0.044 mg/L uranium, 0.05 mg/L selenium, and 0.33 mg/L vanadium (Table 1).

Significant increasing trend based on Mann-Kendall test.

Significant decreasing trend based on Mann-Kendall test.

Notes:

Trend tests were performed using the NADA (Nondetects and Data Analysis for Environmental Data) package in R, version 1.6-1.1 (Lee 2020). The NADA trend test is similar to the traditional Mann-Kendall trend test (e.g., the Kendall package in R [McLeod 2022]) except that it accounts for the presence of nondetects at multiple detection limits.

Trend analyses were conducted at the 0.05 significance level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between -1 and $+1$. Supporting information, including corresponding linear regression results and trend tests conducted for the more recent 2010–2021 sampling period, is provided in Appendix C, Tables C-1 and C-2.

3.3 Surface Water Monitoring Results

This section presents results of historical surface water monitoring at the Old Rifle site. Corresponding ditch, seep, and Colorado River monitoring locations are shown in Figure 2. The most recent (November 2021) surface water sampling results are plotted in the preceding spot plot figures (Figure 6, Figure 8, and Figure 10) along with groundwater monitoring results.

3.3.1 Seep and Ditch Locations

Figure 12 plots historical results for all three COCs in seep (location 0395) and ditch (location 0398) samples. Both locations were characterized in the most recent draft GCAP as representative of background surface or seep water recharging the onsite alluvial aquifer (DOE 2017, Table 5). Although not directly applicable to these data, groundwater benchmarks from Table 1 are shown to provide a context for evaluating results. Current levels of all COCs are below the groundwater benchmarks. Concentrations of uranium and (to a lesser extent) selenium in ditch sample 0398 have rebounded to baseline (1998) levels in the last several years.

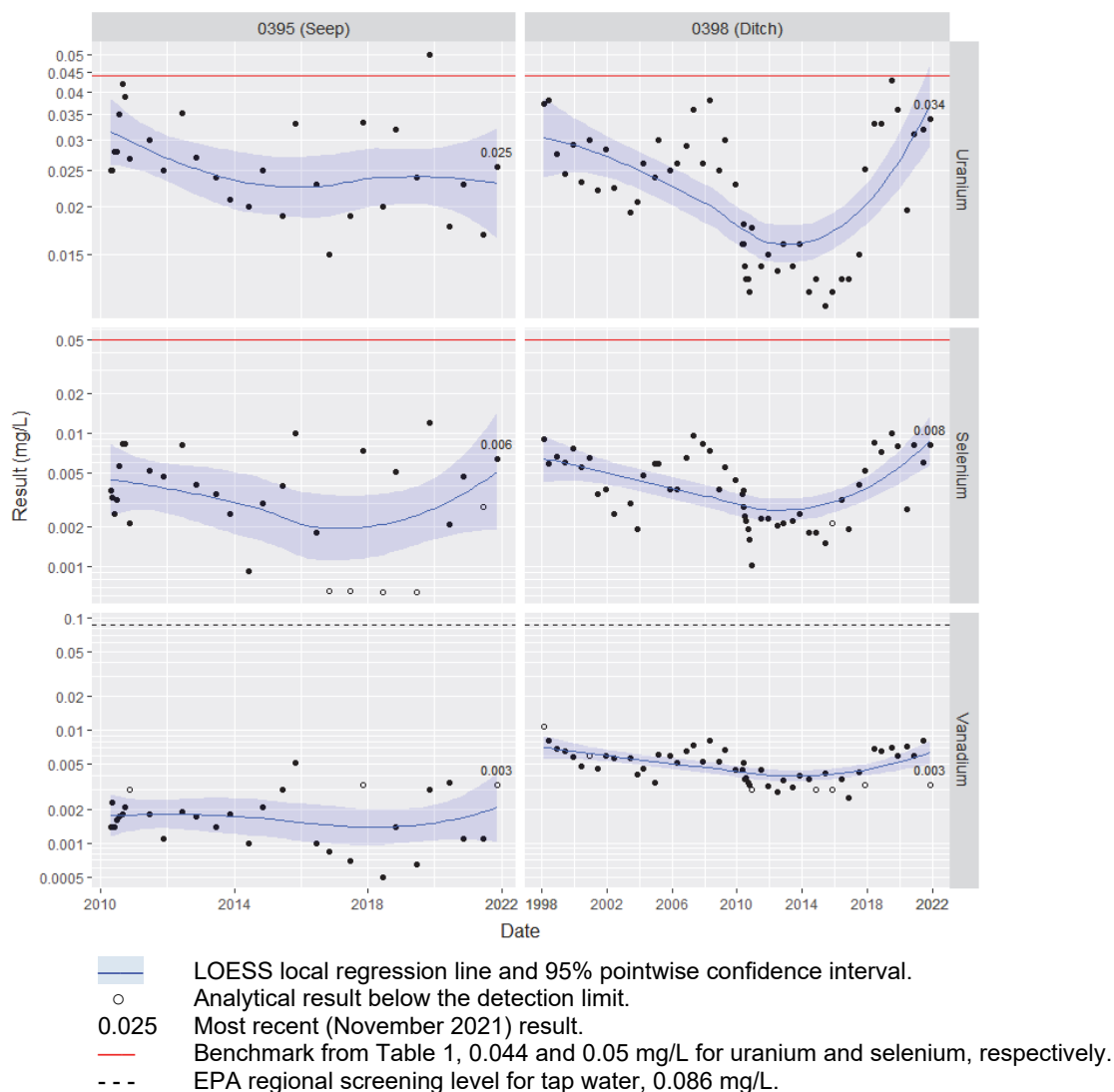


Figure 12. Time-Concentration Plots of COCs in Old Rifle Site Seep and Ditch Samples

3.3.2 Colorado River Water Quality Monitoring

In the most recent draft GCAP (DOE 2017), the Colorado River, where groundwater discharges from the site, was considered the POE for milling-related contamination. Recent and historical results of surface water monitoring indicate that the water quality of the river adjacent to and downgradient of the Old Rifle site (locations 0396 and 0741) is indistinguishable from background water quality (location 0294 and former location 0538). The Colorado River in the site vicinity is classified for agricultural, recreational, and water supply uses.⁶ Water quality standards for the river are established in Regulation No. 37 of CDPHE's Water Quality Control Commission.

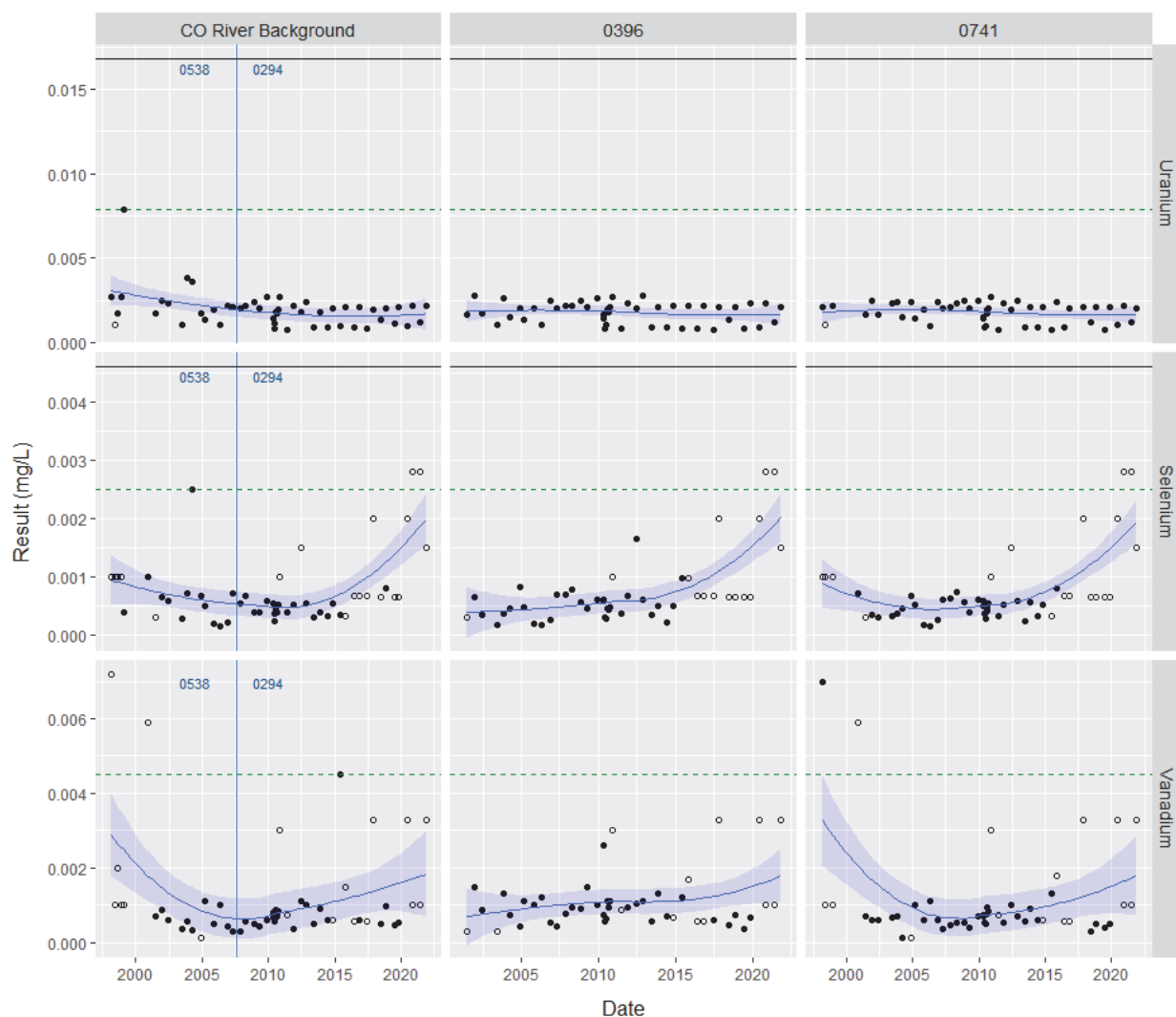
As shown in Figure 13, based on historical semiannual sampling results, the Colorado River water quality in the site vicinity does not exceed, nor has it exceeded, any of these standards, nor—with few exceptions—has it exceeded background surface water quality based on measurements from upgradient location 0294 and former location 0538.

3.4 ICs Monitoring

Most of the formal obligations for verifying and enforcing the ICs rest with the city of Rifle and CDPHE. According to Section 10 of the EC, the owner of the EC (city of Rifle) is required to submit to CDPHE an annual report of site activities. The annual report details the owner's compliance, and any lack of compliance, with the terms of the EC. Verification of the restrictions in the zone overlay is required under No. 8 of Subsection (d), the standard operating procedures (SOPs). The city manager shall annually inform all department heads of the SOPs, deed restrictions, and ECs affecting the UMTRA Project sites. As noted in Section 1.3.1, Appendix A of the draft GCAP (DOE 2017) documents the ICs for the Old Rifle site in their entirety.

DOE verification that the city has upheld the quitclaim deed conditions is an ongoing process, accomplished throughout each year by (1) discussions with city officials about construction projects and possible incursions of groundwater that could result from these activities; (2) physical inspection of the site by the State of Colorado or DOE (or both), usually during the annual Rifle disposal site inspection; and (3) observations during groundwater sampling activities at other times of the year. Observations made during inspection or groundwater sampling events are documented in the trip reports for those events.

⁶ Applicable segment is COLCLC01: Mainstem of the Colorado River from the confluence with the Roaring Fork River to immediately below the confluence with Rifle Creek, designated as Aquatic Cold Life 1 (Volume 5 *Code of Colorado Regulations* Section 1002-37 [5 CCR 1002-37]).



Notes:

- LOESS local regression line and 95% pointwise confidence interval.
- Analytical result below the detection limit.
- - - Maximum detected concentration at upgradient (background) river locations 0538 or 0294:
0.0079 mg/L, 0.0025 mg/L, and 0.0045 mg/L for uranium, selenium, and vanadium, respectively.
- “Surface Water Standard” (5 CCR 1002-37):
 - For uranium, the lower bound of the cited range (0.0168–0.03 mg/L) is used.
 - For selenium, the chronic standard of 0.0046 mg/L is shown.
 - There is no surface water standard for vanadium.

Monitoring of current background Colorado River location 0294 began in November 2007. Data from the previous background river location—0538, roughly 0.5 mile upstream (east) of location 0294—are also plotted.

Figure 13. Historical COC Concentrations in Colorado River Water Samples, Old Rifle Site

4.0 New Rifle Site Monitoring Results

In accordance with the initial GCAP (DOE 2003a), routine and typically semiannual monitoring has been performed at the New Rifle site since 2003. This section summarizes the New Rifle site monitoring requirements and documents the results of groundwater and surface water sampling conducted in 2021. Historical contaminant trends are also evaluated for 1998–2021, the period since postremediation site characterization activities were initiated. Appendix B documents corresponding groundwater and surface water analytical results for calendar year 2021.

4.1 Monitoring Network

Table 5 lists the current monitoring requirements for the New Rifle site. The monitoring network currently consists of 17 monitoring wells and eight surface water sampling sites, including three Colorado River locations (Figure 3).

In response to NRC requests for additional information (RAIs) and to support future GCAP revisions, LM also sampled three additional New Rifle site wells in 2021: 0219, 0442, and 0683.⁷ Although results are shown along with those for the routine monitoring network in the maps presented in this section, because these wells are not routinely monitored, corresponding data are not interpreted here. Given the relative paucity of data, time-concentration plots were not generated. However, these data will be used to support LM's ongoing reevaluation of the conceptual site model.

As discussed in Section 1.1.2, groundwater beneath the New Rifle site was contaminated by former uranium- and vanadium-ore processing operations that were ongoing from 1958–1984. Site-related constituents that are currently monitored include ammonia, arsenic, molybdenum, nitrate, selenium, uranium, and vanadium (Table 2). A reduced analytical program was proposed for some offsite wells in the most recent draft GCAP (DOE 2016). The following sections evaluate historical trends in groundwater and surface water samples from 1998 to 2021, the period since postremediation site characterization activities were initiated.

4.2 Groundwater Monitoring Results

As a prelude to the discussion of analyte-specific results that follow, Figure 14 provides a matrix of time-concentration plots for each New Rifle site monitoring well and analyte combination (background well 0169 is excluded). A total of 112 distinct monitoring well and analyte combinations is represented. In this figure, wells are ordered and grouped in a way that is consistent with the categories defined in the draft GCAP (DOE 2016) and listed in Table 5: onsite wells, adjacent downgradient wells (upgradient of the Roaring Fork ponds), and farther downgradient wells (downgradient of the Roaring Fork ponds). Offsite wells are listed in general order of increasing distance from the site and former source areas. The subsequent discussion of overall contamination trends is based on this matrix, the analyte-specific contaminant distribution maps (major COCs only), and the corresponding time-concentration plots that follow (Figure 15 through Figure 26).

⁷ Onsite well 0219 was sampled intermittently from 1998–2002, in 2008, in June 2020, and in June and November 2021 (total of 12 measurements). Offsite well 0442 was sampled intermittently from 1998–2006 and in November 2021 ($n = 10$). Onsite well 0683 was sampled in 2008–2009, June 2020, and in June and November 2021 ($n = 10$).

Table 5. Summary of GCAP Monitoring Requirements for the New Rifle Site

Locations ^a	Monitoring Purpose	Analytes ^b	Frequency
0215, 0216, 0658, 0659*, 0664*, 0669*, 0670, 0855	Monitor COCs in onsite wells	Ammonia as N Arsenic Molybdenum Nitrate as N Selenium Uranium Vanadium	Semiannually ^c
0201, 0217*, 0590, 0635	Monitor COCs adjacent to and downgradient of the site and upgradient of the Roaring Fork ponds		
0170, 0172, 0195, 0620	Monitor COCs in wells farther downgradient of the site and downgradient of the Roaring Fork ponds		
0169	Monitor background groundwater quality ^d		
Roaring Fork ponds: ^e 0323, 0575 Colorado River: RFO-0538 and RFO-0294 (background); 0322, 0324, 0326 ^f Wetland locations: 0320, 0452, 0453	Monitor surface water to determine impact of groundwater discharge to surface water and ecological receptors		

* Asterisks denote locations designated as POC wells in the most recent draft GCAP (DOE 2016): 0217, 0659, 0664, and 0669.

Notes:

^a Locations shown in Figure 3.

^b New Rifle site COCs and proposed monitoring requirements have varied over the years (DOE 1999a; DOE 2003a; DOE 2014). The most recent draft GCAP (DOE 2016, Table 10) proposed a reduced analytical scope for downgradient offsite wells 0170, 0172, 0195, and 0620 (excluding arsenic, selenium, and vanadium). Until that GCAP is approved, all site locations listed above will continue to be monitored semiannually for the seven analytes listed above.

^c Semiannual frequency listed here is consistent with previous VMRs (DOE 2014) and, for onsite wells, the early sampling regime proposed in the initial GCAP (DOE 2003a). In the most recent draft GCAP (DOE 2016), a reduced frequency was proposed: annually for the first 5 years (following acceptance of the GCAP), after which monitoring requirements would be reevaluated. As the 2016 GCAP is pending approval by NRC and CDPHE, LM will continue semiannual monitoring at the New Rifle site.

^d Although the 2016 draft GCAP proposed that background groundwater quality monitoring be discontinued (the background dataset was deemed to be adequate), background well 0169 continues to be monitored for the full suite of COCs. Previous evaluations (DOE 2014; DOE 2016) also used background wells 0292A and 0658 from the Old Rifle site (Table 3). These Old Rifle site wells are no longer considered valid background locations for the New Rifle site (Jasso 2020; Saxton 2020).

^e The Roaring Fork ponds were proposed as POE locations in the recent draft GCAP (DOE 2016).

^f Colorado River location 0326 was established in June 2015 (Figure 3).

Abbreviations:

N = nitrogen

RFO = Old Rifle site (monitoring locations)

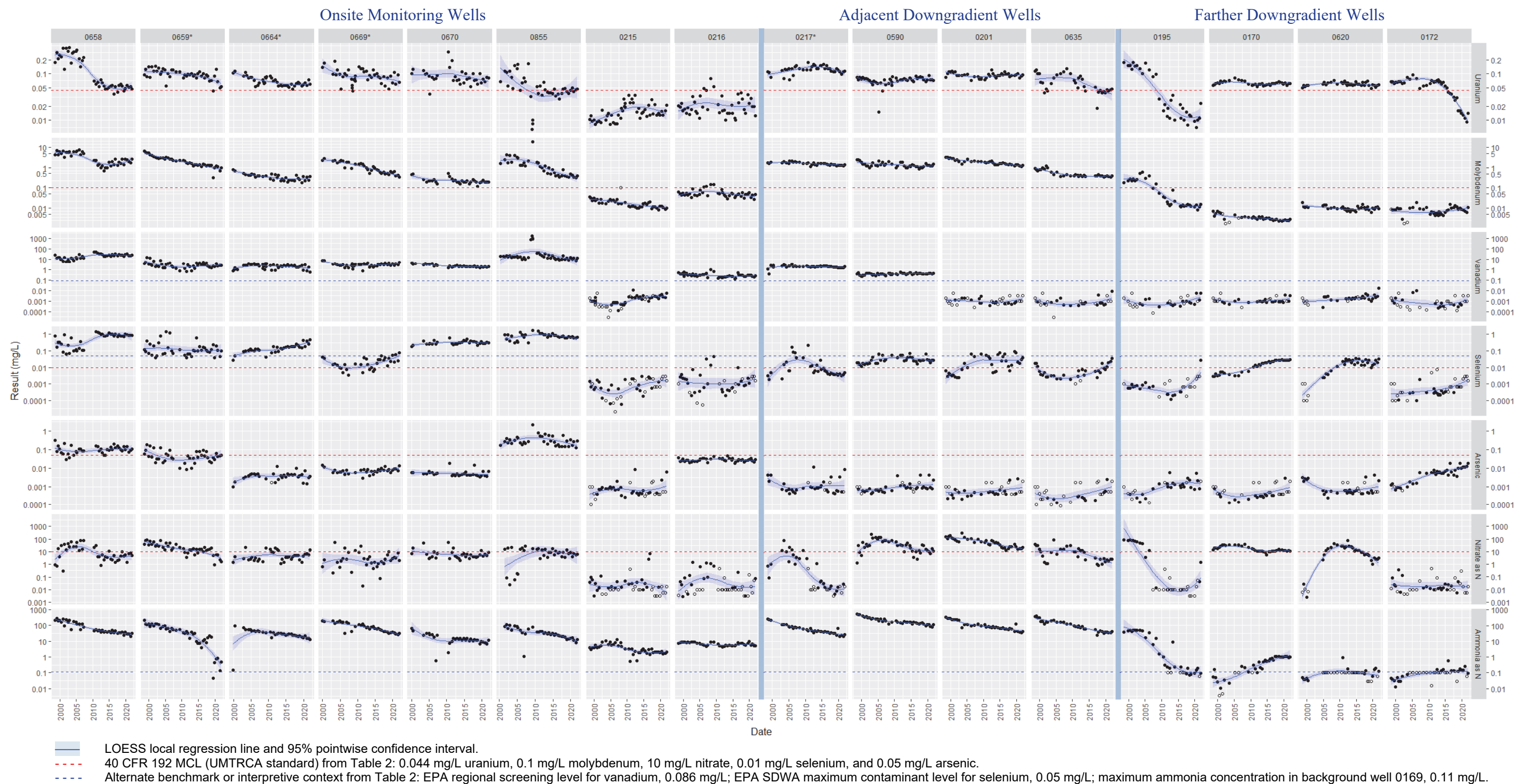


Figure 14. Time-Concentration Plots of COCs and Ammonia in New Rifle Site Monitoring Wells

4.2.1 Discussion

This section summarizes overall findings and observations based on the preceding matrix plot (Figure 14) and subsequent COC-specific exhibits. This section concludes with a summary of Mann-Kendall trend test results that were run for each well and analyte combination for the period 1998–2021. Wells with statistically significant trends are identified in each time-series data plot presented in this section.

Uranium

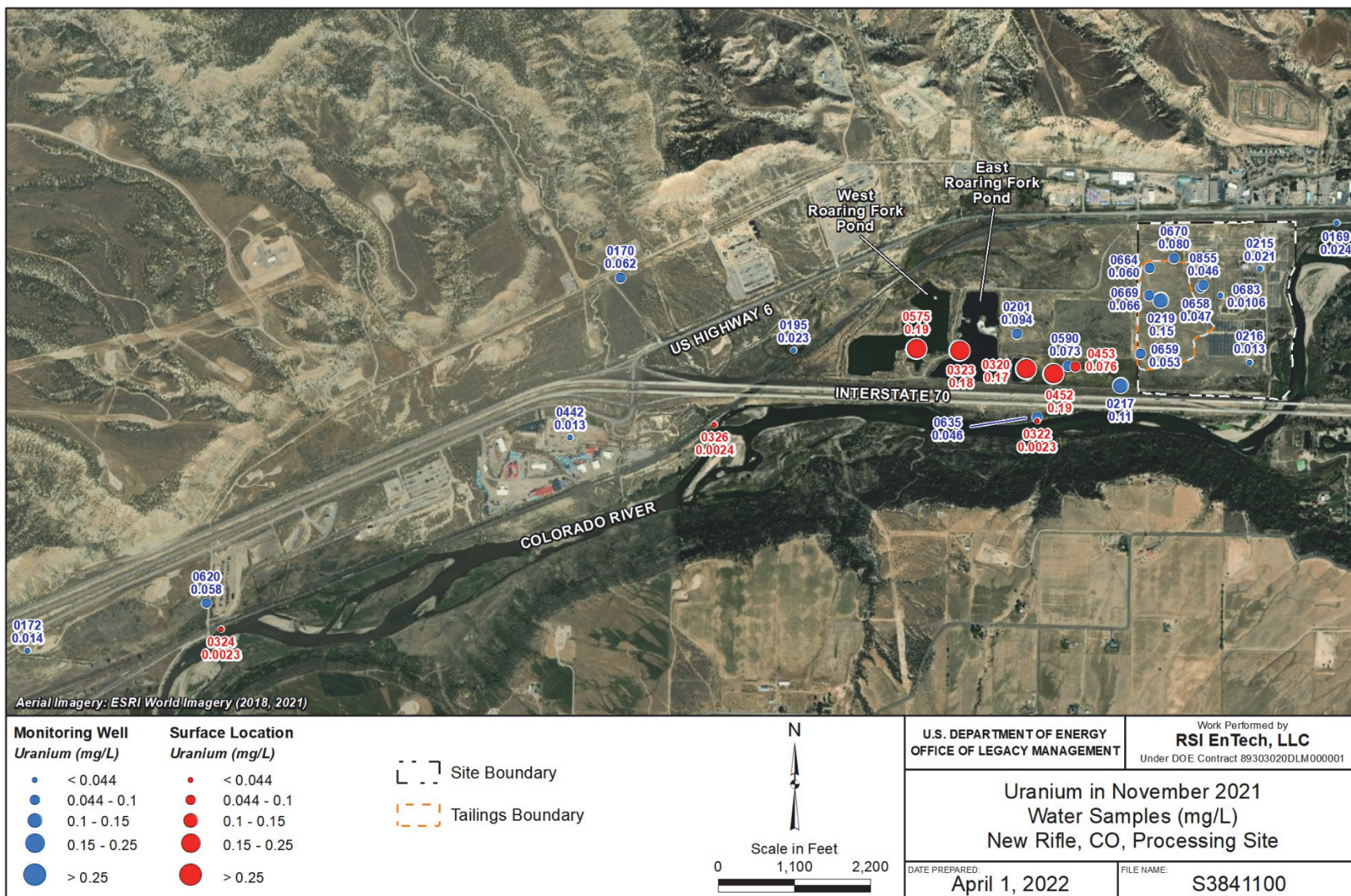
Figure 15 plots the most recent (November 2021) uranium results for New Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are shown in Figure 16. As shown in these exhibits, elevated uranium concentrations persist throughout the New Rifle site monitoring well network. The 0.044 mg/L 40 CFR 192 MCL is currently exceeded in 12 of the 16 non-background wells,⁸ as far downgradient as well 0620. Of those wells routinely monitored, the highest uranium concentrations in groundwater continue to be measured in well 0217 (0.113 mg/L in November 2021), immediately southwest of the former tailings pile. The maximum uranium concentration in groundwater (0.15 mg/L) was measured in onsite well 0219, which is not routinely monitored. Accounting for all monitoring locations, the highest uranium levels—approximately 0.2 mg/L—were measured at the Roaring Fork pond and wetland locations (0320, 0323, 0452, and 0575).

Across the monitoring network, the lowest uranium levels have been measured in onsite wells 0215 and 0216; almost all measurements have been below 0.044 mg/L. This is likely due to recharge from the north-south-aligned reach of the Colorado River that forms the east border of the site (Figure 15). COC concentrations in this region tend to be diluted by mixing with influent river water (DOE 2016). Seasonal fluctuations likely account for the scatter in results apparent in Figure 16.

Uranium concentrations in well 0195, about 400 ft downgradient of the West Roaring Fork Pond, have declined by nearly an order of magnitude, from 0.18 mg/L in 1998 to 0.023 mg/L in November 2021. Levels in wells 0170 and 0620 have remained relatively stable at about 0.06 mg/L, slightly above the 0.044 UMTRCA standard. Uranium concentrations in the farthest downgradient well (0172) exceeded this standard between 1998 and mid-2015 (0.05–0.1 mg/L) but have since declined to about 0.01 mg/L. Possible explanations for these trends are discussed in the most recent GCAP and subsequent correspondence (DOE 2016; Jasso 2019).

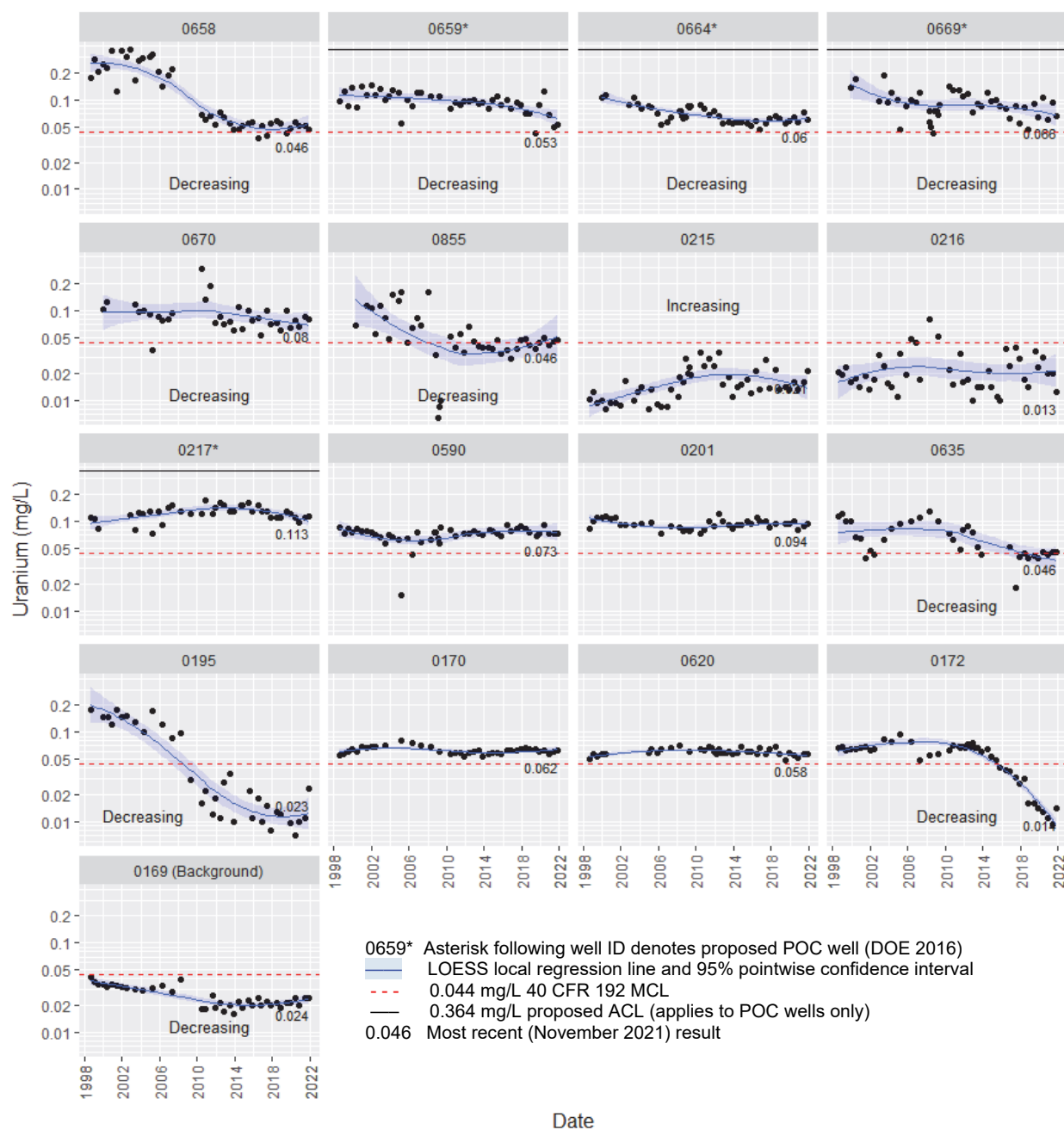
Statistically significant decreasing trends were found for 9 of the 16 wells based on analysis of data from 1998–2021 (Figure 16). If only results since 2010 are considered, no significant trend was found for four of those nine wells (Table 6; Appendix C). In onsite well 0215, uranium concentrations significantly increased over the 1998–2021 period, but stabilized more recently (no trend found for 2010–2021). Consistent with the previous VMR (DOE 2021), a significant increasing trend was found for downgradient well 0170 based on the 2010–2021 dataset. Since November 2011, uranium concentrations in this well increased from 0.053 mg/L to a maximum concentration of 0.067 mg/L in June 2018.

⁸ In the remainder of this section, only results for the eight onsite and eight downgradient wells are considered. While time-concentration figures also plot data for location 0169, in most cases, this background well is not addressed in the broader discussion of results.



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled.

Figure 15. Uranium Concentrations in New Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

Wells are ordered and grouped as follows:

- Rows 1 and 2 = onsite wells.
- Row 3 = adjacent downgradient wells.
- Row 4 = farther downgradient offsite wells.
- Row 5 = New Rifle site background well.

Onsite wells 0215 and 0216 are plotted last in the second row because of historically low COC levels relative to other onsite wells. Offsite wells (rows 3–4) are listed in general order of increasing distance from the site and former source areas.

Mann-Kendall trend tests were run for the sampling period 1998–2021. For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information, including results of trend tests conducted for the more recent 2010–2021 time frame, is provided in Section 4.2.2 (Table 6) and in Appendix C, Tables C-3 and C-4.

Figure 16. Time-Concentration Plots of Uranium in New Rifle Site Monitoring Wells

Molybdenum

Figure 17 plots the most recent (November 2021) molybdenum results for New Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are shown in Figure 18. Molybdenum, one of the most widespread COCs at the New Rifle site, remains elevated in onsite and at adjacent downgradient wells. Exceptions are wells 0215 and 0216, where mixing with river water likely occurs. Molybdenum concentrations in farther downgradient wells, west of the Roaring Fork ponds, are all less than the 0.1 mg/L 40 CFR 192 MCL.

Similar to trends found for uranium, nitrate, and ammonia (Figure 14), molybdenum concentrations in well 0195 have declined markedly, from a maximum of 0.6 mg/L in 2004 to 0.015 mg/L in November 2021. Levels in farther downgradient wells—0170, 0620, and 0172—continue to be about an order of magnitude less than the 0.1 mg/L benchmark. Mann-Kendall trend tests performed on the full (1998–2021) dataset indicate significant decreasing trends in molybdenum concentrations in the majority (14) of the 16 wells (Figure 18). In six of these wells, molybdenum levels have stabilized, with no significant trend identified using the 2010–2021 dataset (Table 6; Appendix C).

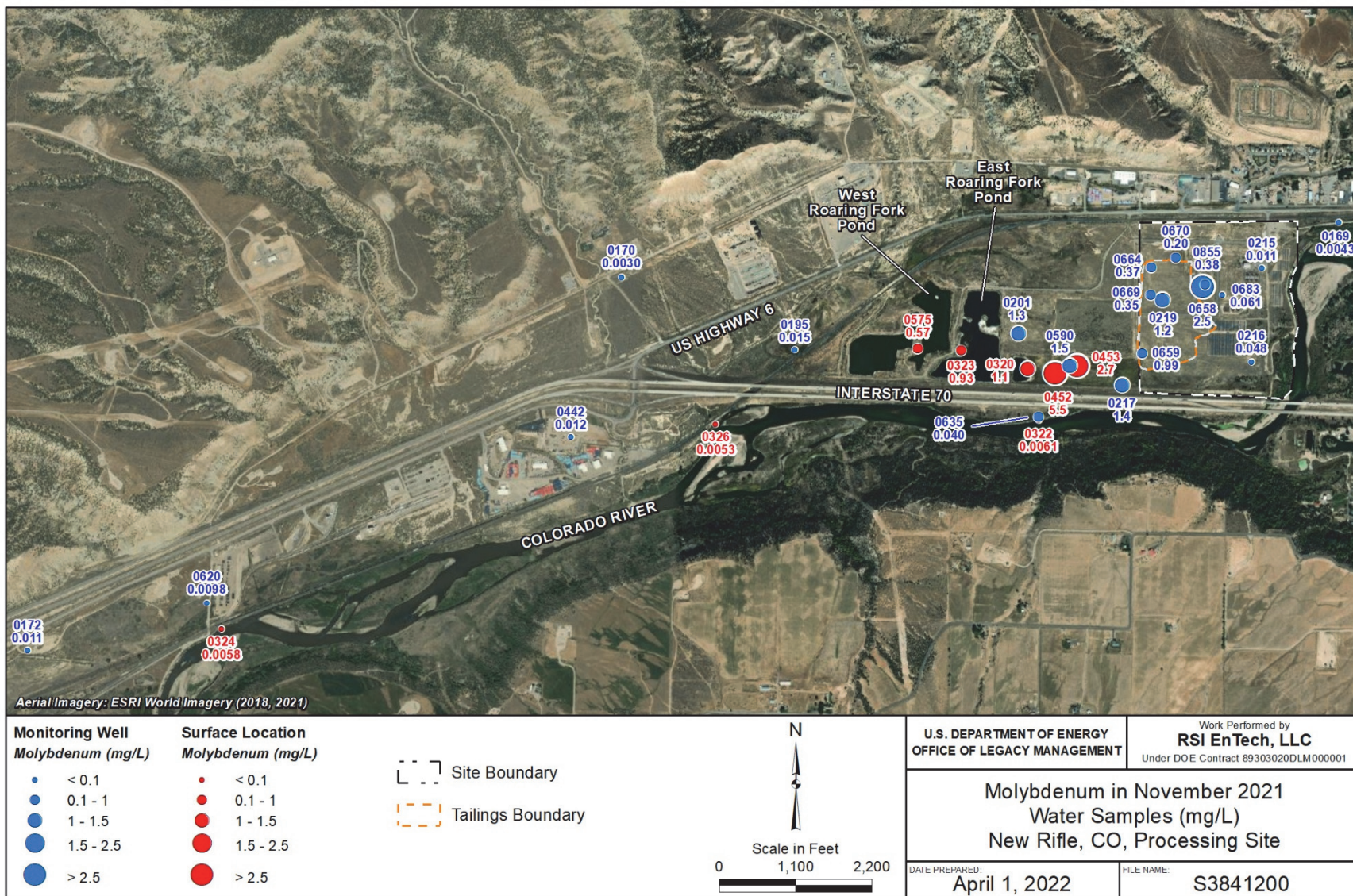
Vanadium

Figure 19 plots the most recent (November 2021) vanadium results for New Rifle site monitoring wells along with surface water sampling results. Vanadium concentrations remain elevated relative to the (0.086 and 0.33 mg/L) benchmarks in all onsite monitoring wells except 0215 and 0216 (Figure 20). Levels are also elevated in adjacent downgradient wells 0217 and 0590. Vanadium concentrations have been consistently low (<0.086 mg/L) in farther downgradient wells. As discussed in previous VMRs (DOE 2020), the 2008–2009 spike in vanadium concentrations in well 0855 (up to 1600 mg/L) coincided with the city of Rifle's previous construction work and attendant dewatering activities in the eastern portion of the site (DOE 2010; DOE 2016). Arsenic and molybdenum levels also increased markedly in well 0855 at that time. By June 2010, vanadium levels in this well had decreased to 40 mg/L.

Mann-Kendall trend tests identified statistically significant trends for 9 of the 16 monitoring wells based on data from 1998–2021 (Figure 20). However, significant trends were not found for most of these wells when the analysis was limited to 2010–2021 (Table 6; Appendix C). Only one well, downgradient location 0620 (most recent result of 0.016 mg/L), was found to have a significant increasing trend for both time frames.

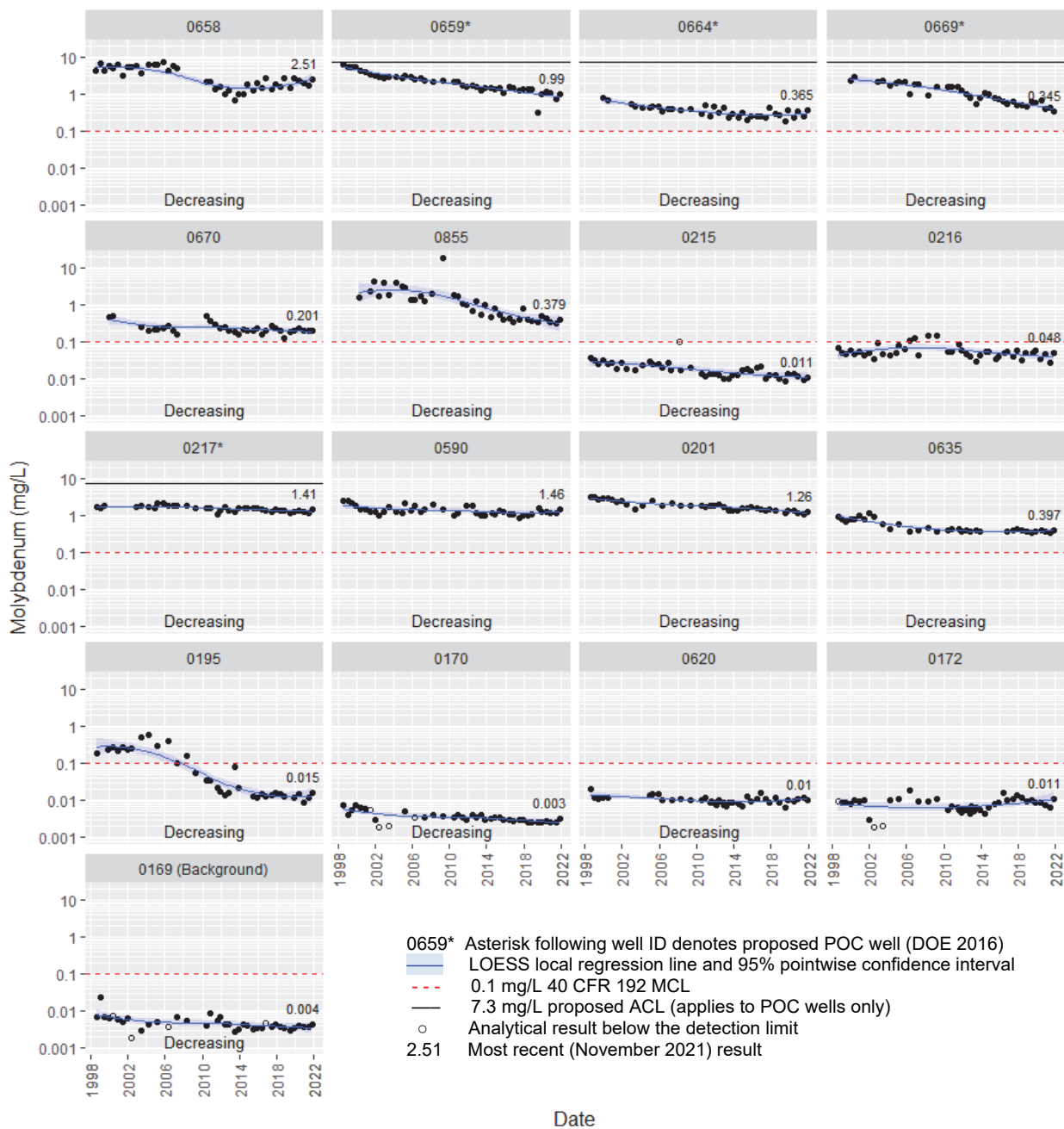
Selenium

Figure 21 plots the most recent (November 2021) selenium results for New Rifle site monitoring wells along with surface water sampling results. Corresponding time-series data for monitoring wells are shown in Figure 22. Because selenium concentrations have, prior to 2010, exceeded the 40 CFR 192 (UMTRCA) standard of 0.01 mg/L in background well 0169, the SDWA standard of 0.05 mg/L is used as the selenium benchmark (Table 2). Selenium concentrations exceed this benchmark in all onsite wells except those most influenced by the Colorado River, 0215 and 0216. In November 2021, the maximum selenium concentration (0.87 mg/L) was measured in well 0658. Selenium concentrations in all offsite wells are currently less than 0.05 mg/L.



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled.

Figure 17. Molybdenum Concentrations in New Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

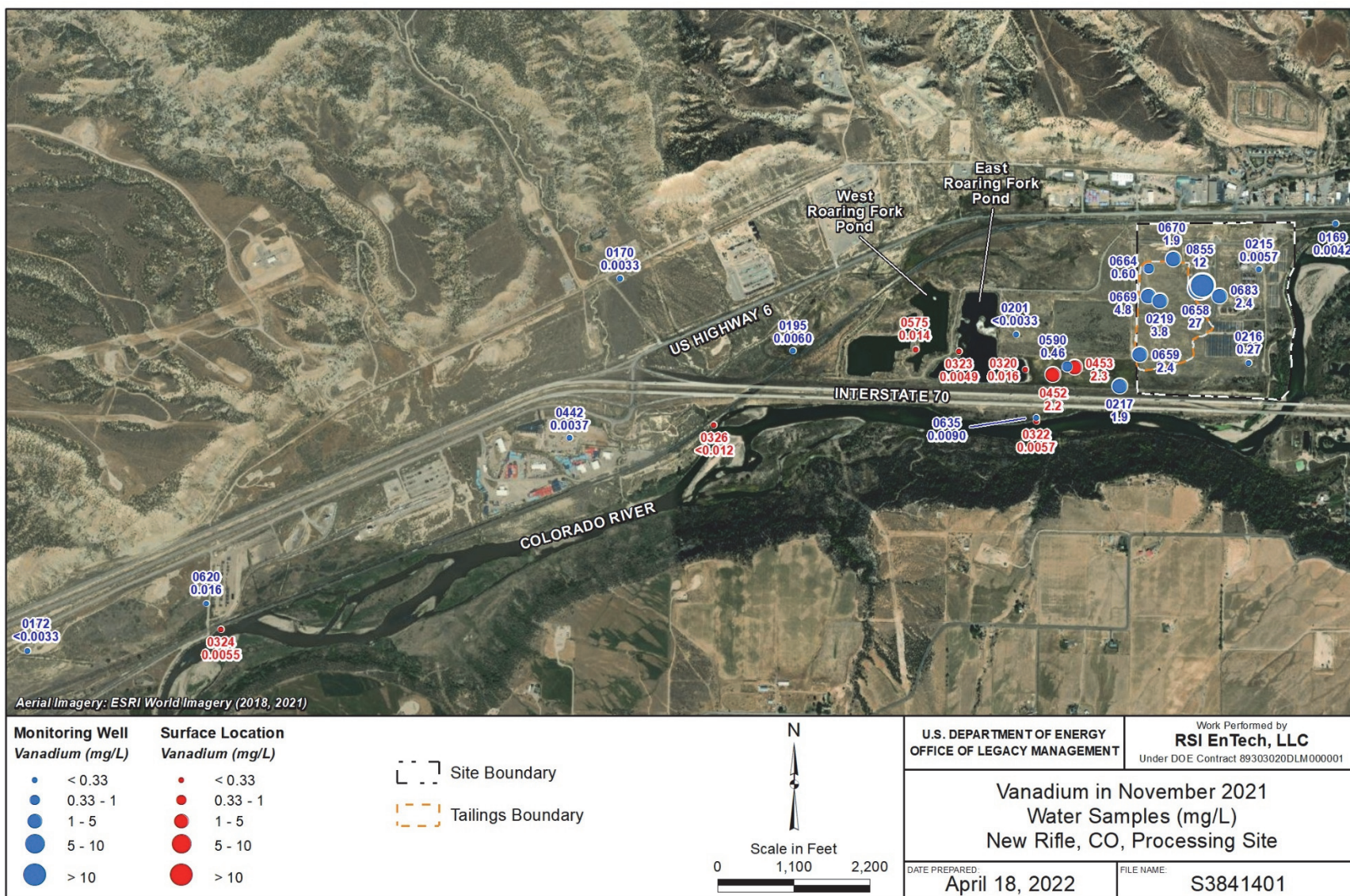
Wells are ordered and grouped as follows:

- Rows 1 and 2 = onsite wells.
- Row 3 = adjacent downgradient wells.
- Row 4 = farther downgradient offsite wells.
- Row 5 = New Rifle site background well.

Onsite wells 0215 and 0216 are plotted last in the second row because of historically low COC levels relative to other onsite wells. Offsite wells (rows 3–4) are listed in general order of increasing distance from the site and former source areas.

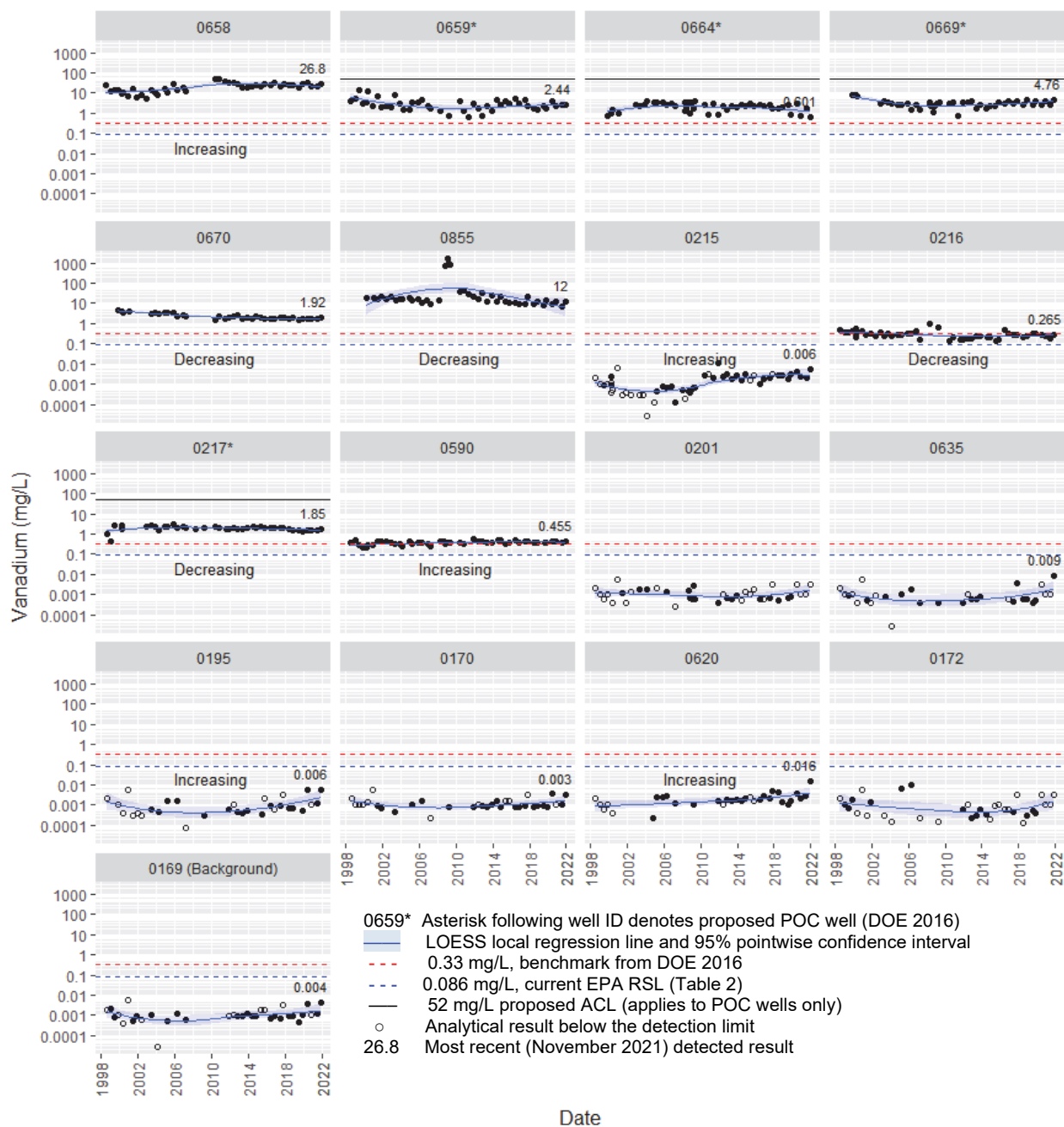
Mann-Kendall trend tests were run for the sampling period 1998–2021. For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Based on trend tests conducted for the more recent 2010–2021 time frame, wells 0658 and 0172 were found to have significant increasing trends. Supporting information is provided in Section 4.2.2 (Table 6) and in Appendix C, Tables C-3 and C-4.

Figure 18. Time-Concentration Plots of Molybdenum in New Rifle Site Monitoring Wells



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled.

Figure 19. Vanadium Concentrations in New Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

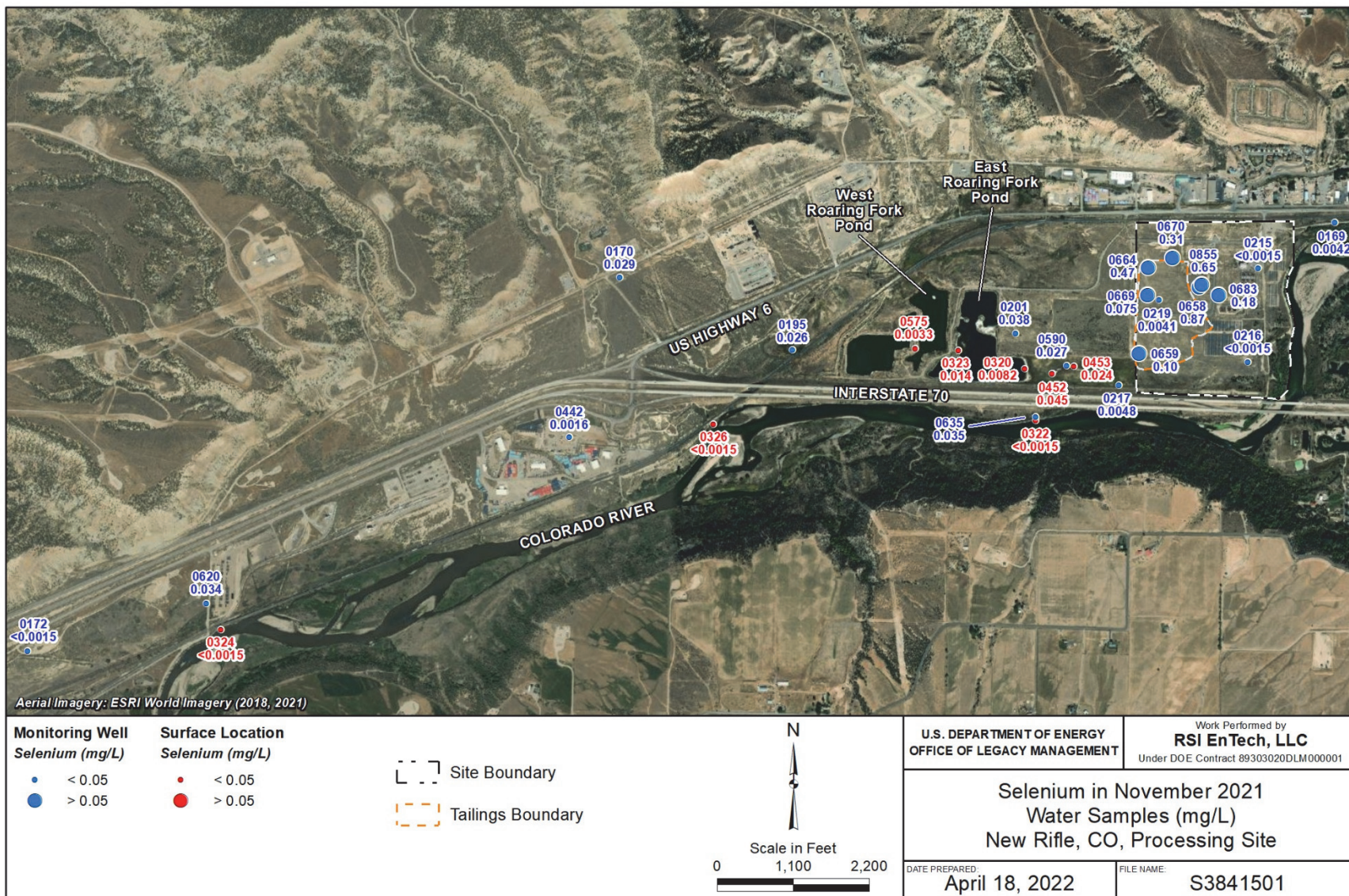
Wells are ordered and grouped as follows:

- Rows 1 and 2 = onsite wells.
- Row 3 = adjacent downgradient wells.
- Row 4 = farther downgradient offsite wells.
- Row 5 = New Rifle site background well.

Onsite wells 0215 and 0216 are plotted last in the second row because of historically low COC levels relative to other onsite wells. Offsite wells (rows 3–4) are listed in order of increasing distance from the site and former source areas.

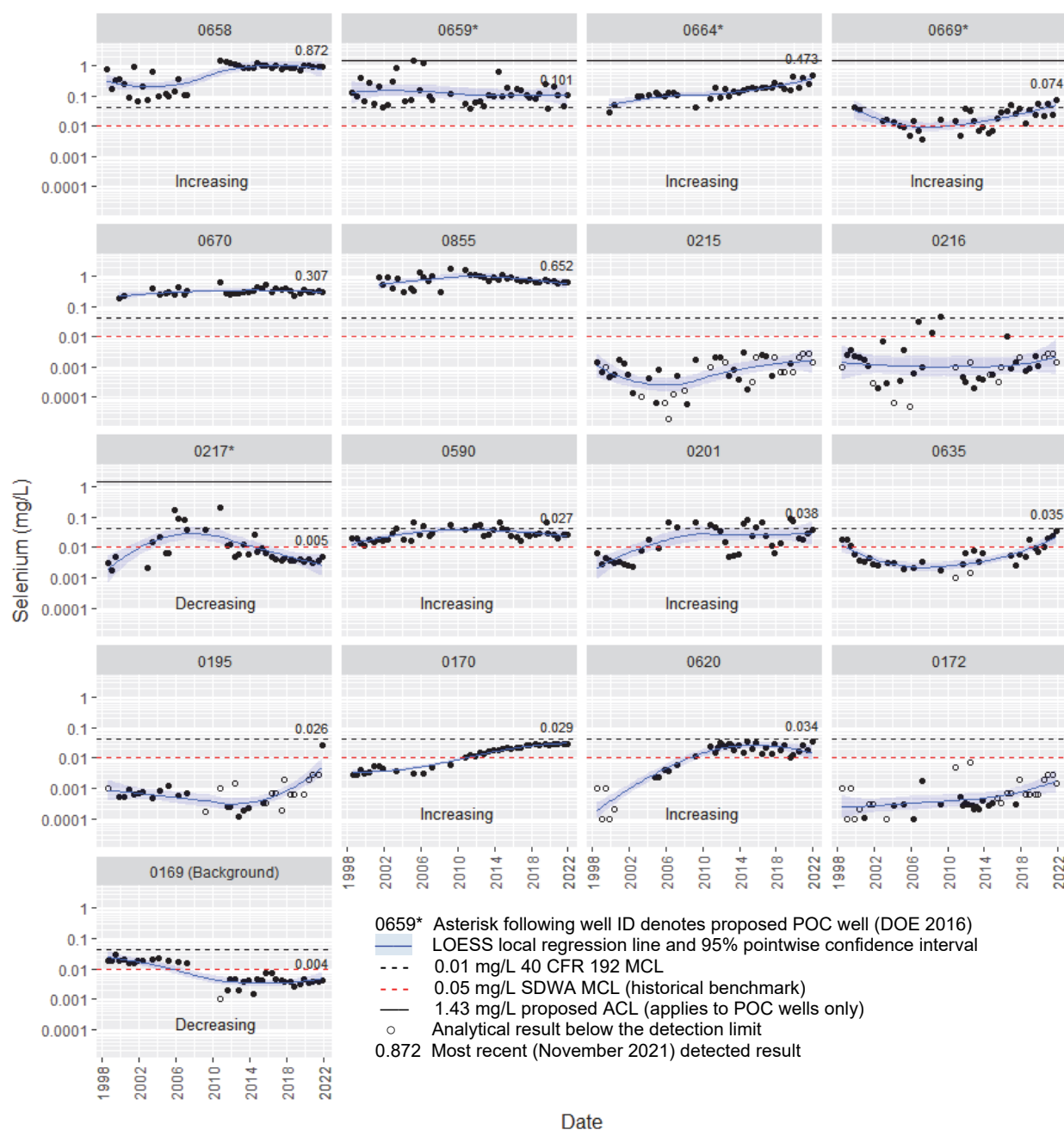
Mann-Kendall trend tests were run for the sampling period 1998–2021. For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information, including results of trend tests conducted for the more recent 2010–2021 time frame, is provided in Section 4.2.2 (Table 6) and in Appendix C, Tables C-3 and C-4.

Figure 20. Time-Concentration Plots of Vanadium in New Rifle Site Monitoring Wells



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled.

Figure 21. Selenium Concentrations in New Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

Wells are ordered and grouped as follows:

- Rows 1 and 2 = onsite wells.
- Row 3 = adjacent downgradient wells.
- Row 4 = farther downgradient offsite wells.
- Row 5 = New Rifle site background well.

Onsite wells 0215 and 0216 are plotted last in the second row because of historically low COC levels relative to other onsite wells. Offsite wells (rows 3–4) are listed in order of increasing distance from the site and former source areas.

Mann-Kendall trend tests were run for the sampling period 1998–2021. For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information, including results of trend tests conducted for the more recent 2010–2021 time frame, is provided in Section 4.2.2 (Table 6) and in Appendix C, Tables C-3 and C-4.

Figure 22. Time-Concentration Plots of Selenium in New Rifle Site Monitoring Wells

Mann-Kendall trend analysis identified significant increasing trends in selenium concentrations in onsite POC wells 0664 and 0669 for both 1998–2021 and 2010–2021 time frames. Although selenium concentrations in offsite wells have generally been below the 0.05 mg/L benchmark (exceptions shown in Figure 22), levels are increasing significantly at several locations, most notably in well 0170. Using the historical (1998–2021) dataset, Mann-Kendall trend tests indicated statistically significant increasing trends for 8 of the 16 monitoring wells (Table 6; Appendix C). Trend tests run for the 2010–2021 time frame indicate that four wells—onsite wells 0664 and 0669 and offsite wells 0635 and 0170—had significant increasing trends.

Nitrate (+ Nitrite as Nitrogen)

Figure 23 plots the most recent (November 2021) nitrate results for New Rifle site monitoring wells along with surface water sampling results. As shown in Figure 24, nitrate concentrations ranged between about 100 and 300 mg/L in several onsite and offsite wells during the first decade of monitoring (1998–2008). In November 2021, nitrate concentrations exceeded the 10 mg/L 40 CFR 192 MCL in four monitoring wells, in most cases just slightly: in onsite well 0664 (13.7 mg/L), adjacent downgradient wells 0201 and 0590 (21.8 and 11.1 mg/L, respectively), and in farther downgradient well 0170 (11.2 mg/L). No significant trends were identified for onsite wells, except well 0659 (significant decreasing trend). In farther downgradient offsite wells, nitrate concentrations are predominantly decreasing (Figure 24; Table 6).

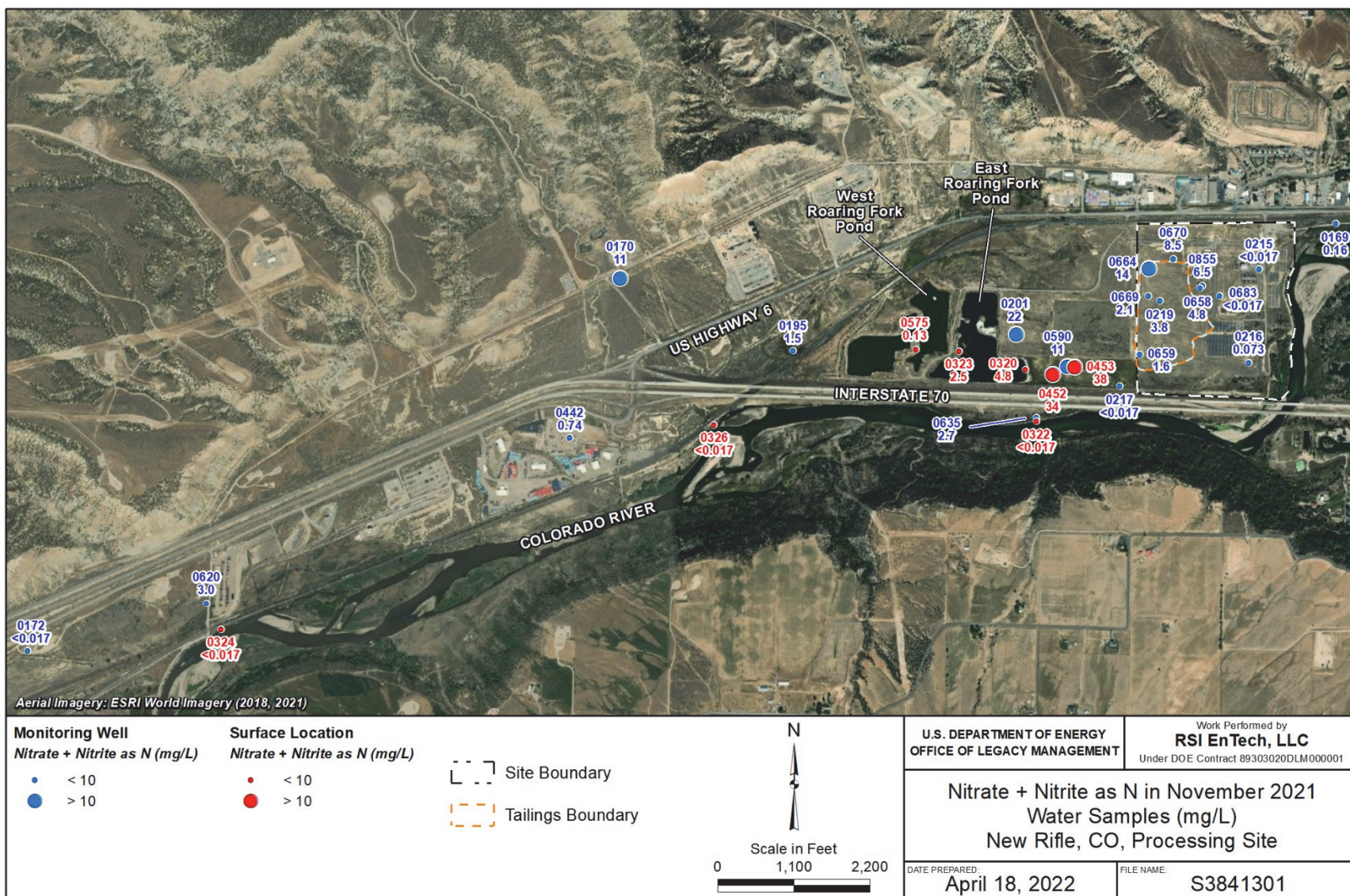
Arsenic

Historically, arsenic has been elevated relative to the 0.05 mg/L 40 CFR 192 MCL in three onsite wells: 0658, 0659, and 0855 (Figure 14 and Figure 25). As observed for molybdenum and vanadium, the highest arsenic concentrations have been measured in well 0855, where levels spiked in 2009 (up to 2.2. mg/L) coinciding with adjacent dewatering activities. In November 2021, the 0.05 mg/L benchmark was exceeded in two wells: 0658 (0.108 mg/L) and 0855 (0.284 mg/L).

Mann-Kendall tests applied to the historical dataset (1998–2021) indicated no trends in most wells but significant increasing trends for offsite wells 0590, 0195, and 0172 (Table 6; Appendix C). Applying the trend tests to the 2010–2021 dataset, increases in offsite wells are statistically significant only for far downgradient well 0172, where arsenic concentrations increased from 0.001 mg/L in 1998 to a maximum of 0.019 mg/L in November 2021 (Figure 25).

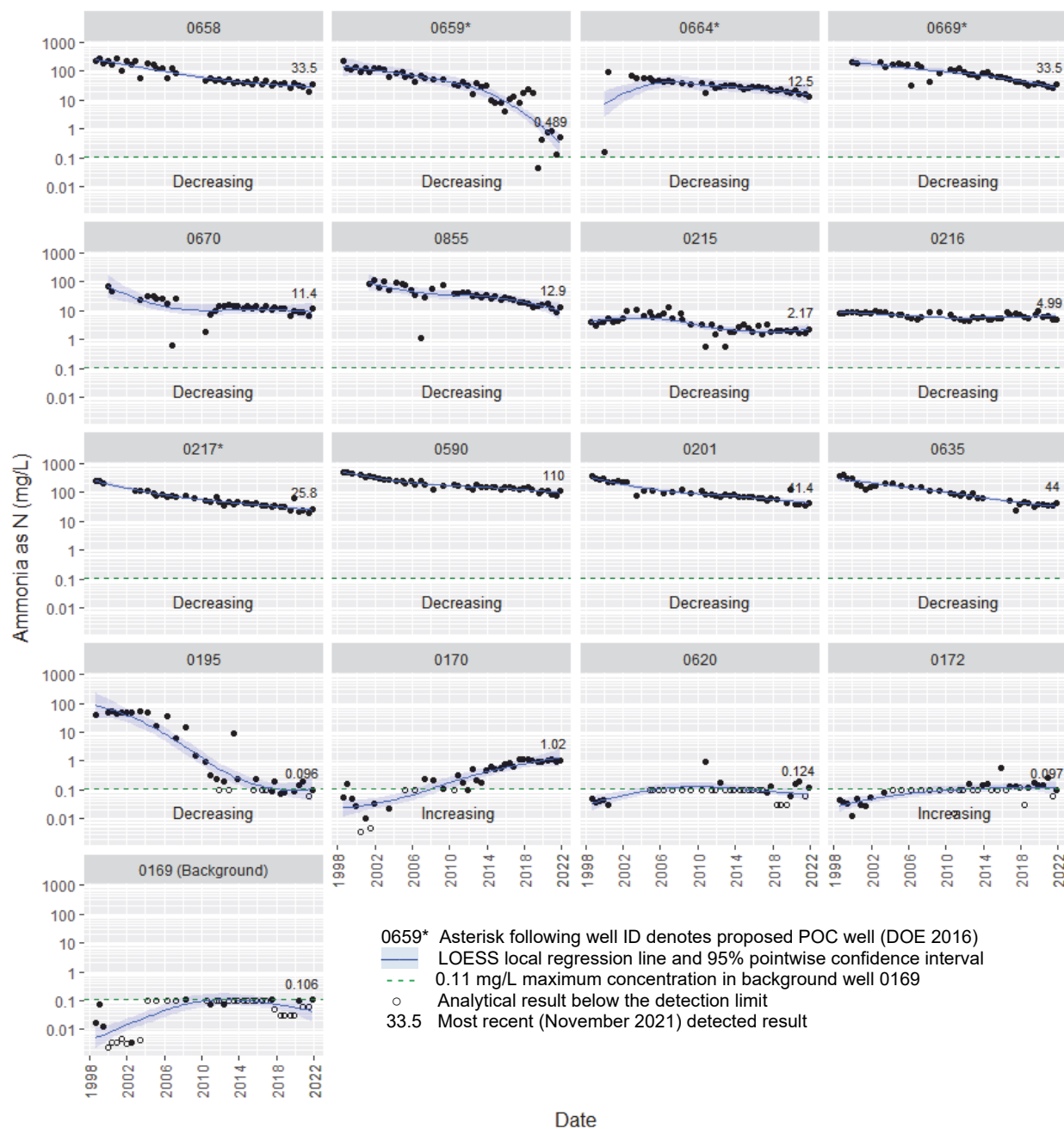
Ammonia

Ammonia is not a COC because it is not regulated under 40 CFR 192. However, it is addressed in this and previous reports because nitrate, which is a COC, was likely derived from ammonia at the site (DOE 2016). Ammonia concentrations have declined significantly in onsite and adjacent downgradient wells since 1998 (Figure 26). Ammonia concentrations are currently highest in adjacent downgradient well 0590 (110 mg/L), east of the Roaring Fork ponds. Mann-Kendall trend tests indicate significant decreasing ammonia trends throughout most of the New Rifle site monitoring well network. Although ammonia concentrations in well 0170 increased significantly since 1998, levels have stabilized at about 1 mg/L in the last 5 years (Figure 26).



Note: Onsite wells 0219 and 0683 and downgradient offsite well 0442 are not routinely sampled.

Figure 23. Nitrate (as N) Concentrations in New Rifle Site Groundwater and Surface Water Samples, November 2021



Notes:

Wells are ordered and grouped as follows:

- Rows 1 and 2 = onsite wells.
- Row 3 = adjacent downgradient wells.
- Row 4 = farther downgradient offsite wells.
- Row 5 = New Rifle site background well.

Onsite wells 0215 and 0216 are plotted last in the second row because of historically low COC levels relative to other onsite wells. Offsite wells (rows 3–4) are listed in order of increasing distance from the site and former source areas.

Mann-Kendall trend tests were run for the sampling period 1998–2021. For wells with statistically significant trends ($p < 0.05$), the direction of the trend is indicated on the plot. Supporting information, including results of trend tests conducted for the more recent 2010–2021 time frame, is provided in Section 4.2.2 (Table 6) and in Appendix C, Tables C-3 and C-4.

Abbreviation: N = nitrogen

Figure 26. Time-Concentration Plots of Ammonia (as N) in New Rifle Site Monitoring Wells

4.2.2 Mann-Kendall Trend Analysis

Consistent with the approach applied to Old Rifle site data, Mann-Kendall trend tests were initially run for the period 1998–2021, representing measurements collected since postremediation monitoring began ($n = 35$ –49 for the primary COCs). Statistically significant trends were identified for about half of the well-analyte combinations. For most COCs (e.g., uranium and molybdenum), trends are predominantly decreasing. Selenium is an exception in that significant increases were noted in about half of the wells. As evident in the preceding time-concentration plot figures, in some of these cases contaminant concentrations appear to have stabilized more recently. Therefore, a second set of Mann-Kendall trend tests was run for the 2010–2021 time frame ($n = 19$ –29). Table 6 provides a high-level summary of the Mann-Kendall trend tests run for all New Rifle site COCs and ammonia; supporting details are provided in Appendix C. Results of corresponding linear regression analyses are also included in that appendix.

In Table 6, wells are grouped and ordered in a way consistent with the categories used in the draft GCAP (DOE 2016) and in the preceding time-series data plots. Onsite wells are listed first, followed by adjacent downgradient wells and farther downgradient wells. Offsite wells are listed in general order of increasing distance from the site and former source areas. For each analyte, cross-references to corresponding time-concentration plots are provided to facilitate review. In some cases, trend test results yielded for the larger (1998–2021) dataset differ from those obtained using the more recent (2010–2021) dataset. These cases are noted in Table 6 and usually correspond to a stabilization in COC concentrations since 2010. This table is intended as a summary of the detailed Mann-Kendall trend tests documented in Appendix C. Interpretations of trends for specific well and analyte combinations are addressed in the preceding discussion.

Table 6. Mann-Kendall Trend Test Results for New Rifle Site Monitoring Wells

	Uranium	Molybdenum	Vanadium	Selenium	Nitrate	Arsenic	Ammonia
40 CFR 192 MCL (mg/L)	0.044	0.1	–	0.01	10	0.05	–
Benchmark (mg/L)	–	0.1	0.33 / 0.086	0.05	10	0.05	–
ACL (mg/L)	0.364	7.3	52	1.43	75	0.313	–
Figure Cross-Reference	Figure 16	Figure 18	Figure 20	Figure 22	Figure 24	Figure 25	Figure 26
Onsite Wells							
0658	Decreasing	Decreasing [‡]	Increasing*	Increasing [†]	No Trend	No Trend	Decreasing
0659 (POC)	Decreasing	Decreasing	No Trend	No Trend	Decreasing*	No Trend	Decreasing
0664 (POC)	Decreasing*	Decreasing*	No Trend	Increasing	No Trend	No Trend	Decreasing
0669 (POC)	Decreasing	Decreasing	No Trend	Increasing	No Trend	No Trend [‡]	Decreasing
0670	Decreasing*	Decreasing*	Decreasing*	No Trend	No Trend	Decreasing*	Decreasing*
0855	Decreasing*	Decreasing	Decreasing	No Trend [†]	No Trend	No Trend [†]	Decreasing
0215	Increasing*	Decreasing*	Increasing*	No Trend	No Trend	No Trend	Decreasing*
0216	No Trend	No Trend	Decreasing [‡]	No Trend	–	No Trend	Decreasing*
Adjacent Downgradient Wells							
0217 (POC)	No Trend [†]	Decreasing	Decreasing	Decreasing	Decreasing*	No Trend	Decreasing
0590	No Trend	Decreasing*	Increasing*	Increasing*	Decreasing	Increasing*	Decreasing
0201	No Trend	Decreasing	–	Increasing*	Decreasing	No Trend	Decreasing
0635	Decreasing	Decreasing	No Trend	No Trend [‡]	Decreasing	–	Decreasing
Downgradient Wells							
0195	Decreasing*	Decreasing	Increasing*	Increasing*	–	Increasing*	Decreasing*
0170	No Trend [‡]	Decreasing*	No Trend	Increasing	Decreasing*	–	Increasing
0620	No Trend [†]	Decreasing*	Increasing	Increasing*	No Trend [†]	No Trend	–
0172	Decreasing	No Trend [‡]	–	–	–	Increasing	Increasing*
Background Well							
0169	Decreasing [‡]	Decreasing*	No Trend [‡]	Decreasing*	Decreasing*	No Trend	–

- Statistically significant increasing trend (1998–2021)
- Statistically significant decreasing trend (1998–2021)
- No trend or significant decreasing trend for 1998–2021 but significant increasing trend for 2010–2021

Notes:

Analysis period from 1998–2021.

Benchmarks and ACLs listed above are from Table 2.

Detailed test statistics for both 1998–2021 and 2010–2021 time frames are provided in Appendix C for Mann-Kendall and linear regression trend tests (significance level = 0.05). For some well-analyte combinations, Mann-Kendall trend test results for the more recent 2010–2021 time frame differ from those listed above. These cases are identified as follows:

- * No trend indicated using only data from 2010–2021.
- † Decreasing trend indicated using only data from 2010–2021.
- ‡ Increasing trend indicated using only data from 2010–2021.

Abbreviation:

– = Trend not established given large proportion (≥50%) of nondetects

4.3 Surface Water Monitoring Results

The primary surface water features at or near the New Rifle site include the Colorado River, the Roaring Fork gravel pit ponds, and the mitigation wetland. This section includes a brief summary of contaminant trends measured at these locations. A more detailed discussion, including an evaluation of potential ecological risks, is provided in the most recent GCAP (DOE 2016).

4.3.1 Roaring Fork Gravel Pit Ponds and Wetland Areas

Figure 27 shows time-concentration plots of all COCs and ammonia for New Rifle site pond locations. Water is continuously present at locations 0323, the former East Roaring Fork Pond, and 0575, the former West Roaring Fork Pond. Both gravel pit pond locations were proposed as POE locations in the draft GCAP (DOE 2016). Monitoring locations 0320, 0452, and 0453 are in the reconstructed wetland. While water is usually present at wetland location 0320, it dries up occasionally during periods of low Colorado River flows. Wetland locations 0452 and 0453 dry up more frequently, again during low-water periods in the river. (Location 0453 was dry during the June 2021 sampling event.) There is no regular land use of either the gravel pit ponds or wetland areas other than the monitoring conducted by LM; much of the area is heavily vegetated.

To provide a context for interpreting results, data plotted in Figure 27 are shown relative to aquatic benchmarks and agricultural standards established in the draft GCAP (DOE 2016). Restrictions have been placed on use of surface water and groundwater for agricultural purposes, so that exposure pathway is incomplete. Risk-based concentrations (RBCs) corresponding to a recreational swimming scenario were also derived.⁹ These values are shown to the right of the time-series plots in Figure 27 because monitoring results for all COCs have historically been below (in most cases, well below) the corresponding RBCs.

Uranium concentrations in gravel pit and wetland pond samples (currently about 0.1–0.2 mg/L) have always been well below the corresponding aquatic benchmark (2.4 mg/L) and the 59 mg/L RBC derived for a recreational (swimming) scenario (Figure 27). Molybdenum levels continue to exceed the 0.24 mg/L aquatic benchmark at all gravel pit and wetland sampling locations. Molybdenum concentrations in both gravel pit ponds are currently about 1 mg/L and slightly higher in the wetland ponds (maximum of 5.5 mg/L at location 0452). However, all levels are below the 96 mg/L RBC.

Vanadium levels in the Roaring Fork ponds have been consistently low, less than the 0.019 mg/L aquatic benchmark, but exceed this benchmark at wetland locations 0452 and 0453 (current levels average about 2 mg/L). Vanadium concentrations at all pond locations have been below the 17.4 mg/L RBC.

Selenium concentrations exceed the 0.0046 mg/L aquatic benchmark at all locations except west Roaring Fork Pond 0575. In 2021, selenium levels ranged from 0.003–0.045 mg/L (maximum at wetland pond 0452), below the 96 mg/L RBC.

⁹ As indicated in Section 2.5.1 (human health risk evaluation) of the draft GCAP (DOE 2016), it was assumed that children (the most sensitive receptors) could access the Roaring Fork ponds and would regularly swim in those ponds during summer months. The ponds are not known to be used for swimming; however, values for exposure parameters were chosen to provide conservative estimates of risk.

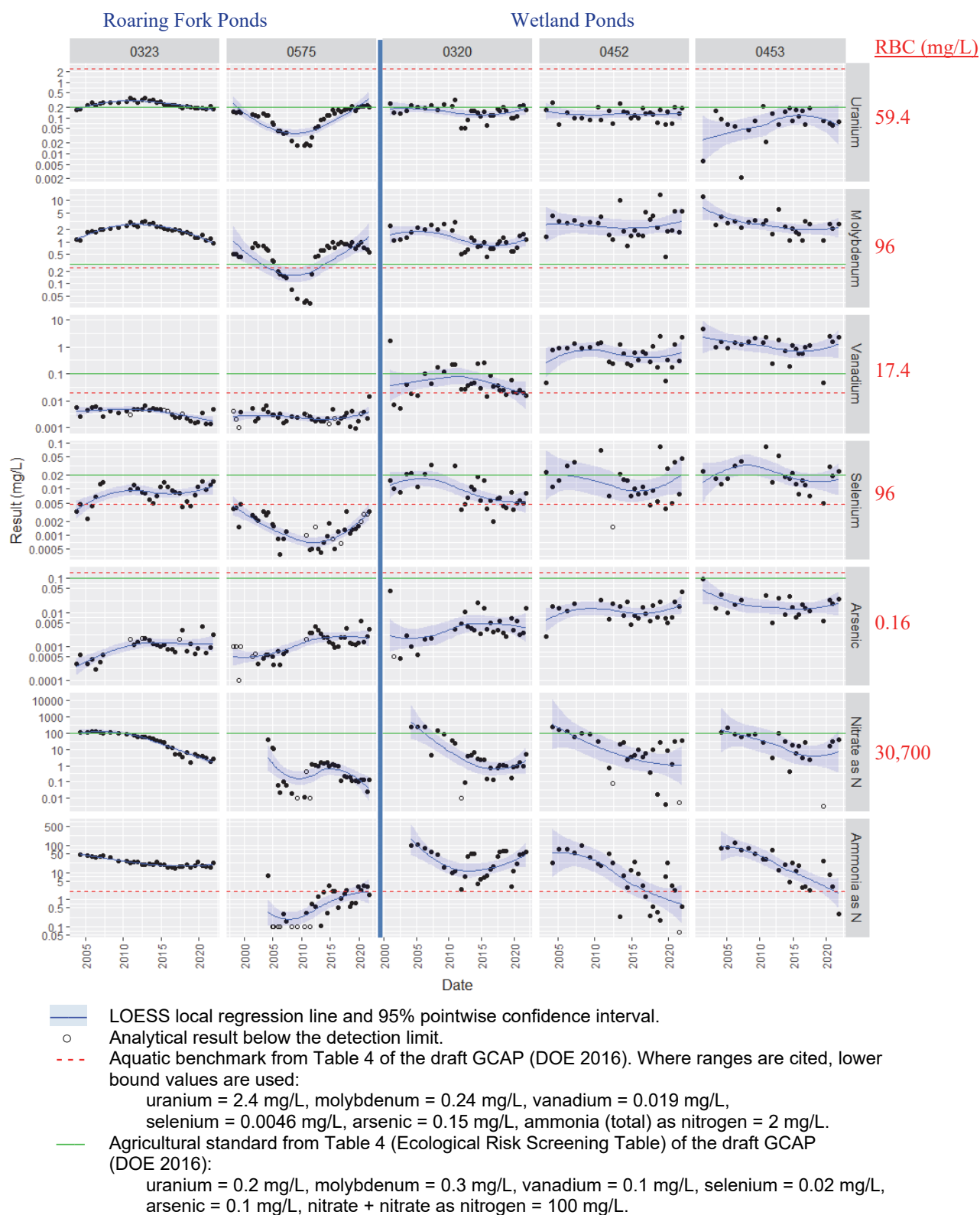


Figure 27. Time-Concentration Plots of COCs and Ammonia in New Rifle Site Pond Samples

Arsenic concentrations, while below the 0.15 mg/L aquatic benchmark and the 0.16 mg/L RBC, are increasing at all locations except 0453, and significantly so ($p < 0.05$) at location 0575. Although nitrate concentrations in pond samples have at times slightly exceeded the 100 mg/L agricultural benchmark, levels have significantly decreased at all locations except 0575. Nitrate levels are currently low in the gravel ponds (0.025–2.5 mg/L) and highest in wetland ponds 0452 and 0453 (34–37.5 mg/L in November 2021).

Ammonia concentrations have consistently exceeded the 2 mg/L aquatic benchmark at location 0323 (former East Roaring Fork pond) and wetland pond location 0320 (current levels range from 22–57 mg/L). Ammonia levels have significantly decreased at all locations except 0575 (west gravel pit pond) and wetland location 0320. While ammonia concentrations have increased significantly in samples from the west gravel pit pond (0575), the current level (1.5 mg/L) is below the 2 mg/L aquatic benchmark.

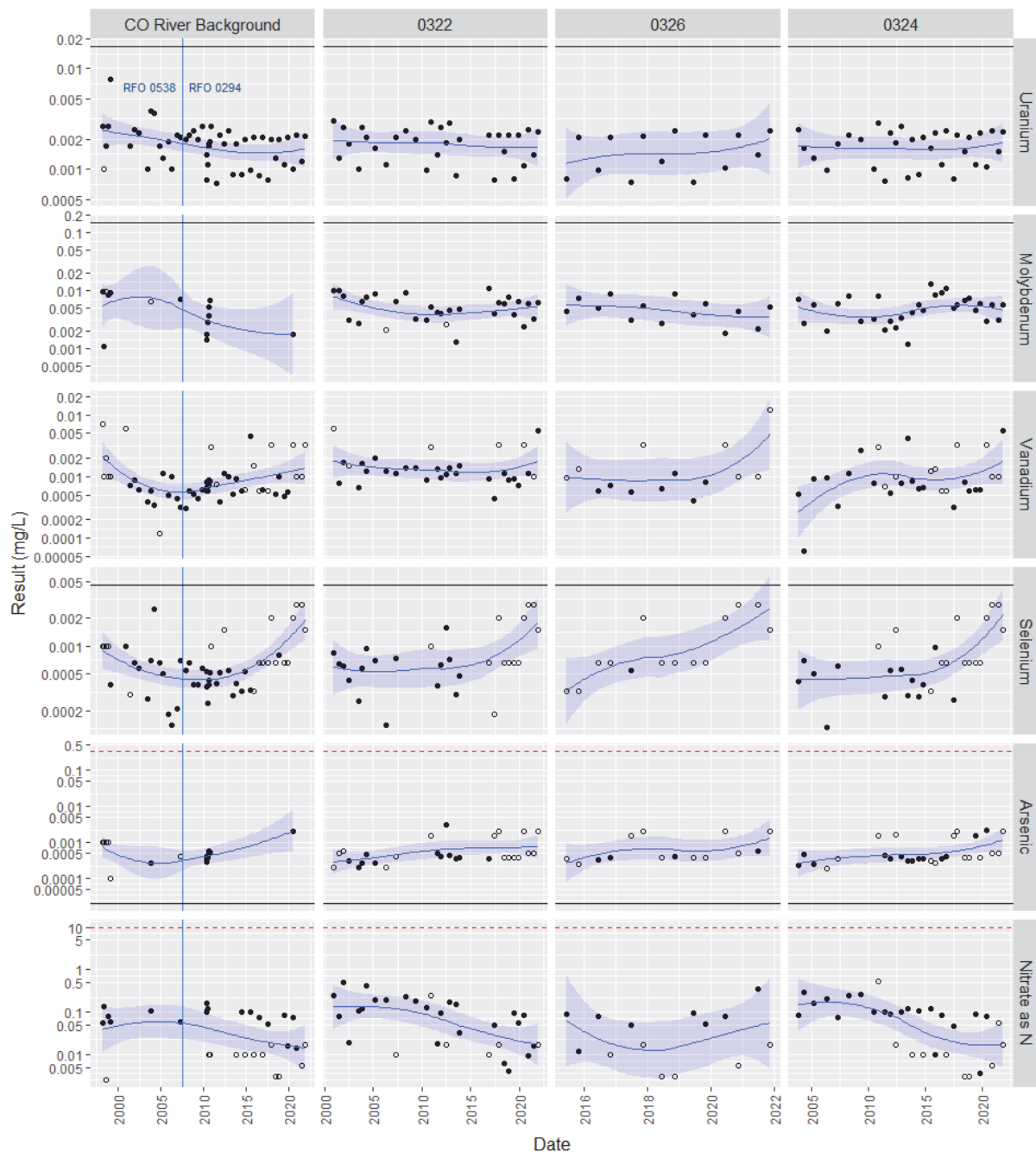
The Roaring Fork ponds have been a focus in recent NRC reviews of the draft GCAP (Saxton 2019; Saxton 2020). Analysis of historical monitoring data in light of the risk evaluations developed for the draft GCAP indicate that potential exposures to contaminants in the ponds—assuming those pathways are complete—are unlikely to pose any potential risk that would warrant additional controls or restrictions. The only COCs currently exceeding either agricultural or aquatic benchmarks at any of these POE locations are molybdenum and selenium. In 2021, molybdenum concentrations at both pond locations (0.6–1.2 mg/L) exceeded both (0.24 and 0.3 mg/L) benchmarks (Figure 27). Selenium concentrations exceeded the 0.0046 mg/L aquatic benchmark only in the east pond (location 0323, with most recent result of 0.014 mg/L). These results are orders of magnitude lower than corresponding RBCs derived for a recreational swimming scenario (96 mg/L for both molybdenum and selenium).

4.3.2 Colorado River Water Quality Monitoring

The Colorado River forms the southern boundary of the New Rifle site and is the dominant surface water feature, ultimately receiving most of the surface drainage from the New Rifle site. Precipitation falling on the site drains directly into the river and into the mitigation wetland ponds south of the site. The river also receives groundwater discharge from the alluvial aquifer along the southern portion of the site. Although this east-west-trending reach of the Colorado River is mostly a site of groundwater discharge, some surface water probably seeps into the groundwater system (i.e., recharges the aquifer) throughout each year (DOE 2016).

Concentrations at locations 0322 and 0324, in the Colorado River, were comparable to background. A relatively new location—0326, between 0322 and 0324—was established in 2010 (Figure 3). The Colorado River in the site vicinity is classified for agricultural, recreational, and water supply uses.¹⁰ As illustrated in Figure 28, the river water in the site vicinity does not exceed, nor has it exceeded, any of these standards, nor—with few exceptions—has it exceeded background surface water quality based on measurements from Old Rifle site upgradient locations 0538 and 0294 (former and current background locations, respectively).

¹⁰ Applicable segment is COLCLC02A: Mainstem of the Colorado River from immediately below the confluence with Rifle Creek to immediately above the confluence of Rapid Creek, designated as Aquatic Cold Warm 1 (5 CCR 1002-37). Although the aquatic life designation differs from that assigned to the river segment adjacent to the Old Rifle site (COLCLC01, Aquatic Life Cold 1), surface water quality standards are essentially the same in both segments.



- LOESS local regression line and 95% pointwise confidence interval.
- Analytical result below the detection limit.
- “Chronic Surface Water Standard” (5 CCR 1002-37):
 - uranium = 0.0168 mg/L (lower bound of 0.0168–0.03 mg/L cited range)
 - molybdenum = 0.15 mg/L (chronic)
 - selenium = 0.0046 mg/L (chronic)
 - arsenic = 0.00002 (chronic standard, exceeded at background locations)
 - nitrate = 10 mg/L (acute)
- “Acute Surface Water Standard” (5 CCR 1002-37):
 - arsenic = 0.34 mg/L
 - nitrate = 10 mg/L

Note:

Monitoring of background Colorado River location 0294 began in November 2007. Data from the previous background river location—0538, roughly 0.5 mile upstream of location 0294—are also shown.

Figure 28. Historical COC Concentrations in Colorado River Water Samples, New Rifle Site

4.4 ICs Monitoring

A comprehensive ICs program has been implemented to prevent future use of contaminated groundwater associated with the New Rifle processing site. These ICs are robust and overlapping, providing ample protection. As noted in Section 1.3.2, Appendix A of the draft GCAP (DOE 2016) documents the ICs for the New Rifle site in their entirety.

To verify that the described ICs are being maintained as stated above, DOE conducts regular inspections and holds discussions with city of Rifle staff and other affected parties. As with the quitclaim deed verification, DOE accomplishes this by (1) discussions with city officials about construction projects and possible incursions of groundwater that could result from these activities; (2) physical inspection of the site by State of Colorado or DOE staff (or both), usually during the annual Rifle disposal site inspection; and (3) observations during groundwater sampling activities at other times of the year. LM will continue to work closely with CDPHE, as well as city and county officials, to maintain successful implementation of ICs and to ensure protection of human health and the environment.

5.0 Summary and Conclusions

Verification monitoring in 2021 at the Old and New Rifle sites entailed routine semiannual sampling of groundwater and surface water and monitoring of ICs. Monitoring results continue to indicate that milling-related contamination persists at the sites.

Uranium is the most prevalent milling-related contaminant occurring in alluvial aquifer groundwater at the Old Rifle site. Concentrations continue to exceed the UMTRCA standard of 0.044 mg/L in five of the six onsite monitoring wells. Selenium and vanadium concentrations exceed relevant benchmarks in two wells (0305 and 0655) coinciding with the former tailings area.

At the New Rifle site, uranium, molybdenum, and vanadium receive the most focus because of their magnitude and spatial extent. Although levels of these three constituents have generally decreased across the monitoring network (at times significantly), they are still elevated relative to corresponding benchmarks in most onsite and adjacent downgradient wells. Exceptions are onsite wells 0215 and 0216, where mixing with river water occurs. In November 2021, uranium concentrations exceeded the 0.044 mg/L UMTRCA standard in 12 of 16 monitoring wells (excluding background) as far downgradient as well 0620.

Selenium concentrations exceed the 0.05 mg/L SDWA benchmark in all onsite wells except those with a strong river influence (0215 and 0216). Although selenium concentrations in offsite wells have generally been below the 0.05 mg/L benchmark, levels are increasing significantly at several downgradient locations, most notably in well 0170. Nitrate currently exceeds the 10 mg/L benchmark in four monitoring wells (three are downgradient), in most cases only slightly. In several offsite downgradient wells, nitrate levels have declined significantly in the last decade.

Except for in three onsite wells, arsenic concentrations have generally been stable (nontrending) and below the 0.05 mg/L benchmark across the monitoring network. Levels are significantly increasing in far downgradient well 0172, however, having increased from 0.001 mg/L (baseline) to 0.019 mg/L in November 2021. Although ammonia is not a COC, it is monitored at the New Rifle site because of its association with nitrate and historically elevated concentrations relative to background. Ammonia concentrations are currently highest (40–110 mg/L) in adjacent downgradient wells east of the Roaring Fork ponds. In most wells, ammonia levels have declined significantly since 1998.

Surface water quality of the Colorado River, a POE at both the Old and New Rifle sites, remains unaffected by groundwater discharge from either site. COC concentrations in river samples adjacent to and downstream of both sites have been similar to or lower than those in background (upstream) samples.

In addition to the Colorado River, other surface water features at or near the New Rifle site include the Roaring Fork gravel pit ponds and the mitigation wetland. Because water is continuously present in the Roaring Fork ponds (and not in the mitigation wetland), these sampling sites (0323 and 0575) were proposed as POE locations in the draft GCAP. The only COCs currently exceeding either agricultural or aquatic benchmarks at any of these POE locations are molybdenum and selenium. These most recent results are about 2–3 orders of

magnitude lower than corresponding RBCs derived for a recreational swimming scenario (96 mg/L for both constituents). In summary, potential exposures to contaminants in the Roaring Fork ponds—assuming those pathways are complete—are unlikely to pose any potential risk that would warrant additional controls or restrictions. Restrictions have been placed on use of the surface water and groundwater for agricultural purposes, so that exposure pathway is incomplete.

At both the Old and New Rifle sites, multiple ICs are in place to prevent domestic use of groundwater and to ensure protection of human health and the environment. Three ICs—a zone overlay, a quitclaim deed, and an EC—are in place at the Old Rifle site. These overlapping measures restrict a number of activities at the site and limit access to the subsurface and groundwater without written permission from CDPHE and DOE.

At the New Rifle site, DOE, CDPHE, the city of Rifle, and Garfield County have enacted a series of four ICs to prevent humans and livestock from being exposed to site-related contaminants on the former mill site and on downgradient properties. These controls consist of a quitclaim deed on the site proper, a large zone overlay to restrict consumption of contaminated groundwater, an EC to limit access to groundwater and to prevent livestock from accessing water in former gravel pit ponds, and an overlay zone district that further limits activities on the former mill site.

Semiannual verification monitoring of groundwater and surface water at the Old and New Rifle sites will also continue, and be documented in annual VMRs, pending regulatory concurrence on the corresponding draft GCAPs.

6.0 References

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Appendix A

Groundwater and Surface Water Monitoring Results for Calendar Year 2021

Old Rifle Processing Site

**Groundwater Quality Data by Parameter for Site RFO01, 2021 Sampling
Old Rifle, Colorado, Processing Site**

Report Date: 4/13/2022

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Alkalinity, Total (As CaCO3)	0292A WL	6/22/2021	N	F	498	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0292A WL	11/15/2021	N	F	545	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0304 WL	6/22/2021	N	F	283	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0304 WL	11/15/2021	N	F	393	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0305 WL	6/23/2021	N	F	369	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0305 WL	11/15/2021	N	F	438	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0309 WL	6/22/2021	N	F	370	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0309 WL	11/15/2021	N	F	379	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0310 WL	6/22/2021	N	F	404	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0310 WL	11/15/2021	N	F	337	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0655 WL	6/23/2021	N	F	445	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0655 WL	11/15/2021	N	F	442	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0656 WL	6/22/2021	N	F	266	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0656 WL	11/15/2021	N	F	282	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0658 WL	6/22/2021	N	F	455.263	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0658 WL	11/15/2021	N	F	518	mg/L	F		Y
Calcium	0292A WL	6/22/2021	T	F	210	mg/L	F	0.094	Y
Calcium	0292A WL	11/15/2021	T	F	159	mg/L	F	0.05	Y
Calcium	0304 WL	6/22/2021	T	F	250	mg/L	F	0.094	Y
Calcium	0304 WL	11/15/2021	T	F	242	mg/L	F	0.05	Y
Calcium	0305 WL	6/23/2021	T	F	220	mg/L	F	0.094	Y
Calcium	0305 WL	11/15/2021	T	F	243	mg/L	F	0.05	Y
Calcium	0309 WL	6/22/2021	T	F	200	mg/L	F	0.094	Y
Calcium	0309 WL	11/15/2021	T	F	206	mg/L	F	0.05	Y
Calcium	0310 WL	6/22/2021	T	F	240	mg/L	F	0.094	Y
Calcium	0310 WL	11/15/2021	T	F	247	mg/L	F	0.05	Y
Calcium	0655 WL	6/23/2021	T	F	240	mg/L	F	0.094	Y
Calcium	0655 WL	11/15/2021	T	D	225	mg/L	F	0.05	Y
Calcium	0655 WL	11/15/2021	T	F	223	mg/L	F	0.05	Y
Calcium	0656 WL	6/22/2021	T	F	120	mg/L	F	0.094	Y
Calcium	0656 WL	11/15/2021	T	F	129	mg/L	F	0.05	Y
Calcium	0658 WL	6/22/2021	T	D	180	mg/L	F	0.094	Y
Calcium	0658 WL	6/22/2021	T	F	190	mg/L	F	0.094	Y
Calcium	0658 WL	11/15/2021	T	D	188	mg/L	F	0.05	Y
Calcium	0658 WL	11/15/2021	T	F	189	mg/L	F	0.05	Y
Chloride	0292A WL	6/22/2021	N	F	130	mg/L	F	1.5	Y
Chloride	0292A WL	11/15/2021	N	F	53.9	mg/L	F	6.70	Y
Chloride	0304 WL	6/22/2021	N	F	150	mg/L	F	0.76	Y
Chloride	0304 WL	11/15/2021	N	F	137	mg/L	F	6.70	Y
Chloride	0305 WL	6/23/2021	N	F	300	mg/L	FJ	1.5	Y
Chloride	0305 WL	11/15/2021	N	F	336	mg/L	F	6.70	Y
Chloride	0309 WL	6/22/2021	N	F	160	mg/L	F	1.5	Y
Chloride	0309 WL	11/15/2021	N	F	141	mg/L	F	6.70	Y
Chloride	0310 WL	6/22/2021	N	F	300	mg/L	FJ	1.5	Y
Chloride	0310 WL	11/15/2021	N	F	271	mg/L	F	6.70	Y
Chloride	0655 WL	6/23/2021	N	F	250	mg/L	F	1.5	Y
Chloride	0655 WL	11/15/2021	N	D	215	mg/L	F	6.70	Y
Chloride	0655 WL	11/15/2021	N	F	216	mg/L	F	6.70	Y
Chloride	0656 WL	6/22/2021	N	F	280	mg/L	FJ	1.5	Y
Chloride	0656 WL	11/15/2021	N	F	475	mg/L	F	6.70	Y
Chloride	0658 WL	6/22/2021	N	D	77	mg/L	FJ	0.76	Y
Chloride	0658 WL	6/22/2021	N	F	79	mg/L	F	0.76	Y
Chloride	0658 WL	11/15/2021	N	D	102	mg/L	F	6.70	Y
Chloride	0658 WL	11/15/2021	N	F	102	mg/L	F	6.70	Y
Dissolved Oxygen	0292A WL	6/22/2021	N	F	0.95	mg/L	F		Y
Dissolved Oxygen	0292A WL	11/15/2021	N	F	0.48	mg/L	F		Y
Dissolved Oxygen	0304 WL	6/22/2021	N	F	0.54	mg/L	F		Y
Dissolved Oxygen	0304 WL	11/15/2021	N	F	0.59	mg/L	FJ		Y
Dissolved Oxygen	0305 WL	6/23/2021	N	F	0.68	mg/L	F		Y
Dissolved Oxygen	0305 WL	11/15/2021	N	F	0.38	mg/L	FJ		Y
Dissolved Oxygen	0309 WL	6/22/2021	N	F	0.2	mg/L	F		Y

**Groundwater Quality Data by Parameter for Site RFO01, 2021 Sampling
Old Rifle, Colorado, Processing Site**

Report Date: 4/13/2022

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Dissolved Oxygen	0309 WL	11/15/2021	N	F	0.59	mg/L	F		Y
Dissolved Oxygen	0310 WL	6/22/2021	N	F	0.79	mg/L	F		Y
Dissolved Oxygen	0310 WL	11/15/2021	N	F	0.74	mg/L	F		Y
Dissolved Oxygen	0655 WL	6/23/2021	N	F	0.18	mg/L	F		Y
Dissolved Oxygen	0655 WL	11/15/2021	N	F	0.4	mg/L	F		Y
Dissolved Oxygen	0656 WL	6/22/2021	N	F	0.52	mg/L	F		Y
Dissolved Oxygen	0656 WL	11/15/2021	N	F	0.94	mg/L	FJ		Y
Dissolved Oxygen	0658 WL	6/22/2021	N	F	0.55	mg/L	F		Y
Dissolved Oxygen	0658 WL	11/15/2021	N	F	0.53	mg/L	F		Y
Magnesium	0292A WL	6/22/2021	T	F	110	mg/L	F	0.086	Y
Magnesium	0292A WL	11/15/2021	T	F	91.1	mg/L	F	0.11	Y
Magnesium	0304 WL	6/22/2021	T	F	100	mg/L	F	0.086	Y
Magnesium	0304 WL	11/15/2021	T	F	109	mg/L	F	0.11	Y
Magnesium	0305 WL	6/23/2021	T	F	94	mg/L	F	0.086	Y
Magnesium	0305 WL	11/15/2021	T	F	113	mg/L	F	0.11	Y
Magnesium	0309 WL	6/22/2021	T	F	130	mg/L	F	0.086	Y
Magnesium	0309 WL	11/15/2021	T	F	141	mg/L	F	0.11	Y
Magnesium	0310 WL	6/22/2021	T	F	110	mg/L	F	0.086	Y
Magnesium	0310 WL	11/15/2021	T	F	124	mg/L	F	0.11	Y
Magnesium	0655 WL	6/23/2021	T	F	150	mg/L	F	0.086	Y
Magnesium	0655 WL	11/15/2021	T	D	143	mg/L	F	0.11	Y
Magnesium	0655 WL	11/15/2021	T	F	142	mg/L	F	0.11	Y
Magnesium	0656 WL	6/22/2021	T	F	53	mg/L	F	0.086	Y
Magnesium	0656 WL	11/15/2021	T	F	63.8	mg/L	F	0.11	Y
Magnesium	0658 WL	6/22/2021	T	D	77	mg/L	F	0.086	Y
Magnesium	0658 WL	6/22/2021	T	F	79	mg/L	F	0.086	Y
Magnesium	0658 WL	11/15/2021	T	D	81.2	mg/L	F	0.11	Y
Magnesium	0658 WL	11/15/2021	T	F	80.8	mg/L	F	0.11	Y
Nitrate + Nitrite as Nitrogen	0292A WL	6/22/2021	N	F	0.0056	mg/L	U F	0.0056	Y
Nitrate + Nitrite as Nitrogen	0292A WL	11/15/2021	N	F	0.017	mg/L	U F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0304 WL	11/15/2021	N	F	0.017	mg/L	U F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0305 WL	6/23/2021	N	F	0.056	mg/L	U FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0305 WL	11/15/2021	N	F	0.017	mg/L	U F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0309 WL	6/22/2021	N	F	0.0056	mg/L	U F	0.0056	Y
Nitrate + Nitrite as Nitrogen	0309 WL	11/15/2021	N	F	0.017	mg/L	U F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0310 WL	6/22/2021	N	F	0.0056	mg/L	U F	0.0056	Y
Nitrate + Nitrite as Nitrogen	0310 WL	11/15/2021	N	F	0.017	mg/L	U F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0655 WL	6/23/2021	N	F	2	mg/L	FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0655 WL	11/15/2021	N	D	1.49	mg/L	F	0.0850	Y
Nitrate + Nitrite as Nitrogen	0655 WL	11/15/2021	N	F	1.5	mg/L	F	0.0850	Y
Nitrate + Nitrite as Nitrogen	0656 WL	6/22/2021	N	F	0.054	mg/L	FU	0.0056	Y
Nitrate + Nitrite as Nitrogen	0656 WL	11/15/2021	N	F	0.101	mg/L	F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0658 WL	6/22/2021	N	D	0.15	mg/L	J F	0.056	Y
Nitrate + Nitrite as Nitrogen	0658 WL	6/22/2021	N	F	0.22	mg/L	F	0.0056	Y
Nitrate + Nitrite as Nitrogen	0658 WL	11/15/2021	N	D	0.679	mg/L	F	0.0170	Y
Nitrate + Nitrite as Nitrogen	0658 WL	11/15/2021	N	F	0.692	mg/L	F	0.0170	Y
Oxidation Reduction Potential	0292A WL	6/22/2021	N	F	-44.7	mV	F		Y
Oxidation Reduction Potential	0292A WL	11/15/2021	N	F	-204.8	mV	F		Y
Oxidation Reduction Potential	0304 WL	6/22/2021	N	F	-48.6	mV	F		Y
Oxidation Reduction Potential	0304 WL	11/15/2021	N	F	-27	mV	F		Y
Oxidation Reduction Potential	0305 WL	6/23/2021	N	F	77.1	mV	F		Y
Oxidation Reduction Potential	0305 WL	11/15/2021	N	F	24.8	mV	F		Y
Oxidation Reduction Potential	0309 WL	6/22/2021	N	F	-59.9	mV	F		Y
Oxidation Reduction Potential	0309 WL	11/15/2021	N	F	-69.8	mV	F		Y
Oxidation Reduction Potential	0310 WL	6/22/2021	N	F	-69.4	mV	F		Y
Oxidation Reduction Potential	0310 WL	11/15/2021	N	F	-145.2	mV	F		Y
Oxidation Reduction Potential	0655 WL	6/23/2021	N	F	-34.5	mV	F		Y
Oxidation Reduction Potential	0655 WL	11/15/2021	N	F	-69.8	mV	F		Y
Oxidation Reduction Potential	0656 WL	6/22/2021	N	F	81.5	mV	F		Y
Oxidation Reduction Potential	0656 WL	11/15/2021	N	F	51.3	mV	F		Y
Oxidation Reduction Potential	0658 WL	6/22/2021	N	F	71.6	mV	F		Y

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Oxidation Reduction Potential	0658 WL	11/15/2021	N	F	80.3	mV	F		Y
Percent Dissolved Oxygen	0292A WL	6/22/2021	N	F	9.3	%	F		Y
Percent Dissolved Oxygen	0292A WL	11/15/2021	N	F	4.7	%	F		Y
Percent Dissolved Oxygen	0304 WL	6/22/2021	N	F	5.3	%	F		Y
Percent Dissolved Oxygen	0304 WL	11/15/2021	N	F	5.9	%	F		Y
Percent Dissolved Oxygen	0305 WL	6/23/2021	N	F	6.5	%	F		Y
Percent Dissolved Oxygen	0305 WL	11/15/2021	N	F	3.9	%	F		Y
Percent Dissolved Oxygen	0309 WL	6/22/2021	N	F	2.1	%	F		Y
Percent Dissolved Oxygen	0309 WL	11/15/2021	N	F	5.9	%	F		Y
Percent Dissolved Oxygen	0310 WL	6/22/2021	N	F	8	%	F		Y
Percent Dissolved Oxygen	0310 WL	11/15/2021	N	F	7.5	%	F		Y
Percent Dissolved Oxygen	0655 WL	6/23/2021	N	F	1.8	%	F		Y
Percent Dissolved Oxygen	0655 WL	11/15/2021	N	F	4	%	F		Y
Percent Dissolved Oxygen	0656 WL	6/22/2021	N	F	5.6	%	F		Y
Percent Dissolved Oxygen	0656 WL	11/15/2021	N	F	10.2	%	F		Y
Percent Dissolved Oxygen	0658 WL	6/22/2021	N	F	5	%	F		Y
Percent Dissolved Oxygen	0658 WL	11/15/2021	N	F	4.8	%	F		Y
pH	0292A WL	6/22/2021	N	F	6.8	s.u.	F		Y
pH	0292A WL	11/15/2021	N	F	7.09	s.u.	F		Y
pH	0304 WL	6/22/2021	N	F	7.02	s.u.	F		Y
pH	0304 WL	11/15/2021	N	F	7.09	s.u.	F		Y
pH	0305 WL	6/23/2021	N	F	6.81	s.u.	F		Y
pH	0305 WL	11/15/2021	N	F	6.96	s.u.	F		Y
pH	0309 WL	6/22/2021	N	F	7.01	s.u.	F		Y
pH	0309 WL	11/15/2021	N	F	7.11	s.u.	F		Y
pH	0310 WL	6/22/2021	N	F	6.96	s.u.	F		Y
pH	0310 WL	11/15/2021	N	F	7.1	s.u.	F		Y
pH	0655 WL	6/23/2021	N	F	6.78	s.u.	F		Y
pH	0655 WL	11/15/2021	N	F	7.03	s.u.	F		Y
pH	0656 WL	6/22/2021	N	F	7.06	s.u.	F		Y
pH	0656 WL	11/15/2021	N	F	7.2	s.u.	F		Y
pH	0658 WL	6/22/2021	N	F	6.72	s.u.	F		Y
pH	0658 WL	11/15/2021	N	F	6.95	s.u.	F		Y
Potassium	0292A WL	6/22/2021	T	F	10	mg/L	F	0.33	Y
Potassium	0292A WL	11/15/2021	T	F	3.54	mg/L	J F	0.05	Y
Potassium	0304 WL	6/22/2021	T	F	9.2	mg/L	F	0.33	Y
Potassium	0304 WL	11/15/2021	T	F	6.68	mg/L	F	0.05	Y
Potassium	0305 WL	6/23/2021	T	F	9.3	mg/L	F	0.33	Y
Potassium	0305 WL	11/15/2021	T	F	6.95	mg/L	F	0.05	Y
Potassium	0309 WL	6/22/2021	T	F	10	mg/L	F	0.33	Y
Potassium	0309 WL	11/15/2021	T	F	7.13	mg/L	F	0.05	Y
Potassium	0310 WL	6/22/2021	T	F	15	mg/L	F	0.33	Y
Potassium	0310 WL	11/15/2021	T	F	10.6	mg/L	F	0.05	Y
Potassium	0655 WL	6/23/2021	T	F	15	mg/L	F	0.33	Y
Potassium	0655 WL	11/15/2021	T	D	10.2	mg/L	F	0.05	Y
Potassium	0655 WL	11/15/2021	T	F	10.1	mg/L	F	0.05	Y
Potassium	0656 WL	6/22/2021	T	F	14	mg/L	F	0.33	Y
Potassium	0656 WL	11/15/2021	T	F	11.3	mg/L	F	0.05	Y
Potassium	0658 WL	6/22/2021	T	D	5	mg/L	F	0.33	Y
Potassium	0658 WL	6/22/2021	T	F	5.2	mg/L	F	0.33	Y
Potassium	0658 WL	11/15/2021	T	D	3.85	mg/L	J F	0.05	Y
Potassium	0658 WL	11/15/2021	T	F	3.85	mg/L	J F	0.05	Y
Selenium	0292A WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0292A WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0304 WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0304 WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0305 WL	6/23/2021	T	F	0.017	mg/L	F	0.0028	Y
Selenium	0305 WL	11/15/2021	T	F	0.0159	mg/L	F	0.0015	Y
Selenium	0309 WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0309 WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0310 WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y

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Selenium	0310 WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0655 WL	6/23/2021	T	F	0.076	mg/L	F	0.0028	Y
Selenium	0655 WL	11/15/2021	T	D	0.0559	mg/L	F	0.0015	Y
Selenium	0655 WL	11/15/2021	T	F	0.0562	mg/L	F	0.0015	Y
Selenium	0656 WL	6/22/2021	T	F	0.0038	mg/L	J F	0.0028	Y
Selenium	0656 WL	11/15/2021	T	F	0.00156	mg/L	J F	0.0015	Y
Selenium	0658 WL	6/22/2021	T	D	0.023	mg/L	F	0.0028	Y
Selenium	0658 WL	6/22/2021	T	F	0.024	mg/L	F	0.0028	Y
Selenium	0658 WL	11/15/2021	T	D	0.0204	mg/L	F	0.0015	Y
Selenium	0658 WL	11/15/2021	T	F	0.0209	mg/L	F	0.0015	Y
Sodium	0292A WL	6/22/2021	T	F	290	mg/L	F	3.6	Y
Sodium	0292A WL	11/15/2021	T	F	179	mg/L	J F	0.1	Y
Sodium	0304 WL	6/22/2021	T	F	170	mg/L	F	3.6	Y
Sodium	0304 WL	11/15/2021	T	F	190	mg/L	J F	0.1	Y
Sodium	0305 WL	6/23/2021	T	F	250	mg/L	F	3.6	Y
Sodium	0305 WL	11/15/2021	T	F	293	mg/L	J F	0.1	Y
Sodium	0309 WL	6/22/2021	T	F	220	mg/L	F	3.6	Y
Sodium	0309 WL	11/15/2021	T	F	205	mg/L	J F	0.1	Y
Sodium	0310 WL	6/22/2021	T	F	250	mg/L	F	3.6	Y
Sodium	0310 WL	11/15/2021	T	F	261	mg/L	J F	0.1	Y
Sodium	0655 WL	6/23/2021	T	F	290	mg/L	F	3.6	Y
Sodium	0655 WL	11/15/2021	T	D	304	mg/L	J F	0.1	Y
Sodium	0655 WL	11/15/2021	T	F	304	mg/L	J F	0.1	Y
Sodium	0656 WL	6/22/2021	T	F	210	mg/L	F	3.6	Y
Sodium	0656 WL	11/15/2021	T	F	338	mg/L	J F	0.1	Y
Sodium	0658 WL	6/22/2021	T	D	100	mg/L	F	0.36	Y
Sodium	0658 WL	6/22/2021	T	F	110	mg/L	F	0.36	Y
Sodium	0658 WL	11/15/2021	T	D	138	mg/L	J F	0.1	Y
Sodium	0658 WL	11/15/2021	T	F	141	mg/L	J F	0.1	Y
Specific Conductance	0292A WL	6/22/2021	N	F	2679	umhos/cm	F		Y
Specific Conductance	0292A WL	11/15/2021	N	F	1859	umhos/cm	F		Y
Specific Conductance	0304 WL	6/22/2021	N	F	2498	umhos/cm	F		Y
Specific Conductance	0304 WL	11/15/2021	N	F	2411	umhos/cm	F		Y
Specific Conductance	0305 WL	6/23/2021	N	F	2581	umhos/cm	F		Y
Specific Conductance	0305 WL	11/15/2021	N	F	2932	umhos/cm	F		Y
Specific Conductance	0309 WL	6/22/2021	N	F	2530	umhos/cm	F		Y
Specific Conductance	0309 WL	11/15/2021	N	F	2338	umhos/cm	F		Y
Specific Conductance	0310 WL	6/22/2021	N	F	2758	umhos/cm	F		Y
Specific Conductance	0310 WL	11/15/2021	N	F	2859	umhos/cm	F		Y
Specific Conductance	0655 WL	6/23/2021	N	F	3024	umhos/cm	F		Y
Specific Conductance	0655 WL	11/15/2021	N	F	2926	umhos/cm	F		Y
Specific Conductance	0656 WL	6/22/2021	N	F	1862	umhos/cm	F		Y
Specific Conductance	0656 WL	11/15/2021	N	F	2499	umhos/cm	F		Y
Specific Conductance	0658 WL	6/22/2021	N	F	1769	umhos/cm	F		Y
Specific Conductance	0658 WL	11/15/2021	N	F	1839	umhos/cm	F		Y
Sulfate	0292A WL	6/22/2021	N	F	950	mg/L	F	11	Y
Sulfate	0292A WL	11/15/2021	N	F	470	mg/L	F	13.3	Y
Sulfate	0304 WL	6/22/2021	N	F	870	mg/L	F	5.3	Y
Sulfate	0304 WL	11/15/2021	N	F	813	mg/L	F	13.3	Y
Sulfate	0305 WL	6/23/2021	N	F	690	mg/L	F	5.3	Y
Sulfate	0305 WL	11/15/2021	N	F	695	mg/L	F	13.3	Y
Sulfate	0309 WL	6/22/2021	N	F	940	mg/L	F	11	Y
Sulfate	0309 WL	11/15/2021	N	F	850	mg/L	F	13.3	Y
Sulfate	0310 WL	6/22/2021	N	F	770	mg/L	F	5.3	Y
Sulfate	0310 WL	11/15/2021	N	F	795	mg/L	F	13.3	Y
Sulfate	0655 WL	6/23/2021	N	F	1000	mg/L	F	11	Y
Sulfate	0655 WL	11/15/2021	N	D	922	mg/L	F	13.3	Y
Sulfate	0655 WL	11/15/2021	N	F	924	mg/L	F	13.3	Y
Sulfate	0656 WL	6/22/2021	N	F	290	mg/L	F	2.6	Y
Sulfate	0656 WL	11/15/2021	N	F	278	mg/L	F	13.3	Y
Sulfate	0658 WL	6/22/2021	N	D	440	mg/L	FJ	5.3	Y

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Sulfate	0658 WL	6/22/2021	N	F	440	mg/L	F	5.3	Y
Sulfate	0658 WL	11/15/2021	N	D	391	mg/L	F	13.3	Y
Sulfate	0658 WL	11/15/2021	N	F	387	mg/L	F	13.3	Y
Temperature	0292A WL	6/22/2021	N	F	13.95	C	F		Y
Temperature	0292A WL	11/15/2021	N	F	14.59	C	F		Y
Temperature	0304 WL	6/22/2021	N	F	14.21	C	F		Y
Temperature	0304 WL	11/15/2021	N	F	14.65	C	F		Y
Temperature	0305 WL	6/23/2021	N	F	13.36	C	F		Y
Temperature	0305 WL	11/15/2021	N	F	15.71	C	F		Y
Temperature	0309 WL	6/22/2021	N	F	16.9	C	F		Y
Temperature	0309 WL	11/15/2021	N	F	15.36	C	F		Y
Temperature	0310 WL	6/22/2021	N	F	15.55	C	F		Y
Temperature	0310 WL	11/15/2021	N	F	15.32	C	F		Y
Temperature	0655 WL	6/23/2021	N	F	13.11	C	F		Y
Temperature	0655 WL	11/15/2021	N	F	14.9	C	F		Y
Temperature	0656 WL	6/22/2021	N	F	18.31	C	F		Y
Temperature	0656 WL	11/15/2021	N	F	18.68	C	F		Y
Temperature	0658 WL	6/22/2021	N	F	10.29	C	F		Y
Temperature	0658 WL	11/15/2021	N	F	11.45	C	F		Y
Turbidity	0292A WL	6/22/2021	N	F	5.52	NTU	F		Y
Turbidity	0292A WL	11/15/2021	N	F	1.88	NTU	F		Y
Turbidity	0304 WL	6/22/2021	N	F	1.48	NTU	F		Y
Turbidity	0304 WL	11/15/2021	N	F	1.55	NTU	F		Y
Turbidity	0305 WL	6/23/2021	N	F	1.64	NTU	F		Y
Turbidity	0305 WL	11/15/2021	N	F	0.76	NTU	F		Y
Turbidity	0309 WL	6/22/2021	N	F	7.21	NTU	F		Y
Turbidity	0309 WL	11/15/2021	N	F	0.79	NTU	F		Y
Turbidity	0310 WL	6/22/2021	N	F	5.24	NTU	F		Y
Turbidity	0310 WL	11/15/2021	N	F	1.86	NTU	F		Y
Turbidity	0655 WL	6/23/2021	N	F	4.11	NTU	F		Y
Turbidity	0655 WL	11/15/2021	N	F	0.57	NTU	F		Y
Turbidity	0656 WL	6/22/2021	N	F	3.42	NTU	F		Y
Turbidity	0656 WL	11/15/2021	N	F	2.28	NTU	F		Y
Turbidity	0658 WL	6/22/2021	N	F	4.08	NTU	F		Y
Turbidity	0658 WL	11/15/2021	N	F	8.09	NTU	F		Y
Uranium	0292A WL	6/22/2021	T	F	0.034	mg/L	F	0.000040	Y
Uranium	0292A WL	11/15/2021	T	F	0.0125	mg/L	F	0.000067	Y
Uranium	0304 WL	6/22/2021	T	F	0.053	mg/L	F	0.000040	Y
Uranium	0304 WL	11/15/2021	T	F	0.0688	mg/L	F	0.000067	Y
Uranium	0305 WL	6/23/2021	T	F	0.083	mg/L	F	0.000040	Y
Uranium	0305 WL	11/15/2021	T	F	0.116	mg/L	F	0.000067	Y
Uranium	0309 WL	6/22/2021	T	F	0.016	mg/L	F	0.000040	Y
Uranium	0309 WL	11/15/2021	T	F	0.0167	mg/L	F	0.000067	Y
Uranium	0310 WL	6/22/2021	T	F	0.084	mg/L	F	0.000040	Y
Uranium	0310 WL	11/15/2021	T	F	0.0926	mg/L	F	0.000067	Y
Uranium	0655 WL	6/23/2021	T	F	0.14	mg/L	F	0.000040	Y
Uranium	0655 WL	11/15/2021	T	D	0.133	mg/L	F	0.000067	Y
Uranium	0655 WL	11/15/2021	T	F	0.133	mg/L	F	0.000067	Y
Uranium	0656 WL	6/22/2021	T	F	0.14	mg/L	F	0.000040	Y
Uranium	0656 WL	11/15/2021	T	F	0.1	mg/L	F	0.000067	Y
Uranium	0658 WL	6/22/2021	T	D	0.0088	mg/L	F	0.000040	Y
Uranium	0658 WL	6/22/2021	T	F	0.0092	mg/L	F	0.000040	Y
Uranium	0658 WL	11/15/2021	T	D	0.011	mg/L	F	0.000067	Y
Uranium	0658 WL	11/15/2021	T	F	0.0113	mg/L	F	0.000067	Y
Vanadium	0292A WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0292A WL	11/15/2021	T	F	0.0033	mg/L	U FJ	0.0033	Y
Vanadium	0304 WL	6/22/2021	T	F	0.015	mg/L	F	0.0010	Y
Vanadium	0304 WL	11/15/2021	T	F	0.017	mg/L	J FU	0.0033	Y
Vanadium	0305 WL	6/23/2021	T	F	0.35	mg/L	F	0.0010	Y
Vanadium	0305 WL	11/15/2021	T	F	0.504	mg/L	F	0.0033	Y
Vanadium	0309 WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y

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Vanadium	0309	WL	11/15/2021	T	F	0.0033	mg/L	U	FJ	0.0033	Y
Vanadium	0310	WL	6/22/2021	T	F	0.0058	mg/L		F	0.0010	Y
Vanadium	0310	WL	11/15/2021	T	F	0.00383	mg/L	J	FJU	0.0033	Y
Vanadium	0655	WL	6/23/2021	T	F	0.25	mg/L		F	0.0010	Y
Vanadium	0655	WL	11/15/2021	T	D	0.307	mg/L		F	0.0033	Y
Vanadium	0655	WL	11/15/2021	T	F	0.295	mg/L		F	0.0033	Y
Vanadium	0656	WL	6/22/2021	T	F	0.057	mg/L		F	0.0010	Y
Vanadium	0656	WL	11/15/2021	T	F	0.0959	mg/L		F	0.0033	Y
Vanadium	0658	WL	6/22/2021	T	D	0.001	mg/L	U	F	0.0010	Y
Vanadium	0658	WL	6/22/2021	T	F	0.001	mg/L	U	F	0.0010	Y
Vanadium	0658	WL	11/15/2021	T	D	0.0033	mg/L	U	FJ	0.0033	Y
Vanadium	0658	WL	11/15/2021	T	F	0.0033	mg/L	U	FJ	0.0033	Y

Location Type

WL Well

Sample Type

F Field Sample
D Duplicate

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

Data Qualifiers

F Low flow sampling method used. Estimated
J Estimated value
U Parameter analyzed for but was not detected.

Lab Qualifiers

J Estimated value
U Parameter analyzed for but was not detected.

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

**Surface Water Quality Data by Parameter for Site RFO01, 2021 Sampling,
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PARAMETER	LOCATION CODE /		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTIO N	QA
Alkalinity, Total (As CaCO3)	0294	SL	6/22/2021	N	F	101	mg/L			Y
Alkalinity, Total (As CaCO3)	0294	SL	11/15/2021	N	F	125	mg/L			Y
Alkalinity, Total (As CaCO3)	0395	SL	6/22/2021	D	F	272	mg/L			Y
Alkalinity, Total (As CaCO3)	0395	SL	11/15/2021	D	F	266	mg/L			Y
Alkalinity, Total (As CaCO3)	0396	SL	6/23/2021	N	F	92	mg/L			Y
Alkalinity, Total (As CaCO3)	0396	SL	11/17/2021	N	F	143	mg/L			Y
Alkalinity, Total (As CaCO3)	0398	SL	6/22/2021	D	F	308	mg/L			Y
Alkalinity, Total (As CaCO3)	0398	SL	11/15/2021	N	F	342	mg/L			Y
Alkalinity, Total (As CaCO3)	0741	SL	6/23/2021	N	F	100	mg/L			Y
Alkalinity, Total (As CaCO3)	0741	SL	11/17/2021	N	F	109	mg/L			Y
Calcium	0294	SL	6/22/2021	T	F	52	mg/L		0.094	Y
Calcium	0294	SL	11/15/2021	T	F	70.2	mg/L		0.05	Y
Calcium	0395	SL	6/22/2021	D	F	91	mg/L		0.094	Y
Calcium	0395	SL	11/15/2021	D	F	125	mg/L		0.05	Y
Calcium	0396	SL	6/23/2021	T	F	53	mg/L		0.094	Y
Calcium	0396	SL	11/17/2021	T	F	68.1	mg/L		0.05	Y
Calcium	0398	SL	6/22/2021	D	F	210	mg/L		0.094	Y
Calcium	0398	SL	11/15/2021	T	F	197	mg/L		0.05	Y
Calcium	0741	SL	6/23/2021	T	F	54	mg/L		0.094	Y
Calcium	0741	SL	11/17/2021	T	F	71	mg/L		0.05	Y
Chloride	0294	SL	6/22/2021	N	F	130	mg/L	J	0.76	Y
Chloride	0294	SL	11/15/2021	N	F	182	mg/L		6.70	Y
Chloride	0395	SL	6/22/2021	N	F	20	mg/L		0.38	Y
Chloride	0395	SL	11/15/2021	N	F	53.5	mg/L		6.70	Y
Chloride	0396	SL	6/23/2021	N	F	120	mg/L	J	0.76	Y
Chloride	0396	SL	11/17/2021	N	F	173	mg/L		6.70	Y
Chloride	0398	SL	6/22/2021	N	F	130	mg/L		0.76	Y
Chloride	0398	SL	11/15/2021	N	F	106	mg/L		6.70	Y
Chloride	0741	SL	6/23/2021	N	F	120	mg/L	J	0.76	Y
Chloride	0741	SL	11/17/2021	N	F	175	mg/L		6.70	Y
Dissolved Oxygen	0294	SL	6/22/2021	N	F	9.15	mg/L			Y
Dissolved Oxygen	0294	SL	11/15/2021	N	F	12.81	mg/L			Y
Dissolved Oxygen	0395	SL	6/22/2021	N	F	6.9	mg/L			Y
Dissolved Oxygen	0395	SL	11/15/2021	N	F	10.64	mg/L	J		Y
Dissolved Oxygen	0396	SL	6/23/2021	N	F	8.43	mg/L			Y
Dissolved Oxygen	0396	SL	11/17/2021	N	F	10.18	mg/L			Y
Dissolved Oxygen	0398	SL	6/22/2021	N	F	7.52	mg/L			Y
Dissolved Oxygen	0398	SL	11/15/2021	N	F	9.2	mg/L	J		Y
Dissolved Oxygen	0741	SL	6/23/2021	N	F	8.77	mg/L			Y
Dissolved Oxygen	0741	SL	11/17/2021	N	F	10.3	mg/L			Y
Magnesium	0294	SL	6/22/2021	T	F	9.5	mg/L		0.086	Y
Magnesium	0294	SL	11/15/2021	T	F	14.7	mg/L		0.11	Y
Magnesium	0395	SL	6/22/2021	D	F	57	mg/L		0.086	Y
Magnesium	0395	SL	11/15/2021	D	F	79.4	mg/L		0.11	Y
Magnesium	0396	SL	6/23/2021	T	F	9.8	mg/L		0.086	Y
Magnesium	0396	SL	11/17/2021	T	F	14.4	mg/L		0.11	Y
Magnesium	0398	SL	6/22/2021	D	F	100	mg/L		0.086	Y
Magnesium	0398	SL	11/15/2021	T	F	105	mg/L		0.11	Y
Magnesium	0741	SL	6/23/2021	T	F	9.9	mg/L		0.086	Y
Magnesium	0741	SL	11/17/2021	T	F	15	mg/L		0.11	Y
Nitrate + Nitrite as Nitrogen	0294	SL	6/22/2021	N	F	0.0056	mg/L	U	0.0056	Y
Nitrate + Nitrite as Nitrogen	0294	SL	11/15/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0395	SL	6/22/2021	N	F	0.0056	mg/L	U	0.0056	Y

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Nitrate + Nitrite as Nitrogen	0395	SL	11/15/2021	N	F	0.486	mg/L		0.0170	Y
Nitrate + Nitrite as Nitrogen	0396	SL	6/23/2021	N	F	0.056	mg/L	U J	0.056	Y
Nitrate + Nitrite as Nitrogen	0396	SL	11/17/2021	N	F	0.0173	mg/L	J	0.0170	Y
Nitrate + Nitrite as Nitrogen	0398	SL	6/22/2021	N	F	1.5	mg/L		0.0056	Y
Nitrate + Nitrite as Nitrogen	0398	SL	11/15/2021	N	F	1.41	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0741	SL	6/23/2021	N	F	0.056	mg/L	U J	0.056	Y
Nitrate + Nitrite as Nitrogen	0741	SL	11/17/2021	N	F	0.017	mg/L	U	0.0170	Y
Oxidation Reduction Potential	0294	SL	6/22/2021	N	F	78.2	mV			Y
Oxidation Reduction Potential	0294	SL	11/15/2021	N	F	23.4	mV			Y
Oxidation Reduction Potential	0395	SL	6/22/2021	N	F	58.6	mV			Y
Oxidation Reduction Potential	0395	SL	11/15/2021	N	F	73.2	mV			Y
Oxidation Reduction Potential	0396	SL	6/23/2021	N	F	25.9	mV			Y
Oxidation Reduction Potential	0396	SL	11/17/2021	N	F	219	mV			Y
Oxidation Reduction Potential	0398	SL	6/22/2021	N	F	86.2	mV			Y
Oxidation Reduction Potential	0398	SL	11/15/2021	N	F	63.8	mV			Y
Oxidation Reduction Potential	0741	SL	6/23/2021	N	F	49.9	mV			Y
Oxidation Reduction Potential	0741	SL	11/17/2021	N	F	229.2	mV			Y
Percent Dissolved Oxygen	0294	SL	6/22/2021	N	F	100.6	%			Y
Percent Dissolved Oxygen	0294	SL	11/15/2021	N	F	120.3	%			Y
Percent Dissolved Oxygen	0395	SL	6/22/2021	N	F	81.9	%			Y
Percent Dissolved Oxygen	0395	SL	11/15/2021	N	F	104	%			Y
Percent Dissolved Oxygen	0396	SL	11/17/2021	N	F	88.5	%			Y
Percent Dissolved Oxygen	0398	SL	6/22/2021	N	F	80.7	%			Y
Percent Dissolved Oxygen	0398	SL	11/15/2021	N	F	88.6	%			Y
Percent Dissolved Oxygen	0741	SL	11/17/2021	N	F	85.1	%			Y
pH	0294	SL	6/22/2021	N	F	8.35	s.u.			Y
pH	0294	SL	11/15/2021	N	F	8.37	s.u.			Y
pH	0395	SL	6/22/2021	N	F	7.89	s.u.			Y
pH	0395	SL	11/15/2021	N	F	7.87	s.u.			Y
pH	0396	SL	6/23/2021	N	F	8.27	s.u.			Y
pH	0396	SL	11/17/2021	N	F	8.19	s.u.			Y
pH	0398	SL	6/22/2021	N	F	8.08	s.u.			Y
pH	0398	SL	11/15/2021	N	F	8.24	s.u.			Y
pH	0741	SL	6/23/2021	N	F	8.25	s.u.			Y
pH	0741	SL	11/17/2021	N	F	8.2	s.u.			Y
Potassium	0294	SL	6/22/2021	T	F	3.5	mg/L		0.33	Y
Potassium	0294	SL	11/15/2021	T	F	4.12	mg/L	J	0.05	Y
Potassium	0395	SL	6/22/2021	D	F	3.5	mg/L		0.33	Y
Potassium	0395	SL	11/15/2021	D	F	2.69	mg/L	J	0.05	Y
Potassium	0396	SL	6/23/2021	T	F	3.5	mg/L		0.33	Y
Potassium	0396	SL	11/17/2021	T	F	3.95	mg/L	J	0.05	Y
Potassium	0398	SL	6/22/2021	D	F	6.4	mg/L		0.33	Y
Potassium	0398	SL	11/15/2021	T	F	4.05	mg/L	J	0.05	Y
Potassium	0741	SL	6/23/2021	T	F	3.5	mg/L		0.33	Y
Potassium	0741	SL	11/17/2021	T	F	4.11	mg/L	J	0.05	Y
Selenium	0294	SL	6/22/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0294	SL	11/15/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0395	SL	6/22/2021	D	F	0.0028	mg/L	U	0.0028	Y
Selenium	0395	SL	11/15/2021	D	F	0.00637	mg/L		0.0015	Y
Selenium	0396	SL	6/23/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0396	SL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0398	SL	6/22/2021	D	F	0.0061	mg/L	J	0.0028	Y
Selenium	0398	SL	11/15/2021	T	F	0.00826	mg/L		0.0015	Y

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Selenium	0741	SL	6/23/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0741	SL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Sodium	0294	SL	6/22/2021	T	F	70	mg/L		0.36	Y
Sodium	0294	SL	11/15/2021	T	F	139	mg/L	J	0.1	Y
Sodium	0395	SL	6/22/2021	D	F	50	mg/L		0.36	Y
Sodium	0395	SL	11/15/2021	D	F	63.1	mg/L	J	0.1	Y
Sodium	0396	SL	6/23/2021	T	F	70	mg/L		0.36	Y
Sodium	0396	SL	11/17/2021	T	F	130	mg/L	J	0.1	Y
Sodium	0398	SL	6/22/2021	D	F	180	mg/L		3.6	Y
Sodium	0398	SL	11/15/2021	T	F	165	mg/L	J	0.1	Y
Sodium	0741	SL	6/23/2021	T	F	71	mg/L		0.36	Y
Sodium	0741	SL	11/17/2021	T	F	135	mg/L	J	0.1	Y
Specific Conductance	0294	SL	6/22/2021	N	F	757	umhos/cm			Y
Specific Conductance	0294	SL	11/15/2021	N	F	1013	umhos/cm			Y
Specific Conductance	0395	SL	6/22/2021	N	F	1005	umhos/cm			Y
Specific Conductance	0395	SL	11/15/2021	N	F	1341	umhos/cm			Y
Specific Conductance	0396	SL	6/23/2021	N	F	776	umhos/cm			Y
Specific Conductance	0396	SL	11/17/2021	N	F	1079	umhos/cm			Y
Specific Conductance	0398	SL	6/22/2021	N	F	2151	umhos/cm			Y
Specific Conductance	0398	SL	11/15/2021	N	F	2009	umhos/cm			Y
Specific Conductance	0741	SL	6/23/2021	N	F	737	umhos/cm			Y
Specific Conductance	0741	SL	11/17/2021	N	F	1069	umhos/cm			Y
Sulfate	0294	SL	6/22/2021	N	F	71	mg/L		1.1	Y
Sulfate	0294	SL	11/15/2021	N	F	109	mg/L		13.3	Y
Sulfate	0395	SL	6/22/2021	N	F	250	mg/L		2.6	Y
Sulfate	0395	SL	11/15/2021	N	F	389	mg/L		13.3	Y
Sulfate	0396	SL	6/23/2021	N	F	72	mg/L		1.1	Y
Sulfate	0396	SL	11/17/2021	N	F	109	mg/L		13.3	Y
Sulfate	0398	SL	6/22/2021	N	F	780	mg/L		5.3	Y
Sulfate	0398	SL	11/15/2021	N	F	658	mg/L		13.3	Y
Sulfate	0741	SL	6/23/2021	N	F	71	mg/L		1.1	Y
Sulfate	0741	SL	11/17/2021	N	F	108	mg/L		13.3	Y
Temperature	0294	SL	6/22/2021	N	F	19.86	C			Y
Temperature	0294	SL	11/15/2021	N	F	12.41	C			Y
Temperature	0395	SL	6/22/2021	N	F	23.85	C			Y
Temperature	0395	SL	11/15/2021	N	F	14.14	C			Y
Temperature	0396	SL	6/23/2021	N	F	17.64	C			Y
Temperature	0396	SL	11/17/2021	N	F	7.42	C			Y
Temperature	0398	SL	6/22/2021	N	F	18.46	C			Y
Temperature	0398	SL	11/15/2021	N	F	13.4	C			Y
Temperature	0741	SL	6/23/2021	N	F	17.48	C			Y
Temperature	0741	SL	11/17/2021	N	F	8.07	C			Y
Turbidity	0294	SL	6/22/2021	N	F	8.21	NTU			Y
Turbidity	0294	SL	11/15/2021	N	F	3.43	NTU			Y
Turbidity	0395	SL	6/22/2021	N	F	50.2	NTU			Y
Turbidity	0395	SL	11/15/2021	N	F	17.2	NTU			Y
Turbidity	0396	SL	6/23/2021	N	F	4.33	NTU			Y
Turbidity	0396	SL	11/17/2021	N	F	7.16	NTU			Y
Turbidity	0398	SL	6/22/2021	N	F	128	NTU			Y
Turbidity	0398	SL	11/15/2021	N	F	3.06	NTU			Y
Turbidity	0741	SL	6/23/2021	N	F	4.67	NTU			Y
Turbidity	0741	SL	11/17/2021	N	F	7.13	NTU			Y
Uranium	0294	SL	6/22/2021	T	F	0.0012	mg/L		0.000040	Y

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Uranium	0294	SL	11/15/2021	T	F	0.00215	mg/L		0.000067	Y
Uranium	0395	SL	6/22/2021	D	F	0.017	mg/L		0.000040	Y
Uranium	0395	SL	11/15/2021	D	F	0.0255	mg/L		0.000067	Y
Uranium	0396	SL	6/23/2021	T	F	0.0012	mg/L		0.000040	Y
Uranium	0396	SL	11/17/2021	T	F	0.00212	mg/L		0.000067	Y
Uranium	0398	SL	6/22/2021	D	F	0.032	mg/L		0.000040	Y
Uranium	0398	SL	11/15/2021	T	F	0.034	mg/L		0.000067	Y
Uranium	0741	SL	6/23/2021	T	F	0.0012	mg/L		0.000040	Y
Uranium	0741	SL	11/17/2021	T	F	0.00202	mg/L		0.000067	Y
Vanadium	0294	SL	6/22/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0294	SL	11/15/2021	T	F	0.0033	mg/L	U J	0.0033	Y
Vanadium	0395	SL	6/22/2021	D	F	0.0011	mg/L	J	0.0010	Y
Vanadium	0395	SL	11/15/2021	D	F	0.0033	mg/L	U J	0.0033	Y
Vanadium	0396	SL	6/23/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0396	SL	11/17/2021	T	F	0.0033	mg/L	U J	0.0033	Y
Vanadium	0398	SL	6/22/2021	D	F	0.0082	mg/L		0.0010	Y
Vanadium	0398	SL	11/15/2021	T	F	0.0033	mg/L	U J	0.0033	Y
Vanadium	0741	SL	6/23/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0741	SL	11/17/2021	T	F	0.0033	mg/L	U J	0.0033	Y
Selenium	0305	WL	11/15/2021	T	F	0.0159	mg/L		F 0.0015	Y
Selenium	0309	WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0309	WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0310	WL	6/22/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0310	WL	11/15/2021	T	F	0.0015	mg/L	U F	0.0015	Y
Selenium	0655	WL	6/23/2021	T	F	0.076	mg/L		F 0.0028	Y
Selenium	0655	WL	11/15/2021	T	D	0.0559	mg/L		F 0.0015	Y
Selenium	0655	WL	11/15/2021	T	F	0.0562	mg/L		F 0.0015	Y
Selenium	0656	WL	6/22/2021	T	F	0.0038	mg/L	J F	0.0028	Y
Selenium	0656	WL	11/15/2021	T	F	0.00156	mg/L	J F	0.0015	Y
Selenium	0658	WL	6/22/2021	T	D	0.023	mg/L		F 0.0028	Y
Selenium	0658	WL	6/22/2021	T	F	0.024	mg/L		F 0.0028	Y
Selenium	0658	WL	11/15/2021	T	D	0.0204	mg/L		F 0.0015	Y
Selenium	0658	WL	11/15/2021	T	F	0.0209	mg/L		F 0.0015	Y
Sodium	0292A	WL	6/22/2021	T	F	290	mg/L		F 3.6	Y
Sodium	0292A	WL	11/15/2021	T	F	179	mg/L	J F	0.1	Y
Sodium	0304	WL	6/22/2021	T	F	170	mg/L		F 3.6	Y
Sodium	0304	WL	11/15/2021	T	F	190	mg/L	J F	0.1	Y
Sodium	0305	WL	6/23/2021	T	F	250	mg/L		F 3.6	Y
Sodium	0305	WL	11/15/2021	T	F	293	mg/L	J F	0.1	Y
Sodium	0309	WL	6/22/2021	T	F	220	mg/L		F 3.6	Y
Sodium	0309	WL	11/15/2021	T	F	205	mg/L	J F	0.1	Y
Sodium	0310	WL	6/22/2021	T	F	250	mg/L		F 3.6	Y
Sodium	0310	WL	11/15/2021	T	F	261	mg/L	J F	0.1	Y
Sodium	0655	WL	6/23/2021	T	F	290	mg/L		F 3.6	Y
Sodium	0655	WL	11/15/2021	T	D	304	mg/L	J F	0.1	Y
Sodium	0655	WL	11/15/2021	T	F	304	mg/L	J F	0.1	Y
Sodium	0656	WL	6/22/2021	T	F	210	mg/L		F 3.6	Y
Sodium	0656	WL	11/15/2021	T	F	338	mg/L	J F	0.1	Y
Sodium	0658	WL	6/22/2021	T	D	100	mg/L		F 0.36	Y
Sodium	0658	WL	6/22/2021	T	F	110	mg/L		F 0.36	Y
Sodium	0658	WL	11/15/2021	T	D	138	mg/L	J F	0.1	Y
Sodium	0658	WL	11/15/2021	T	F	141	mg/L	J F	0.1	Y
Specific Conductance	0292A	WL	6/22/2021	N	F	2679	umhos/cm		F	Y

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Specific Conductance	0292A WL	11/15/2021	N	F	1859	umhos/cm	F		Y
Specific Conductance	0304 WL	6/22/2021	N	F	2498	umhos/cm	F		Y
Specific Conductance	0304 WL	11/15/2021	N	F	2411	umhos/cm	F		Y
Specific Conductance	0305 WL	6/23/2021	N	F	2581	umhos/cm	F		Y
Specific Conductance	0305 WL	11/15/2021	N	F	2932	umhos/cm	F		Y
Specific Conductance	0309 WL	6/22/2021	N	F	2530	umhos/cm	F		Y
Specific Conductance	0309 WL	11/15/2021	N	F	2338	umhos/cm	F		Y
Specific Conductance	0310 WL	6/22/2021	N	F	2758	umhos/cm	F		Y
Specific Conductance	0310 WL	11/15/2021	N	F	2859	umhos/cm	F		Y
Specific Conductance	0655 WL	6/23/2021	N	F	3024	umhos/cm	F		Y
Specific Conductance	0655 WL	11/15/2021	N	F	2926	umhos/cm	F		Y
Specific Conductance	0656 WL	6/22/2021	N	F	1862	umhos/cm	F		Y
Specific Conductance	0656 WL	11/15/2021	N	F	2499	umhos/cm	F		Y
Specific Conductance	0658 WL	6/22/2021	N	F	1769	umhos/cm	F		Y
Specific Conductance	0658 WL	11/15/2021	N	F	1839	umhos/cm	F		Y
Sulfate	0292A WL	6/22/2021	N	F	950	mg/L	F	11	Y
Sulfate	0292A WL	11/15/2021	N	F	470	mg/L	F	13.3	Y
Sulfate	0304 WL	6/22/2021	N	F	870	mg/L	F	5.3	Y
Sulfate	0304 WL	11/15/2021	N	F	813	mg/L	F	13.3	Y
Sulfate	0305 WL	6/23/2021	N	F	690	mg/L	F	5.3	Y
Sulfate	0305 WL	11/15/2021	N	F	695	mg/L	F	13.3	Y
Sulfate	0309 WL	6/22/2021	N	F	940	mg/L	F	11	Y
Sulfate	0309 WL	11/15/2021	N	F	850	mg/L	F	13.3	Y
Sulfate	0310 WL	6/22/2021	N	F	770	mg/L	F	5.3	Y
Sulfate	0310 WL	11/15/2021	N	F	795	mg/L	F	13.3	Y
Sulfate	0655 WL	6/23/2021	N	F	1000	mg/L	F	11	Y
Sulfate	0655 WL	11/15/2021	N	D	922	mg/L	F	13.3	Y
Sulfate	0655 WL	11/15/2021	N	F	924	mg/L	F	13.3	Y
Sulfate	0656 WL	6/22/2021	N	F	290	mg/L	F	2.6	Y
Sulfate	0656 WL	11/15/2021	N	F	278	mg/L	F	13.3	Y
Sulfate	0658 WL	6/22/2021	N	D	440	mg/L	FJ	5.3	Y
Sulfate	0658 WL	6/22/2021	N	F	440	mg/L	F	5.3	Y
Sulfate	0658 WL	11/15/2021	N	D	391	mg/L	F	13.3	Y
Sulfate	0658 WL	11/15/2021	N	F	387	mg/L	F	13.3	Y
Temperature	0292A WL	6/22/2021	N	F	13.95	C	F		Y
Temperature	0292A WL	11/15/2021	N	F	14.59	C	F		Y
Temperature	0304 WL	6/22/2021	N	F	14.21	C	F		Y
Temperature	0304 WL	11/15/2021	N	F	14.65	C	F		Y
Temperature	0305 WL	6/23/2021	N	F	13.36	C	F		Y
Temperature	0305 WL	11/15/2021	N	F	15.71	C	F		Y
Temperature	0309 WL	6/22/2021	N	F	16.9	C	F		Y
Temperature	0309 WL	11/15/2021	N	F	15.36	C	F		Y
Temperature	0310 WL	6/22/2021	N	F	15.55	C	F		Y
Temperature	0310 WL	11/15/2021	N	F	15.32	C	F		Y
Temperature	0655 WL	6/23/2021	N	F	13.11	C	F		Y
Temperature	0655 WL	11/15/2021	N	F	14.9	C	F		Y
Temperature	0656 WL	6/22/2021	N	F	18.31	C	F		Y
Temperature	0656 WL	11/15/2021	N	F	18.68	C	F		Y
Temperature	0658 WL	6/22/2021	N	F	10.29	C	F		Y
Temperature	0658 WL	11/15/2021	N	F	11.45	C	F		Y
Turbidity	0292A WL	6/22/2021	N	F	5.52	NTU	F		Y
Turbidity	0292A WL	11/15/2021	N	F	1.88	NTU	F		Y
Turbidity	0304 WL	6/22/2021	N	F	1.48	NTU	F		Y

**Surface Water Quality Data by Parameter for Site RFO01, 2021 Sampling,
Old Rifle, Colorado, Processing Site**

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PARAMETER	LOCATION CODE /		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTIO N	QA
Turbidity	0304	WL	11/15/2021	N	F	1.55	NTU	F		Y
Turbidity	0305	WL	6/23/2021	N	F	1.64	NTU	F		Y
Turbidity	0305	WL	11/15/2021	N	F	0.76	NTU	F		Y
Turbidity	0309	WL	6/22/2021	N	F	7.21	NTU	F		Y
Turbidity	0309	WL	11/15/2021	N	F	0.79	NTU	F		Y
Turbidity	0310	WL	6/22/2021	N	F	5.24	NTU	F		Y
Turbidity	0310	WL	11/15/2021	N	F	1.86	NTU	F		Y
Turbidity	0655	WL	6/23/2021	N	F	4.11	NTU	F		Y
Turbidity	0655	WL	11/15/2021	N	F	0.57	NTU	F		Y
Turbidity	0656	WL	6/22/2021	N	F	3.42	NTU	F		Y
Turbidity	0656	WL	11/15/2021	N	F	2.28	NTU	F		Y
Turbidity	0658	WL	6/22/2021	N	F	4.08	NTU	F		Y
Turbidity	0658	WL	11/15/2021	N	F	8.09	NTU	F		Y
Uranium	0292A	WL	6/22/2021	T	F	0.034	mg/L	F	0.000040	Y
Uranium	0292A	WL	11/15/2021	T	F	0.0125	mg/L	F	0.000067	Y
Uranium	0304	WL	6/22/2021	T	F	0.053	mg/L	F	0.000040	Y
Uranium	0304	WL	11/15/2021	T	F	0.0688	mg/L	F	0.000067	Y
Uranium	0305	WL	6/23/2021	T	F	0.083	mg/L	F	0.000040	Y
Uranium	0305	WL	11/15/2021	T	F	0.116	mg/L	F	0.000067	Y
Uranium	0309	WL	6/22/2021	T	F	0.016	mg/L	F	0.000040	Y
Uranium	0309	WL	11/15/2021	T	F	0.0167	mg/L	F	0.000067	Y
Uranium	0310	WL	6/22/2021	T	F	0.084	mg/L	F	0.000040	Y
Uranium	0310	WL	11/15/2021	T	F	0.0926	mg/L	F	0.000067	Y
Uranium	0655	WL	6/23/2021	T	F	0.14	mg/L	F	0.000040	Y
Uranium	0655	WL	11/15/2021	T	D	0.133	mg/L	F	0.000067	Y
Uranium	0655	WL	11/15/2021	T	F	0.133	mg/L	F	0.000067	Y
Uranium	0656	WL	6/22/2021	T	F	0.14	mg/L	F	0.000040	Y
Uranium	0656	WL	11/15/2021	T	F	0.1	mg/L	F	0.000067	Y
Uranium	0658	WL	6/22/2021	T	D	0.0088	mg/L	F	0.000040	Y
Uranium	0658	WL	6/22/2021	T	F	0.0092	mg/L	F	0.000040	Y
Uranium	0658	WL	11/15/2021	T	D	0.011	mg/L	F	0.000067	Y
Uranium	0658	WL	11/15/2021	T	F	0.0113	mg/L	F	0.000067	Y
Vanadium	0292A	WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0292A	WL	11/15/2021	T	F	0.0033	mg/L	U FJ	0.0033	Y
Vanadium	0304	WL	6/22/2021	T	F	0.015	mg/L	F	0.0010	Y
Vanadium	0304	WL	11/15/2021	T	F	0.017	mg/L	J FU	0.0033	Y
Vanadium	0305	WL	6/23/2021	T	F	0.35	mg/L	F	0.0010	Y
Vanadium	0305	WL	11/15/2021	T	F	0.504	mg/L	F	0.0033	Y
Vanadium	0309	WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0309	WL	11/15/2021	T	F	0.0033	mg/L	U FJ	0.0033	Y
Vanadium	0310	WL	6/22/2021	T	F	0.0058	mg/L	F	0.0010	Y
Vanadium	0310	WL	11/15/2021	T	F	0.00383	mg/L	J FJU	0.0033	Y
Vanadium	0655	WL	6/23/2021	T	F	0.25	mg/L	F	0.0010	Y
Vanadium	0655	WL	11/15/2021	T	D	0.307	mg/L	F	0.0033	Y
Vanadium	0655	WL	11/15/2021	T	F	0.295	mg/L	F	0.0033	Y
Vanadium	0656	WL	6/22/2021	T	F	0.057	mg/L	F	0.0010	Y
Vanadium	0656	WL	11/15/2021	T	F	0.0959	mg/L	F	0.0033	Y
Vanadium	0658	WL	6/22/2021	T	D	0.001	mg/L	U F	0.0010	Y
Vanadium	0658	WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0658	WL	11/15/2021	T	D	0.0033	mg/L	U FJ	0.0033	Y
Vanadium	0658	WL	11/15/2021	T	F	0.0033	mg/L	U FJ	0.0033	Y

**Surface Water Quality Data by Parameter for Site RFO01, 2021 Sampling,
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PARAMETER	LOCATION CODE /	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTIO N	QA
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Location Type

SL

Surface Location

Sample Type

F

Field Sample

D

Duplicate

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

Data Qualifiers

J

Estimated value

Lab Qualifiers

J

Estimated value

U

Parameter analyzed for but was not detected.

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

Appendix B

Groundwater and Surface Water Monitoring Results for Calendar Year 2021

New Rifle Processing Site

Groundwater Quality Data by Parameter for Site RFN01, 2021 Sampling
New Rifle, Colorado, Processing Site

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Alkalinity, Total (As CaCO3)	0169 WL	6/22/2021	N	F	476	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0169 WL	11/15/2021	N	F	523	mg/L			Y
Alkalinity, Total (As CaCO3)	0170 WL	6/23/2021	N	F	492	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0170 WL	11/17/2021	N	F	542	mg/L			Y
Alkalinity, Total (As CaCO3)	0172 WL	6/23/2021	N	F	908	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0172 WL	11/16/2021	N	F	827	mg/L			Y
Alkalinity, Total (As CaCO3)	0195 WL	6/23/2021	N	F	377	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0195 WL	11/15/2021	D	F	319	mg/L			Y
Alkalinity, Total (As CaCO3)	0201 WL	6/22/2021	N	F	284	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0201 WL	11/16/2021	N	F	310	mg/L			Y
Alkalinity, Total (As CaCO3)	0215 WL	6/23/2021	N	F	250	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0215 WL	11/17/2021	N	F	316	mg/L			Y
Alkalinity, Total (As CaCO3)	0216 WL	6/21/2021	N	F	226	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0216 WL	11/15/2021	N	F	185	mg/L			Y
Alkalinity, Total (As CaCO3)	0217 WL	6/22/2021	N	F	198	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0217 WL	11/16/2021	N	F	206	mg/L			Y
Alkalinity, Total (As CaCO3)	0219 WL	6/24/2021	N	F	269	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0219 WL	11/17/2021	N	F	303	mg/L			Y
Alkalinity, Total (As CaCO3)	0442 WL	11/17/2021	N	F	229	mg/L			Y
Alkalinity, Total (As CaCO3)	0590 WL	6/23/2021	N	F	276	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0590 WL	11/16/2021	N	F	235	mg/L			Y
Alkalinity, Total (As CaCO3)	0620 WL	6/22/2021	N	F	580	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0620 WL	11/17/2021	N	F	545	mg/L			Y
Alkalinity, Total (As CaCO3)	0635 WL	6/21/2021	N	F	200	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0635 WL	11/16/2021	N	F	242	mg/L			Y
Alkalinity, Total (As CaCO3)	0658 WL	6/22/2021	N	F	270	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0658 WL	11/17/2021	N	F	252	mg/L			Y
Alkalinity, Total (As CaCO3)	0659 WL	6/22/2021	D	F	299	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0659 WL	11/16/2021	N	F	206	mg/L			Y
Alkalinity, Total (As CaCO3)	0664 WL	6/23/2021	N	F	450	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0664 WL	11/17/2021	N	F	444	mg/L			Y
Alkalinity, Total (As CaCO3)	0669 WL	6/22/2021	N	F	343	mg/L	FQ		Y
Alkalinity, Total (As CaCO3)	0669 WL	11/15/2021	N	F	401	mg/L			Y
Alkalinity, Total (As CaCO3)	0670 WL	6/22/2021	N	F	508	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0670 WL	11/17/2021	N	F	495	mg/L			Y
Alkalinity, Total (As CaCO3)	0683 WL	6/23/2021	N	F	131	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0683 WL	11/15/2021	N	F	168	mg/L			Y
Alkalinity, Total (As CaCO3)	0689 WL	6/23/2021	D	F	471	mg/L	FQ		Y
Alkalinity, Total (As CaCO3)	0855 WL	6/22/2021	N	F	287	mg/L	F		Y
Alkalinity, Total (As CaCO3)	0855 WL	11/17/2021	N	F	243	mg/L			Y
Ammonia Total as N	0169 WL	6/22/2021	N	F	0.062	mg/L	U F	0.062	Y
Ammonia Total as N	0169 WL	11/15/2021	N	F	0.106	mg/L		0.0170	Y
Ammonia Total as N	0170 WL	6/23/2021	N	F	0.95	mg/L	FJ	0.062	Y
Ammonia Total as N	0170 WL	11/17/2021	N	D	1.14	mg/L		0.0170	Y
Ammonia Total as N	0170 WL	11/17/2021	N	F	1.02	mg/L		0.0170	Y
Ammonia Total as N	0172 WL	6/23/2021	N	F	0.062	mg/L	U FJ	0.062	Y
Ammonia Total as N	0172 WL	11/16/2021	N	F	0.0972	mg/L	J	0.0170	Y
Ammonia Total as N	0195 WL	6/23/2021	N	F	0.062	mg/L	U FJ	0.062	Y
Ammonia Total as N	0195 WL	11/15/2021	N	F	0.0963	mg/L	J	0.0170	Y
Ammonia Total as N	0201 WL	6/22/2021	N	D	36	mg/L	F	0.62	Y
Ammonia Total as N	0201 WL	6/22/2021	N	F	36	mg/L	F	0.62	Y
Ammonia Total as N	0201 WL	11/16/2021	N	F	41.4	mg/L		0.850	Y
Ammonia Total as N	0215 WL	6/23/2021	N	F	1.7	mg/L	FJ	0.062	Y
Ammonia Total as N	0215 WL	11/17/2021	N	F	2.17	mg/L		0.0850	Y
Ammonia Total as N	0216 WL	6/21/2021	N	F	5.1	mg/L	F	0.31	Y
Ammonia Total as N	0216 WL	11/15/2021	N	F	4.99	mg/L		0.0850	Y
Ammonia Total as N	0217 WL	6/22/2021	N	F	20	mg/L	F	0.62	Y

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Ammonia Total as N	0217 WL	11/16/2021	N	F	25.8	mg/L		0.850	Y
Ammonia Total as N	0219 WL	6/24/2021	N	F	49	mg/L	FJ	0.62	Y
Ammonia Total as N	0219 WL	11/17/2021	N	F	56.5	mg/L		0.850	Y
Ammonia Total as N	0442 WL	11/17/2021	N	F	0.0637	mg/L	J	0.0170	Y
Ammonia Total as N	0590 WL	6/23/2021	N	F	81	mg/L	FJ	3.1	Y
Ammonia Total as N	0590 WL	11/16/2021	N	F	110	mg/L		4.25	Y
Ammonia Total as N	0620 WL	6/22/2021	N	F	0.062	mg/L	U	0.062	Y
Ammonia Total as N	0620 WL	11/17/2021	N	F	0.124	mg/L		0.0170	Y
Ammonia Total as N	0635 WL	6/21/2021	N	F	35	mg/L	F	0.62	Y
Ammonia Total as N	0635 WL	11/16/2021	N	F	44	mg/L		0.850	Y
Ammonia Total as N	0658 WL	6/22/2021	N	F	20	mg/L	F	0.62	Y
Ammonia Total as N	0658 WL	11/17/2021	N	D	36.3	mg/L		0.425	Y
Ammonia Total as N	0658 WL	11/17/2021	N	F	33.5	mg/L		0.425	Y
Ammonia Total as N	0659 WL	6/22/2021	N	F	0.13	mg/L	J	0.062	Y
Ammonia Total as N	0659 WL	11/16/2021	N	F	0.489	mg/L		0.0170	Y
Ammonia Total as N	0664 WL	6/23/2021	N	F	16	mg/L	FJ	0.62	Y
Ammonia Total as N	0664 WL	11/17/2021	N	F	12.5	mg/L		0.425	Y
Ammonia Total as N	0669 WL	6/22/2021	N	F	27	mg/L	FQ	0.62	Y
Ammonia Total as N	0669 WL	11/15/2021	N	F	33.5	mg/L		0.425	Y
Ammonia Total as N	0670 WL	6/22/2021	N	F	6.8	mg/L	F	0.62	Y
Ammonia Total as N	0670 WL	11/17/2021	N	F	11.4	mg/L		0.425	Y
Ammonia Total as N	0683 WL	6/23/2021	N	F	2.5	mg/L	FJ	0.062	Y
Ammonia Total as N	0683 WL	11/15/2021	N	F	3.74	mg/L		0.0850	Y
Ammonia Total as N	0689 WL	6/23/2021	N	F	0.33	mg/L	FJQ	0.062	Y
Ammonia Total as N	0855 WL	6/22/2021	N	F	8.5	mg/L	F	0.62	Y
Ammonia Total as N	0855 WL	11/17/2021	N	F	12.9	mg/L		0.425	Y
Arsenic	0169 WL	6/22/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0169 WL	11/15/2021	T	F	0.002	mg/L	U	0.002	Y
Arsenic	0170 WL	6/23/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0170 WL	11/17/2021	T	D	0.00368	mg/L	B	0.002	Y
Arsenic	0170 WL	11/17/2021	T	F	0.002	mg/L	U	0.002	Y
Arsenic	0172 WL	6/23/2021	T	F	0.012	mg/L	F	0.00051	Y
Arsenic	0172 WL	11/16/2021	T	F	0.0186	mg/L		0.002	Y
Arsenic	0195 WL	6/23/2021	T	F	0.00077	mg/L	J	0.00051	Y
Arsenic	0195 WL	11/15/2021	D	F	0.002	mg/L	U	0.002	Y
Arsenic	0201 WL	6/22/2021	D	D	0.00051	mg/L	U	0.00051	Y
Arsenic	0201 WL	6/22/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0201 WL	11/16/2021	T	F	0.002	mg/L	U	0.002	Y
Arsenic	0215 WL	6/23/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0215 WL	11/17/2021	T	F	0.00593	mg/L		0.002	Y
Arsenic	0216 WL	6/21/2021	T	F	0.021	mg/L	F	0.00051	Y
Arsenic	0216 WL	11/15/2021	T	F	0.0296	mg/L		0.002	Y
Arsenic	0217 WL	6/22/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0217 WL	11/16/2021	T	F	0.00837	mg/L		0.002	Y
Arsenic	0219 WL	6/24/2021	T	F	0.021	mg/L	F	0.00051	Y
Arsenic	0219 WL	11/17/2021	T	F	0.0385	mg/L		0.002	Y
Arsenic	0442 WL	11/17/2021	D	F	0.00267	mg/L	B	0.002	Y
Arsenic	0590 WL	6/23/2021	T	F	0.00077	mg/L	J	0.00051	Y
Arsenic	0590 WL	11/16/2021	T	F	0.00219	mg/L	B	0.002	Y
Arsenic	0620 WL	6/22/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0620 WL	11/17/2021	T	F	0.00212	mg/L	B	0.002	Y
Arsenic	0635 WL	6/21/2021	T	F	0.00051	mg/L	U	0.00051	Y
Arsenic	0635 WL	11/16/2021	T	F	0.002	mg/L	U	0.002	Y
Arsenic	0658 WL	6/22/2021	T	F	0.088	mg/L	F	0.00051	Y
Arsenic	0658 WL	11/17/2021	T	D	0.11	mg/L		0.002	Y
Arsenic	0658 WL	11/17/2021	T	F	0.108	mg/L		0.002	Y
Arsenic	0659 WL	6/22/2021	D	F	0.047	mg/L	F	0.00051	Y

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PARAMETER	LOCATION CODE / TYPE		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Arsenic	0659	WL	11/16/2021	T	F	0.0497	mg/L		0.002	Y
Arsenic	0664	WL	6/23/2021	T	F	0.003	mg/L	F	0.00051	Y
Arsenic	0664	WL	11/17/2021	T	F	0.00373	mg/L	B	0.002	Y
Arsenic	0669	WL	6/22/2021	T	F	0.0071	mg/L	FQ	0.00051	Y
Arsenic	0669	WL	11/15/2021	T	F	0.0131	mg/L		0.002	Y
Arsenic	0670	WL	6/22/2021	T	F	0.0035	mg/L	F	0.00051	Y
Arsenic	0670	WL	11/17/2021	T	F	0.00672	mg/L		0.002	Y
Arsenic	0683	WL	6/23/2021	T	F	0.011	mg/L	F	0.00051	Y
Arsenic	0683	WL	11/15/2021	T	F	0.0134	mg/L		0.002	Y
Arsenic	0689	WL	6/23/2021	T	F	0.0061	mg/L	FQ	0.00051	Y
Arsenic	0855	WL	6/22/2021	T	F	0.12	mg/L	F	0.00051	Y
Arsenic	0855	WL	11/17/2021	T	F	0.284	mg/L		0.002	Y
Calcium	0169	WL	6/22/2021	T	F	170	mg/L	F	0.094	Y
Calcium	0169	WL	11/15/2021	T	F	180	mg/L		0.05	Y
Calcium	0170	WL	6/23/2021	T	F	180	mg/L	F	0.094	Y
Calcium	0170	WL	11/17/2021	T	D	194	mg/L		0.05	Y
Calcium	0170	WL	11/17/2021	T	F	193	mg/L		0.05	Y
Calcium	0172	WL	6/23/2021	T	F	300	mg/L	F	0.47	Y
Calcium	0172	WL	11/16/2021	T	F	342	mg/L		0.05	Y
Calcium	0195	WL	6/23/2021	T	F	68	mg/L	F	0.094	Y
Calcium	0195	WL	11/15/2021	D	F	75.4	mg/L		0.05	Y
Calcium	0201	WL	6/22/2021	D	D	460	mg/L	F	0.94	Y
Calcium	0201	WL	6/22/2021	T	F	460	mg/L	F	0.94	Y
Calcium	0201	WL	11/16/2021	T	F	424	mg/L		0.05	Y
Calcium	0215	WL	6/23/2021	T	F	95	mg/L	F	0.094	Y
Calcium	0215	WL	11/17/2021	T	F	115	mg/L		0.05	Y
Calcium	0216	WL	6/21/2021	T	F	96	mg/L	F	0.094	Y
Calcium	0216	WL	11/15/2021	T	F	65.6	mg/L		0.05	Y
Calcium	0217	WL	6/22/2021	T	F	590	mg/L	F	0.94	Y
Calcium	0217	WL	11/16/2021	T	F	638	mg/L		0.5	Y
Calcium	0219	WL	6/24/2021	T	F	530	mg/L	F	0.94	Y
Calcium	0219	WL	11/17/2021	T	F	570	mg/L		0.5	Y
Calcium	0442	WL	11/17/2021	D	F	68.9	mg/L		0.05	Y
Calcium	0590	WL	6/23/2021	T	F	530	mg/L	F	0.47	Y
Calcium	0590	WL	11/16/2021	T	F	584	mg/L		0.5	Y
Calcium	0620	WL	6/22/2021	T	F	320	mg/L	F	0.47	Y
Calcium	0620	WL	11/17/2021	T	F	331	mg/L		0.05	Y
Calcium	0635	WL	6/21/2021	T	F	270	mg/L	F	0.094	Y
Calcium	0635	WL	11/16/2021	T	F	287	mg/L		0.05	Y
Calcium	0658	WL	6/22/2021	T	F	530	mg/L	F	0.94	Y
Calcium	0658	WL	11/17/2021	T	D	559	mg/L		0.5	Y
Calcium	0658	WL	11/17/2021	T	F	536	mg/L		0.5	Y
Calcium	0659	WL	6/22/2021	D	F	350	mg/L	F	0.094	Y
Calcium	0659	WL	11/16/2021	T	F	353	mg/L		0.05	Y
Calcium	0664	WL	6/23/2021	T	F	150	mg/L	F	0.094	Y
Calcium	0664	WL	11/17/2021	T	F	157	mg/L		0.05	Y
Calcium	0669	WL	6/22/2021	T	F	250	mg/L	FQ	0.094	Y
Calcium	0669	WL	11/15/2021	T	F	206	mg/L		0.05	Y
Calcium	0670	WL	6/22/2021	T	F	150	mg/L	F	0.094	Y
Calcium	0670	WL	11/17/2021	T	F	148	mg/L		0.05	Y
Calcium	0683	WL	6/23/2021	T	F	66	mg/L	F	0.094	Y
Calcium	0683	WL	11/15/2021	T	F	66.6	mg/L		0.05	Y
Calcium	0689	WL	6/23/2021	T	F	150	mg/L	FQ	0.094	Y
Calcium	0855	WL	6/22/2021	T	F	180	mg/L	F	0.094	Y
Calcium	0855	WL	11/17/2021	T	F	198	mg/L		0.05	Y
Chloride	0169	WL	6/22/2021	N	F	65	mg/L	F	0.76	Y
Chloride	0169	WL	11/15/2021	N	F	57	mg/L		6.70	Y

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Chloride	0170	WL	6/23/2021	N	F	220	mg/L	F	1.5	Y
Chloride	0170	WL	11/17/2021	N	D	209	mg/L		6.70	Y
Chloride	0170	WL	11/17/2021	N	F	211	mg/L		6.70	Y
Chloride	0172	WL	6/23/2021	N	F	990	mg/L	F	3.8	Y
Chloride	0172	WL	11/16/2021	N	F	998	mg/L		6.70	Y
Chloride	0195	WL	6/23/2021	N	F	17	mg/L	F	0.38	Y
Chloride	0195	WL	11/15/2021	N	F	32.2	mg/L		6.70	Y
Chloride	0201	WL	6/22/2021	N	D	130	mg/L	F	1.5	Y
Chloride	0201	WL	6/22/2021	N	F	130	mg/L	F	1.5	Y
Chloride	0201	WL	11/16/2021	N	F	114	mg/L		6.70	Y
Chloride	0215	WL	6/23/2021	N	F	110	mg/L	FJ	0.76	Y
Chloride	0215	WL	11/17/2021	N	F	87.3	mg/L		6.70	Y
Chloride	0216	WL	6/21/2021	N	F	190	mg/L	FJ	1.5	Y
Chloride	0216	WL	11/15/2021	N	F	143	mg/L		6.70	Y
Chloride	0217	WL	6/22/2021	N	F	170	mg/L	F	1.5	Y
Chloride	0217	WL	11/16/2021	N	F	128	mg/L		6.70	Y
Chloride	0219	WL	6/24/2021	N	F	120	mg/L	F	1.5	Y
Chloride	0219	WL	11/17/2021	N	F	108	mg/L		6.70	Y
Chloride	0442	WL	11/17/2021	N	F	311	mg/L		6.70	Y
Chloride	0590	WL	6/23/2021	N	F	280	mg/L	F	1.5	Y
Chloride	0590	WL	11/16/2021	N	F	247	mg/L		6.70	Y
Chloride	0620	WL	6/22/2021	N	F	1400	mg/L	FJ	7.6	Y
Chloride	0620	WL	11/17/2021	N	F	1270	mg/L		13.4	Y
Chloride	0635	WL	6/21/2021	N	F	160	mg/L	FJ	0.76	Y
Chloride	0635	WL	11/16/2021	N	F	173	mg/L		6.70	Y
Chloride	0658	WL	6/22/2021	N	F	120	mg/L	F	1.5	Y
Chloride	0658	WL	11/17/2021	N	D	109	mg/L		6.70	Y
Chloride	0658	WL	11/17/2021	N	F	109	mg/L		6.70	Y
Chloride	0659	WL	6/22/2021	N	F	92	mg/L	F	0.76	Y
Chloride	0659	WL	11/16/2021	N	F	111	mg/L		6.70	Y
Chloride	0664	WL	6/23/2021	N	F	89	mg/L	F	0.76	Y
Chloride	0664	WL	11/17/2021	N	F	78.3	mg/L		6.70	Y
Chloride	0669	WL	6/22/2021	N	F	110	mg/L	FQ	0.76	Y
Chloride	0669	WL	11/15/2021	N	F	92	mg/L		6.70	Y
Chloride	0670	WL	6/22/2021	N	F	77	mg/L	F	0.76	Y
Chloride	0670	WL	11/17/2021	N	F	70.5	mg/L		6.70	Y
Chloride	0683	WL	6/23/2021	N	F	160	mg/L	FJ	0.76	Y
Chloride	0683	WL	11/15/2021	N	F	130	mg/L		6.70	Y
Chloride	0689	WL	6/23/2021	N	F	140	mg/L	FJQ	0.76	Y
Chloride	0855	WL	6/22/2021	N	F	110	mg/L	F	0.76	Y
Chloride	0855	WL	11/17/2021	N	F	121	mg/L		6.70	Y
Dissolved Oxygen	0169	WL	6/22/2021	N	F	1.51	mg/L	F		Y
Dissolved Oxygen	0169	WL	11/15/2021	N	F	0.59	mg/L	J		Y
Dissolved Oxygen	0170	WL	6/23/2021	N	F	0.29	mg/L	F		Y
Dissolved Oxygen	0170	WL	11/17/2021	N	F	0.4	mg/L			Y
Dissolved Oxygen	0172	WL	6/23/2021	N	F	0.2	mg/L	F		Y
Dissolved Oxygen	0172	WL	11/16/2021	N	F	0.45	mg/L			Y
Dissolved Oxygen	0195	WL	6/23/2021	N	F	0.18	mg/L	F		Y
Dissolved Oxygen	0195	WL	11/15/2021	N	F	0.32	mg/L	J		Y
Dissolved Oxygen	0201	WL	6/22/2021	N	F	0.75	mg/L	F		Y
Dissolved Oxygen	0201	WL	11/16/2021	N	F	0.29	mg/L			Y
Dissolved Oxygen	0215	WL	6/23/2021	N	F	0.14	mg/L	F		Y
Dissolved Oxygen	0215	WL	11/17/2021	N	F	1.24	mg/L			Y
Dissolved Oxygen	0216	WL	6/21/2021	N	F	0.92	mg/L	F		Y
Dissolved Oxygen	0216	WL	11/15/2021	N	F	0.95	mg/L			Y
Dissolved Oxygen	0217	WL	6/22/2021	N	F	1.28	mg/L	F		Y
Dissolved Oxygen	0217	WL	11/16/2021	N	F	0.31	mg/L			Y

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Dissolved Oxygen	0219	WL	6/24/2021	N	F	1.08	mg/L	F		Y
Dissolved Oxygen	0219	WL	11/17/2021	N	F	0.43	mg/L			Y
Dissolved Oxygen	0442	WL	11/17/2021	N	F	0.31	mg/L			Y
Dissolved Oxygen	0590	WL	6/23/2021	N	F	0.94	mg/L	F		Y
Dissolved Oxygen	0590	WL	11/16/2021	N	F	0.72	mg/L			Y
Dissolved Oxygen	0620	WL	6/22/2021	N	F	0.11	mg/L	F		Y
Dissolved Oxygen	0620	WL	11/17/2021	N	F	0.67	mg/L			Y
Dissolved Oxygen	0635	WL	6/21/2021	N	F	1.51	mg/L	F		Y
Dissolved Oxygen	0635	WL	11/16/2021	N	F	0.24	mg/L			Y
Dissolved Oxygen	0658	WL	6/22/2021	N	F	0.79	mg/L	F		Y
Dissolved Oxygen	0658	WL	11/17/2021	N	F	0.59	mg/L			Y
Dissolved Oxygen	0659	WL	6/22/2021	N	F	0.52	mg/L	F		Y
Dissolved Oxygen	0659	WL	11/16/2021	N	F	1.09	mg/L			Y
Dissolved Oxygen	0664	WL	6/23/2021	N	F	0.38	mg/L	F		Y
Dissolved Oxygen	0664	WL	11/17/2021	N	F	0.47	mg/L			Y
Dissolved Oxygen	0669	WL	6/22/2021	N	F	1.35	mg/L	FQ		Y
Dissolved Oxygen	0669	WL	11/15/2021	N	F	0.48	mg/L	J		Y
Dissolved Oxygen	0670	WL	6/22/2021	N	F	0.87	mg/L	F		Y
Dissolved Oxygen	0670	WL	11/17/2021	N	F	0.93	mg/L			Y
Dissolved Oxygen	0683	WL	6/23/2021	N	F	0.55	mg/L	F		Y
Dissolved Oxygen	0683	WL	11/15/2021	N	F	0.71	mg/L			Y
Dissolved Oxygen	0689	WL	6/23/2021	N	F	3.45	mg/L	FQ		Y
Dissolved Oxygen	0689	WL	11/15/2021	N	F	5.33	mg/L			Y
Dissolved Oxygen	0855	WL	6/22/2021	N	F	0.75	mg/L	F		Y
Dissolved Oxygen	0855	WL	11/17/2021	N	F	0.36	mg/L			Y
Magnesium	0169	WL	6/22/2021	T	F	110	mg/L	F	0.086	Y
Magnesium	0169	WL	11/15/2021	T	F	110	mg/L		0.11	Y
Magnesium	0170	WL	6/23/2021	T	F	110	mg/L	F	0.086	Y
Magnesium	0170	WL	11/17/2021	T	D	118	mg/L		0.11	Y
Magnesium	0170	WL	11/17/2021	T	F	117	mg/L		0.11	Y
Magnesium	0172	WL	6/23/2021	T	F	320	mg/L	F	0.43	Y
Magnesium	0172	WL	11/16/2021	T	F	349	mg/L		0.11	Y
Magnesium	0195	WL	6/23/2021	T	F	41	mg/L	F	0.086	Y
Magnesium	0195	WL	11/15/2021	D	F	43.6	mg/L		0.11	Y
Magnesium	0201	WL	6/22/2021	D	D	40	mg/L	F	0.086	Y
Magnesium	0201	WL	6/22/2021	T	F	39	mg/L	F	0.086	Y
Magnesium	0201	WL	11/16/2021	T	F	40.5	mg/L		0.11	Y
Magnesium	0215	WL	6/23/2021	T	F	42	mg/L	F	0.086	Y
Magnesium	0215	WL	11/17/2021	T	F	49.8	mg/L		0.11	Y
Magnesium	0216	WL	6/21/2021	T	F	22	mg/L	F	0.086	Y
Magnesium	0216	WL	11/15/2021	T	F	15.6	mg/L		0.11	Y
Magnesium	0217	WL	6/22/2021	T	F	17	mg/L	F	0.086	Y
Magnesium	0217	WL	11/16/2021	T	F	18	mg/L		0.11	Y
Magnesium	0219	WL	6/24/2021	T	F	37	mg/L	F	0.086	Y
Magnesium	0219	WL	11/17/2021	T	F	39	mg/L		0.11	Y
Magnesium	0442	WL	11/17/2021	D	F	77.5	mg/L		0.11	Y
Magnesium	0590	WL	6/23/2021	T	F	42	mg/L	F	0.086	Y
Magnesium	0590	WL	11/16/2021	T	F	46.9	mg/L		0.11	Y
Magnesium	0620	WL	6/22/2021	T	F	200	mg/L	F	0.43	Y
Magnesium	0620	WL	11/17/2021	T	F	208	mg/L		0.11	Y
Magnesium	0635	WL	6/21/2021	T	F	21	mg/L	F	0.086	Y
Magnesium	0635	WL	11/16/2021	T	F	24.9	mg/L		0.11	Y
Magnesium	0658	WL	6/22/2021	T	F	30	mg/L	F	0.086	Y
Magnesium	0658	WL	11/17/2021	T	D	31.7	mg/L		0.11	Y
Magnesium	0658	WL	11/17/2021	T	F	30.9	mg/L		0.11	Y
Magnesium	0659	WL	6/22/2021	D	F	43	mg/L	F	0.086	Y
Magnesium	0659	WL	11/16/2021	T	F	32.8	mg/L		0.11	Y

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Magnesium	0664	WL	6/23/2021	T	F	83	mg/L	F	0.086	Y
Magnesium	0664	WL	11/17/2021	T	F	81.8	mg/L		0.11	Y
Magnesium	0669	WL	6/22/2021	T	F	42	mg/L	FQ	0.086	Y
Magnesium	0669	WL	11/15/2021	T	F	47	mg/L		0.11	Y
Magnesium	0670	WL	6/22/2021	T	F	89	mg/L	F	0.086	Y
Magnesium	0670	WL	11/17/2021	T	F	92.2	mg/L		0.11	Y
Magnesium	0683	WL	6/23/2021	T	F	18	mg/L	F	0.086	Y
Magnesium	0683	WL	11/15/2021	T	F	18.5	mg/L		0.11	Y
Magnesium	0689	WL	6/23/2021	T	F	51	mg/L	FQ	0.086	Y
Magnesium	0855	WL	6/22/2021	T	F	38	mg/L	F	0.086	Y
Magnesium	0855	WL	11/17/2021	T	F	30.8	mg/L		0.11	Y
Molybdenum	0169	WL	6/22/2021	T	F	0.0036	mg/L	F	0.00046	Y
Molybdenum	0169	WL	11/15/2021	T	F	0.00432	mg/L		0.0002	Y
Molybdenum	0170	WL	6/23/2021	T	F	0.0025	mg/L	F	0.00046	Y
Molybdenum	0170	WL	11/17/2021	T	D	0.00337	mg/L		0.0002	Y
Molybdenum	0170	WL	11/17/2021	T	F	0.00302	mg/L		0.0002	Y
Molybdenum	0172	WL	6/23/2021	T	F	0.0061	mg/L	F	0.00046	Y
Molybdenum	0172	WL	11/16/2021	T	F	0.0109	mg/L		0.0002	Y
Molybdenum	0195	WL	6/23/2021	T	F	0.012	mg/L	F	0.00046	Y
Molybdenum	0195	WL	11/15/2021	D	F	0.0154	mg/L		0.0002	Y
Molybdenum	0201	WL	6/22/2021	D	D	1.2	mg/L	F	0.00046	Y
Molybdenum	0201	WL	6/22/2021	T	F	1.1	mg/L	F	0.00046	Y
Molybdenum	0201	WL	11/16/2021	T	F	1.26	mg/L		0.004	Y
Molybdenum	0215	WL	6/23/2021	T	F	0.0091	mg/L	F	0.00046	Y
Molybdenum	0215	WL	11/17/2021	T	F	0.0106	mg/L		0.0002	Y
Molybdenum	0216	WL	6/21/2021	T	F	0.027	mg/L	F	0.00046	Y
Molybdenum	0216	WL	11/15/2021	T	F	0.0481	mg/L		0.0002	Y
Molybdenum	0217	WL	6/22/2021	T	F	1.2	mg/L	F	0.00046	Y
Molybdenum	0217	WL	11/16/2021	T	F	1.41	mg/L		0.004	Y
Molybdenum	0219	WL	6/24/2021	T	F	1.1	mg/L	F	0.00046	Y
Molybdenum	0219	WL	11/17/2021	T	F	1.23	mg/L		0.004	Y
Molybdenum	0442	WL	11/17/2021	D	F	0.0122	mg/L		0.0002	Y
Molybdenum	0590	WL	6/23/2021	T	F	1.2	mg/L	F	0.00046	Y
Molybdenum	0590	WL	11/16/2021	T	F	1.46	mg/L		0.004	Y
Molybdenum	0620	WL	6/22/2021	T	F	0.012	mg/L	F	0.00046	Y
Molybdenum	0620	WL	11/17/2021	T	F	0.00984	mg/L		0.0002	Y
Molybdenum	0635	WL	6/21/2021	T	F	0.35	mg/L	F	0.00046	Y
Molybdenum	0635	WL	11/16/2021	T	F	0.397	mg/L		0.0002	Y
Molybdenum	0658	WL	6/22/2021	T	F	1.7	mg/L	F	0.00046	Y
Molybdenum	0658	WL	11/17/2021	T	D	2.67	mg/L		0.02	Y
Molybdenum	0658	WL	11/17/2021	T	F	2.51	mg/L		0.02	Y
Molybdenum	0659	WL	6/22/2021	D	F	0.7	mg/L	F	0.00046	Y
Molybdenum	0659	WL	11/16/2021	T	F	0.99	mg/L		0.0002	Y
Molybdenum	0664	WL	6/23/2021	T	F	0.24	mg/L	F	0.00046	Y
Molybdenum	0664	WL	11/17/2021	T	F	0.365	mg/L		0.0002	Y
Molybdenum	0669	WL	6/22/2021	T	F	0.41	mg/L	FQ	0.00046	Y
Molybdenum	0669	WL	11/15/2021	T	F	0.345	mg/L		0.0002	Y
Molybdenum	0670	WL	6/22/2021	T	F	0.2	mg/L	F	0.00046	Y
Molybdenum	0670	WL	11/17/2021	T	F	0.201	mg/L		0.0002	Y
Molybdenum	0683	WL	6/23/2021	T	F	0.032	mg/L	F	0.00046	Y
Molybdenum	0683	WL	11/15/2021	T	F	0.0609	mg/L		0.0002	Y
Molybdenum	0689	WL	6/23/2021	T	F	0.13	mg/L	FQ	0.00046	Y
Molybdenum	0855	WL	6/22/2021	T	F	0.32	mg/L	F	0.00046	Y
Molybdenum	0855	WL	11/17/2021	T	F	0.379	mg/L		0.0002	Y
Nitrate + Nitrite as Nitrogen	0169	WL	6/22/2021	N	F	0.029	mg/L	FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0169	WL	11/15/2021	N	F	0.163	mg/L		0.0170	Y
Nitrate + Nitrite as Nitrogen	0170	WL	6/23/2021	N	F	12	mg/L	FJ	0.056	Y

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PARAMETER	LOCATION CODE / TYPE		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Nitrate + Nitrite as Nitrogen	0170	WL	11/17/2021	N	D	11.5	mg/L		0.425	Y
Nitrate + Nitrite as Nitrogen	0170	WL	11/17/2021	N	F	11.2	mg/L		0.850	Y
Nitrate + Nitrite as Nitrogen	0172	WL	6/23/2021	N	F	0.0056	mg/L	U FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0172	WL	11/16/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0195	WL	6/23/2021	N	F	0.042	mg/L	FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0195	WL	11/15/2021	N	F	1.5	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0201	WL	6/22/2021	N	D	14	mg/L	FJ	0.56	Y
Nitrate + Nitrite as Nitrogen	0201	WL	6/22/2021	N	F	18	mg/L	FJ	0.14	Y
Nitrate + Nitrite as Nitrogen	0201	WL	11/16/2021	N	F	21.8	mg/L		1.70	Y
Nitrate + Nitrite as Nitrogen	0215	WL	6/23/2021	N	F	0.0056	mg/L	U FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0215	WL	11/17/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0216	WL	6/21/2021	N	F	0.056	mg/L	U FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0216	WL	11/15/2021	N	F	0.0727	mg/L		0.0170	Y
Nitrate + Nitrite as Nitrogen	0217	WL	6/22/2021	N	F	0.027	mg/L	F	0.0056	Y
Nitrate + Nitrite as Nitrogen	0217	WL	11/16/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0219	WL	6/24/2021	N	F	0.32	mg/L	FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0219	WL	11/17/2021	N	F	3.77	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0442	WL	11/17/2021	N	F	0.736	mg/L		0.0170	Y
Nitrate + Nitrite as Nitrogen	0590	WL	6/23/2021	N	F	18	mg/L	FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0590	WL	11/16/2021	N	F	11.1	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0620	WL	6/22/2021	N	F	2.6	mg/L	F	0.056	Y
Nitrate + Nitrite as Nitrogen	0620	WL	11/17/2021	N	F	3.03	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0635	WL	6/21/2021	N	F	2.4	mg/L	FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0635	WL	11/16/2021	N	F	2.65	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0658	WL	6/22/2021	N	F	7.7	mg/L	F	0.056	Y
Nitrate + Nitrite as Nitrogen	0658	WL	11/17/2021	N	D	4.8	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0658	WL	11/17/2021	N	F	4.81	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0659	WL	6/22/2021	N	F	2.2	mg/L	F	0.056	Y
Nitrate + Nitrite as Nitrogen	0659	WL	11/16/2021	N	F	1.6	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0664	WL	6/23/2021	N	F	5.5	mg/L	FJ	0.056	Y
Nitrate + Nitrite as Nitrogen	0664	WL	11/17/2021	N	F	13.7	mg/L		0.850	Y
Nitrate + Nitrite as Nitrogen	0669	WL	6/22/2021	N	F	8.2	mg/L	FQ	0.056	Y
Nitrate + Nitrite as Nitrogen	0669	WL	11/15/2021	N	F	2.05	mg/L		0.0850	Y
Nitrate + Nitrite as Nitrogen	0670	WL	6/22/2021	N	F	4.8	mg/L	F	0.056	Y
Nitrate + Nitrite as Nitrogen	0670	WL	11/17/2021	N	F	8.45	mg/L		0.425	Y
Nitrate + Nitrite as Nitrogen	0683	WL	6/23/2021	N	F	0.0056	mg/L	U FJ	0.0056	Y
Nitrate + Nitrite as Nitrogen	0683	WL	11/15/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0689	WL	6/23/2021	N	F	2	mg/L	FJQ	0.056	Y
Nitrate + Nitrite as Nitrogen	0855	WL	6/22/2021	N	F	5.8	mg/L	F	0.056	Y
Nitrate + Nitrite as Nitrogen	0855	WL	11/17/2021	N	F	6.45	mg/L		0.425	Y
Oxidation Reduction Potential	0169	WL	6/22/2021	N	F	104	mV	F		Y
Oxidation Reduction Potential	0169	WL	11/15/2021	N	F	-19	mV			Y
Oxidation Reduction Potential	0170	WL	6/23/2021	N	F	77.9	mV	F		Y
Oxidation Reduction Potential	0170	WL	11/17/2021	N	F	221.6	mV			Y
Oxidation Reduction Potential	0172	WL	6/23/2021	N	F	-102	mV	F		Y
Oxidation Reduction Potential	0172	WL	11/16/2021	N	F	-70.6	mV			Y
Oxidation Reduction Potential	0195	WL	6/23/2021	N	F	15.9	mV	F		Y
Oxidation Reduction Potential	0195	WL	11/15/2021	N	F	39.2	mV			Y
Oxidation Reduction Potential	0201	WL	6/22/2021	N	F	132.1	mV	F		Y
Oxidation Reduction Potential	0201	WL	11/16/2021	N	F	99	mV			Y
Oxidation Reduction Potential	0215	WL	6/23/2021	N	F	5.4	mV	F		Y
Oxidation Reduction Potential	0215	WL	11/17/2021	N	F	154.8	mV			Y
Oxidation Reduction Potential	0216	WL	6/21/2021	N	F	-12.3	mV	F		Y
Oxidation Reduction Potential	0216	WL	11/15/2021	N	F	37.1	mV			Y
Oxidation Reduction Potential	0217	WL	6/22/2021	N	F	98.2	mV	F		Y
Oxidation Reduction Potential	0217	WL	11/16/2021	N	F	129.4	mV			Y
Oxidation Reduction Potential	0219	WL	6/24/2021	N	F	42.7	mV	F		Y

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Oxidation Reduction Potential	0219	WL	11/17/2021	N	F	-95	mV			Y
Oxidation Reduction Potential	0442	WL	11/17/2021	N	F	-210	mV			Y
Oxidation Reduction Potential	0590	WL	6/23/2021	N	F	270.9	mV	F		Y
Oxidation Reduction Potential	0590	WL	11/16/2021	N	F	122	mV			Y
Oxidation Reduction Potential	0620	WL	6/22/2021	N	F	142.2	mV	F		Y
Oxidation Reduction Potential	0620	WL	11/17/2021	N	F	90.5	mV			Y
Oxidation Reduction Potential	0635	WL	6/21/2021	N	F	130.1	mV	F		Y
Oxidation Reduction Potential	0635	WL	11/16/2021	N	F	90.2	mV			Y
Oxidation Reduction Potential	0658	WL	6/22/2021	N	F	164.8	mV	F		Y
Oxidation Reduction Potential	0658	WL	11/17/2021	N	F	136.5	mV			Y
Oxidation Reduction Potential	0659	WL	6/22/2021	N	F	75.7	mV	F		Y
Oxidation Reduction Potential	0659	WL	11/16/2021	N	F	87.2	mV			Y
Oxidation Reduction Potential	0664	WL	6/23/2021	N	F	165.4	mV	F		Y
Oxidation Reduction Potential	0664	WL	11/17/2021	N	F	-21.9	mV			Y
Oxidation Reduction Potential	0669	WL	6/22/2021	N	F	151.4	mV	FQ		Y
Oxidation Reduction Potential	0669	WL	11/15/2021	N	F	156.3	mV			Y
Oxidation Reduction Potential	0670	WL	6/22/2021	N	F	150.4	mV	F		Y
Oxidation Reduction Potential	0670	WL	11/17/2021	N	F	116.4	mV			Y
Oxidation Reduction Potential	0683	WL	6/23/2021	N	F	108.9	mV	F		Y
Oxidation Reduction Potential	0683	WL	11/15/2021	N	F	129.3	mV			Y
Oxidation Reduction Potential	0689	WL	6/23/2021	N	F	-113	mV	FQ		Y
Oxidation Reduction Potential	0689	WL	11/15/2021	N	F	107.5	mV			Y
Oxidation Reduction Potential	0855	WL	6/22/2021	N	F	94.2	mV	F		Y
Oxidation Reduction Potential	0855	WL	11/17/2021	N	F	100.2	mV			Y
Percent Dissolved Oxygen	0169	WL	11/15/2021	N	F	6	%			Y
Percent Dissolved Oxygen	0170	WL	6/23/2021	N	F	3	%	F		Y
Percent Dissolved Oxygen	0170	WL	11/17/2021	N	F	3.3	%			Y
Percent Dissolved Oxygen	0172	WL	6/23/2021	N	F	2.1	%	F		Y
Percent Dissolved Oxygen	0172	WL	11/16/2021	N	F	4.6	%			Y
Percent Dissolved Oxygen	0195	WL	6/23/2021	N	F	1.6	%	F		Y
Percent Dissolved Oxygen	0195	WL	11/15/2021	N	F	2.9	%			Y
Percent Dissolved Oxygen	0201	WL	11/16/2021	N	F	2.8	%			Y
Percent Dissolved Oxygen	0215	WL	6/23/2021	N	F	1.4	%	F		Y
Percent Dissolved Oxygen	0215	WL	11/17/2021	N	F	12.7	%			Y
Percent Dissolved Oxygen	0216	WL	11/15/2021	N	F	9.3	%			Y
Percent Dissolved Oxygen	0217	WL	11/16/2021	N	F	2.8	%			Y
Percent Dissolved Oxygen	0219	WL	11/17/2021	N	F	4.2	%			Y
Percent Dissolved Oxygen	0590	WL	11/16/2021	N	F	6.7	%			Y
Percent Dissolved Oxygen	0620	WL	11/17/2021	N	F	6.7	%			Y
Percent Dissolved Oxygen	0635	WL	11/16/2021	N	F	2.3	%			Y
Percent Dissolved Oxygen	0658	WL	11/17/2021	N	F	5.8	%			Y
Percent Dissolved Oxygen	0659	WL	11/16/2021	N	F	10.4	%			Y
Percent Dissolved Oxygen	0664	WL	11/17/2021	N	F	4.7	%			Y
Percent Dissolved Oxygen	0669	WL	11/15/2021	N	F	4.4	%			Y
Percent Dissolved Oxygen	0670	WL	11/17/2021	N	F	9.3	%			Y
Percent Dissolved Oxygen	0683	WL	6/23/2021	N	F	5.5	%	F		Y
Percent Dissolved Oxygen	0683	WL	11/15/2021	N	F	7.2	%			Y
Percent Dissolved Oxygen	0689	WL	6/23/2021	N	F	39.9	%	FQ		Y
Percent Dissolved Oxygen	0689	WL	11/15/2021	N	F	55.6	%			Y
Percent Dissolved Oxygen	0855	WL	11/17/2021	N	F	3.5	%			Y
pH	0169	WL	6/22/2021	N	F	7.03	s.u.	F		Y
pH	0169	WL	11/15/2021	N	F	6.98	s.u.			Y
pH	0170	WL	6/23/2021	N	F	6.84	s.u.	F		Y
pH	0170	WL	11/17/2021	N	F	6.98	s.u.			Y
pH	0172	WL	6/23/2021	N	F	6.93	s.u.	F		Y
pH	0172	WL	11/16/2021	N	F	6.99	s.u.			Y
pH	0195	WL	6/23/2021	N	F	7.01	s.u.	F		Y

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pH	0195 WL	11/15/2021	N	F	7.2	s.u.			Y
pH	0201 WL	6/22/2021	N	F	6.87	s.u.	F		Y
pH	0201 WL	11/16/2021	N	F	6.86	s.u.			Y
pH	0215 WL	6/23/2021	N	F	7.18	s.u.	F		Y
pH	0215 WL	11/17/2021	N	F	7.25	s.u.			Y
pH	0216 WL	6/21/2021	N	F	7.36	s.u.	F		Y
pH	0216 WL	11/15/2021	N	F	7.41	s.u.			Y
pH	0217 WL	6/22/2021	N	F	6.89	s.u.	F		Y
pH	0217 WL	11/16/2021	N	F	6.93	s.u.			Y
pH	0219 WL	6/24/2021	N	F	6.91	s.u.	F		Y
pH	0219 WL	11/17/2021	N	F	7.02	s.u.			Y
pH	0442 WL	11/17/2021	N	F	7.73	s.u.	J		Y
pH	0590 WL	6/23/2021	N	F	6.77	s.u.	F		Y
pH	0590 WL	11/16/2021	N	F	6.78	s.u.			Y
pH	0620 WL	6/22/2021	N	F	7.05	s.u.	F		Y
pH	0620 WL	11/17/2021	N	F	7.09	s.u.			Y
pH	0635 WL	6/21/2021	N	F	6.93	s.u.	F		Y
pH	0635 WL	11/16/2021	N	F	6.94	s.u.			Y
pH	0658 WL	6/22/2021	N	F	6.75	s.u.	F		Y
pH	0658 WL	11/17/2021	N	F	6.8	s.u.			Y
pH	0659 WL	6/22/2021	N	F	7.15	s.u.	F		Y
pH	0659 WL	11/16/2021	N	F	7.25	s.u.			Y
pH	0664 WL	6/23/2021	N	F	6.94	s.u.	F		Y
pH	0664 WL	11/17/2021	N	F	6.9	s.u.			Y
pH	0669 WL	6/22/2021	N	F	6.92	s.u.	FQ		Y
pH	0669 WL	11/15/2021	N	F	6.96	s.u.			Y
pH	0670 WL	6/22/2021	N	F	6.99	s.u.	F		Y
pH	0670 WL	11/17/2021	N	F	7.04	s.u.			Y
pH	0683 WL	6/23/2021	N	F	7.32	s.u.	F		Y
pH	0683 WL	11/15/2021	N	F	7.35	s.u.			Y
pH	0689 WL	6/23/2021	N	F	6.68	s.u.	FQ		Y
pH	0689 WL	11/15/2021	N	F	6.95	s.u.			Y
pH	0855 WL	6/22/2021	N	F	6.98	s.u.	F		Y
pH	0855 WL	11/17/2021	N	F	6.97	s.u.			Y
Potassium	0169 WL	6/22/2021	T	F	7.5	mg/L	F	0.33	Y
Potassium	0169 WL	11/15/2021	T	F	5.35	mg/L		0.05	Y
Potassium	0170 WL	6/23/2021	T	F	11	mg/L	F	0.33	Y
Potassium	0170 WL	11/17/2021	T	D	6.52	mg/L		0.05	Y
Potassium	0170 WL	11/17/2021	T	F	6.27	mg/L		0.05	Y
Potassium	0172 WL	6/23/2021	T	F	15	mg/L	F	1.6	Y
Potassium	0172 WL	11/16/2021	T	F	10.2	mg/L		0.05	Y
Potassium	0195 WL	6/23/2021	T	F	7.3	mg/L	F	0.33	Y
Potassium	0195 WL	11/15/2021	D	F	5.69	mg/L		0.05	Y
Potassium	0201 WL	6/22/2021	D	D	12	mg/L	F	0.33	Y
Potassium	0201 WL	6/22/2021	T	F	12	mg/L	F	0.33	Y
Potassium	0201 WL	11/16/2021	T	F	8.11	mg/L		0.05	Y
Potassium	0215 WL	6/23/2021	T	F	5.4	mg/L	F	0.33	Y
Potassium	0215 WL	11/17/2021	T	F	4.74	mg/L	B	0.05	Y
Potassium	0216 WL	6/21/2021	T	F	11	mg/L	F	0.33	Y
Potassium	0216 WL	11/15/2021	T	F	6.36	mg/L		0.05	Y
Potassium	0217 WL	6/22/2021	T	F	17	mg/L	F	0.33	Y
Potassium	0217 WL	11/16/2021	T	F	12	mg/L		0.05	Y
Potassium	0219 WL	6/24/2021	T	F	11	mg/L	F	0.33	Y
Potassium	0219 WL	11/17/2021	T	F	7.11	mg/L		0.05	Y
Potassium	0442 WL	11/17/2021	D	F	4.98	mg/L	B	0.05	Y
Potassium	0590 WL	6/23/2021	T	F	30	mg/L	F	0.33	Y
Potassium	0590 WL	11/16/2021	T	F	22.8	mg/L		0.05	Y

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Potassium	0620	WL	6/22/2021	T	F	14	mg/L	F	1.6	Y
Potassium	0620	WL	11/17/2021	T	F	9.1	mg/L		0.05	Y
Potassium	0635	WL	6/21/2021	T	F	28	mg/L	F	0.33	Y
Potassium	0635	WL	11/16/2021	T	F	24.3	mg/L		0.05	Y
Potassium	0658	WL	6/22/2021	T	F	9.8	mg/L	F	0.33	Y
Potassium	0658	WL	11/17/2021	T	D	6.49	mg/L		0.05	Y
Potassium	0658	WL	11/17/2021	T	F	6.3	mg/L		0.05	Y
Potassium	0659	WL	6/22/2021	D	F	11	mg/L	F	0.33	Y
Potassium	0659	WL	11/16/2021	T	F	7.24	mg/L		0.05	Y
Potassium	0664	WL	6/23/2021	T	F	13	mg/L	F	0.33	Y
Potassium	0664	WL	11/17/2021	T	F	8.14	mg/L		0.05	Y
Potassium	0669	WL	6/22/2021	T	F	9.3	mg/L	FQ	0.33	Y
Potassium	0669	WL	11/15/2021	T	F	5.31	mg/L		0.05	Y
Potassium	0670	WL	6/22/2021	T	F	11	mg/L	F	0.33	Y
Potassium	0670	WL	11/17/2021	T	F	7.61	mg/L		0.05	Y
Potassium	0683	WL	6/23/2021	T	F	9.3	mg/L	F	0.33	Y
Potassium	0683	WL	11/15/2021	T	F	7.04	mg/L		0.05	Y
Potassium	0689	WL	6/23/2021	T	F	22	mg/L	FQ	0.33	Y
Potassium	0855	WL	6/22/2021	T	F	13	mg/L	F	0.33	Y
Potassium	0855	WL	11/17/2021	T	F	6.89	mg/L		0.05	Y
Selenium	0169	WL	6/22/2021	T	F	0.0036	mg/L	J F	0.0028	Y
Selenium	0169	WL	11/15/2021	T	F	0.00424	mg/L	B	0.0015	Y
Selenium	0170	WL	6/23/2021	T	F	0.028	mg/L	F	0.0028	Y
Selenium	0170	WL	11/17/2021	T	D	0.0309	mg/L		0.0015	Y
Selenium	0170	WL	11/17/2021	T	F	0.0294	mg/L		0.0015	Y
Selenium	0172	WL	6/23/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0172	WL	11/16/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0195	WL	6/23/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0195	WL	11/15/2021	D	F	0.0262	mg/L		0.0015	Y
Selenium	0201	WL	6/22/2021	D	D	0.029	mg/L	F	0.0028	Y
Selenium	0201	WL	6/22/2021	T	F	0.029	mg/L	F	0.0028	Y
Selenium	0201	WL	11/16/2021	T	F	0.0381	mg/L		0.0015	Y
Selenium	0215	WL	6/23/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0215	WL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0216	WL	6/21/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0216	WL	11/15/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0217	WL	6/22/2021	T	F	0.0037	mg/L	J F	0.0028	Y
Selenium	0217	WL	11/16/2021	T	F	0.00478	mg/L	B	0.0015	Y
Selenium	0219	WL	6/24/2021	T	F	0.0028	mg/L	U F	0.0028	Y
Selenium	0219	WL	11/17/2021	T	F	0.00414	mg/L	B	0.0015	Y
Selenium	0442	WL	11/17/2021	D	F	0.00159	mg/L	B	0.0015	Y
Selenium	0590	WL	6/23/2021	T	F	0.026	mg/L	F	0.0028	Y
Selenium	0590	WL	11/16/2021	T	F	0.0274	mg/L		0.0015	Y
Selenium	0620	WL	6/22/2021	T	F	0.019	mg/L	F	0.0028	Y
Selenium	0620	WL	11/17/2021	T	F	0.0336	mg/L		0.0015	Y
Selenium	0635	WL	6/21/2021	T	F	0.023	mg/L	F	0.0028	Y
Selenium	0635	WL	11/16/2021	T	F	0.0352	mg/L		0.0015	Y
Selenium	0658	WL	6/22/2021	T	F	0.89	mg/L	F	0.0028	Y
Selenium	0658	WL	11/17/2021	T	D	0.89	mg/L		0.015	Y
Selenium	0658	WL	11/17/2021	T	F	0.872	mg/L		0.015	Y
Selenium	0659	WL	6/22/2021	D	F	0.047	mg/L	F	0.0028	Y
Selenium	0659	WL	11/16/2021	T	F	0.101	mg/L		0.0015	Y
Selenium	0664	WL	6/23/2021	T	F	0.25	mg/L	F	0.0028	Y
Selenium	0664	WL	11/17/2021	T	F	0.473	mg/L		0.0015	Y
Selenium	0669	WL	6/22/2021	T	F	0.024	mg/L	FQ	0.0028	Y
Selenium	0669	WL	11/15/2021	T	F	0.0745	mg/L		0.0015	Y
Selenium	0670	WL	6/22/2021	T	F	0.33	mg/L	F	0.0028	Y

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Selenium	0670	WL	11/17/2021	T	F	0.307	mg/L		0.0015	Y
Selenium	0683	WL	6/23/2021	T	F	0.2	mg/L	F	0.0028	Y
Selenium	0683	WL	11/15/2021	T	F	0.184	mg/L		0.0015	Y
Selenium	0689	WL	6/23/2021	T	F	0.36	mg/L	FQ	0.0028	Y
Selenium	0855	WL	6/22/2021	T	F	0.61	mg/L	F	0.0028	Y
Selenium	0855	WL	11/17/2021	T	F	0.652	mg/L		0.015	Y
Sodium	0169	WL	6/22/2021	T	F	180	mg/L	F	3.6	Y
Sodium	0169	WL	11/15/2021	T	F	176	mg/L	B	0.1	Y
Sodium	0170	WL	6/23/2021	T	F	450	mg/L	F	3.6	Y
Sodium	0170	WL	11/17/2021	T	D	486	mg/L	B	0.1	Y
Sodium	0170	WL	11/17/2021	T	F	507	mg/L	B	0.1	Y
Sodium	0172	WL	6/23/2021	T	F	1700	mg/L	F	18	Y
Sodium	0172	WL	11/16/2021	T	F	1900	mg/L	B	1	Y
Sodium	0195	WL	6/23/2021	T	F	96	mg/L	F	0.36	Y
Sodium	0195	WL	11/15/2021	D	F	111	mg/L	B	0.1	Y
Sodium	0201	WL	6/22/2021	D	D	240	mg/L	F	3.6	Y
Sodium	0201	WL	6/22/2021	T	F	240	mg/L	F	3.6	Y
Sodium	0201	WL	11/16/2021	T	F	234	mg/L	B	0.1	Y
Sodium	0215	WL	6/23/2021	T	F	91	mg/L	F	0.36	Y
Sodium	0215	WL	11/17/2021	T	F	119	mg/L	B	0.1	Y
Sodium	0216	WL	6/21/2021	T	F	180	mg/L	F	3.6	Y
Sodium	0216	WL	11/15/2021	T	F	144	mg/L	B	0.1	Y
Sodium	0217	WL	6/22/2021	T	F	180	mg/L	F	3.6	Y
Sodium	0217	WL	11/16/2021	T	F	158	mg/L	B	1	Y
Sodium	0219	WL	6/24/2021	T	F	200	mg/L	F	3.6	Y
Sodium	0219	WL	11/17/2021	T	F	195	mg/L	B	1	Y
Sodium	0442	WL	11/17/2021	D	F	523	mg/L	B	1	Y
Sodium	0590	WL	6/23/2021	T	F	320	mg/L	F	1.8	Y
Sodium	0590	WL	11/16/2021	T	F	353	mg/L	B	1	Y
Sodium	0620	WL	6/22/2021	T	F	1100	mg/L	F	18	Y
Sodium	0620	WL	11/17/2021	T	F	1110	mg/L	B	1	Y
Sodium	0635	WL	6/21/2021	T	F	160	mg/L	F	3.6	Y
Sodium	0635	WL	11/16/2021	T	F	177	mg/L	B	0.1	Y
Sodium	0658	WL	6/22/2021	T	F	160	mg/L	F	3.6	Y
Sodium	0658	WL	11/17/2021	T	D	157	mg/L	B	0.1	Y
Sodium	0658	WL	11/17/2021	T	F	154	mg/L	B	0.1	Y
Sodium	0659	WL	6/22/2021	D	F	97	mg/L	F	0.36	Y
Sodium	0659	WL	11/16/2021	T	F	113	mg/L	B	0.1	Y
Sodium	0664	WL	6/23/2021	T	F	210	mg/L	F	3.6	Y
Sodium	0664	WL	11/17/2021	T	F	199	mg/L	B	0.1	Y
Sodium	0669	WL	6/22/2021	T	F	190	mg/L	FQ	3.6	Y
Sodium	0669	WL	11/15/2021	T	F	176	mg/L	B	0.1	Y
Sodium	0670	WL	6/22/2021	T	F	210	mg/L	F	3.6	Y
Sodium	0670	WL	11/17/2021	T	F	199	mg/L	B	0.1	Y
Sodium	0683	WL	6/23/2021	T	F	92	mg/L	F	0.36	Y
Sodium	0683	WL	11/15/2021	T	F	99.3	mg/L	B	0.1	Y
Sodium	0689	WL	6/23/2021	T	F	170	mg/L	FQ	3.6	Y
Sodium	0855	WL	6/22/2021	T	F	140	mg/L	F	0.36	Y
Sodium	0855	WL	11/17/2021	T	F	135	mg/L	B	0.1	Y
Specific Conductance	0169	WL	6/22/2021	N	F	2081	umhos/cm	F		Y
Specific Conductance	0169	WL	11/15/2021	N	F	2031	umhos/cm			Y
Specific Conductance	0170	WL	6/23/2021	N	F	3436	umhos/cm	F		Y
Specific Conductance	0170	WL	11/17/2021	N	F	3412	umhos/cm			Y
Specific Conductance	0172	WL	6/23/2021	N	F	9344	umhos/cm	F		Y
Specific Conductance	0172	WL	11/16/2021	N	F	9628	umhos/cm			Y
Specific Conductance	0195	WL	6/23/2021	N	F	1049	umhos/cm	F		Y
Specific Conductance	0195	WL	11/15/2021	N	F	1035	umhos/cm			Y

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Specific Conductance	0201	WL	6/22/2021	N	F	3244	umhos/cm	F		Y
Specific Conductance	0201	WL	11/16/2021	N	F	3052	umhos/cm			Y
Specific Conductance	0215	WL	6/23/2021	N	F	1237	umhos/cm	F		Y
Specific Conductance	0215	WL	11/17/2021	N	F	1333	umhos/cm			Y
Specific Conductance	0216	WL	6/21/2021	N	F	1523	umhos/cm	F		Y
Specific Conductance	0216	WL	11/15/2021	N	F	1112	umhos/cm			Y
Specific Conductance	0217	WL	6/22/2021	N	F	3150	umhos/cm	F		Y
Specific Conductance	0217	WL	11/16/2021	N	F	3035	umhos/cm			Y
Specific Conductance	0219	WL	6/24/2021	N	F	3269	umhos/cm	F		Y
Specific Conductance	0219	WL	11/17/2021	N	F	3290	umhos/cm			Y
Specific Conductance	0442	WL	11/17/2021	N	F	3082	umhos/cm			Y
Specific Conductance	0590	WL	6/23/2021	N	F	4510	umhos/cm	F		Y
Specific Conductance	0590	WL	11/16/2021	N	F	4355	umhos/cm			Y
Specific Conductance	0620	WL	6/22/2021	N	F	7104	umhos/cm	F		Y
Specific Conductance	0620	WL	11/17/2021	N	F	7134	umhos/cm			Y
Specific Conductance	0635	WL	6/21/2021	N	F	2233	umhos/cm	F		Y
Specific Conductance	0635	WL	11/16/2021	N	F	2381	umhos/cm			Y
Specific Conductance	0658	WL	6/22/2021	N	F	2917	umhos/cm	F		Y
Specific Conductance	0658	WL	11/17/2021	N	F	3017	umhos/cm			Y
Specific Conductance	0659	WL	6/22/2021	N	F	2012	umhos/cm	F		Y
Specific Conductance	0659	WL	11/16/2021	N	F	2150	umhos/cm			Y
Specific Conductance	0664	WL	6/23/2021	N	F	2146	umhos/cm	F		Y
Specific Conductance	0664	WL	11/17/2021	N	F	2110	umhos/cm			Y
Specific Conductance	0669	WL	6/22/2021	N	F	2256	umhos/cm	FQ		Y
Specific Conductance	0669	WL	11/15/2021	N	F	2124	umhos/cm			Y
Specific Conductance	0670	WL	6/22/2021	N	F	2098	umhos/cm	F		Y
Specific Conductance	0670	WL	11/17/2021	N	F	2119	umhos/cm			Y
Specific Conductance	0683	WL	6/23/2021	N	F	991	umhos/cm	F		Y
Specific Conductance	0683	WL	11/15/2021	N	F	988	umhos/cm			Y
Specific Conductance	0689	WL	6/23/2021	N	F	2163	umhos/cm	FQ		Y
Specific Conductance	0689	WL	11/15/2021	N	F	1935	umhos/cm			Y
Specific Conductance	0855	WL	6/22/2021	N	F	1795	umhos/cm	F		Y
Specific Conductance	0855	WL	11/17/2021	N	F	1748	umhos/cm			Y
Sulfate	0169	WL	6/22/2021	N	F	640	mg/L	F	5.3	Y
Sulfate	0169	WL	11/15/2021	N	F	612	mg/L		13.3	Y
Sulfate	0170	WL	6/23/2021	N	F	1200	mg/L	F	11	Y
Sulfate	0170	WL	11/17/2021	N	D	1080	mg/L		13.3	Y
Sulfate	0170	WL	11/17/2021	N	F	1120	mg/L		13.3	Y
Sulfate	0172	WL	6/23/2021	N	F	3800	mg/L	F	26	Y
Sulfate	0172	WL	11/16/2021	N	F	3940	mg/L		33.3	Y
Sulfate	0195	WL	6/23/2021	N	F	180	mg/L	F	2.6	Y
Sulfate	0195	WL	11/15/2021	N	F	194	mg/L		13.3	Y
Sulfate	0201	WL	6/22/2021	N	D	1500	mg/L	F	11	Y
Sulfate	0201	WL	6/22/2021	N	F	1400	mg/L	F	11	Y
Sulfate	0201	WL	11/16/2021	N	F	1260	mg/L		13.3	Y
Sulfate	0215	WL	6/23/2021	N	F	240	mg/L	F	2.6	Y
Sulfate	0215	WL	11/17/2021	N	F	278	mg/L		13.3	Y
Sulfate	0216	WL	6/21/2021	N	F	200	mg/L	F	2.6	Y
Sulfate	0216	WL	11/15/2021	N	F	138	mg/L		13.3	Y
Sulfate	0217	WL	6/22/2021	N	F	1600	mg/L	F	11	Y
Sulfate	0217	WL	11/16/2021	N	F	1530	mg/L		13.3	Y
Sulfate	0219	WL	6/24/2021	N	F	1600	mg/L	F	11	Y
Sulfate	0219	WL	11/17/2021	N	F	1600	mg/L		13.3	Y
Sulfate	0442	WL	11/17/2021	N	F	893	mg/L		13.3	Y
Sulfate	0590	WL	6/23/2021	N	F	2100	mg/L	FJ	13	Y
Sulfate	0590	WL	11/16/2021	N	F	1940	mg/L		26.6	Y
Sulfate	0620	WL	6/22/2021	N	F	1700	mg/L	F	11	Y

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Sulfate	0620	WL	11/17/2021	N	F	1620	mg/L		13.3	Y
Sulfate	0635	WL	6/21/2021	N	F	750	mg/L	FJ	5.3	Y
Sulfate	0635	WL	11/16/2021	N	F	717	mg/L		13.3	Y
Sulfate	0658	WL	6/22/2021	N	F	1400	mg/L	F	11	Y
Sulfate	0658	WL	11/17/2021	N	D	1370	mg/L		13.3	Y
Sulfate	0658	WL	11/17/2021	N	F	1370	mg/L		13.3	Y
Sulfate	0659	WL	6/22/2021	N	F	880	mg/L	F	5.3	Y
Sulfate	0659	WL	11/16/2021	N	F	833	mg/L		13.3	Y
Sulfate	0664	WL	6/23/2021	N	F	640	mg/L	F	5.3	Y
Sulfate	0664	WL	11/17/2021	N	F	576	mg/L		13.3	Y
Sulfate	0669	WL	6/22/2021	N	F	730	mg/L	FQ	5.3	Y
Sulfate	0669	WL	11/15/2021	N	F	619	mg/L		13.3	Y
Sulfate	0670	WL	6/22/2021	N	F	610	mg/L	F	5.3	Y
Sulfate	0670	WL	11/17/2021	N	F	570	mg/L		13.3	Y
Sulfate	0683	WL	6/23/2021	N	F	100	mg/L	F	1.1	Y
Sulfate	0683	WL	11/15/2021	N	F	102	mg/L		13.3	Y
Sulfate	0689	WL	6/23/2021	N	F	350	mg/L	FQ	2.6	Y
Sulfate	0855	WL	6/22/2021	N	F	510	mg/L	F	5.3	Y
Sulfate	0855	WL	11/17/2021	N	F	518	mg/L		13.3	Y
Temperature	0169	WL	6/22/2021	N	F	16.67	C	F		Y
Temperature	0169	WL	11/15/2021	N	F	15.61	C			Y
Temperature	0170	WL	6/23/2021	N	F	16.73	C	F		Y
Temperature	0170	WL	11/17/2021	N	F	14.14	C			Y
Temperature	0172	WL	6/23/2021	N	F	15.71	C	F		Y
Temperature	0172	WL	11/16/2021	N	F	15.06	C			Y
Temperature	0195	WL	6/23/2021	N	F	11.34	C	F		Y
Temperature	0195	WL	11/15/2021	N	F	10.99	C			Y
Temperature	0201	WL	6/22/2021	N	F	14.12	C	F		Y
Temperature	0201	WL	11/16/2021	N	F	14.54	C			Y
Temperature	0215	WL	6/23/2021	N	F	13.88	C	F		Y
Temperature	0215	WL	11/17/2021	N	F	15.06	C			Y
Temperature	0216	WL	6/21/2021	N	F	16.78	C	F		Y
Temperature	0216	WL	11/15/2021	N	F	15.13	C			Y
Temperature	0217	WL	6/22/2021	N	F	11.12	C	F		Y
Temperature	0217	WL	11/16/2021	N	F	10.29	C			Y
Temperature	0219	WL	6/24/2021	N	F	16.03	C	F		Y
Temperature	0219	WL	11/17/2021	N	F	13.37	C			Y
Temperature	0442	WL	11/17/2021	N	F	13.5	C			Y
Temperature	0590	WL	6/23/2021	N	F	12.32	C	F		Y
Temperature	0590	WL	11/16/2021	N	F	11.93	C			Y
Temperature	0620	WL	6/22/2021	N	F	17.29	C	F		Y
Temperature	0620	WL	11/17/2021	N	F	13.98	C			Y
Temperature	0635	WL	6/21/2021	N	F	16.54	C	F		Y
Temperature	0635	WL	11/16/2021	N	F	12.77	C			Y
Temperature	0658	WL	6/22/2021	N	F	16.23	C	F		Y
Temperature	0658	WL	11/17/2021	N	F	13.63	C			Y
Temperature	0659	WL	6/22/2021	N	F	18.69	C	F		Y
Temperature	0659	WL	11/16/2021	N	F	13.01	C			Y
Temperature	0664	WL	6/23/2021	N	F	14.12	C	F		Y
Temperature	0664	WL	11/17/2021	N	F	15.04	C			Y
Temperature	0669	WL	6/22/2021	N	F	17.09	C	FQ		Y
Temperature	0669	WL	11/15/2021	N	F	13.9	C			Y
Temperature	0670	WL	6/22/2021	N	F	15.9	C	F		Y
Temperature	0670	WL	11/17/2021	N	F	14.98	C			Y
Temperature	0683	WL	6/23/2021	N	F	15.29	C	F		Y
Temperature	0683	WL	11/15/2021	N	F	16.45	C			Y
Temperature	0689	WL	6/23/2021	N	F	22.32	C	FQ		Y

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Temperature	0689	WL	11/15/2021	N	F	17.83	C			Y
Temperature	0855	WL	6/22/2021	N	F	17.57	C	F		Y
Temperature	0855	WL	11/17/2021	N	F	14.03	C			Y
Turbidity	0169	WL	6/22/2021	N	F	2.17	NTU	F		Y
Turbidity	0169	WL	11/15/2021	N	F	4.12	NTU			Y
Turbidity	0170	WL	6/23/2021	N	F	3.53	NTU	F		Y
Turbidity	0170	WL	11/17/2021	N	F	1.05	NTU			Y
Turbidity	0172	WL	6/23/2021	N	F	3.59	NTU	F		Y
Turbidity	0172	WL	11/16/2021	N	F	4.83	NTU			Y
Turbidity	0195	WL	6/23/2021	N	F	2.05	NTU	F		Y
Turbidity	0195	WL	11/15/2021	N	F	13.9	NTU			Y
Turbidity	0201	WL	6/22/2021	N	F	1.31	NTU	F		Y
Turbidity	0201	WL	11/16/2021	N	F	2.11	NTU			Y
Turbidity	0215	WL	6/23/2021	N	F	0.56	NTU	F		Y
Turbidity	0215	WL	11/17/2021	N	F	0.96	NTU			Y
Turbidity	0216	WL	6/21/2021	N	F	2.36	NTU	F		Y
Turbidity	0216	WL	11/15/2021	N	F	1.11	NTU			Y
Turbidity	0217	WL	6/22/2021	N	F	2.45	NTU	F		Y
Turbidity	0217	WL	11/16/2021	N	F	0.98	NTU			Y
Turbidity	0219	WL	6/24/2021	N	F	6.5	NTU	F		Y
Turbidity	0219	WL	11/17/2021	N	F	2.74	NTU			Y
Turbidity	0442	WL	11/17/2021	N	F	13.9	NTU			Y
Turbidity	0590	WL	6/23/2021	N	F	4.02	NTU	F		Y
Turbidity	0590	WL	11/16/2021	N	F	0.82	NTU			Y
Turbidity	0620	WL	6/22/2021	N	F	2.88	NTU	F		Y
Turbidity	0620	WL	11/17/2021	N	F	0.86	NTU			Y
Turbidity	0635	WL	6/21/2021	N	F	1.46	NTU	F		Y
Turbidity	0635	WL	11/16/2021	N	F	0.88	NTU			Y
Turbidity	0658	WL	6/22/2021	N	F	3.75	NTU	F		Y
Turbidity	0658	WL	11/17/2021	N	F	1.29	NTU			Y
Turbidity	0659	WL	6/22/2021	N	F	19.6	NTU	F		Y
Turbidity	0659	WL	11/16/2021	N	F	7.5	NTU			Y
Turbidity	0664	WL	6/23/2021	N	F	8.4	NTU	F		Y
Turbidity	0664	WL	11/17/2021	N	F	4.73	NTU			Y
Turbidity	0669	WL	6/22/2021	N	F	3.4	NTU	FQ		Y
Turbidity	0669	WL	11/15/2021	N	F	2.38	NTU			Y
Turbidity	0670	WL	6/22/2021	N	F	2.89	NTU	F		Y
Turbidity	0670	WL	11/17/2021	N	F	1.52	NTU			Y
Turbidity	0683	WL	6/23/2021	N	F	2.27	NTU	F		Y
Turbidity	0683	WL	11/15/2021	N	F	0.89	NTU			Y
Turbidity	0689	WL	6/23/2021	N	F	22.6	NTU	FQ		Y
Turbidity	0689	WL	11/15/2021	N	F	31	NTU			Y
Turbidity	0855	WL	6/22/2021	N	F	2.56	NTU	F		Y
Turbidity	0855	WL	11/17/2021	N	F	0.7	NTU			Y
Uranium	0169	WL	6/22/2021	T	F	0.024	mg/L	F	0.000040	Y
Uranium	0169	WL	11/15/2021	T	F	0.0239	mg/L		0.000067	Y
Uranium	0170	WL	6/23/2021	T	F	0.061	mg/L	F	0.000040	Y
Uranium	0170	WL	11/17/2021	T	D	0.0605	mg/L		0.000067	Y
Uranium	0170	WL	11/17/2021	T	F	0.062	mg/L		0.000067	Y
Uranium	0172	WL	6/23/2021	T	F	0.0093	mg/L	F	0.000040	Y
Uranium	0172	WL	11/16/2021	T	F	0.0139	mg/L		0.000067	Y
Uranium	0195	WL	6/23/2021	T	F	0.011	mg/L	F	0.000040	Y
Uranium	0195	WL	11/15/2021	D	F	0.0234	mg/L		0.000067	Y
Uranium	0201	WL	6/22/2021	D	D	0.093	mg/L	F	0.000040	Y
Uranium	0201	WL	6/22/2021	T	F	0.089	mg/L	F	0.000040	Y
Uranium	0201	WL	11/16/2021	T	F	0.0936	mg/L		0.000067	Y
Uranium	0215	WL	6/23/2021	T	F	0.016	mg/L	F	0.000040	Y

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PARAMETER	LOCATION CODE / TYPE		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Uranium	0215	WL	11/17/2021	T	F	0.021	mg/L		0.000067	Y
Uranium	0216	WL	6/21/2021	T	F	0.02	mg/L	F	0.000040	Y
Uranium	0216	WL	11/15/2021	T	F	0.0125	mg/L		0.000067	Y
Uranium	0217	WL	6/22/2021	T	F	0.11	mg/L	F	0.000040	Y
Uranium	0217	WL	11/16/2021	T	F	0.113	mg/L		0.000067	Y
Uranium	0219	WL	6/24/2021	T	F	0.14	mg/L	F	0.000040	Y
Uranium	0219	WL	11/17/2021	T	F	0.146	mg/L		0.000067	Y
Uranium	0442	WL	11/17/2021	D	F	0.0127	mg/L		0.000067	Y
Uranium	0590	WL	6/23/2021	T	F	0.074	mg/L	F	0.000040	Y
Uranium	0590	WL	11/16/2021	T	F	0.0728	mg/L		0.000067	Y
Uranium	0620	WL	6/22/2021	T	F	0.057	mg/L	F	0.000040	Y
Uranium	0620	WL	11/17/2021	T	F	0.0575	mg/L		0.000067	Y
Uranium	0635	WL	6/21/2021	T	F	0.045	mg/L	F	0.000040	Y
Uranium	0635	WL	11/16/2021	T	F	0.046	mg/L		0.000067	Y
Uranium	0658	WL	6/22/2021	T	F	0.052	mg/L	F	0.000040	Y
Uranium	0658	WL	11/17/2021	T	D	0.0476	mg/L		0.000067	Y
Uranium	0658	WL	11/17/2021	T	F	0.0465	mg/L		0.000067	Y
Uranium	0659	WL	6/22/2021	D	F	0.05	mg/L	F	0.000040	Y
Uranium	0659	WL	11/16/2021	T	F	0.0534	mg/L		0.000067	Y
Uranium	0664	WL	6/23/2021	T	F	0.073	mg/L	F	0.000040	Y
Uranium	0664	WL	11/17/2021	T	F	0.0602	mg/L		0.000067	Y
Uranium	0669	WL	6/22/2021	T	F	0.095	mg/L	FQ	0.000040	Y
Uranium	0669	WL	11/15/2021	T	F	0.0662	mg/L		0.000067	Y
Uranium	0670	WL	6/22/2021	T	F	0.084	mg/L	F	0.000040	Y
Uranium	0670	WL	11/17/2021	T	F	0.0801	mg/L		0.000067	Y
Uranium	0683	WL	6/23/2021	T	F	0.01	mg/L	F	0.000040	Y
Uranium	0683	WL	11/15/2021	T	F	0.0106	mg/L		0.000067	Y
Uranium	0689	WL	6/23/2021	T	F	0.045	mg/L	FQ	0.000040	Y
Uranium	0855	WL	6/22/2021	T	F	0.045	mg/L	F	0.000040	Y
Uranium	0855	WL	11/17/2021	T	F	0.0463	mg/L		0.000067	Y
Vanadium	0169	WL	6/22/2021	T	F	0.0012	mg/L	J F	0.0010	Y
Vanadium	0169	WL	11/15/2021	T	F	0.00417	mg/L	B	0.0033	Y
Vanadium	0170	WL	6/23/2021	T	F	0.001	mg/L	J F	0.0010	Y
Vanadium	0170	WL	11/17/2021	T	D	0.00375	mg/L	B	0.0033	Y
Vanadium	0170	WL	11/17/2021	T	F	0.0033	mg/L	B	0.0033	Y
Vanadium	0172	WL	6/23/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0172	WL	11/16/2021	T	F	0.0033	mg/L	U	0.0033	Y
Vanadium	0195	WL	6/23/2021	T	F	0.0012	mg/L	J F	0.0010	Y
Vanadium	0195	WL	11/15/2021	D	F	0.00598	mg/L	B	0.0033	Y
Vanadium	0201	WL	6/22/2021	D	D	0.0013	mg/L	J F	0.0010	Y
Vanadium	0201	WL	6/22/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0201	WL	11/16/2021	T	F	0.0033	mg/L	U	0.0033	Y
Vanadium	0215	WL	6/23/2021	T	F	0.0021	mg/L	J F	0.0010	Y
Vanadium	0215	WL	11/17/2021	T	F	0.00565	mg/L	B	0.0033	Y
Vanadium	0216	WL	6/21/2021	T	F	0.19	mg/L	F	0.0010	Y
Vanadium	0216	WL	11/15/2021	T	F	0.265	mg/L		0.0033	Y
Vanadium	0217	WL	6/22/2021	T	F	1.5	mg/L	F	0.0010	Y
Vanadium	0217	WL	11/16/2021	T	F	1.85	mg/L		0.066	Y
Vanadium	0219	WL	6/24/2021	T	F	2.3	mg/L	F	0.0010	Y
Vanadium	0219	WL	11/17/2021	T	F	3.83	mg/L		0.066	Y
Vanadium	0442	WL	11/17/2021	D	F	0.00367	mg/L	B	0.0033	Y
Vanadium	0590	WL	6/23/2021	T	F	0.36	mg/L	F	0.0010	Y
Vanadium	0590	WL	11/16/2021	T	F	0.455	mg/L		0.0033	Y
Vanadium	0620	WL	6/22/2021	T	F	0.0027	mg/L	J F	0.0010	Y
Vanadium	0620	WL	11/17/2021	T	F	0.0158	mg/L	B	0.0033	Y
Vanadium	0635	WL	6/21/2021	T	F	0.001	mg/L	U F	0.0010	Y
Vanadium	0635	WL	11/16/2021	T	F	0.00901	mg/L	B	0.0033	Y

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PARAMETER	LOCATION CODE / TYPE		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Vanadium	0658	WL	6/22/2021	T	F	22	mg/L	F	0.010	Y
Vanadium	0658	WL	11/17/2021	T	D	26.5	mg/L		0.33	Y
Vanadium	0658	WL	11/17/2021	T	F	26.8	mg/L		0.33	Y
Vanadium	0659	WL	6/22/2021	D	F	2.6	mg/L	F	0.0010	Y
Vanadium	0659	WL	11/16/2021	T	F	2.44	mg/L		0.033	Y
Vanadium	0664	WL	6/23/2021	T	F	1.7	mg/L	F	0.0010	Y
Vanadium	0664	WL	11/17/2021	T	F	0.601	mg/L		0.0033	Y
Vanadium	0669	WL	6/22/2021	T	F	2.7	mg/L	FQ	0.0010	Y
Vanadium	0669	WL	11/15/2021	T	F	4.76	mg/L		0.033	Y
Vanadium	0670	WL	6/22/2021	T	F	1.7	mg/L	F	0.0010	Y
Vanadium	0670	WL	11/17/2021	T	F	1.92	mg/L		0.033	Y
Vanadium	0683	WL	6/23/2021	T	F	2	mg/L	F	0.0010	Y
Vanadium	0683	WL	11/15/2021	T	F	2.42	mg/L		0.033	Y
Vanadium	0689	WL	6/23/2021	T	F	2.7	mg/L	FQ	0.0010	Y
Vanadium	0855	WL	6/22/2021	T	F	7.1	mg/L	F	0.0010	Y
Vanadium	0855	WL	11/17/2021	T	F	12	mg/L		0.33	Y

Location Type

WL

Well

Sample Type

F

Field Sample

D

Duplicate

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

Data Qualifiers

F

Low flow sampling method used. Estimated

J

Estimated value

Q

Qualitative result due to sampling technique

Lab Qualifiers

B

Blank contamination. The recorded result is associated with a contaminated blank

J

Estimated value

U

Parameter analyzed for but was not detected.

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

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PARAMETER	LOCATION CODE / TYPE		SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA		DETECTION LIMIT	QA
Alkalinity, Total (As CaCO3)	0320	SL	6/23/2021	D	F	122	mg/L				Y
Alkalinity, Total (As CaCO3)	0320	SL	11/16/2021	N	F	148	mg/L				Y
Alkalinity, Total (As CaCO3)	0322	SL	6/23/2021	N	F	100	mg/L				Y
Alkalinity, Total (As CaCO3)	0322	SL	11/17/2021	N	F	120	mg/L				Y
Alkalinity, Total (As CaCO3)	0323	SL	6/23/2021	N	F	150	mg/L				Y
Alkalinity, Total (As CaCO3)	0323	SL	11/15/2021	N	F	141	mg/L				Y
Alkalinity, Total (As CaCO3)	0324	SL	6/22/2021	N	F	89	mg/L				Y
Alkalinity, Total (As CaCO3)	0324	SL	11/17/2021	N	F	127	mg/L				Y
Alkalinity, Total (As CaCO3)	0326	SL	6/23/2021	N	F	114	mg/L				Y
Alkalinity, Total (As CaCO3)	0326	SL	11/17/2021	N	F	124	mg/L				Y
Alkalinity, Total (As CaCO3)	0452	SL	6/23/2021	D	F	138	mg/L				Y
Alkalinity, Total (As CaCO3)	0452	SL	11/16/2021	N	F	101	mg/L				Y
Alkalinity, Total (As CaCO3)	0453	SL	11/16/2021	N	F	111	mg/L				Y
Alkalinity, Total (As CaCO3)	0575	SL	6/23/2021	D	F	156	mg/L				Y
Alkalinity, Total (As CaCO3)	0575	SL	11/15/2021	D	F	157	mg/L				Y
Ammonia Total as N	0320	SL	6/23/2021	N	F	48	mg/L		J	0.62	Y
Ammonia Total as N	0320	SL	11/16/2021	N	F	57	mg/L			0.850	Y
Ammonia Total as N	0322	SL	6/23/2021	N	F	0.062	mg/L	U	J	0.062	Y
Ammonia Total as N	0322	SL	11/17/2021	N	F	0.0664	mg/L	J		0.0170	Y
Ammonia Total as N	0323	SL	6/23/2021	N	F	16	mg/L		J	0.62	Y
Ammonia Total as N	0323	SL	11/15/2021	N	F	22.2	mg/L			0.425	Y
Ammonia Total as N	0324	SL	6/22/2021	N	F	0.062	mg/L	U		0.062	Y
Ammonia Total as N	0324	SL	11/17/2021	N	F	0.0418	mg/L	J		0.0170	Y
Ammonia Total as N	0326	SL	6/23/2021	N	F	0.062	mg/L	U	J	0.062	Y
Ammonia Total as N	0326	SL	6/23/2021	N	D	0.062	mg/L	U	J	0.062	Y
Ammonia Total as N	0326	SL	11/17/2021	N	F	0.0273	mg/L	J		0.0170	Y
Ammonia Total as N	0452	SL	6/23/2021	N	F	0.062	mg/L	U	J	0.062	Y
Ammonia Total as N	0452	SL	11/16/2021	N	F	0.553	mg/L			0.0170	Y
Ammonia Total as N	0453	SL	11/16/2021	N	F	0.293	mg/L			0.0170	Y
Ammonia Total as N	0575	SL	6/23/2021	N	F	3	mg/L		J	0.062	Y
Ammonia Total as N	0575	SL	11/15/2021	N	F	1.51	mg/L			0.0850	Y
Arsenic	0320	SL	6/23/2021	D	F	0.0025	mg/L			0.00051	Y
Arsenic	0320	SL	11/16/2021	T	F	0.013	mg/L			0.002	Y
Arsenic	0322	SL	6/23/2021	T	F	0.00051	mg/L	U		0.00051	Y
Arsenic	0322	SL	11/17/2021	T	F	0.002	mg/L	U		0.002	Y
Arsenic	0323	SL	6/23/2021	T	F	0.00092	mg/L	J		0.00051	Y
Arsenic	0323	SL	11/15/2021	T	F	0.00226	mg/L	B		0.002	Y
Arsenic	0324	SL	6/22/2021	T	F	0.00051	mg/L	U		0.00051	Y
Arsenic	0324	SL	11/17/2021	T	F	0.002	mg/L	U		0.002	Y
Arsenic	0326	SL	6/23/2021	T	F	0.00057	mg/L	J		0.00051	Y
Arsenic	0326	SL	6/23/2021	T	D	0.00051	mg/L	U		0.00051	Y
Arsenic	0326	SL	11/17/2021	T	F	0.002	mg/L	U		0.002	Y
Arsenic	0452	SL	6/23/2021	D	F	0.015	mg/L			0.00051	Y
Arsenic	0452	SL	11/16/2021	T	F	0.0414	mg/L			0.002	Y
Arsenic	0453	SL	11/16/2021	T	F	0.0244	mg/L			0.002	Y
Arsenic	0575	SL	6/23/2021	T	F	0.002	mg/L			0.00051	Y
Arsenic	0575	SL	11/15/2021	D	F	0.0032	mg/L	B		0.002	Y
Calcium	0320	SL	6/23/2021	D	F	810	mg/L			0.47	Y
Calcium	0320	SL	11/16/2021	T	F	806	mg/L			0.5	Y
Calcium	0322	SL	6/23/2021	T	F	50	mg/L			0.094	Y
Calcium	0322	SL	11/17/2021	T	F	67.7	mg/L			0.05	Y
Calcium	0323	SL	6/23/2021	T	F	560	mg/L			0.47	Y
Calcium	0323	SL	11/15/2021	T	F	536	mg/L			0.5	Y
Calcium	0324	SL	6/22/2021	T	F	51	mg/L			0.094	Y
Calcium	0324	SL	11/17/2021	T	F	71.1	mg/L			0.05	Y
Calcium	0326	SL	6/23/2021	T	F	51	mg/L			0.094	Y
Calcium	0326	SL	6/23/2021	T	D	51	mg/L			0.094	Y
Calcium	0326	SL	11/17/2021	T	F	67.6	mg/L			0.05	Y
Calcium	0452	SL	6/23/2021	D	F	770	mg/L			0.94	Y
Calcium	0452	SL	11/16/2021	T	F	578	mg/L			0.5	Y
Calcium	0453	SL	11/16/2021	T	F	619	mg/L			0.5	Y
Calcium	0575	SL	6/23/2021	T	F	580	mg/L			0.94	Y
Calcium	0575	SL	11/15/2021	D	F	596	mg/L			0.5	Y
Chloride	0320	SL	6/23/2021	N	F	720	mg/L			3.8	Y
Chloride	0320	SL	11/16/2021	N	F	660	mg/L			6.70	Y

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Chloride	0322 SL	6/23/2021	N	F	120	mg/L	J	0.76	Y
Chloride	0322 SL	11/17/2021	N	F	177	mg/L		6.70	Y
Chloride	0323 SL	6/23/2021	N	F	410	mg/L		3.8	Y
Chloride	0323 SL	11/15/2021	N	F	366	mg/L		6.70	Y
Chloride	0324 SL	6/22/2021	N	F	110	mg/L	J	0.76	Y
Chloride	0324 SL	11/17/2021	N	F	177	mg/L		6.70	Y
Chloride	0326 SL	6/23/2021	N	F	70	mg/L	J	0.76	Y
Chloride	0326 SL	6/23/2021	N	D	100	mg/L	J	0.76	Y
Chloride	0326 SL	11/17/2021	N	F	174	mg/L		6.70	Y
Chloride	0452 SL	6/23/2021	N	F	3200	mg/L	J	15	Y
Chloride	0452 SL	11/16/2021	N	F	665	mg/L		6.70	Y
Chloride	0453 SL	11/16/2021	N	F	366	mg/L		6.70	Y
Chloride	0575 SL	6/23/2021	N	F	950	mg/L		7.6	Y
Chloride	0575 SL	11/15/2021	N	F	851	mg/L		6.70	Y
Dissolved Oxygen	0320 SL	6/23/2021	N	F	6.6	mg/L			Y
Dissolved Oxygen	0320 SL	11/16/2021	N	F	9.65	mg/L			Y
Dissolved Oxygen	0322 SL	6/23/2021	N	F	8.79	mg/L			Y
Dissolved Oxygen	0322 SL	11/17/2021	N	F	9.8	mg/L			Y
Dissolved Oxygen	0323 SL	6/23/2021	N	F	7.47	mg/L			Y
Dissolved Oxygen	0323 SL	11/15/2021	N	F	9.26	mg/L	J		Y
Dissolved Oxygen	0324 SL	6/22/2021	N	F	10.41	mg/L			Y
Dissolved Oxygen	0324 SL	11/17/2021	N	F	0.58	mg/L			Y
Dissolved Oxygen	0326 SL	6/23/2021	N	F	8.95	mg/L			Y
Dissolved Oxygen	0326 SL	11/17/2021	N	F	11.34	mg/L			Y
Dissolved Oxygen	0452 SL	6/23/2021	N	F	8.62	mg/L			Y
Dissolved Oxygen	0452 SL	11/16/2021	N	F	8.66	mg/L			Y
Dissolved Oxygen	0453 SL	11/16/2021	N	F	13.8	mg/L			Y
Dissolved Oxygen	0575 SL	6/23/2021	N	F	5.31	mg/L			Y
Dissolved Oxygen	0575 SL	11/15/2021	N	F	10.17	mg/L	J		Y
Magnesium	0320 SL	6/23/2021	D	F	130	mg/L		0.43	Y
Magnesium	0320 SL	11/16/2021	T	F	132	mg/L		0.11	Y
Magnesium	0322 SL	6/23/2021	T	F	10	mg/L		0.086	Y
Magnesium	0322 SL	11/17/2021	T	F	14.1	mg/L		0.11	Y
Magnesium	0323 SL	6/23/2021	T	F	120	mg/L		0.086	Y
Magnesium	0323 SL	11/15/2021	T	F	125	mg/L		0.11	Y
Magnesium	0324 SL	6/22/2021	T	F	10	mg/L		0.086	Y
Magnesium	0324 SL	11/17/2021	T	F	15.3	mg/L		0.11	Y
Magnesium	0326 SL	6/23/2021	T	F	10	mg/L		0.086	Y
Magnesium	0326 SL	6/23/2021	T	D	10	mg/L		0.086	Y
Magnesium	0326 SL	11/17/2021	T	F	14.2	mg/L		0.11	Y
Magnesium	0452 SL	6/23/2021	D	F	490	mg/L		0.86	Y
Magnesium	0452 SL	11/16/2021	T	F	95	mg/L		0.11	Y
Magnesium	0453 SL	11/16/2021	T	F	63.6	mg/L		0.11	Y
Magnesium	0575 SL	6/23/2021	T	F	390	mg/L		0.86	Y
Magnesium	0575 SL	11/15/2021	D	F	361	mg/L		0.11	Y
Molybdenum	0320 SL	6/23/2021	D	F	1.6	mg/L		0.00046	Y
Molybdenum	0320 SL	11/16/2021	T	F	1.14	mg/L		0.004	Y
Molybdenum	0322 SL	6/23/2021	T	F	0.0033	mg/L		0.00046	Y
Molybdenum	0322 SL	11/17/2021	T	F	0.00613	mg/L		0.0002	Y
Molybdenum	0323 SL	6/23/2021	T	F	1.2	mg/L		0.00046	Y
Molybdenum	0323 SL	11/15/2021	T	F	0.925	mg/L		0.004	Y
Molybdenum	0324 SL	6/22/2021	T	F	0.0031	mg/L		0.00046	Y
Molybdenum	0324 SL	11/17/2021	T	F	0.00572	mg/L		0.0002	Y
Molybdenum	0326 SL	6/23/2021	T	F	0.0022	mg/L		0.00046	Y
Molybdenum	0326 SL	6/23/2021	T	D	0.003	mg/L		0.00046	Y
Molybdenum	0326 SL	11/17/2021	T	F	0.00527	mg/L		0.0002	Y
Molybdenum	0452 SL	6/23/2021	D	F	1.7	mg/L		0.00046	Y
Molybdenum	0452 SL	11/16/2021	T	F	5.46	mg/L		0.005	Y
Molybdenum	0453 SL	11/16/2021	T	F	2.67	mg/L		0.004	Y
Molybdenum	0575 SL	6/23/2021	T	F	0.67	mg/L		0.00046	Y
Molybdenum	0575 SL	11/15/2021	D	F	0.569	mg/L		0.0002	Y
Nitrate + Nitrite as Nitrogen	0320 SL	6/23/2021	N	F	0.94	mg/L	J	0.0056	Y
Nitrate + Nitrite as Nitrogen	0320 SL	11/16/2021	N	F	4.75	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0322 SL	6/23/2021	N	F	0.016	mg/L	J J	0.0056	Y
Nitrate + Nitrite as Nitrogen	0322 SL	11/17/2021	N	F	0.017	mg/L	U	0.0170	Y

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Nitrate + Nitrite as Nitrogen	0323 SL	6/23/2021	N	F	1.9	mg/L	J	0.028	Y
Nitrate + Nitrite as Nitrogen	0323 SL	11/15/2021	N	F	2.5	mg/L		0.170	Y
Nitrate + Nitrite as Nitrogen	0324 SL	6/22/2021	N	F	0.056	mg/L	U	0.056	Y
Nitrate + Nitrite as Nitrogen	0324 SL	11/17/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0326 SL	6/23/2021	N	F	0.35	mg/L	J	0.056	Y
Nitrate + Nitrite as Nitrogen	0326 SL	6/23/2021	N	D	0.056	mg/L	U J	0.056	Y
Nitrate + Nitrite as Nitrogen	0326 SL	11/17/2021	N	F	0.017	mg/L	U	0.0170	Y
Nitrate + Nitrite as Nitrogen	0452 SL	6/23/2021	N	F	0.0056	mg/L	U J	0.0056	Y
Nitrate + Nitrite as Nitrogen	0452 SL	11/16/2021	N	F	34	mg/L		0.850	Y
Nitrate + Nitrite as Nitrogen	0453 SL	11/16/2021	N	F	37.5	mg/L		0.850	Y
Nitrate + Nitrite as Nitrogen	0575 SL	6/23/2021	N	F	0.025	mg/L	J	0.0056	Y
Nitrate + Nitrite as Nitrogen	0575 SL	11/15/2021	N	F	0.129	mg/L		0.0170	Y
Oxidation Reduction Potential	0320 SL	6/23/2021	N	F	172.6	mV			Y
Oxidation Reduction Potential	0320 SL	11/16/2021	N	F	119	mV			Y
Oxidation Reduction Potential	0322 SL	6/23/2021	N	F	89.1	mV			Y
Oxidation Reduction Potential	0322 SL	11/17/2021	N	F	203.1	mV			Y
Oxidation Reduction Potential	0323 SL	6/23/2021	N	F	182	mV			Y
Oxidation Reduction Potential	0323 SL	11/15/2021	N	F	84.2	mV			Y
Oxidation Reduction Potential	0324 SL	6/22/2021	N	F	164	mV			Y
Oxidation Reduction Potential	0324 SL	11/17/2021	N	F	88.5	mV			Y
Oxidation Reduction Potential	0326 SL	6/23/2021	N	F	99.9	mV			Y
Oxidation Reduction Potential	0326 SL	11/17/2021	N	F	206.4	mV			Y
Oxidation Reduction Potential	0452 SL	6/23/2021	N	F	110.2	mV			Y
Oxidation Reduction Potential	0452 SL	11/16/2021	N	F	98.5	mV			Y
Oxidation Reduction Potential	0453 SL	11/16/2021	N	F	102.4	mV			Y
Oxidation Reduction Potential	0575 SL	6/23/2021	N	F	266	mV			Y
Oxidation Reduction Potential	0575 SL	11/15/2021	N	F	83.7	mV			Y
Percent Dissolved Oxygen	0320 SL	11/16/2021	N	F	89.6	%			Y
Percent Dissolved Oxygen	0322 SL	11/17/2021	N	F	88.4	%			Y
Percent Dissolved Oxygen	0323 SL	11/15/2021	N	F	83.6	%			Y
Percent Dissolved Oxygen	0324 SL	11/17/2021	N	F	5.8	%			Y
Percent Dissolved Oxygen	0326 SL	11/17/2021	N	F	87.4	%			Y
Percent Dissolved Oxygen	0452 SL	11/16/2021	N	F	77.2	%			Y
Percent Dissolved Oxygen	0453 SL	11/16/2021	N	F	125	%			Y
Percent Dissolved Oxygen	0575 SL	11/15/2021	N	F	95.9	%			Y
pH	0320 SL	6/23/2021	N	F	8.07	s.u.			Y
pH	0320 SL	11/16/2021	N	F	7.82	s.u.			Y
pH	0322 SL	6/23/2021	N	F	8.29	s.u.			Y
pH	0322 SL	11/17/2021	N	F	8.37	s.u.			Y
pH	0323 SL	6/23/2021	N	F	8.11	s.u.			Y
pH	0323 SL	11/15/2021	N	F	8.16	s.u.			Y
pH	0324 SL	6/22/2021	N	F	8.26	s.u.			Y
pH	0324 SL	11/17/2021	N	F	7.04	s.u.			Y
pH	0326 SL	6/23/2021	N	F	8.3	s.u.			Y
pH	0326 SL	11/17/2021	N	F	8.32	s.u.			Y
pH	0452 SL	6/23/2021	N	F	9.26	s.u.			Y
pH	0452 SL	11/16/2021	N	F	7.78	s.u.			Y
pH	0453 SL	11/16/2021	N	F	8	s.u.			Y
pH	0575 SL	6/23/2021	N	F	8.27	s.u.			Y
pH	0575 SL	11/15/2021	N	F	8.12	s.u.			Y
Potassium	0320 SL	6/23/2021	D	F	82	mg/L		1.6	Y
Potassium	0320 SL	11/16/2021	T	F	55.7	mg/L		0.05	Y
Potassium	0322 SL	6/23/2021	T	F	3.3	mg/L		0.33	Y
Potassium	0322 SL	11/17/2021	T	F	4.02	mg/L	B	0.05	Y
Potassium	0323 SL	6/23/2021	T	F	67	mg/L		0.33	Y
Potassium	0323 SL	11/15/2021	T	F	48.3	mg/L		0.05	Y
Potassium	0324 SL	6/22/2021	T	F	3.5	mg/L		0.33	Y
Potassium	0324 SL	11/17/2021	T	F	4.26	mg/L	B	0.05	Y
Potassium	0326 SL	6/23/2021	T	F	3.4	mg/L		0.33	Y
Potassium	0326 SL	6/23/2021	T	D	3.2	mg/L		0.33	Y
Potassium	0326 SL	11/17/2021	T	F	4.14	mg/L	B	0.05	Y
Potassium	0452 SL	6/23/2021	D	F	290	mg/L		3.3	Y
Potassium	0452 SL	11/16/2021	T	F	51.6	mg/L		0.05	Y
Potassium	0453 SL	11/16/2021	T	F	28.3	mg/L		0.05	Y
Potassium	0575 SL	6/23/2021	T	F	150	mg/L		3.3	Y

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Potassium	0575 SL	11/15/2021	D	F	105	mg/L		0.05	Y
Selenium	0320 SL	6/23/2021	D	F	0.0049	mg/L	J	0.0028	Y
Selenium	0320 SL	11/16/2021	T	F	0.0082	mg/L		0.0015	Y
Selenium	0322 SL	6/23/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0322 SL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0323 SL	6/23/2021	T	F	0.012	mg/L		0.0028	Y
Selenium	0323 SL	11/15/2021	T	F	0.0143	mg/L		0.0015	Y
Selenium	0324 SL	6/22/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0324 SL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0326 SL	6/23/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0326 SL	6/23/2021	T	D	0.0028	mg/L	U	0.0028	Y
Selenium	0326 SL	11/17/2021	T	F	0.0015	mg/L	U	0.0015	Y
Selenium	0452 SL	6/23/2021	D	F	0.0079	mg/L	J	0.0028	Y
Selenium	0452 SL	11/16/2021	T	F	0.0452	mg/L		0.0015	Y
Selenium	0453 SL	11/16/2021	T	F	0.0242	mg/L		0.0015	Y
Selenium	0575 SL	6/23/2021	T	F	0.0028	mg/L	U	0.0028	Y
Selenium	0575 SL	11/15/2021	D	F	0.00334	mg/L	B	0.0015	Y
Sodium	0320 SL	6/23/2021	D	F	940	mg/L		18	Y
Sodium	0320 SL	11/16/2021	T	F	938	mg/L	B	1	Y
Sodium	0322 SL	6/23/2021	T	F	69	mg/L		0.36	Y
Sodium	0322 SL	11/17/2021	T	F	128	mg/L	B	0.1	Y
Sodium	0323 SL	6/23/2021	T	F	700	mg/L		1.8	Y
Sodium	0323 SL	11/15/2021	T	F	721	mg/L	B	1	Y
Sodium	0324 SL	6/22/2021	T	F	70	mg/L		0.36	Y
Sodium	0324 SL	11/17/2021	T	F	131	mg/L	B	0.1	Y
Sodium	0326 SL	6/23/2021	T	F	70	mg/L		0.36	Y
Sodium	0326 SL	6/23/2021	T	D	70	mg/L		0.36	Y
Sodium	0326 SL	11/17/2021	T	F	130	mg/L	B	0.1	Y
Sodium	0452 SL	6/23/2021	D	F	3500	mg/L		36	Y
Sodium	0452 SL	11/16/2021	T	F	807	mg/L	B	1	Y
Sodium	0453 SL	11/16/2021	T	F	503	mg/L	B	1	Y
Sodium	0575 SL	6/23/2021	T	F	1900	mg/L		36	Y
Sodium	0575 SL	11/15/2021	D	F	1760	mg/L	B	1	Y
Specific Conductance	0320 SL	6/23/2021	N	F	7571	umhos/cm			Y
Specific Conductance	0320 SL	11/16/2021	N	F	7159	umhos/cm			Y
Specific Conductance	0322 SL	6/23/2021	N	F	732	umhos/cm			Y
Specific Conductance	0322 SL	11/17/2021	N	F	1075	umhos/cm			Y
Specific Conductance	0323 SL	6/23/2021	N	F	5683	umhos/cm			Y
Specific Conductance	0323 SL	11/15/2021	N	F	5652	umhos/cm			Y
Specific Conductance	0324 SL	6/22/2021	N	F	733	umhos/cm			Y
Specific Conductance	0324 SL	11/17/2021	N	F	7135	umhos/cm			Y
Specific Conductance	0326 SL	6/23/2021	N	F	727	umhos/cm			Y
Specific Conductance	0326 SL	11/17/2021	N	F	1063	umhos/cm			Y
Specific Conductance	0452 SL	6/23/2021	N	F	19291	umhos/cm			Y
Specific Conductance	0452 SL	11/16/2021	N	F	6024	umhos/cm			Y
Specific Conductance	0453 SL	11/16/2021	N	F	3810	umhos/cm			Y
Specific Conductance	0575 SL	6/23/2021	N	F	10889	umhos/cm			Y
Specific Conductance	0575 SL	11/15/2021	N	F	10048	umhos/cm			Y
Sulfate	0320 SL	6/23/2021	N	F	3700	mg/L		26	Y
Sulfate	0320 SL	11/16/2021	N	F	3460	mg/L		26.6	Y
Sulfate	0322 SL	6/23/2021	N	F	69	mg/L		1.1	Y
Sulfate	0322 SL	11/17/2021	N	F	115	mg/L		13.3	Y
Sulfate	0323 SL	6/23/2021	N	F	2900	mg/L		26	Y
Sulfate	0323 SL	11/15/2021	N	F	2770	mg/L		26.6	Y
Sulfate	0324 SL	6/22/2021	N	F	74	mg/L		1.1	Y
Sulfate	0324 SL	11/17/2021	N	F	118	mg/L		13.3	Y
Sulfate	0326 SL	6/23/2021	N	F	74	mg/L		1.1	Y
Sulfate	0326 SL	6/23/2021	N	D	72	mg/L		1.1	Y
Sulfate	0326 SL	11/17/2021	N	F	115	mg/L		13.3	Y
Sulfate	0452 SL	6/23/2021	N	F	8900	mg/L		53	Y
Sulfate	0452 SL	11/16/2021	N	F	2380	mg/L		26.6	Y
Sulfate	0453 SL	11/16/2021	N	F	1930	mg/L		13.3	Y
Sulfate	0575 SL	6/23/2021	N	F	6000	mg/L		53	Y
Sulfate	0575 SL	11/15/2021	N	F	5310	mg/L		66.5	Y

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PARAMETER	LOCATION CODE / TYPE	SAMPLE DATE	FRACTION	SAMPLE TYPE	RESULT	UNIT	QUALIFIERS LAB / DATA	DETECTION LIMIT	QA
Temperature	0320 SL	6/23/2021	N	F	21.8	C			Y
Temperature	0320 SL	11/16/2021	N	F	10.98	C			Y
Temperature	0322 SL	6/23/2021	N	F	19.12	C			Y
Temperature	0322 SL	11/17/2021	N	F	7.11	C			Y
Temperature	0323 SL	6/23/2021	N	F	23.05	C			Y
Temperature	0323 SL	11/15/2021	N	F	9.95	C			Y
Temperature	0324 SL	6/22/2021	N	F	21.43	C			Y
Temperature	0324 SL	11/17/2021	N	F	13.96	C			Y
Temperature	0326 SL	6/23/2021	N	F	19.12	C			Y
Temperature	0326 SL	11/17/2021	N	F	7.38	C			Y
Temperature	0452 SL	6/23/2021	N	F	20.4	C			Y
Temperature	0452 SL	11/16/2021	N	F	9.19	C			Y
Temperature	0453 SL	11/16/2021	N	F	9.59	C			Y
Temperature	0575 SL	6/23/2021	N	F	22.31	C			Y
Temperature	0575 SL	11/15/2021	N	F	11.11	C			Y
Turbidity	0320 SL	6/23/2021	N	F	13.5	NTU			Y
Turbidity	0320 SL	11/16/2021	N	F	3.51	NTU			Y
Turbidity	0322 SL	6/23/2021	N	F	4.9	NTU			Y
Turbidity	0322 SL	11/17/2021	N	F	6.69	NTU			Y
Turbidity	0323 SL	6/23/2021	N	F	9.5	NTU			Y
Turbidity	0323 SL	11/15/2021	N	F	3.84	NTU			Y
Turbidity	0324 SL	6/22/2021	N	F	4.31	NTU			Y
Turbidity	0324 SL	11/17/2021	N	F	5.4	NTU			Y
Turbidity	0326 SL	6/23/2021	N	F	4.13	NTU			Y
Turbidity	0326 SL	11/17/2021	N	F	7	NTU			Y
Turbidity	0452 SL	6/23/2021	N	F	111	NTU			Y
Turbidity	0452 SL	11/16/2021	N	F	1.59	NTU			Y
Turbidity	0453 SL	11/16/2021	N	F	5.44	NTU			Y
Turbidity	0575 SL	6/23/2021	N	F	16.8	NTU			Y
Turbidity	0575 SL	11/15/2021	N	F	20.3	NTU			Y
Uranium	0320 SL	6/23/2021	D	F	0.22	mg/L		0.000040	Y
Uranium	0320 SL	11/16/2021	T	F	0.171	mg/L		0.000067	Y
Uranium	0322 SL	6/23/2021	T	F	0.0014	mg/L		0.000040	Y
Uranium	0322 SL	11/17/2021	T	F	0.00234	mg/L		0.000067	Y
Uranium	0323 SL	6/23/2021	T	F	0.21	mg/L		0.000040	Y
Uranium	0323 SL	11/15/2021	T	F	0.18	mg/L		0.000067	Y
Uranium	0324 SL	6/22/2021	T	F	0.0015	mg/L		0.000040	Y
Uranium	0324 SL	11/17/2021	T	F	0.00233	mg/L		0.000067	Y
Uranium	0326 SL	6/23/2021	T	F	0.0014	mg/L		0.000040	Y
Uranium	0326 SL	6/23/2021	T	D	0.0014	mg/L		0.000040	Y
Uranium	0326 SL	11/17/2021	T	F	0.00243	mg/L		0.000067	Y
Uranium	0452 SL	6/23/2021	D	F	0.13	mg/L		0.000040	Y
Uranium	0452 SL	11/16/2021	T	F	0.193	mg/L		0.000067	Y
Uranium	0453 SL	11/16/2021	T	F	0.0762	mg/L		0.000067	Y
Uranium	0575 SL	6/23/2021	T	F	0.22	mg/L		0.000040	Y
Uranium	0575 SL	11/15/2021	D	F	0.194	mg/L		0.000067	Y
Vanadium	0320 SL	6/23/2021	D	F	0.02	mg/L		0.0010	Y
Vanadium	0320 SL	11/16/2021	T	F	0.0159	mg/L	B	0.0033	Y
Vanadium	0322 SL	6/23/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0322 SL	11/17/2021	T	F	0.00565	mg/L	B	0.0033	Y
Vanadium	0323 SL	6/23/2021	T	F	0.0014	mg/L	J	0.0010	Y
Vanadium	0323 SL	11/15/2021	T	F	0.00492	mg/L	B	0.0033	Y
Vanadium	0324 SL	6/22/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0324 SL	11/17/2021	T	F	0.00547	mg/L	B	0.0033	Y
Vanadium	0326 SL	6/23/2021	T	F	0.001	mg/L	U	0.0010	Y
Vanadium	0326 SL	6/23/2021	T	D	0.001	mg/L	U	0.0010	Y
Vanadium	0326 SL	11/17/2021	T	F	0.0123	mg/L	B U	0.0033	Y
Vanadium	0452 SL	6/23/2021	D	F	0.31	mg/L		0.0010	Y
Vanadium	0452 SL	11/16/2021	T	F	2.2	mg/L		0.0825	Y
Vanadium	0453 SL	11/16/2021	T	F	2.32	mg/L		0.066	Y
Vanadium	0575 SL	6/23/2021	T	F	0.0023	mg/L	J	0.0010	Y
Vanadium	0575 SL	11/15/2021	D	F	0.0141	mg/L	B	0.0033	Y

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Location Type

SL

Surface Location

Sample Type

F

Field Sample

D

Duplicate

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

Data Qualifiers

J

Estimated value

U

Parameter analyzed for but was not detected.

Appendix C

Detailed Mann-Kendall Trend Test and Linear Regression Results

Table C-1. Mann-Kendall Trend Test and Linear Regression Results for Old Rifle Site Wells: 1998–2021

Parameter	Location	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results			Linear Regression Results		
							Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Uranium	0304	5/19/1998	11/15/2021	53	0	0.07	0.025	0.79	No Trend	-0.019	0.83	No Trend
	0305	5/19/1998	11/15/2021	52	0	0.12	0.307	0.001	Increasing	0.21	0.0003	Increasing
	0309	5/19/1998	11/15/2021	53	0	0.02	-0.086	0.36	No Trend	0.10	0.012	Decreasing
	0310	5/19/1998	11/15/2021	53	0	0.09	-0.561	<0.0001	Decreasing	0.49	<0.0001	Decreasing
	0655	5/18/1998	11/15/2021	53	0	0.13	-0.174	0.065	No Trend	0.079	0.023	Decreasing
	0656	5/20/1998	11/15/2021	53	0	0.10	0.554	<0.0001	Increasing	0.46	<0.0001	Increasing
	0292A	4/14/2009	11/15/2021	32	0	0.0125	0.016	0.91	No Trend	-0.029	0.72	No Trend
Selenium	0658	5/21/1998	11/15/2021	42	0	0.0113	-0.583	<0.0001	Decreasing	0.51	<0.0001	Decreasing
	0304	5/19/1998	11/15/2021	53	6	<0.0015	-0.527	<0.0001	Decreasing	0.46	<0.0001	Decreasing
	0305	5/19/1998	11/15/2021	52	0	0.0159	-0.771	<0.0001	Decreasing	0.67	<0.0001	Decreasing
	0309	5/19/1998	11/15/2021	53	33	<0.0015	0.128	0.17	No Trend	0.24	0.0001	Increasing
	0310	5/19/1998	11/15/2021	53	24	<0.0015	0.221	0.018	Increasing	0.24	0.0001	Increasing
	0655	5/18/1998	11/15/2021	53	0	0.0562	0.216	0.023	Increasing	0.068	0.033	Increasing
	0656	5/20/1998	11/15/2021	53	4	0.00156	-0.259	0.006	Decreasing	0.20	0.0005	Decreasing
Vanadium	0292A	4/14/2009	11/15/2021	32	9	<0.0015	-0.044	0.73	No Trend	0.043	0.13	No Trend
	0658	5/21/1998	11/15/2021	42	3	0.0209	0.074	0.49	No Trend	-0.024	0.83	No Trend
	0304	5/19/1998	11/15/2021	53	1	<0.017	-0.448	<0.0001	Decreasing	0.27	<0.0001	Decreasing
	0305	5/19/1998	11/15/2021	52	0	0.504	-0.487	<0.0001	Decreasing	0.49	<0.0001	Decreasing
	0309	5/19/1998	11/15/2021	53	31	<0.0033	0.168	0.069	No Trend	-0.001	0.33	No Trend
	0310	5/19/1998	11/15/2021	53	1	<0.00383	-0.562	<0.0001	Decreasing	0.52	<0.0001	Decreasing
	0655	5/18/1998	11/15/2021	53	0	0.295	-0.599	<0.0001	Decreasing	0.53	<0.0001	Decreasing
	0656	5/20/1998	11/15/2021	53	0	0.0959	-0.070	0.46	No Trend	0.036	0.091	No Trend
	0292A	4/14/2009	11/15/2021	32	12	<0.0033	0.125	0.31	No Trend	0.25	0.002	Increasing
	0658	5/21/1998	11/15/2021	42	12	<0.0033	-0.105	0.32	No Trend	0.021	0.18	No Trend

Shaded values denote most recent result less than the corresponding benchmark: 0.044 mg/L uranium, 0.05 mg/L selenium, and 0.33 mg/L vanadium (Table 1).

Statistically significant increasing trend.

Statistically significant decreasing trend.

Notes:

Trend tests were performed using the NADA (Nondetects and Data Analysis for Environmental Data) package in R, version 1.6-1.1 (Lee 2020). The NADA trend test is similar to the traditional Mann-Kendall trend test (e.g., the Kendall package in R [McLeod 2022]) except that it accounts for the presence of nondetects at multiple detection limits. This adjusted Mann-Kendall test yields the same results as those yielded using the traditional Mann-Kendall test if there are no nondetects (e.g., uranium).

Trend analyses were conducted at the 0.05 significance level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between -1 and +1. Results of linear regression analyses are also provided.

Table C-2. Mann-Kendall Trend Test and Linear Regression Results for Old Rifle Site Wells: 2010–2021

Parameter	Location	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results			Linear Regression Results		
							Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Uranium	0304	4/28/2010	11/15/2021	30	0	0.07	0.338	0.009	Increasing	0.35	0.0003	Increasing
	0305	4/28/2010	11/15/2021	30	0	0.12	0.106	0.42	No Trend	0.04	0.15	No Trend
	0309	4/28/2010	11/15/2021	30	0	0.02	-0.129	0.32	No Trend	0.021	0.21	No Trend
	0310	4/29/2010	11/15/2021	30	0	0.09	-0.623	<0.0001	Decreasing	0.71	<0.0001	Decreasing
	0655	4/28/2010	11/15/2021	30	0	0.13	0.067	0.61	No Trend	-0.015	0.45	No Trend
	0656	4/28/2010	11/15/2021	30	0	0.10	0.046	0.73	No Trend	-0.016	0.47	No Trend
	0292A	4/29/2010	11/15/2021	30	0	0.0125	0.074	0.58	No Trend	-0.023	0.56	No Trend
	0658	4/29/2010	11/15/2021	30	0	0.0113	-0.361	0.005	Decreasing	0.095	0.054	No Trend
Selenium	0304	4/28/2010	11/15/2021	30	6	<0.0015	-0.471	0.0002	Decreasing	0.20	0.008	Decreasing
	0305	4/28/2010	11/15/2021	30	0	0.0159	-0.669	<0.0001	Decreasing	0.69	<0.0001	Decreasing
	0309	4/28/2010	11/15/2021	30	15	<0.0015	-0.053	0.68	No Trend	0.44	<0.0001	Increasing
	0310	4/29/2010	11/15/2021	30	12	<0.0015	-0.044	0.74	No Trend	0.15	0.018	Increasing
	0655	4/28/2010	11/15/2021	30	0	0.0562	0.225	0.083	No Trend	0.10	0.0496	Increasing
	0656	4/28/2010	11/15/2021	30	3	0.00156	-0.354	0.006	Decreasing	0.17	0.014	Decreasing
	0292A	4/29/2010	11/15/2021	30	9	<0.0015	-0.044	0.74	No Trend	0.07	0.085	No Trend
	0658	4/29/2010	11/15/2021	30	3	0.0209	0.016	0.91	No Trend	-0.027	0.63	No Trend
Vanadium	0304	4/28/2010	11/15/2021	30	1	<0.017	-0.462	0.0003	Decreasing	0.40	0.0001	Decreasing
	0305	4/28/2010	11/15/2021	30	0	0.504	-0.195	0.13	No Trend	0.11	0.041	Decreasing
	0309	4/28/2010	11/15/2021	30	13	<0.0033	-0.021	0.88	No Trend	0.10	0.048	Increasing
	0310	4/29/2010	11/15/2021	30	1	<0.00383	-0.621	<0.0001	Decreasing	0.54	<0.0001	Decreasing
	0655	4/28/2010	11/15/2021	30	0	0.295	-0.474	0.0002	Decreasing	0.37	0.0002	Decreasing
	0656	4/28/2010	11/15/2021	30	0	0.0959	0.474	0.0002	Increasing	0.51	<0.0001	Increasing
	0292A	4/29/2010	11/15/2021	30	11	<0.0033	0.101	0.43	No Trend	0.22	0.005	Increasing
	0658	4/29/2010	11/15/2021	30	10	<0.0033	-0.301	0.017	Decreasing	-0.031	0.71	No Trend

Shaded values denote most recent result less than the corresponding benchmark: 0.044 mg/L uranium, 0.05 mg/L selenium, and 0.33 mg/L vanadium (Table 1).

Statistically significant increasing trend.

Statistically significant decreasing trend.

Notes:

Analysis period from 2010–2021.

Trend tests were run using the NADA package in R, version 1.6-1.1 (Lee 2020). Trend analyses were conducted at the 0.05 significance level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between –1 and +1. Results of linear regression analyses are also provided.

Table C-3. Mann-Kendall Trend Test and Linear Regression Results for New Rifle Site Wells: 1998–2021

Parameter	Location	Initial Trend	Final Trend	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results			Linear Regression Results		
		Analysis Date	Analysis Date				Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Ammonia as N	0169	8/20/1998	11/15/2021	39	29	0.106	0.08	0.46	No Trend	0.19	0.003	Increasing
Ammonia as N	0170	8/20/1998	11/17/2021	38	5	1.02	0.70	<0.0001	Increasing	0.78	<0.0001	Increasing
Ammonia as N	0172	8/19/1998	11/16/2021	39	18	0.097	0.29	0.006	Increasing	0.18	0.005	Increasing
Ammonia as N	0195	8/19/1998	11/15/2021	35	6	0.096	-0.66	<0.0001	Decreasing	0.74	<0.0001	Decreasing
Ammonia as N	0201	8/18/1998	11/16/2021	39	0	41.4	-0.81	<0.0001	Decreasing	0.72	<0.0001	Decreasing
Ammonia as N	0215	8/14/1998	11/17/2021	44	0	2.17	-0.44	<0.0001	Decreasing	0.32	<0.0001	Decreasing
Ammonia as N	0216	8/18/1998	11/15/2021	44	0	4.99	-0.32	0.002	Decreasing	0.21	<0.001	Decreasing
Ammonia as N	0217	8/18/1998	11/16/2021	38	0	25.8	-0.84	<0.0001	Decreasing	0.69	<0.0001	Decreasing
Ammonia as N	0590	8/12/1998	11/16/2021	42	0	110	-0.84	<0.0001	Decreasing	0.77	<0.0001	Decreasing
Ammonia as N	0620	8/17/1998	11/17/2021	36	23	0.124	0.13	0.20	No Trend	-0.03	0.71	No Trend
Ammonia as N	0635	8/18/1998	11/16/2021	35	0	44	-0.82	<0.0001	Decreasing	0.74	<0.0001	Decreasing
Ammonia as N	0658	8/13/1998	11/17/2021	42	0	33.5	-0.79	<0.0001	Decreasing	0.74	<0.0001	Decreasing
Ammonia as N	0659	8/13/1998	11/16/2021	44	0	0.489	-0.81	<0.0001	Decreasing	0.82	<0.0001	Decreasing
Ammonia as N	0664	12/14/1999	11/17/2021	37	0	12.5	-0.74	<0.0001	Decreasing	0.47	<0.0001	Decreasing
Ammonia as N	0669	12/14/1999	11/15/2021	37	0	33.5	-0.76	<0.0001	Decreasing	0.75	<0.0001	Decreasing
Ammonia as N	0670	12/14/1999	11/17/2021	34	0	11.4	-0.53	<0.0001	Decreasing	0.50	<0.0001	Decreasing
Ammonia as N	0855	6/14/2001	11/17/2021	38	0	12.9	-0.75	<0.0001	Decreasing	0.64	<0.0001	Decreasing
Arsenic	0169	8/20/1998	11/15/2021	37	15	<0.002	0.19	0.090	No Trend	0.12	0.019	Increasing
Arsenic	0170	8/20/1998	11/17/2021	36	19	<0.002	0.07	0.55	No Trend	0.03	0.14	No Trend
Arsenic	0172	8/19/1998	11/16/2021	42	2	0.0186	0.62	<0.0001	Increasing	0.61	<0.0001	Increasing
Arsenic	0195	8/19/1998	11/15/2021	33	9	<0.002	0.36	0.003	Increasing	0.22	0.003	Increasing
Arsenic	0201	8/18/1998	11/16/2021	37	14	<0.002	0.12	0.30	No Trend	0.09	0.039	Increasing
Arsenic	0215	8/14/1998	11/17/2021	43	15	0.006	-0.07	0.53	No Trend	0.01	0.23	No Trend
Arsenic	0216	8/18/1998	11/15/2021	43	0	0.030	0.04	0.74	No Trend	-0.02	0.81	No Trend
Arsenic	0217	8/18/1998	11/16/2021	36	4	0.008	-0.11	0.35	No Trend	-0.03	0.87	No Trend
Arsenic	0590	8/12/1998	11/16/2021	41	8	0.002	0.35	0.001	Increasing	0.13	0.012	Increasing
Arsenic	0620	8/17/1998	11/17/2021	39	7	0.002	-0.17	0.14	No Trend	0.05	0.10	No Trend
Arsenic	0635	8/18/1998	11/16/2021	33	21	0.002	0.18	0.14	No Trend	0.12	0.028	Increasing
Arsenic	0658	8/13/1998	11/17/2021	41	0	0.108	0.12	0.29	No Trend	-0.03	0.95	No Trend
Arsenic	0659	8/13/1998	11/16/2021	42	0	0.050	-0.11	0.33	No Trend	0.09	0.033	Decreasing
Arsenic	0664	12/14/1999	11/17/2021	35	1	0.004	0.06	0.61	No Trend	-0.01	0.38	No Trend
Arsenic	0669	12/14/1999	11/15/2021	35	0	0.013	0.23	0.052	No Trend	-0.02	0.49	No Trend
Arsenic	0670	12/14/1999	11/17/2021	33	0	0.007	-0.31	0.010	Decreasing	-0.03	0.67	No Trend
Arsenic	0855	4/28/2000	11/17/2021	38	0	0.284	-0.14	0.22	No Trend	-0.02	0.56	No Trend
Molybdenum	0169	8/20/1998	11/15/2021	39	4	0.004	-0.35	0.002	Decreasing	0.18	0.004	Decreasing
Molybdenum	0170	8/20/1998	11/17/2021	39	4	0.003	-0.50	<0.0001	Decreasing	0.46	<0.0001	Decreasing
Molybdenum	0172	8/19/1998	11/16/2021	45	3	0.011	0.10	0.34	No Trend	-0.01	0.54	No Trend
Molybdenum	0195	8/19/1998	11/15/2021	35	0	0.015	-0.66	<0.0001	Decreasing	0.54	<0.0001	Decreasing
Molybdenum	0201	8/18/1998	11/16/2021	39	0	1.26	-0.77	<0.0001	Decreasing	0.79	<0.0001	Decreasing
Molybdenum	0215	8/14/1998	11/17/2021	44	1	0.011	-0.56	<0.0001	Decreasing	0.17	0.003	Decreasing
Molybdenum	0216	8/18/1998	11/15/2021	44	0	0.048	-0.20	0.061	No Trend	0.03	0.14	No Trend
Molybdenum	0217	8/18/1998	11/16/2021	38	0	1.41	-0.54	<0.0001	Decreasing	0.46	<0.0001	Decreasing
Molybdenum	0590	8/12/1998	11/16/2021	43	0	1.46	-0.33	0.002	Decreasing	0.25	0.0003	Decreasing
Molybdenum	0620	8/17/1998	11/17/2021	41	0	0.0098	-0.24	0.025	Decreasing	0.15	0.008	Decreasing
Molybdenum	0635	8/18/1998	11/16/2021	35	0	0.40	-0.59	<0.0001	Decreasing	0.58	<0.0001	Decreasing
Molybdenum	0658	8/13/1998	11/17/2021	42	0	2.51	-0.38	0.0004	Decreasing	0.59	<0.0001	Decreasing
Molybdenum	0659	8/13/1998	11/16/2021	44	0	0.99	-0.88	<0.0001	Decreasing	0.81	<0.0001	Decreasing
Molybdenum	0664	12/14/1999	11/17/2021	37	0	0.37	-0.50	<0.0001	Decreasing	0.52	<0.0001	Decreasing
Molybdenum	0669	12/14/1999	11/15/2021	37	0	0.35	-0.79	<0.0001	Decreasing	0.84	<0.0001	Decreasing
Molybdenum	0670	12/14/1999	11/17/2021	34	0	0.20	-0.26	0.030	Decreasing	0.22	0.003	Decreasing
Molybdenum	0855	4/28/2000	11/17/2021	39	0	0.38	-0.72	<0.0001	Decreasing	0.11	0.024	Decreasing
Nitrate as N	0169	8/20/1998	11/15/2021	39	3	0.163	-0.58	<0.0001	Decreasing	0.67	<0.0001	Decreasing
Nitrate as N	0170	8/20/1998	11/17/2021	39	0	11.2	-0.38	0.0006	Decreasing	0.42	<0.0001	Decreasing
Nitrate as N	0172	8/19/1998	11/16/2021	40	20	<0.017	-0.08	0.45	No Trend	-0.02	0.68	No Trend
Nitrate as N	0195	8/19/1998	11/15/2021	35	21	1.5	-0.48	<0.0001	Decreasing	0.66	<0.0001	Decreasing
Nitrate as N	0201	8/18/1998	11/16/2021	39	0	21.8	-0.71	<0.0001	Decreasing	0.56	<0.0001	Decreasing
Nitrate as N	0215	8/14/1998	11/17/2021	43	19	<0.017	-0.15	0.15	No Trend	0.00	0.29	No Trend
Nitrate as N	0216	8/18/1998	11/15/2021	44	25	0.0727	-0.15	0.15	No Trend	0.01	0.23	No Trend
Nitrate as N	0217	8/18/1998	11/16/2021	38	11	<0.017	-0.48	<0.0001	Decreasing	0.11	0.024	Decreasing
Nitrate as N	0590	8/12/1998	11/16/2021	43	0	11.1	-0.29	0.007	Decreasing	0.14	0.007	Decreasing
Nitrate as N	0620	8/17/1998	11/17/2021	36	3	3.03	-0.14	0.25	No Trend	-0.03	0.94	No Trend
Nitrate as N	0635	8/18/1998	11/16/2021	35	0	2.65	-0.40	0.0008	Decreasing	0.18	0.006	Decreasing
Nitrate as N	0658	8/13/1998	11/17/2021	42	0	4.81	-0.21	0.056	No Trend	0.16	0.005	Decreasing

Table C-3. Mann-Kendall Trend Test and Linear Regression Results for New Rifle Site Wells: 1998–2021
(continued)

Parameter	Location	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results			Linear Regression Results		
							Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Nitrate as N	0659	8/13/1998	11/16/2021	44	0	1.6	-0.60	<0.0001	Decreasing	0.57	<0.0001	Decreasing
Nitrate as N	0664	12/14/1999	11/17/2021	37	0	13.7	0.15	0.21	No Trend	-0.03	0.96	No Trend
Nitrate as N	0669	12/14/1999	11/15/2021	37	0	2.05	0.08	0.51	No Trend	0.02	0.20	No Trend
Nitrate as N	0670	12/14/1999	11/17/2021	34	0	8.45	-0.05	0.70	No Trend	0.05	0.12	No Trend
Nitrate as N	0855	6/14/2001	11/17/2021	37	0	6.45	-0.13	0.26	No Trend	0.01	0.24	No Trend
Selenium	0169	8/20/1998	11/15/2021	37	1	0.004	-0.47	<0.0001	Decreasing	0.76	<0.0001	Decreasing
Selenium	0170	8/20/1998	11/17/2021	36	0	0.029	0.87	<0.0001	Increasing	0.90	<0.0001	Increasing
Selenium	0172	8/19/1998	11/16/2021	42	23	<0.0015	0.09	0.37	No Trend	0.03	0.14	No Trend
Selenium	0195	8/19/1998	11/15/2021	33	15	0.026	-0.16	0.18	No Trend	0.06	0.086	No Trend
Selenium	0201	8/18/1998	11/16/2021	37	0	0.038	0.36	0.002	Increasing	0.19	0.004	Increasing
Selenium	0215	8/14/1998	11/17/2021	43	18	<0.0015	-0.01	0.95	No Trend	0.18	0.003	Increasing
Selenium	0216	8/18/1998	11/15/2021	43	14	<0.0015	-0.08	0.44	No Trend	-0.02	0.67	No Trend
Selenium	0217	8/18/1998	11/16/2021	36	0	0.005	-0.33	0.005	Decreasing	0.02	0.19	No Trend
Selenium	0590	8/12/1998	11/16/2021	41	0	0.027	0.25	0.024	Increasing	0.04	0.098	No Trend
Selenium	0620	8/17/1998	11/17/2021	39	5	0.034	0.40	0.0003	Increasing	0.48	<0.0001	Increasing
Selenium	0635	8/18/1998	11/16/2021	33	2	0.035	0.21	0.088	No Trend	0.09	0.051	No Trend
Selenium	0658	8/13/1998	11/17/2021	41	0	0.872	0.32	0.003	Increasing	0.43	<0.0001	Increasing
Selenium	0659	8/13/1998	11/16/2021	42	0	0.101	-0.03	0.76	No Trend	0.02	0.20	No Trend
Selenium	0664	12/14/1999	11/17/2021	35	0	0.473	0.65	<0.0001	Increasing	0.52	<0.0001	Increasing
Selenium	0669	12/14/1999	11/15/2021	35	0	0.0745	0.29	0.016	Increasing	0.16	0.010	Increasing
Selenium	0670	12/14/1999	11/17/2021	33	0	0.307	0.21	0.082	No Trend	0.03	0.18	No Trend
Selenium	0855	6/14/2001	11/17/2021	37	0	0.652	-0.17	0.15	No Trend	-0.03	0.86	No Trend
Uranium	0169	8/20/1998	11/15/2021	39	0	0.024	-0.45	<0.0001	Decreasing	0.63	<0.0001	Decreasing
Uranium	0170	8/20/1998	11/17/2021	39	0	0.062	-0.05	0.65	No Trend	0.05	0.084	No Trend
Uranium	0172	8/19/1998	11/16/2021	45	0	0.014	-0.54	<0.0001	Decreasing	0.53	<0.0001	Decreasing
Uranium	0195	8/19/1998	11/15/2021	35	0	0.023	-0.68	<0.0001	Decreasing	0.80	<0.0001	Decreasing
Uranium	0201	8/18/1998	11/16/2021	43	0	0.094	-0.03	0.79	No Trend	0.00	0.31	No Trend
Uranium	0215	8/14/1998	11/17/2021	49	0	0.021	0.32	0.001	Increasing	0.12	0.009	Increasing
Uranium	0216	8/18/1998	11/15/2021	45	0	0.013	-0.01	0.95	No Trend	-0.02	0.94	No Trend
Uranium	0217	8/18/1998	11/16/2021	39	0	0.113	0.05	0.64	No Trend	0.02	0.19	No Trend
Uranium	0590	8/12/1998	11/16/2021	48	0	0.073	0.10	0.32	No Trend	0.03	0.12	No Trend
Uranium	0620	8/17/1998	11/17/2021	41	0	0.058	-0.08	0.47	No Trend	-0.03	0.89	No Trend
Uranium	0635	8/18/1998	11/16/2021	35	0	0.046	-0.44	0.0002	Decreasing	0.33	0.0002	Decreasing
Uranium	0658	8/13/1998	11/17/2021	43	0	0.047	-0.60	<0.0001	Decreasing	0.68	<0.0001	Decreasing
Uranium	0659	8/13/1998	11/16/2021	45	0	0.053	-0.43	<0.0001	Decreasing	0.33	<0.0001	Decreasing
Uranium	0664	12/14/1999	11/17/2021	44	0	0.060	-0.43	<0.0001	Decreasing	0.48	<0.0001	Decreasing
Uranium	0669	12/14/1999	11/15/2021	44	0	0.066	-0.24	0.023	Decreasing	0.14	0.007	Decreasing
Uranium	0670	12/14/1999	11/17/2021	35	0	0.080	-0.29	0.014	Decreasing	0.02	0.19	No Trend
Uranium	0855	4/28/2000	11/17/2021	43	0	0.046	-0.31	0.004	Decreasing	0.26	0.0003	Decreasing
Vanadium	0169	8/20/1998	11/15/2021	35	12	0.004	0.20	0.083	No Trend	-0.02	0.65	No Trend
Vanadium	0170	8/20/1998	11/17/2021	34	12	0.003	0.19	0.11	No Trend	-0.03	0.98	No Trend
Vanadium	0172	8/19/1998	11/16/2021	35	20	<0.0033	-0.12	0.31	No Trend	0.00	0.32	No Trend
Vanadium	0195	8/19/1998	11/15/2021	31	13	0.0060	0.29	0.021	Increasing	0.00	0.34	No Trend
Vanadium	0201	8/18/1998	11/16/2021	39	21	<0.0033	-0.04	0.72	No Trend	-0.02	0.77	No Trend
Vanadium	0215	8/14/1998	11/17/2021	51	19	0.006	0.48	<0.0001	Increasing	0.17	0.001	Increasing
Vanadium	0216	8/18/1998	11/15/2021	47	0	0.265	-0.27	0.009	Decreasing	0.06	0.054	No Trend
Vanadium	0217	8/18/1998	11/16/2021	41	0	1.850	-0.32	0.003	Decreasing	0.01	0.22	No Trend
Vanadium	0590	8/12/1998	11/16/2021	49	0	0.455	0.28	0.004	Increasing	0.16	0.003	Increasing
Vanadium	0620	8/17/1998	11/17/2021	32	8	0.016	0.40	0.001	Increasing	0.13	0.022	Increasing
Vanadium	0635	8/18/1998	11/16/2021	31	13	0.009	0.10	0.41	No Trend	-0.01	0.38	No Trend
Vanadium	0658	8/13/1998	11/17/2021	44	0	26.8	0.38	0.0003	Increasing	0.27	0.0002	Increasing
Vanadium	0659	8/13/1998	11/16/2021	46	0	2.4	-0.18	0.075	No Trend	0.12	0.011	Decreasing
Vanadium	0664	12/14/1999	11/17/2021	46	0	0.601	-0.14	0.18	No Trend	0.00	0.27	No Trend
Vanadium	0669	12/14/1999	11/15/2021	45	0	4.76	0.02	0.88	No Trend	0.04	0.11	No Trend
Vanadium	0670	12/14/1999	11/17/2021	37	0	1.92	-0.61	<0.0001	Decreasing	0.73	<0.0001	Decreasing
Vanadium	0855	4/28/2000	11/17/2021	44	0	12.0	-0.34	0.001	Decreasing	-0.01	0.52	No Trend

Shaded values denote most recent result less than the corresponding benchmark from Table 2: 0.11 mg/L ammonia; 0.05 mg/L arsenic; 0.1 mg/L molybdenum; 10 mg/L nitrate; 0.05 mg/L selenium; 0.044 mg/L uranium; and 0.33 mg/L vanadium.

Note:

Trend tests were run using the NADA package in R, version 1.6-1.1 (Lee 2020); trend analyses were conducted at the 0.05 significance level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between -1 and +1. Results of linear regression analyses are also provided.

Table C-4. Mann-Kendall Trend Test and Linear Regression Results for New Rifle Site Wells: 2010–2021

Parameter	Location	Initial Trend	Final Trend	Number of	Number of	Most Recent	Mann-Kendall Trend Test Results			Linear Regression Results		
		Analysis Date	Analysis Date				Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Ammonia as N	0169	6/24/2010	11/15/2021	24	19	0.106	0.11	0.39	No Trend	0.17	0.027	Decreasing
Ammonia as N	0170	6/24/2010	11/17/2021	24	1	1.02	0.67	<0.0001	Increasing	0.81	<0.0001	Increasing
Ammonia as N	0172	6/24/2010	11/16/2021	24	12	0.097	0.19	0.18	No Trend	-0.03	0.56	No Trend
Ammonia as N	0195	6/22/2010	11/15/2021	21	6	0.096	-0.30	0.055	No Trend	0.00	0.34	No Trend
Ammonia as N	0201	6/22/2010	11/16/2021	23	0	41.4	-0.70	<0.0001	Decreasing	0.33	0.002	Decreasing
Ammonia as N	0215	6/24/2010	11/17/2021	24	0	2.17	-0.05	0.77	No Trend	-0.04	0.79	No Trend
Ammonia as N	0216	6/24/2010	11/15/2021	24	0	4.99	0.24	0.10	No Trend	0.09	0.081	No Trend
Ammonia as N	0217	6/22/2010	11/16/2021	24	0	25.8	-0.65	<0.0001	Decreasing	0.40	0.0006	Decreasing
Ammonia as N	0590	6/22/2010	11/16/2021	23	0	110	-0.68	<0.0001	Decreasing	0.70	<0.0001	Decreasing
Ammonia as N	0620	6/24/2010	11/17/2021	24	16	0.124	0.08	0.58	No Trend	0.07	0.11	No Trend
Ammonia as N	0635	6/24/2010	11/16/2021	19	0	44	-0.65	0.0001	Decreasing	0.78	<0.0001	Decreasing
Ammonia as N	0658	6/23/2010	11/17/2021	24	0	33.5	-0.59	<0.0001	Decreasing	0.59	<0.0001	Decreasing
Ammonia as N	0659	6/23/2010	11/16/2021	24	0	0.489	-0.57	0.0001	Decreasing	0.63	<0.0001	Decreasing
Ammonia as N	0664	6/23/2010	11/17/2021	24	0	12.5	-0.69	<0.0001	Decreasing	0.58	<0.0001	Decreasing
Ammonia as N	0669	6/23/2010	11/15/2021	24	0	33.5	-0.86	<0.0001	Decreasing	0.85	<0.0001	Decreasing
Ammonia as N	0670	6/23/2010	11/17/2021	24	0	11.4	-0.28	0.061	No Trend	-0.02	0.45	No Trend
Ammonia as N	0855	6/23/2010	11/17/2021	24	0	12.9	-0.83	<0.0001	Decreasing	0.91	<0.0001	Decreasing
Arsenic	0169	11/18/2010	11/15/2021	23	9	<0.002	0.01	0.98	No Trend	-0.01	0.38	No Trend
Arsenic	0170	11/16/2010	11/17/2021	23	13	<0.002	0.11	0.44	No Trend	0.01	0.27	No Trend
Arsenic	0172	11/17/2010	11/16/2021	28	0	0.0186	0.37	0.006	Increasing	0.36	0.0005	Increasing
Arsenic	0195	11/17/2010	11/15/2021	20	3	<0.002	-0.08	0.62	No Trend	-0.05	0.83	No Trend
Arsenic	0201	11/16/2010	11/16/2021	22	10	<0.002	-0.01	0.95	No Trend	-0.01	0.38	No Trend
Arsenic	0215	11/16/2010	11/17/2021	23	10	0.006	-0.05	0.76	No Trend	-0.05	0.93	No Trend
Arsenic	0216	11/18/2010	11/15/2021	23	0	0.030	-0.20	0.19	No Trend	0.09	0.095	No Trend
Arsenic	0217	11/18/2010	11/16/2021	23	4	0.008	-0.17	0.25	No Trend	-0.05	0.99	No Trend
Arsenic	0590	11/18/2010	11/16/2021	22	4	0.002	-0.06	0.73	No Trend	-0.05	0.98	No Trend
Arsenic	0620	11/17/2010	11/17/2021	28	7	0.002	-0.03	0.82	No Trend	0.04	0.15	No Trend
Arsenic	0635	11/17/2010	11/16/2021	18	9	0.002	0.09	0.59	No Trend	-0.01	0.39	No Trend
Arsenic	0658	11/17/2010	11/17/2021	23	0	0.108	0.04	0.79	No Trend	-0.04	0.77	No Trend
Arsenic	0659	11/18/2010	11/16/2021	23	0	0.050	0.24	0.12	No Trend	0.02	0.25	No Trend
Arsenic	0664	11/18/2010	11/17/2021	23	1	0.004	0.01	0.96	No Trend	-0.04	0.82	No Trend
Arsenic	0669	11/17/2010	11/15/2021	23	0	0.013	0.37	0.015	Increasing	0.25	0.008	Increasing
Arsenic	0670	11/18/2010	11/17/2021	23	0	0.007	-0.12	0.43	No Trend	-0.01	0.41	No Trend
Arsenic	0855	11/17/2010	11/17/2021	23	0	0.284	-0.38	0.013	Decreasing	0.32	0.003	Decreasing
Molybdenum	0169	6/24/2010	11/15/2021	24	1	0.004	-0.22	0.13	No Trend	0.19	0.019	Decreasing
Molybdenum	0170	6/24/2010	11/17/2021	24	0	0.003	-0.58	<0.0001	Decreasing	0.57	<0.0001	Decreasing
Molybdenum	0172	6/24/2010	11/16/2021	29	0	0.011	0.40	0.003	Increasing	0.31	0.001	Increasing
Molybdenum	0195	6/22/2010	11/15/2021	21	0	0.015	-0.48	0.002	Decreasing	0.15	0.045	Decreasing
Molybdenum	0201	6/22/2010	11/16/2021	23	0	1.26	-0.65	<0.0001	Decreasing	0.68	<0.0001	Decreasing
Molybdenum	0215	6/24/2010	11/17/2021	24	0	0.011	-0.17	0.25	No Trend	-0.02	0.43	No Trend
Molybdenum	0216	6/24/2010	11/15/2021	24	0	0.048	-0.19	0.20	No Trend	0.07	0.11	No Trend
Molybdenum	0217	6/22/2010	11/16/2021	24	0	1.41	-0.36	0.012	Decreasing	0.17	0.028	Decreasing
Molybdenum	0590	6/22/2010	11/16/2021	23	0	1.46	0.08	0.61	No Trend	-0.05	0.85	No Trend
Molybdenum	0620	6/24/2010	11/17/2021	29	0	0.0098	0.13	0.34	No Trend	0.03	0.17	No Trend
Molybdenum	0635	6/24/2010	11/16/2021	19	0	0.40	-0.34	0.045	Decreasing	0.15	0.057	No Trend
Molybdenum	0658	6/23/2010	11/17/2021	24	0	2.51	0.30	0.039	Increasing	0.16	0.032	Increasing
Molybdenum	0659	6/23/2010	11/16/2021	24	0	0.99	-0.69	<0.0001	Decreasing	0.63	<0.0001	Decreasing
Molybdenum	0664	6/23/2010	11/17/2021	24	0	0.37	-0.11	0.45	No Trend	0.01	0.30	No Trend
Molybdenum	0669	6/23/2010	11/15/2021	24	0	0.35	-0.70	<0.0001	Decreasing	0.69	<0.0001	Decreasing
Molybdenum	0670	6/23/2010	11/17/2021	24	0	0.20	-0.23	0.12	No Trend	0.22	0.011	Decreasing
Molybdenum	0855	6/23/2010	11/17/2021	24	0	0.38	-0.67	<0.0001	Decreasing	0.59	<0.0001	Decreasing
Nitrate as N	0169	6/24/2010	11/15/2021	24	3	0.163	-0.14	0.33	No Trend	0.09	0.087	No Trend
Nitrate as N	0170	6/24/2010	11/17/2021	24	0	11.2	0.06	0.69	No Trend	-0.04	0.87	No Trend
Nitrate as N	0172	6/24/2010	11/16/2021	24	12	<0.017	-0.08	0.58	No Trend	-0.02	0.47	No Trend
Nitrate as N	0195	6/22/2010	11/15/2021	21	19	1.5	0.17	0.21	No Trend	0.02	0.25	No Trend
Nitrate as N	0201	6/22/2010	11/16/2021	23	0	21.8	-0.54	0.0003	Decreasing	0.52	<0.0001	Decreasing
Nitrate as N	0215	6/24/2010	11/17/2021	24	14	<0.017	-0.18	0.21	No Trend	-0.04	0.91	No Trend
Nitrate as N	0216	6/24/2010	11/15/2021	24	19	0.0727	0.07	0.60	No Trend	-0.01	0.39	No Trend
Nitrate as N	0217	6/22/2010	11/16/2021	24	11	<0.017	-0.14	0.34	No Trend	0.15	0.033	Decreasing
Nitrate as N	0590	6/22/2010	11/16/2021	23	0	11.1	-0.31	0.039	Decreasing	0.28	0.006	Decreasing
Nitrate as N	0620	6/24/2010	11/17/2021	24	0	3.03	-0.79	<0.0001	Decreasing	0.50	<0.0001	Decreasing
Nitrate as N	0635	6/24/2010	11/16/2021	19	0	2.65	-0.41	0.016	Decreasing	0.54	0.0002	Decreasing
Nitrate as N	0658	6/23/2010	11/17/2021	24	0	4.81	0.00	1.00	No Trend	0.09	0.088	No Trend

Table C-4. Mann-Kendall Trend Test and Linear Regression Results for New Rifle Site Wells: 2010–2021
(continued)

Parameter	Location	Initial Trend	Final Trend	Number of Samples	Number of Nondetects	Most Recent Result (mg/L)	Mann-Kendall Trend Test Results			Linear Regression Results		
		Analysis Date	Analysis Date				Kendall's tau	p-value	Trend	Adjusted r ²	p-value	Trend
Nitrate as N	0659	6/23/2010	11/16/2021	24	0	1.6	-0.22	0.13	No Trend	0.07	0.11	No Trend
Nitrate as N	0664	6/23/2010	11/17/2021	24	0	13.7	-0.03	0.88	No Trend	0.10	0.069	No Trend
Nitrate as N	0669	6/23/2010	11/15/2021	24	0	2.05	0.16	0.27	No Trend	-0.01	0.41	No Trend
Nitrate as N	0670	6/23/2010	11/17/2021	24	0	8.45	0.07	0.64	No Trend	0.07	0.11	No Trend
Nitrate as N	0855	6/23/2010	11/17/2021	24	0	6.45	-0.24	0.10	No Trend	0.14	0.042	Decreasing
Selenium	0169	11/18/2010	11/15/2021	23	1	0.004	0.07	0.65	No Trend	0.01	0.28	No Trend
Selenium	0170	11/16/2010	11/17/2021	23	0	0.029	0.85	<0.0001	Increasing	0.91	<0.0001	Increasing
Selenium	0172	11/17/2010	11/16/2021	28	15	<0.0015	-0.03	0.82	No Trend	-0.04	0.86	No Trend
Selenium	0195	11/17/2010	11/15/2021	20	13	0.026	0.08	0.62	No Trend	0.15	0.051	No Trend
Selenium	0201	11/16/2010	11/16/2021	22	0	0.038	0.06	0.71	No Trend	-0.05	0.77	No Trend
Selenium	0215	11/16/2010	11/17/2021	23	12	<0.0015	-0.13	0.37	No Trend	-0.01	0.37	No Trend
Selenium	0216	11/18/2010	11/15/2021	23	10	<0.0015	0.22	0.13	No Trend	0.03	0.20	No Trend
Selenium	0217	11/18/2010	11/16/2021	23	0	0.005	-0.61	<0.0001	Decreasing	0.13	0.051	No Trend
Selenium	0590	11/18/2010	11/16/2021	22	0	0.027	-0.21	0.18	No Trend	0.08	0.11	No Trend
Selenium	0620	11/17/2010	11/17/2021	28	0	0.034	-0.13	0.33	No Trend	0.01	0.27	No Trend
Selenium	0635	11/17/2010	11/16/2021	18	2	0.035	0.63	0.0003	Increasing	0.46	0.001	Increasing
Selenium	0658	11/17/2010	11/17/2021	23	0	0.872	-0.36	0.016	Decreasing	0.31	0.003	Decreasing
Selenium	0659	11/18/2010	11/16/2021	23	0	0.101	0.19	0.21	No Trend	-0.05	0.86	No Trend
Selenium	0664	11/18/2010	11/17/2021	23	0	0.473	0.56	0.0002	Increasing	0.49	0.0001	Increasing
Selenium	0669	11/17/2010	11/15/2021	23	0	0.0745	0.40	0.009	Increasing	0.31	0.003	Increasing
Selenium	0670	11/18/2010	11/17/2021	23	0	0.307	-0.01	0.98	No Trend	-0.01	0.42	No Trend
Selenium	0855	11/17/2010	11/17/2021	23	0	0.652	-0.68	<0.0001	Decreasing	0.60	<0.0001	Decreasing
Uranium	0169	6/24/2010	11/15/2021	24	0	0.024	0.31	0.034	Increasing	0.12	0.051	No Trend
Uranium	0170	6/24/2010	11/17/2021	24	0	0.062	0.41	0.006	Increasing	0.28	0.005	Increasing
Uranium	0172	6/24/2010	11/16/2021	29	0	0.014	-0.79	<0.0001	Decreasing	0.93	<0.0001	Decreasing
Uranium	0195	6/22/2010	11/15/2021	21	0	0.023	-0.29	0.074	No Trend	0.09	0.11	No Trend
Uranium	0201	6/22/2010	11/16/2021	23	0	0.094	0.11	0.49	No Trend	-0.05	0.88	No Trend
Uranium	0215	6/24/2010	11/17/2021	24	0	0.021	-0.27	0.065	No Trend	0.21	0.013	Decreasing
Uranium	0216	6/24/2010	11/15/2021	24	0	0.013	0.09	0.57	No Trend	0.00	0.32	No Trend
Uranium	0217	6/22/2010	11/16/2021	24	0	0.113	-0.47	0.001	Decreasing	0.39	0.0007	Decreasing
Uranium	0590	6/22/2010	11/16/2021	23	0	0.073	0.08	0.63	No Trend	-0.02	0.50	No Trend
Uranium	0620	6/24/2010	11/17/2021	29	0	0.058	-0.34	0.010	Decreasing	0.16	0.019	Decreasing
Uranium	0635	6/24/2010	11/16/2021	19	0	0.046	-0.38	0.025	Decreasing	0.41	0.002	Decreasing
Uranium	0658	6/23/2010	11/17/2021	24	0	0.047	-0.31	0.035	Decreasing	0.23	0.011	Decreasing
Uranium	0659	6/23/2010	11/16/2021	24	0	0.053	-0.33	0.024	Decreasing	0.17	0.024	Decreasing
Uranium	0664	6/23/2010	11/17/2021	24	0	0.060	-0.11	0.47	No Trend	0.08	0.094	No Trend
Uranium	0669	6/23/2010	11/15/2021	24	0	0.066	-0.47	0.001	Decreasing	0.42	0.0004	Decreasing
Uranium	0670	6/23/2010	11/17/2021	24	0	0.080	-0.22	0.13	No Trend	0.21	0.013	Decreasing
Uranium	0855	6/23/2010	11/17/2021	24	0	0.046	0.02	0.90	No Trend	-0.03	0.64	No Trend
Vanadium	0169	11/18/2011	11/15/2021	21	6	0.004	0.30	0.048	Increasing	0.12	0.065	No Trend
Vanadium	0170	11/21/2011	11/17/2021	21	5	0.003	0.19	0.22	No Trend	0.10	0.089	No Trend
Vanadium	0172	11/16/2011	11/16/2021	21	12	<0.0033	-0.01	0.95	No Trend	0.16	0.044	Increasing
Vanadium	0195	11/17/2011	11/15/2021	18	5	0.0060	0.32	0.058	No Trend	0.21	0.030	Increasing
Vanadium	0201	11/16/2011	11/16/2021	20	11	<0.0033	0.04	0.80	No Trend	0.15	0.054	No Trend
Vanadium	0215	6/24/2010	11/17/2021	24	4	0.006	0.08	0.60	No Trend	-0.04	0.74	No Trend
Vanadium	0216	6/24/2010	11/15/2021	24	0	0.265	0.37	0.012	Increasing	0.13	0.050	Increasing
Vanadium	0217	6/22/2010	11/16/2021	24	0	1.850	-0.41	0.006	Decreasing	0.28	0.004	Decreasing
Vanadium	0590	6/22/2010	11/16/2021	23	0	0.455	0.03	0.85	No Trend	-0.05	0.89	No Trend
Vanadium	0620	11/16/2011	11/17/2021	21	3	0.016	0.35	0.028	Increasing	0.16	0.039	Increasing
Vanadium	0635	11/17/2011	11/16/2021	16	5	0.009	0.14	0.44	No Trend	0.12	0.098	No Trend
Vanadium	0658	6/23/2010	11/17/2021	24	0	26.8	-0.26	0.082	No Trend	0.25	0.008	Decreasing
Vanadium	0659	6/23/2010	11/16/2021	24	0	2.4	0.09	0.55	No Trend	-0.03	0.62	No Trend
Vanadium	0664	6/23/2010	11/17/2021	24	0	0.601	-0.17	0.24	No Trend	0.02	0.26	No Trend
Vanadium	0669	6/23/2010	11/15/2021	24	0	4.76	0.22	0.13	No Trend	0.10	0.075	No Trend
Vanadium	0670	6/23/2010	11/17/2021	24	0	1.92	-0.19	0.20	No Trend	0.02	0.23	No Trend
Vanadium	0855	6/23/2010	11/17/2021	24	0	12.0	-0.54	0.0003	Decreasing	0.52	<0.0001	Decreasing

Shaded values denote most recent result less than the corresponding benchmark from Table 2: 0.11 mg/L ammonia; 0.05 mg/L arsenic; 0.1 mg/L molybdenum; 10 mg/L nitrate; 0.05 mg/L selenium; 0.044 mg/L uranium; and 0.33 mg/L vanadium.

Note:

Trend tests were run using the NADA package in R, version 1.6-1.1 (Lee 2020); trend analyses were conducted at the 0.05 significance level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between -1 and +1. Results of linear regression analyses are also provided.