LMS/RFO/RFN/S07012

2010 Verification Monitoring Report for the Old and New Rifle, Colorado, Processing Sites

September 2010

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

CDPHE	Colorado Department of Public Health and Environment
COC	contaminant of concern
DOE	U.S. Department of Energy
ft	foot (feet)
FY	fiscal year
GCAP	Ground Water Compliance Action Plan
ICs	institutional controls
MCL	maximum concentration limit
mg/L	milligram per liter
NRC	U.S. Nuclear Regulatory Commission
RRM	residual radioactive material
SOWP	Site Observational Work Plan
UMTRA	Uranium Mill Tailings Remedial Action

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1.0 Introduction

1.1 Purpose of Report

The purpose of this Verification Monitoring Report is to evaluate and interpret groundwater monitoring data collected at the Old and New Rifle, Colorado, Uranium Mill Tailings Remedial Action (UMTRA) Project processing sites (Figure 1 and Figure 2) and to assess the progress of meeting the compliance strategies for groundwater cleanup. Detailed information for the Old and New Rifle sites and water quality data through 1998 and 1999 are found in the final Site Observational Work Plans (SOWPs) (DOE 1999a and 1999b) for the sites.

1.2 Compliance Strategy

The proposed compliance strategy for both the New and Old Rifle sites is natural flushing in conjunction with continued groundwater and surface water monitoring, and institutional controls (ICs) that would restrict access to contaminated groundwater (DOE 2005 and 2001). Also, the U.S. Department of Energy (DOE) and the State of Colorado constructed an alternate domestic water supply system in 2003 to service users near and downgradient of the New Rifle site (Figure 2). This compliance strategy will be protective of human health and the environment.

1.3 Site Status

The Old Rifle SOWP (DOE 1999a) and Ground Water Compliance Action Plan (GCAP) (DOE 2001) are complete and have received concurrence from the U.S. Nuclear Regulatory Commission (NRC) and the Colorado Department of Public Health and Environment (CDPHE). The conditions of the natural flushing compliance strategy are to maintain ICs over the site and conduct a monitoring program until concentrations of contaminants of concern (COCs) decrease to acceptable levels. The City of Rifle currently owns the Old Rifle site.

The New Rifle SOWP (DOE 1999b) and the draft GCAP (DOE 2006) were submitted to NRC and CDPHE. The GCAP is currently undergoing revision based on comments received from NRC and the State. Final concurrence of the GCAP will occur when any outstanding issues have been resolved. The conditions of the natural flushing compliance strategy are to maintain ICs over the site and downgradient areas (Figure 3) and continue a monitoring program until concentrations of COCs decrease to acceptable levels. The annual verification monitoring proposed in the GCAPs for these sites is currently being implemented. This report presents the results of the fiscal year (FY) 2010 monitoring.

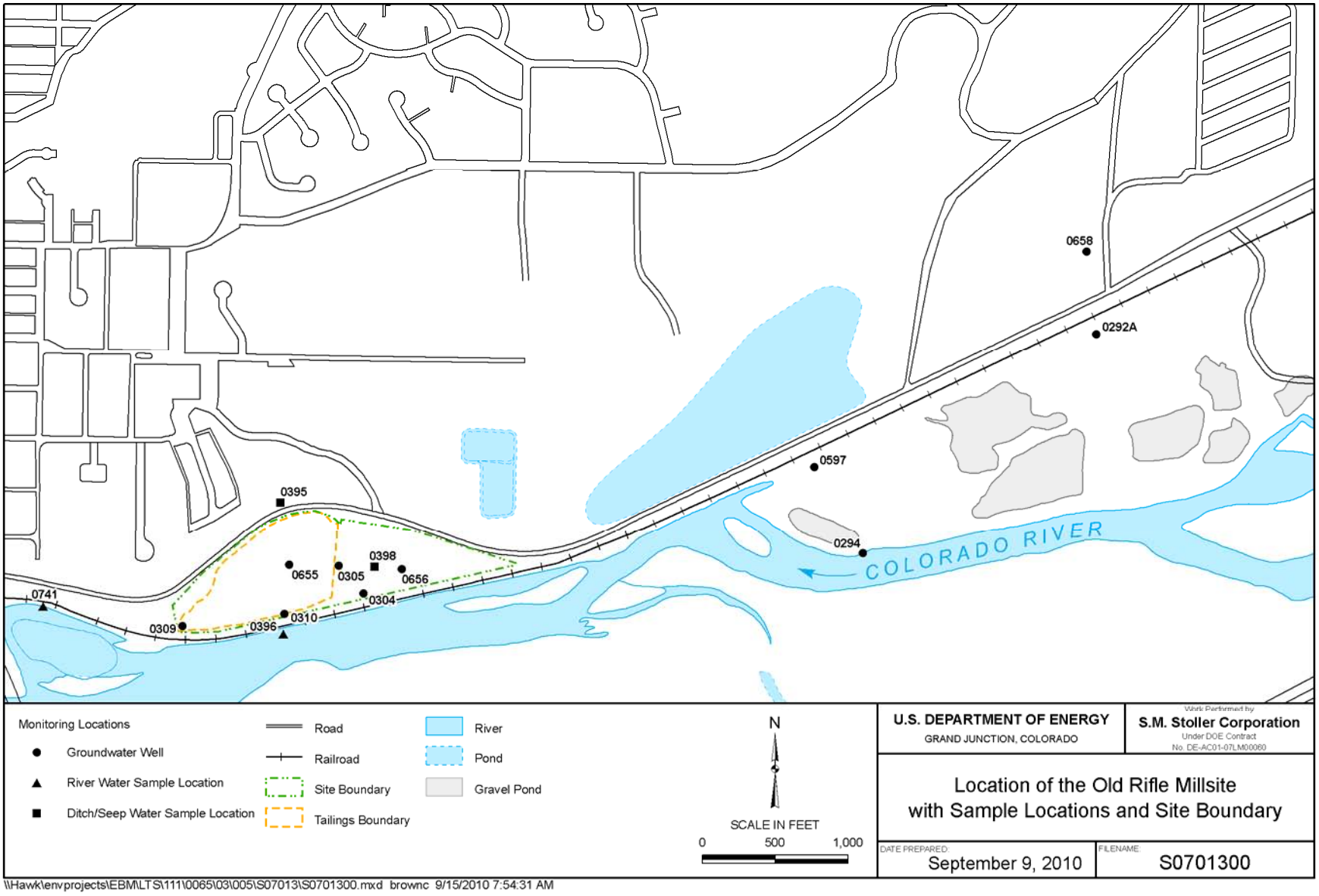

Figure 1. Location of the Old Rifle Mill Site with Sample Locations and Site Boundary

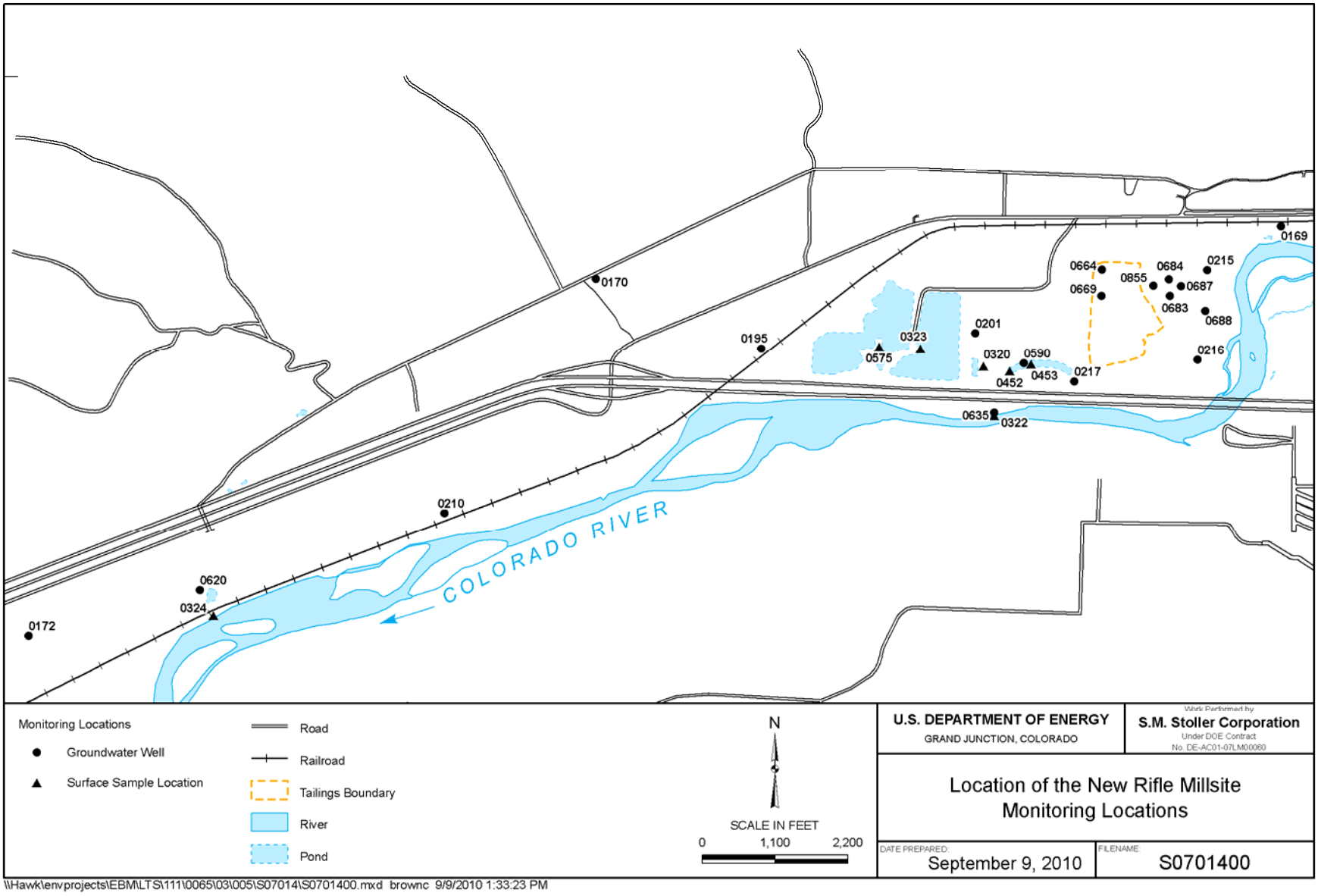

Figure 2. Location of the New Rifle Mill Site Monitoring Locations

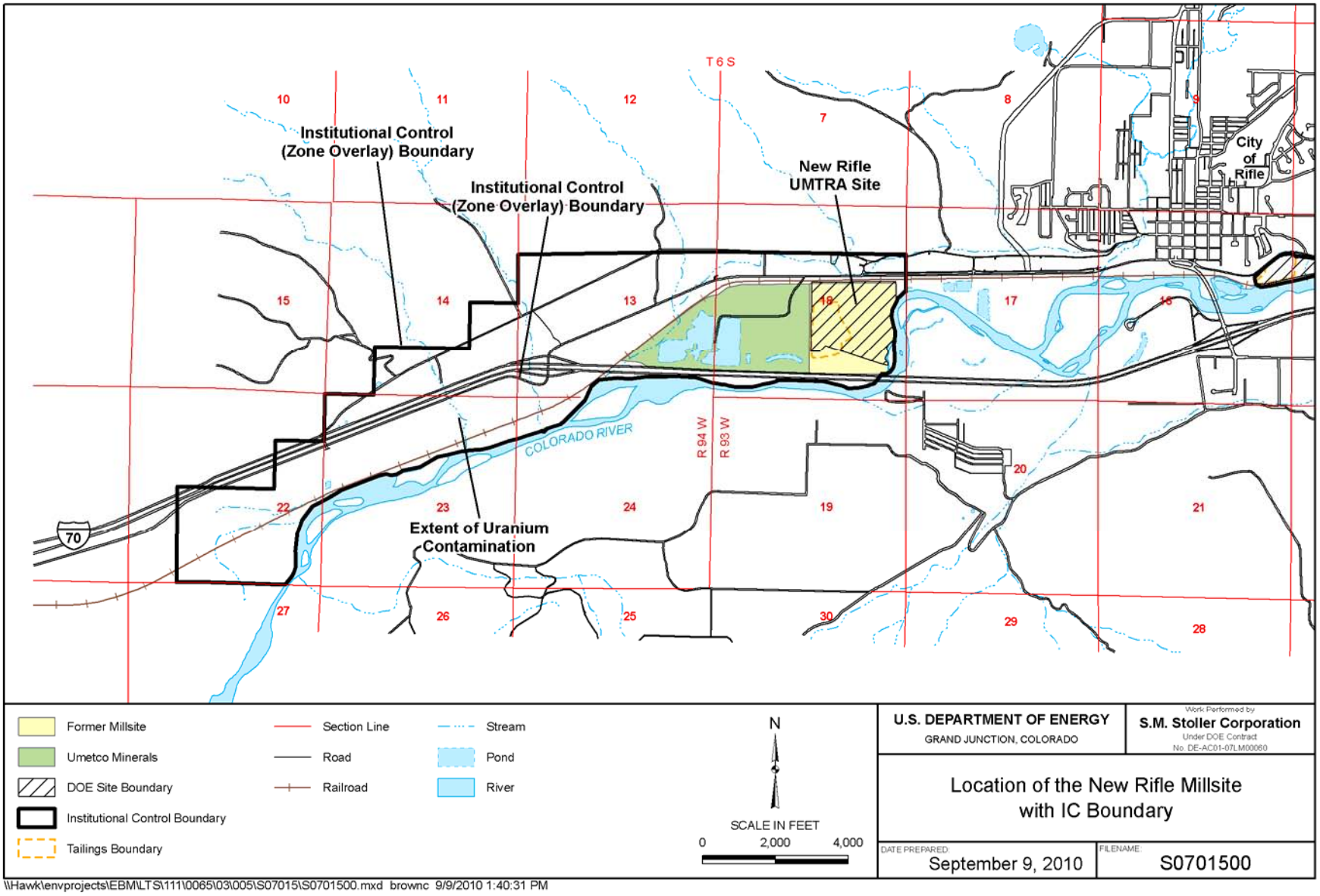

Figure 3. Location of the New Rifle Mill Site with IC Boundary

2.0 Site Conditions

2.1 Hydrogeology

The former Old Rifle processing site is 0.3 mile southeast of the city of Rifle, in a floodplain on the north side of the Colorado River (Figure 1). Groundwater is unconfined in the uppermost aquifer, which consists of river alluvium and the upper weathered surface of the Tertiary Wasatch Formation. The uppermost aquifer is 5 to 25 feet (ft) thick; saturation occurs from 5 to 10 ft below ground surface. The uppermost aquifer is composed of poorly sorted sediments ranging from clay-sized material through gravel, with cobbles and occasional boulders. Groundwater in the alluvial aquifer generally flows to the west-southwest. Hydraulic conductivity ranges from 1.2 ft per day in the alluvium to 0.02 ft per day in the weathered Wasatch. Recharge is from groundwater ephemeral seeps above the mill site, precipitation, and an unlined irrigation return ditch that flows across the middle of the site. The Colorado River can briefly recharge the mill site groundwater during periods of maximum flow associated with spring runoff. Groundwater discharge is mainly to the Colorado River. Another source of discharge is evapotranspiration. At Old Rifle, alluvium pinches out against bedrock outcrops at the downgradient end of the site. The Old Rifle site has no hydrological connection to the New Rifle site. The SOWP (DOE 1999a) provides additional data regarding the hydrogeology of the Old Rifle site.

The former New Rifle processing site is about 1.5 miles west of the city of Rifle and is also situated on the north floodplain of the Colorado River (Figure 2). As with the Old Rifle site, the uppermost aquifer consists of river alluvium and the weathered surface of the Wasatch Formation. Other hydrologic properties are similar to those at the Old Rifle site (DOE 1999b). Alluvium is thickest along the western and southern portions of the site and is continuous for at least 4 miles downgradient of the site. The alluvium provides a source for domestic water in the area. Recharge is from ephemeral streams from the north and precipitation. Groundwater discharge is to the Colorado River and through evapotranspiration.

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 on-site mining pit where excavation was occurring to another on-site pit for storage and infiltration. (These pits have been referred to previously as the “Roaring Fork ponds.”) During Roaring Fork Resources’ period of operation, the pumping affected groundwater flow downgradient of the New Rifle site, creating both a cone of depression in and a groundwater mound on the alluvial aquifer water table (DOE 1999b). Operation of the gravel mine ceased in early 2003, and natural alluvial groundwater flow conditions have been reestablished, though the effects of the ponds on contaminant distribution persist today. Over time, and with the progression of natural flushing, these effects have become less pronounced.

2.2 Groundwater Quality

Alluvial groundwater in background locations near the Rifle sites has concentrations of selenium and uranium that are above applicable standards (DOE 1995b). Sulfate levels in background locations have also been relatively high, far exceeding the secondary drinking water standard of 250 milligrams per liter (mg/L) (non-enforceable; based on aesthetic considerations). However, it has been demonstrated that site-related activities contaminated the groundwater in the

uppermost aquifer beneath the Old Rifle site and beneath and downgradient of the New Rifle site.

Table 1 presents historical data for COCs in groundwater at both sites before surface remediation was completed. A comparison of historical data with benchmarks indicates that criteria were exceeded for a number of COCs. Contamination at the New Rifle site was much greater than at the Old Rifle site.

Table 1. Historical Groundwater Chemistry for Old and New Rifle Site COCs

COC (all units mg/L)	Benchmark	Old Rifle Site		New Rifle Site	
		Historical Range[a] Aug. 1990−Aug. 1994	Median	Historical Range[a] Aug. 1990−Aug. 1994	Median
Ammonia as NH_4[b]	NA	NA	NA	506−1,750	1,030
Arsenic	0.05[c]	NA	NA	0.97−1.3	1.1
Molybdenum	0.10[c]	NA	NA	2.3−3.7	2.9
Nitrate + Nitrite as Nitrogen	10[c]	NA	NA	124−251	177
Selenium	0.036[d]	0.007–0.085	0.072	<0.002−0.3	<0.05
Uranium	0.067[d]	1.6–2.1	1.8	0.24−0.37	0.29
Vanadium	NA	0.5–-0.75	0.55	0.59−2.8	1.3

[a] Ranges and median values are from the Baseline Risk Assessment (DOE 1995a), Table 3.1 (pre-remedial action).
[b] No longer considered a COC; included to understand nitrate behavior.
[c] U.S. Environmental Protection Agency UMTRA Project groundwater standard (Title 40 *Code of Federal Regulations* Part 192).
[d] Maximum background value, cleanup goal.
NA = not applicable

During surface remediation, mill tailings and other residual radioactive materials (RRM) were removed. Surface remediation was completed by 1996, and tailings were stabilized in an engineered repository about 15 miles north of Rifle. RRM was removed down to and, in some cases, just below the groundwater surface. Clean gravel and soil were used to fill the excavations, and the surface was given 6 inches of topsoil and sown with seed mixtures.

Subsequent characterization completed at the New Rifle site as part of a pilot study for the removal of vanadium from the groundwater (DOE 2000) indicated that some residual soil contamination remains at that site below the water table. Analyses showed elevated concentrations of vanadium; several samples also showed residual concentrations of molybdenum, uranium, and arsenic. Most of these soils are associated with the location of a former disposal pond and, to a lesser extent, a former tailings pile. The City of Rifle recently conducted activities within and to the east of these known contaminated soils.

2.3 Land and Water Use

The City of Rifle acquired the former Old Rifle processing site from the State of Colorado in 2000. Because all groundwater contamination is contained on the mill site and discharges into the Colorado River, adjacent property is not sampled. The City built a maintenance facility on the east end of the site and has not yet decided how the western end of the property will be used in the future.

The former New Rifle processing site was transferred from the State of Colorado to the City of Rifle in 2004. Umetco Minerals Corporation, which Dow Chemical acquired, owned the adjacent downgradient property (Figure 3). Other private parties own parcels farther downgradient of the site.

The City constructed a wastewater treatment facility on the northeastern portion of the site and has other long-range plans for the remainder of the site. The 2009 Verification Monitoring Report noted that on-site activities caused concentrations of some COCs in groundwater to spike significantly. In 2010, some wells showed similar increases, while others declined since last year (see time-concentrations plots in Appendix A and discussed in section 3.2.2).

Historically, domestic wells downgradient of the New Rifle site were used for drinking water. However, these wells are no longer in use, and water at these locations is supplied by the City. The Roaring Fork gravel pit (now owned by Dow Chemical) ceased operation in 2003, and the ponds have since filled up and equilibrated with the local water table. The banks of the ponds have been contoured and seeded. According to an agreement between Dow Chemical and the State of Colorado, use of the ponds by livestock will be restricted, probably by fencing. No immediate plans are in place for this property.

3.0 Monitoring Program

3.1 Monitoring Network

Table 2 lists the sampling locations that constitute the monitoring network at the Old Rifle processing site. The monitoring network consists of nine monitoring wells (six on-site wells and three background wells) and five surface water locations (Figure 1). Selenium, uranium, and vanadium are monitored at these locations.

Table 2. Summary of Monitoring Requirements for the Old Rifle Site

Location	Monitoring Purpose	Analytes	Frequency[a]
RFO-0305, RFO-0655	Center of plume; west side of ditch	Selenium, uranium, vanadium	Semiannually
RFO-0656	Center of plume; east side of ditch	Selenium, uranium, vanadium	Semiannually
RFO-0304, RFO-0309, RFO-0310	Farthest downgradient location; leading edge of plume	Selenium, uranium, vanadium	Semiannually
RFO-0292A, RFO-0658, RFN-0169	Background groundwater quality; upgradient monitoring well	Selenium, uranium, vanadium	Semiannually
RFO-0395, RFO-0398	Monitor surface water recharging aquifer; seep and on-site ditch	Selenium, uranium, vanadium	Semiannually
RFO-0294 (to replace RFO-0598), RFO-0396, RFO-0741	Monitor effects of site on river; surface water; upgradient of, and adjacent to, and downgradient of site on Colorado River	Selenium, uranium, vanadium	Semiannually

[a] Monitoring for a COC will be discontinued when and if the contaminant concentrations have remained below the compliance levels for 3 consecutive years.

Table 3 lists the monitoring requirements for the New Rifle site. The monitoring network consists of 17 monitoring wells at various locations and seven surface sampling sites. The two Old Rifle background wells also serve as background wells for the New Rifle site. The analytes monitored vary with the sample location. Monitoring was only conducted once in 2010, but starting in FY 2011, it will be conducted semiannually.

Table 3. Summary of Monitoring Requirements for the New Rifle Site

Location	Monitoring Purpose	Analytes	Frequency
RFN-0170, RFN-0172, RFN-0210, RFN-0620	Monitor middle and leading edge of molybdenum, uranium, and nitrate plumes	Molybdenum, uranium, nitrate	Semiannually
RFN-0195, RFN-0201, RFN-0215, RFN-0216, RFN-0217, RFN-0590, RFN-0635, RFN-0658, RFN-0659, RFN-0664, RFN-0669, RFN-0670, RFN-0855	Monitor flushing in main body of plumes	Molybdenum, nitrate, uranium	
RFN-0320, RFN-0322, RFN-0323, RFN-0324, RFN-0452, RFN-0453, RFN-0575	Monitor surface water to determine impact of groundwater discharge to surface water and ecological receptors	Molybdenum, nitrate, uranium, vanadium	
RFN-0215, RFN-0216, RFN-0217, RFN-0590, RFN-0658, RFN-0659, RFN-0664, RFN-0669, RFN-0670, RFN-0855	Monitor flushing in main body of plumes	Vanadium	

[a] Monitoring for a COC will be discontinued when and if the contaminant concentrations have remained below the compliance levels for 3 consecutive years.

3.2 Results of the Monitoring Program

3.2.1 Old Rifle Site

3.2.1.1 Surface Water

Results of surface water monitoring in the Colorado River (locations RFO-0294, RFO-0396, and RFO-0741) indicate that the water quality of the river adjacent to and downgradient of the Old Rifle site is indistinguishable from background water quality. This confirms the calculations included in the SOWP (DOE 1999a) demonstrating that groundwater discharged to the river would immediately undergo rapid mixing with river water. Sampling of the site ditch and upgradient seep (RFO-0398 and RFO-0395), which serve as sources of recharge to the alluvial aquifer, indicates that measurable amounts of uranium (0.014 and 0.028 mg/L) are present in the surface water there. Appendix C includes surface water results for 2010.

3.2.1.2 Groundwater

Appendix C includes groundwater monitoring results for FY 2010. Figure 4 through Figure 6 present spot plots showing the distribution of COCs in groundwater at the Old Rifle site.

Appendix A presents time-concentration graphs for wells sampled at both the Old and New Rifle sites. Table 4 presents statistics for monitoring results for the Old Rifle site for two periods—(1) 1998 and 1999, shortly after the completion of surface remediation, and (2) the most recent monitoring results, from June 2010. A comparison of these two groups of data should indicate the progress natural flushing has made since the surface cleanup ended.

Table 4. Post-Remediation Groundwater Monitoring Results for the Old Rifle Site

COC (all units mg/L)	Benchmark	Range 1998–1999	Mean 1998–1999	Range June 2010	Mean June 2010
Selenium	0.05[a]	<0.0001–0.122	0.023	0.00054–0.064	0.0159
Uranium	0.044[b]	0.0268–0.270	0.0997	0.020–0.180	0.104
Vanadium	0.33[c]	<0.0006–0.799	0.2337	0.00059–0.52	0.135

Data for wells RFO-0304, RFO-0305, RFO-0309, RFO-0310, RFO-0655, and RFO-0656
[a] U.S. Environmental Protection Agency Safe Drinking Water Act standard and approved alternate concentration limit
[b] U.S. Environmental Protection Agency UMTRA Project groundwater standard (Title 40 *Code of Federal Regulations* Part 192)
[c] Risk-based concentration

Spot plots in Figure 4 through Figure 6 indicate that elevated uranium concentrations persist across the site, while selenium and vanadium are more localized. This is somewhat consistent with the conceptual site model, which indicated that selenium and vanadium tended to be less mobile than uranium (DOE 1999b). The limited distribution of and greater decreases in concentrations of vanadium and selenium, when compared to uranium, can likely be attributed to some type of adsorptive mechanisms. Attenuation through adsorption rather than true flushing of the aquifer is probably the cause for decreases in these COCs.

By contrast, uranium tends to be a highly mobile constituent and was expected to easily be flushed from site groundwater in solution. The fact that uranium concentrations have not decreased significantly at the site may indicate that groundwater is not moving through the subsurface as rapidly as previously thought or that the transport of uranium is more complicated than expected.

Selenium. The selenium concentrations for all wells were below the cleanup standard (background at 0.036 mg/L) in 2008 and 2009. In June 2010, the concentration in well RFO-0655 increased to nearly double the standard, at 0.064 mg/L.

Uranium. Uranium persists at the site. Uranium concentrations at most sampling locations exceeded the uranium standard during FY 2010. The current average concentration of uranium is slightly higher than it was 10 years ago. Time-concentration plots are ambiguous with respect to the attenuation of uranium. Portions of plots for some wells show increases, while others show decreases; plots for other wells appear to fluctuate around almost level concentrations. Uranium monitoring should continue until conclusions can be reached regarding the applicability of the natural flushing compliance strategy. At that time, a change in the monitoring approach may be called for.

Vanadium. Data in Table 4 indicate that currently the average concentration of vanadium in Old Rifle alluvial groundwater is below the benchmark value of 0.33 mg/L. Two locations (RFO-0305 and RFO-0655) exceeded this value in FY 2010 and had concentrations that were slightly higher than the previous year's.

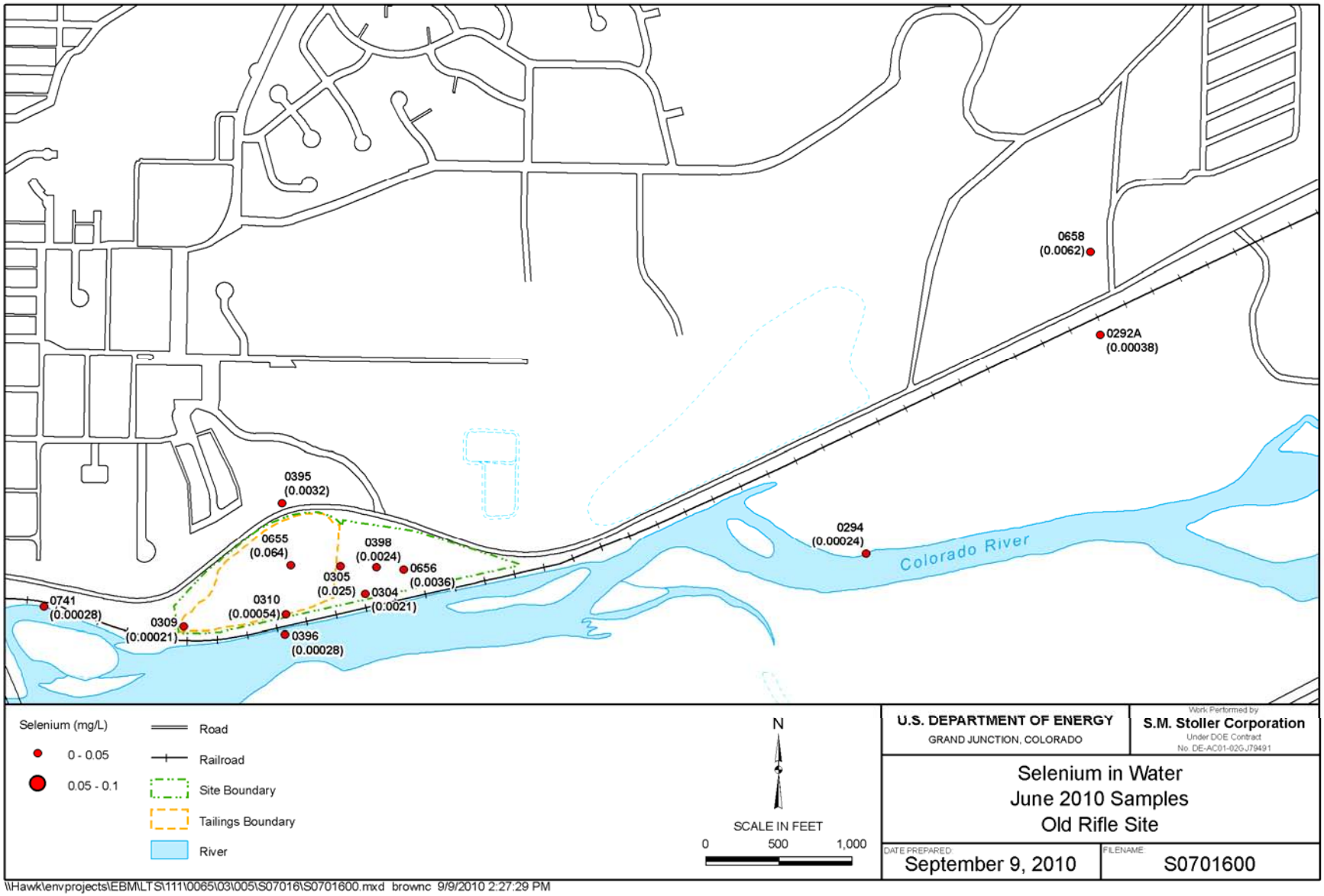

Figure 4. Selenium in Water at the Old Rifle Site

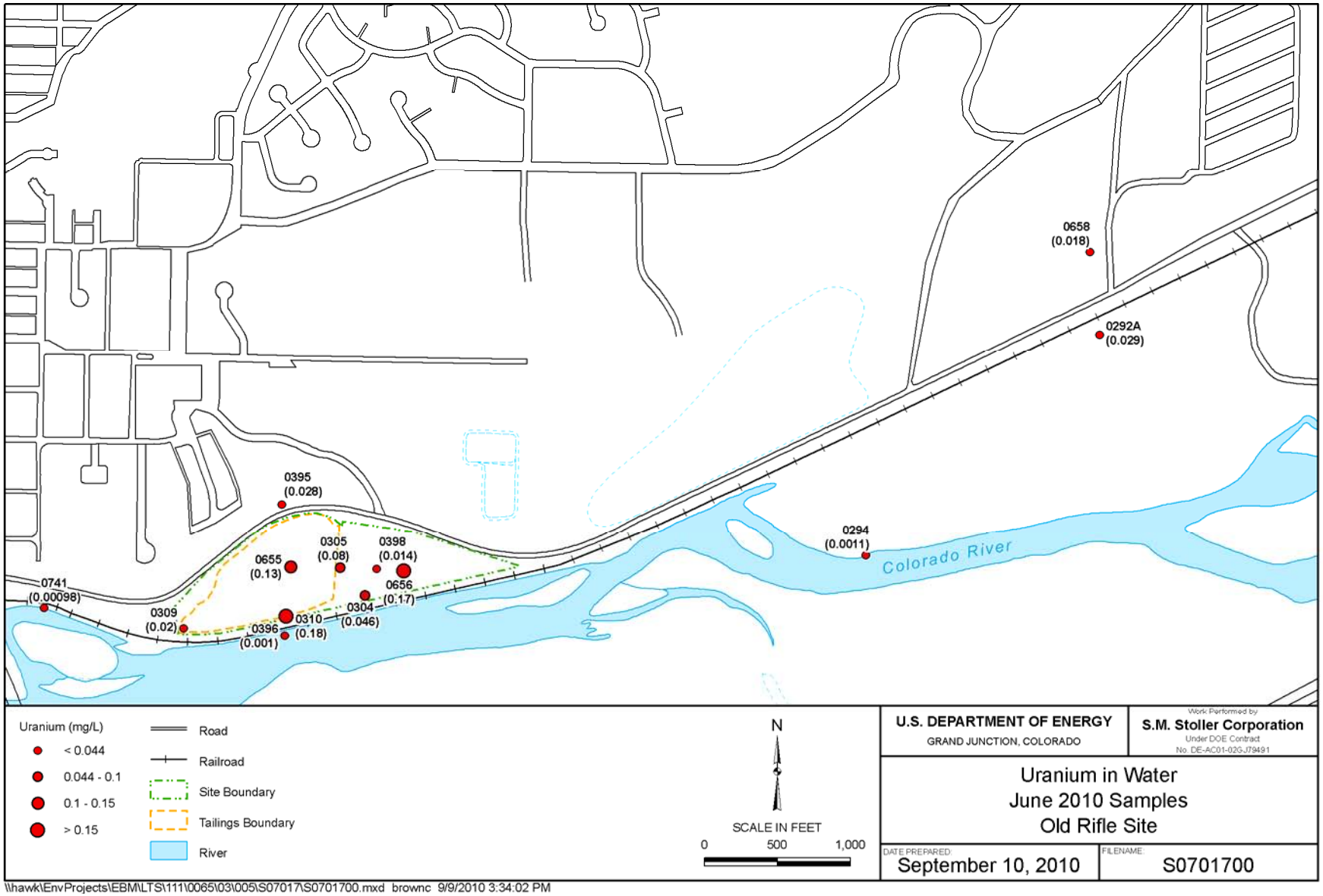

Figure 5. Uranium in Water at the Old Rifle Site

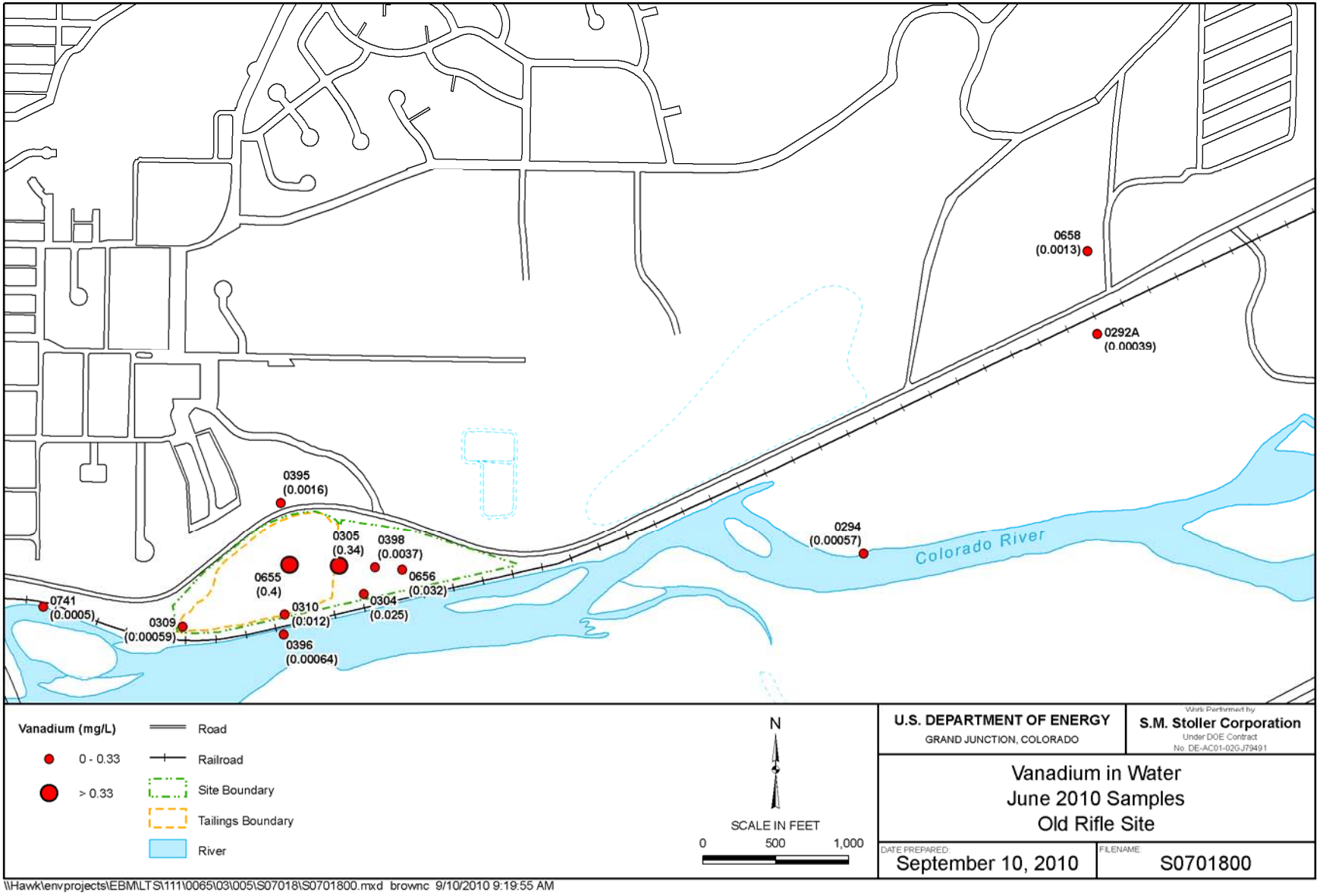

Figure 6. Vanadium in Water at the Old Rifle Site

3.2.2 New Rifle Site

3.2.2.1 Surface Water

Appendix C includes surface water monitoring results for 2010. Two surface water locations at the New Rifle site (locations RFN-0322 and RFN-0324) represent Colorado River water. At the other five surface locations, samples were collected from the wetland area and former Roaring Fork gravel pond; these samples may be more representative of groundwater in the area, though they could have higher COC concentrations due to evaporation. The two river samples were chemically indistinguishable (in terms of COC concentrations) from one another as well as from background, indicating no site-related chemical signature. COC concentrations in river water samples were orders of magnitude less than concentrations in samples from the adjacent wetlands. No surface water standards were exceeded in the river. Sampling results confirm the calculations performed as part of the SOWP (DOE 1999b), which indicate that discharging groundwater undergoes significant mixing with river water and that contaminants attenuate rapidly.

The wetland area and the Roaring Fork gravel pond have elevated levels of the site-related COCs molybdenum, nitrate, uranium, and vanadium. As natural flushing results in declining contaminant concentrations in the alluvial aquifer, corresponding declines should occur in the surface water at these locations as well.

3.2.2.2 Groundwater

Groundwater beneath the New Rifle site was contaminated by former vanadium- and uranium-ore-processing operations that were ongoing from 1958 through 1972, from lignite ash processing from 1964 to 1967, and from vanadium processing (which did not produce tailings but may have produced milling solutions) from 1973 to 1984. Site field investigations have shown that the alluvial aquifer is the only aquifer the former milling operations affected. COCs previously identified in the alluvial aquifer at concentrations that exceed the groundwater standards of Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192) are arsenic, molybdenum, nitrate, selenium, and uranium. Fluoride levels have exceeded the Safe Drinking Water Act standard of 4 mg/L. Concentrations of ammonia, manganese, and vanadium have exceeded risk-based concentrations deemed acceptable for groundwater that is used for domestic purposes in a residential setting (DOE 1999). Based on discussions with CDPHE, fluoride and manganese are of little concern at the site and were eliminated from the monitoring program. Ammonia, arsenic, and selenium have declined below levels of concern for the most part, though analysis for these constituents has continued to a limited degree. Most of the following discussion focuses on the more widespread or persistent COCs—molybdenum, nitrate, uranium, and vanadium. Appendix C includes groundwater monitoring results for 2009.

The most conspicuous feature in groundwater monitoring data collected for 2009 was a pronounced spike in concentrations for molybdenum, arsenic, selenium, and vanadium in samples collected from well RFN-0855. This was attributed to dewatering and excavation activities being conducted by the City of Rifle in association with constructing the city's wastewater treatment facility. In 2010, concentrations of molybdenum and vanadium in well RFN-0855 decreased significantly; large changes in concentrations of various COCs were also noted for wells RFN-0658, RFN-0670, and RFN-0216 during the last couple of sampling events. These changes are likely also due to construction-related impacts on the aquifer.

Figure 7 through Figure 10 present spot plots showing the distribution of COCs monitored in New Rifle alluvial groundwater and surface water. The plots may contain some sample locations that are not part of the regular monitoring network but were sampled as part of another project. Including those sample locations here provides a more complete picture of contaminant distribution. Those wells, however, are not included in site statistics; their omission allows the same well sets from year to year to be compared. Well RFN-0210 was abandoned and eliminated from the monitoring network in 2010 due to conflicts with the property owner. The need for a replacement well has not been determined.

In general, the contaminant plumes for the less mobile COCs (such as vanadium) are restricted in areal extent and are still concentrated around the former mill site. Plumes for constituents that are more mobile (nitrate, molybdenum, and uranium) are more extensive. To evaluate the progress of natural flushing at the New Rifle site, monitoring wells were assigned to one of three groupings—on site, adjacent to site, and downgradient—for the purposes of computing statistics for analytical results.

On-site wells are those within the site boundary. As noted, residual soil contamination does exist at the New Rifle site below the water table. This contamination is most likely to affect groundwater in contact with those soils and serve as a persistent source of contamination to groundwater, and it would thus influence water quality in on-site wells. Although on-site wells are all grouped together for the purpose of computing groundwater statistics and comparing the results to historical trends, three subgroups of on-site wells were recognized in previous verification monitoring reports based on patterns of time-concentration plots for the wells (Appendix A includes time-concentration plots). These patterns were interpreted as being related to the wells' location and proximity to former source areas.

Wells RFN-0169, RFN-0215, and RFN-216 are adjacent to the Colorado River and upgradient of the main source of site groundwater contamination—the former raffinate ponds and tailings pile. Concentrations of most COCs in these wells are generally low and have had limited variability over the past 10 years. A notable exception is well RFN-216, which, in 2008, showed spikes in molybdenum, uranium, and vanadium concentrations that remained elevated in 2009 but declined in 2010. This is likely due to the groundwater pumping that the City of Rifle conducted in the immediate area during the construction of infrastructure for the wastewater treatment plant.

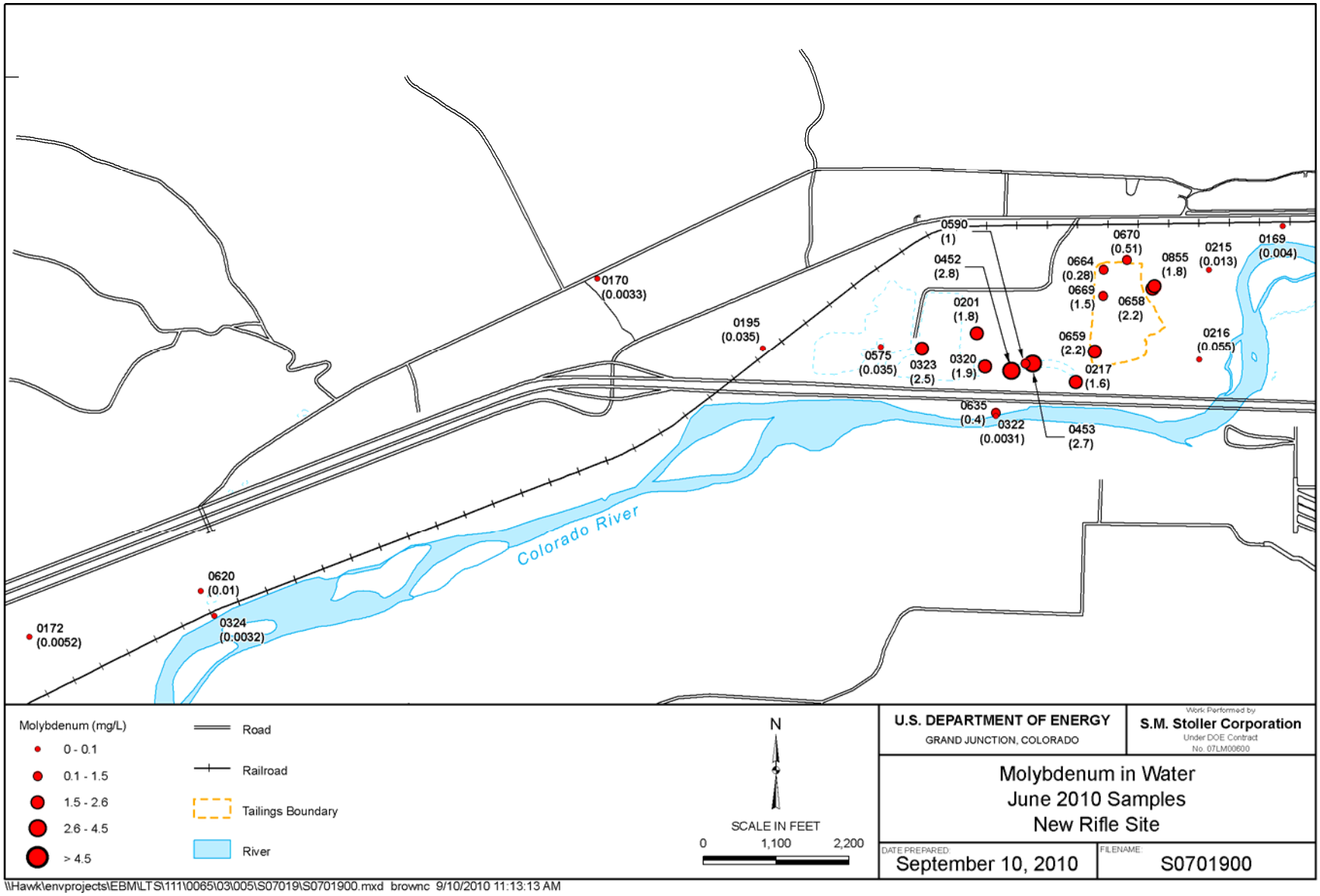

Figure 7. Molybdenum in Water at the New Rifle Site

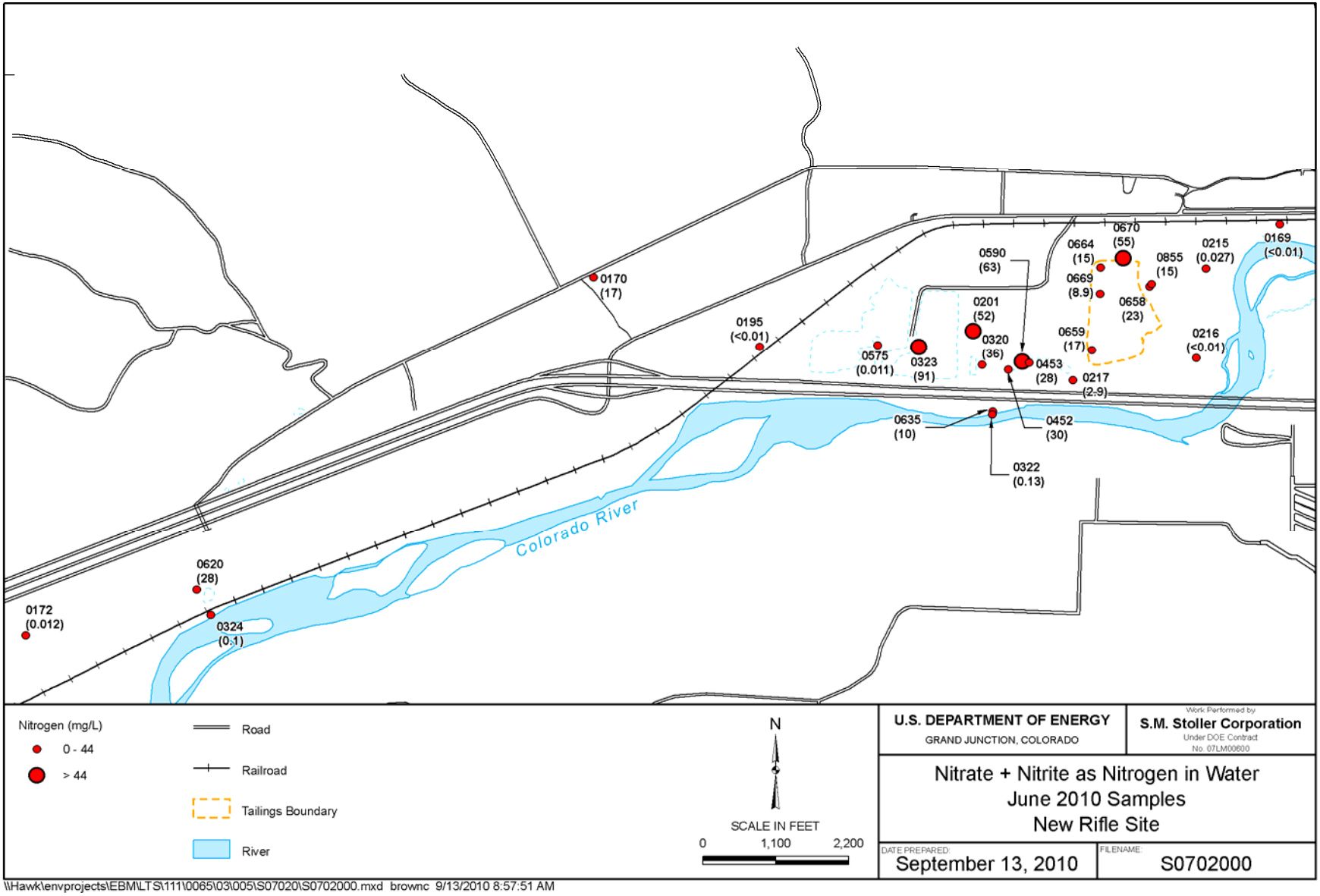

Figure 8. Nitrate + Nitrate as Nitrogen in Water at the New Rifle Site

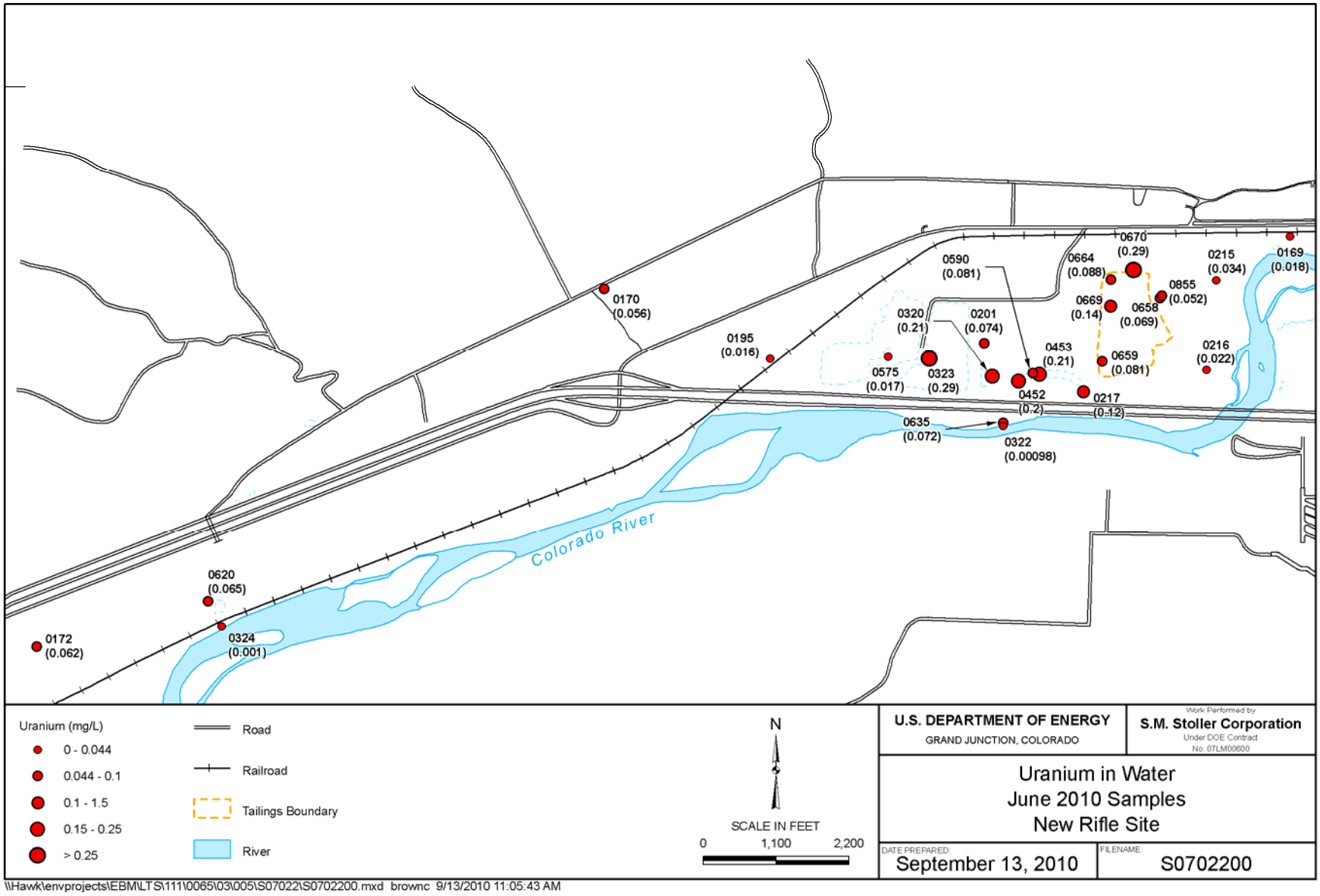

Figure 9. Uranium in Water at the New Rifle Site

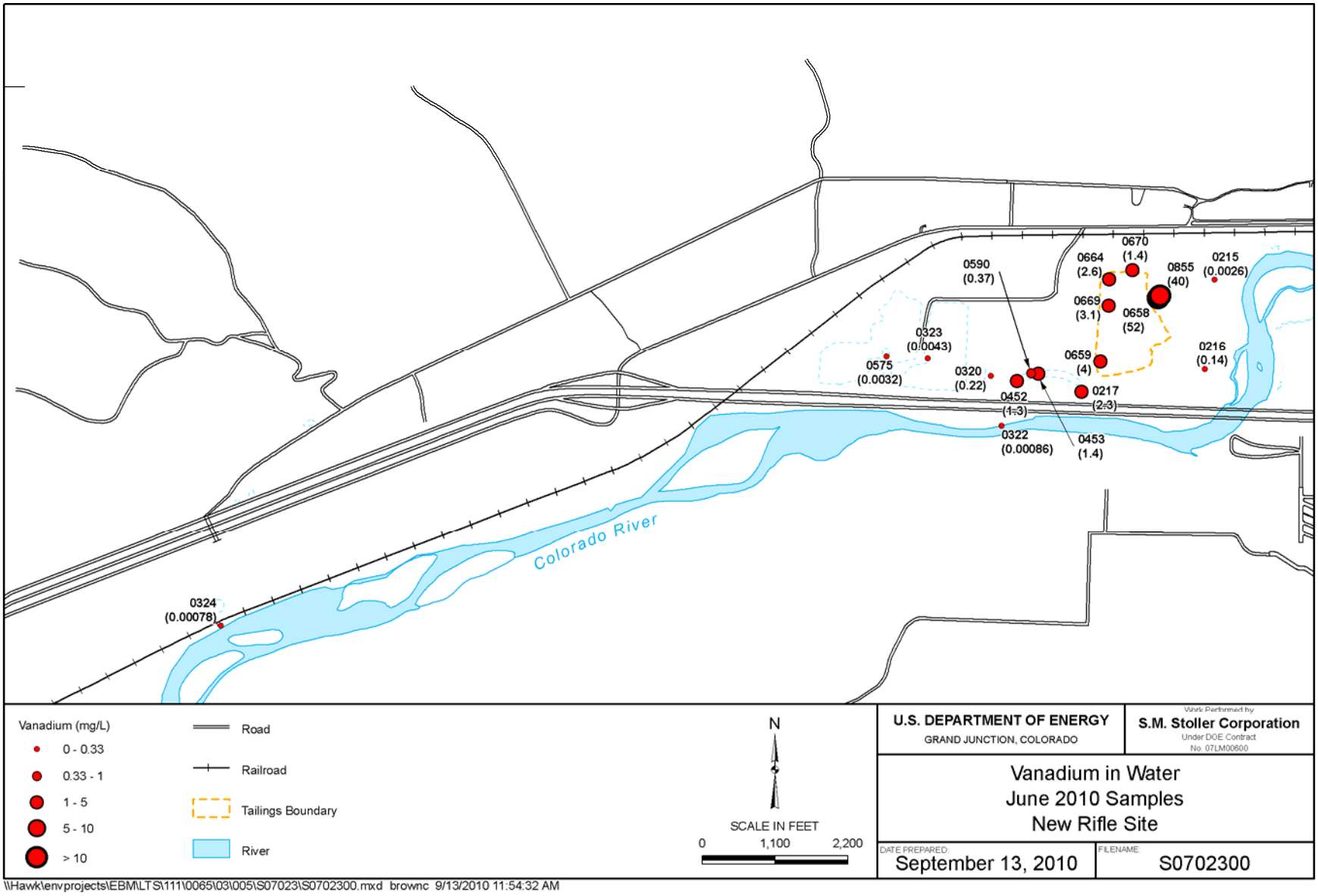

Figure 10. Vanadium in Water at the New Rifle Site

Locations RFN-0855, RFN-0658, and RFN-0659 are in the footprint of the former raffinate ponds and tailings pile. Soil sampling conducted during the pilot study for vanadium at the site indicated that residual contamination exists in these areas and may have local influence on groundwater quality. These locations are characterized by time-concentration plots with the highest concentrations of most COCs and the greatest degree of variability over time. For the most part, these wells exhibit no clear trends. Adsorption/desorption reactions between groundwater and soils probably occur in this area, and groundwater concentrations are likely sensitive to fluctuations in the water table. As noted above, due to the City's activities, concentrations for a number of COCs in well RFN-0855 increased sharply (for example, vanadium increased from 14 mg/L in 2007, before dewatering began, to 1,000 mg/L in 2009), but declined again in 2010. Future monitoring results will be evaluated to determine whether this contaminant "slug" affects concentrations in downgradient wells. The City has ceased dewatering, and groundwater levels are returning to normal, as should concentrations. The question is, how much time will pass before the concentrations return to their usual levels?

The remaining on-site wells—RFN-0669, RFN-0664, and RFN-0670—are outside of the residual contamination area. Trends shown in time-concentration plots for these locations are more similar to those for off-site locations. They show some variability but are typically decreasing (with some exceptions) for COCs with concentrations above benchmarks.

Contamination in off-site wells is attributed solely to the downgradient migration of contaminated groundwater and not from direct contact with a residual source. The wells downgradient of the New Rifle site were split into two groups according to their location relative to the Roaring Fork gravel ponds. As described previously, the ponds affected groundwater flow direction during pumping operations, thus hydraulically separating those two groups of wells to some extent. Additionally, activities associated with wetland construction were more likely to influence the water quality of the wells adjacent to the site than that of the wells farther downgradient. These differences have lessened over time. Table 5 and Table 6 provide statistics for the three main groups of wells. Table 5 provides water quality benchmarks, for comparison. The historical data provided in Table 1 are based on the combined results of data from wells on and adjacent to the site. Appendix A includes time-concentration plots for molybdenum, nitrate, uranium, and vanadium in the New Rifle wells.

Table 5. Mean Concentrations in Groundwater—1998–1999 and June 2010 for the New Rifle Site

Contaminant	Benchmark (mg/L)	On Site[a]		Adjacent to Site[b]		Downgradient[c]	
		1998–1999 mean (mg/L)	June 2010 mean (mg/L)	1998–1999 mean (mg/L)	June 2010 mean (mg/L)	1998–1999 mean (mg/L)	June 2010 mean (mg/L)
Molybdenum	0.1[d]	2.498	1.07	1.928	1.2	0.035	0.015
Nitrate + Nitrite as Nitrogen	10[d]	61.13	16.74	230	31.98	75.8	5.67
Uranium	0.067[e]	0.1012	0.097	0.097	0.087	0.0752	0.045
Vanadium	NA	5.68	12.91	0.367	1.34	<0.0001	NA

[a] Includes wells RFN-0215, RFN-216, RFN-0658, RFN-0659, RFN-0664, RFN-0669, RFN-0670, and RFN-0855 (not all wells were sampled for all analytes).
[b] Includes wells RFN-0201, RFN-0217, RFN-0590, and RFN-0635 (only wells RFN-0217 and RFN-0590 were sampled for vanadium).
[c] Includes wells RFN-0170, RFN-0172, RFN-0195, and RFN-0210.
[d] U.S. Environmental Protection Agency UMTRA Project groundwater standard (40 CFR 192).
[e] Maximum background value, cleanup goal.
NA = not applicable

Table 6. Range of Concentrations in Groundwater—1998–1999 and June 2010 for the New Rifle Site

Contaminant	On Site[a]		Adjacent to Site[b]		Downgradient[c]	
	1998–1999 range (mg/L)	April 2009 range (mg/L)	1998–1999 range (mg/L)	April 2009 range (mg/L)	1998–1999 range (mg/L)	April 2009 range (mg/L)
Molybdenum	0.0237–6.84	0.013–2.200	0.661–3.15	0.40–1.8	0.0041–0.231	0.0033–0.035
Nitrate + Nitrite as Nitrogen	0.013–368	<0.01-55	0.393–836	2.9–63	0.0522–377	<0.01–5.67
Uranium	0.0103–0.284	0.022–0.29	0.0837–0.120	0.072–0.12	0.054–0.177	0.016–0.062
Vanadium	<0.001–25.3	0.0026–52.0	<0.001–2.69	0.37–2.3	0.00065–0.0018	NA

[a] Includes wells RFN-0215, RFN-0216, RFN-0658, RFN-0659, RFN-0664, RFN-0669, RFN-0670, and RFN-0855 (not all wells were sampled for all analytes).
[b] Includes wells RFN-0201, RFN-0217, RFN-0590, and RFN-0635 (only wells RFN-0217 and RFN-0590 were sampled for vanadium).
[c] Includes wells RFN-0170, RFN-0172, RFN-0195, and RFN-0210.
NA = not applicable

Molybdenum. Molybdenum has been one of the most widespread site COCs due to its high mobility. It remains elevated in on-site wells. Well RFN-0855 spiked at an all-time high observation of 18 mg/L in 2009, but the concentration decreased significantly in 2010. Molybdenum in the portion of the plume downgradient of the former gravel ponds appears to have dissipated. However, the relatively high concentrations recently observed on site suggest that molybdenum may move downgradient and recontaminate these areas.

Nitrate. The highest concentrations of nitrate are immediately downgradient of the site, though the standard is exceeded as far downgradient as location RFN-0620. The source of much of the nitrate is likely the degradation of ammonia. Trends (or lack thereof) probably depend more on ammonia behavior than on natural flushing processes. It appears that—with declines in ammonia to low levels—nitrate's behavior has become less erratic, and its concentrations are leveling out.

Uranium. Uranium persists throughout the plume. The standard is exceeded as far downgradient as well RFN-0172. However, all locations downgradient of the former gravel ponds are below the maximum background concentration of 0.067 mg/L. As with molybdenum, this may indicate that the portion of the plume downgradient of the former gravel ponds has dissipated.

Vanadium. In 2009, vanadium spiked to the highest concentration ever observed in well RFN-0855 (1,000 mg/L) in association with the City of Rifle's construction work. The concentration in RFN-0855 dropped back to 40 mg/L in 2010; the vanadium concentration in adjacent well RFN-0658 was 52 mg/L. Elevated concentrations are observed only on site and immediately downgradient of the site, as has been the case in past years.

3.2.2.3 Mann-Kendall Test for Trend

Another method of data evaluation is the nonparametric Mann-Kendall test for trend (Gilbert 1987). The test does not require any particular data distribution and will accommodate missing values and data reported as less than the detection limit. Essentially, it analyzes a series of data by subtracting the values of data collected earlier from those of later data. The method results in a test statistic that is a positive or negative (indicating an increasing or decreasing trend) and is used to estimate the probability that the trend is real. Appendix D-1 of the GCAP (DOE 2006) describes the Mann-Kendall test for trend.

As a preliminary analysis, several wells from the New Rifle site were selected for application of the Mann-Kendall test based on their locations with respect to the uranium and molybdenum plumes. The test was applied to uranium and molybdenum concentrations because these COCs are the most widespread and the most mobile. Additionally, they are not affected by geochemical transformation processes, as are ammonia and nitrate. Wells RFN-0664 and RFN-0669 are from two on-site locations near the original plume source areas (raffinate ponds and tailings piles). Well RFN-0201 is immediately downgradient of the site and upgradient of the Roaring Fork ponds; well RFN-0195 is immediately downgradient of the ponds. Appendix B includes the results of applying the Mann-Kendall test statistic to uranium and molybdenum values for these wells. On-site wells RFN-0664 and RFN-0669 show strongly decreasing trends (at the 95 percent confidence level) for both uranium and molybdenum. Likewise, well RFN-0201 shows a decrease in molybdenum (95 percent confidence level). Downgradient well RFN-0195 shows a strong decrease in uranium (95 percent confidence level) but no trend in molybdenum. The lack of a molybdenum trend is likely because the concentrations have reached levels that are fairly low (about half the MCL) and not much higher than background.

These results support the conclusions that natural flushing for these two COCs is progressing and that the main portions of the uranium and molybdenum plumes are moving off site into the adjacent downgradient area. The results also illustrate that different portions of the plume would be expected to display differing characteristics over time and space depending on site-specific characteristics (e.g., source location, hydrologic features). This is an important factor in evaluating long-term trends and assessing the attainment of remediation goals.

4.0 Results and Conclusions

Concentrations of selenium and vanadium at the Old Rifle site continue to decrease. Uranium concentrations do not display any consistent trends and have not declined as the modeling results in the SOWP predicted. The modeling results indicated that uranium would meet its groundwater standard sitewide within 30 years. The vanadium benchmark is currently exceeded at two wells; one well exceeds the selenium benchmark. Selenium and vanadium compliance goals have been met based on the sitewide averages. Time-concentrations plots in Appendix A-1 indicate that these two COCs have been relatively stable in Old Rifle wells for the last few of years of monitoring.

As expected with natural flushing, contaminant plumes for a number of COCs associated with the New Rifle site have been decreasing in general and moving downgradient over time. The only significant COCs in terms of concentration and distribution are molybdenum, nitrate, uranium, and vanadium. The highest concentrations of the mobile COCs—molybdenum, nitrate, and uranium—were found downgradient of the site. Nitrate concentrations, which had been increasing in response to ammonia degradation, now appear to be declining. The uranium standard was exceeded over the entire plume length; concentrations appear to be nearly constant in some wells. The highest concentrations of vanadium were still found on site. Significant fluctuations in molybdenum, vanadium, and uranium were noted in several on-site wells over the last few sampling rounds, due to dewatering activities conducted on the eastern part of the site by the City of Rifle. These fluctuations have begun to stabilize with cessation of the dewatering.

With the number of variables that can affect the distribution of contaminants in the alluvial aquifer at New Rifle, it is probably too early to determine the effectiveness of natural flushing at the site. However, data collected for the site indicate that some COCs are flushing, even if trends do not exactly match predictions. Generally speaking, groundwater contamination is decreasing. Some individual wells may display increasing concentrations for certain COCs, but this is to be expected as the plume centers migrate downgradient away from the site. On the basis of combined spatial and temporal data, plume centers for molybdenum, nitrate, and uranium appear to have already moved off site and continue to dissipate downgradient. The portions of the molybdenum and uranium plumes downgradient of the former gravel ponds seem to have dissipated; however, elevated upgradient concentrations could eventually recontaminate these areas as they move downgradient. Arsenic and selenium have little mobility and will probably remain confined to site groundwater. Vanadium, also relatively immobile, has migrated off site, but only to a very limited degree.

Neither the Old Rifle site's nor the New Rifle site's groundwater discharge is affecting surface water quality of the Colorado River. Presently, the selected compliance strategies at both sites appear to be adequately protective. A more definitive evaluation may be possible after more monitoring data are collected.

5.0 References

40 CFR 192. "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations*, July 1, 2007.

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EPA (U.S. Environmental Protection Agency), 1992. *Methods for Evaluating the Attainment of Cleanup Standards*, Volume 2: Groundwater, EPA 230-R-92-014, July.

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Appendix A−1

Time-Concentration Plots for Wells at the Old Rifle Site

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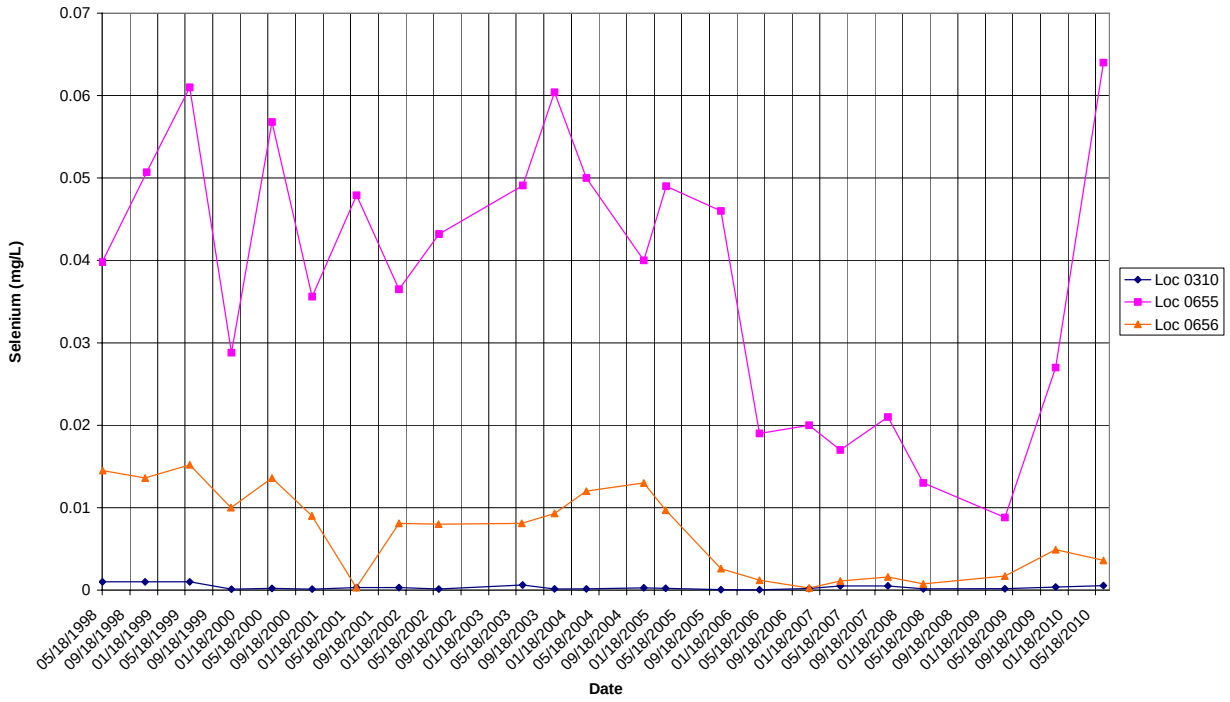
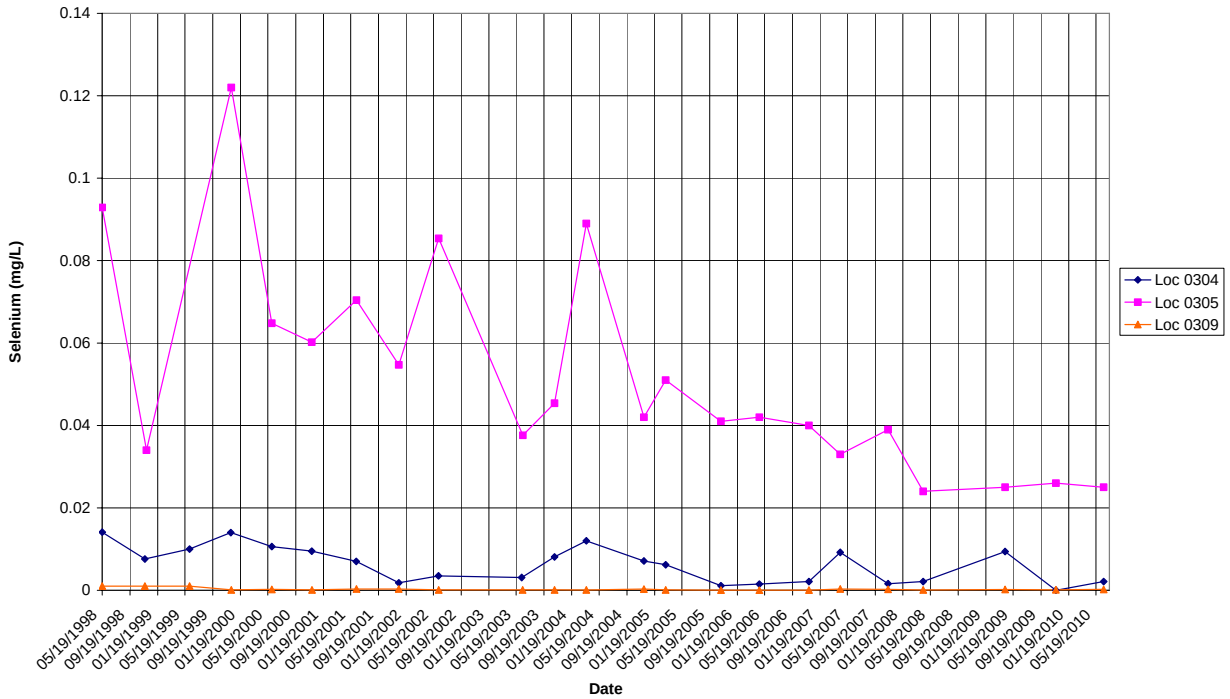
Rifle Old Processing Site (RFO01)

Selenium Concentration



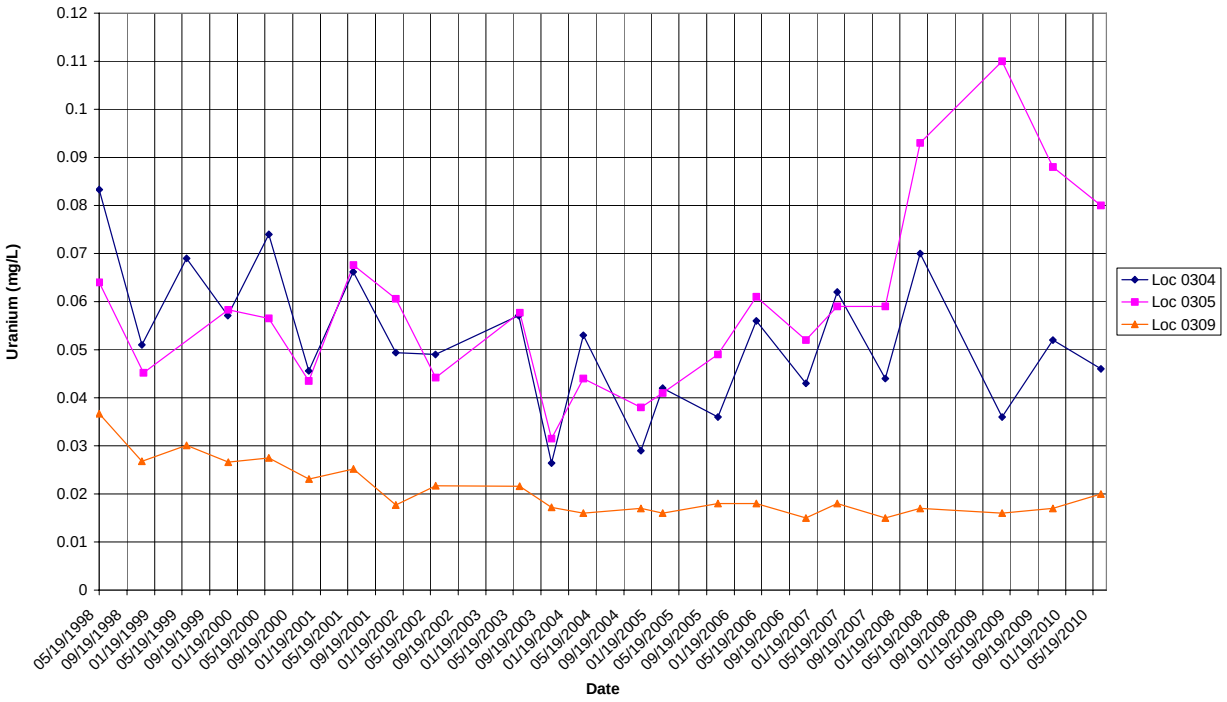
Rifle Old Processing Site (RFO01)

Selenium Concentration



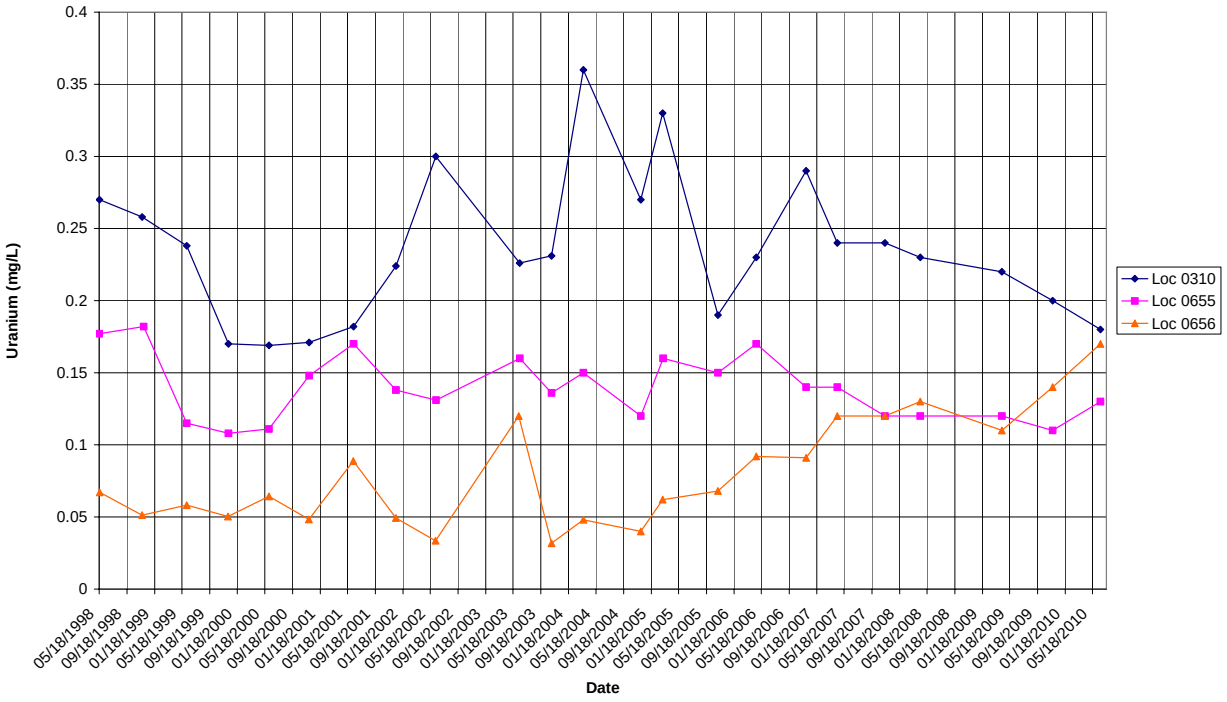
Rifle Old Processing Site (RFO01)

Uranium Concentration



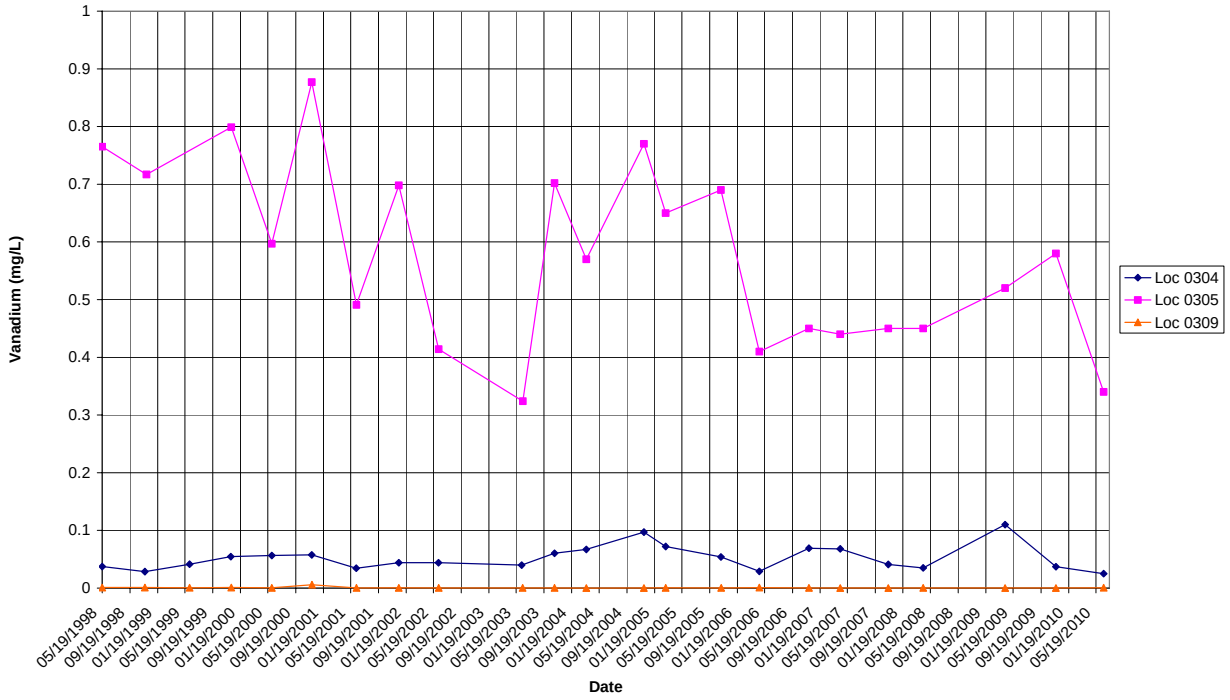
Rifle Old Processing Site (RFO01)

Uranium Concentration



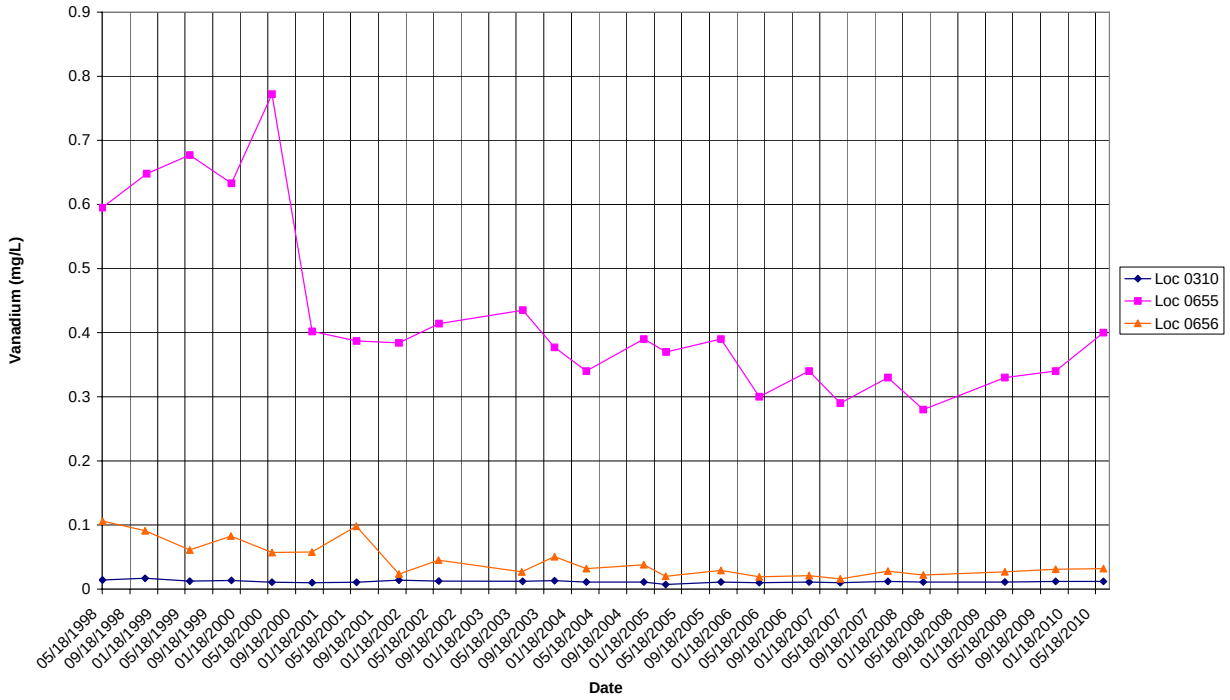
Rifle Old Processing Site (RFO01)

Vanadium Concentration



Rifle Old Processing Site (RFO01)

Vanadium Concentration



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Appendix A−2

Time-Concentration Plots for Wells at the New Rifle Site

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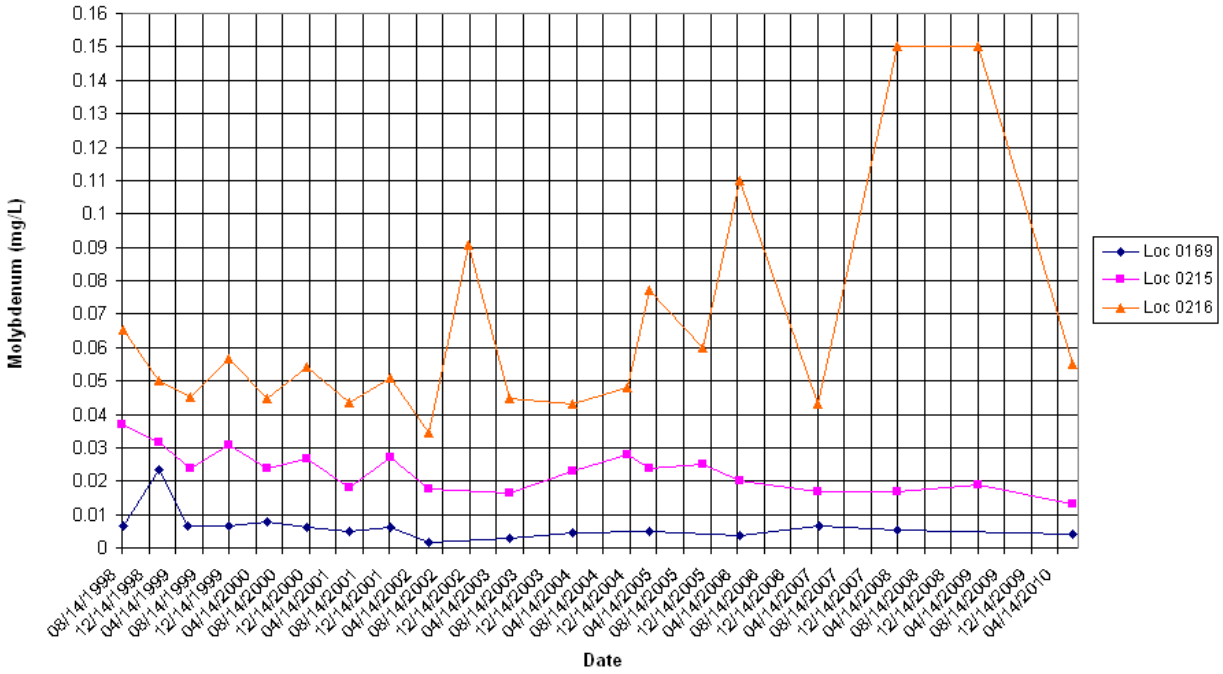
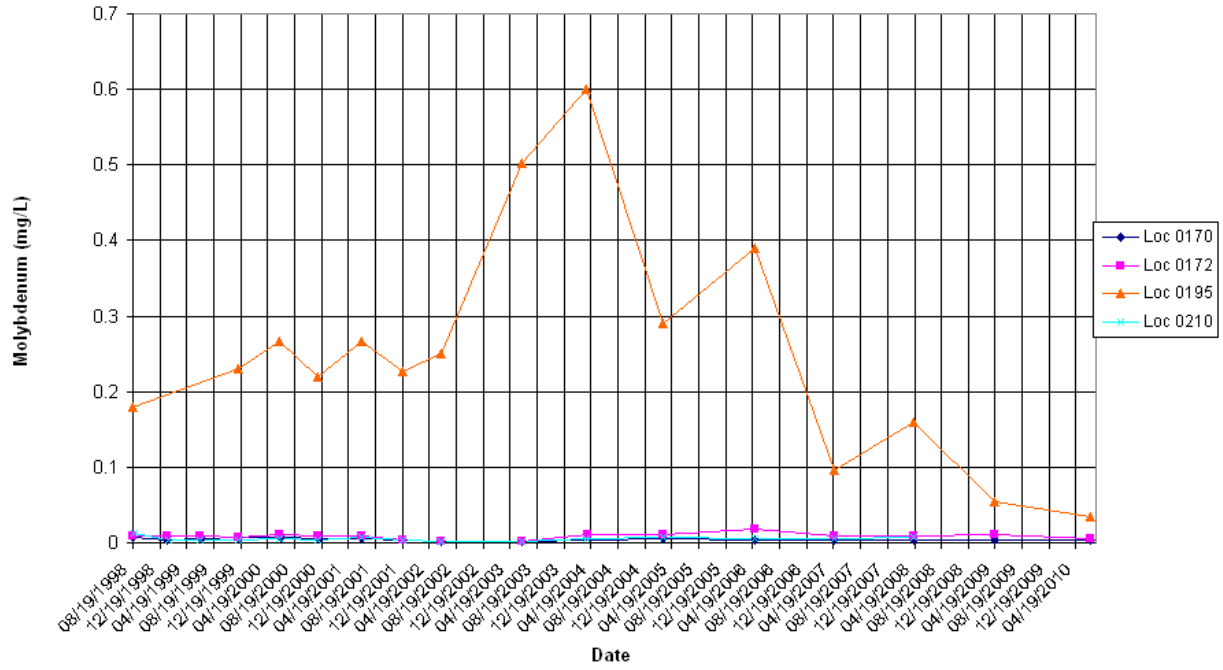
Rifle New Processing Site (RFN01)

Molybdenum Concentration



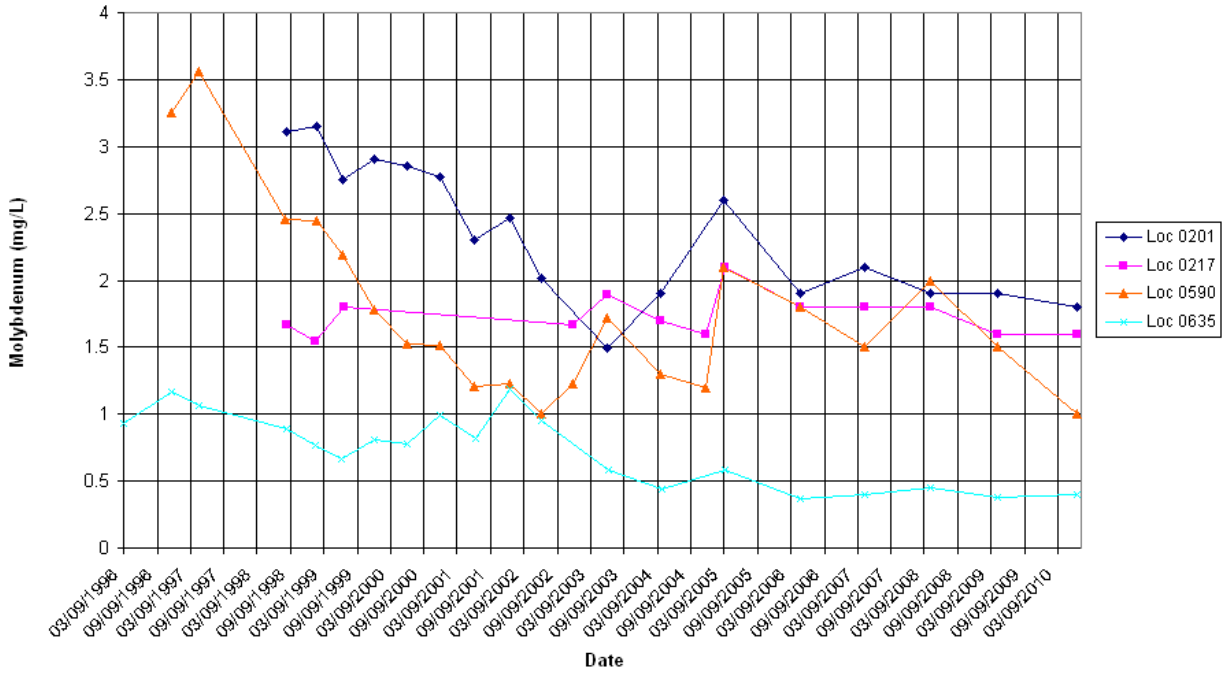
Rifle New Processing Site (RFN01)

Molybdenum Concentration



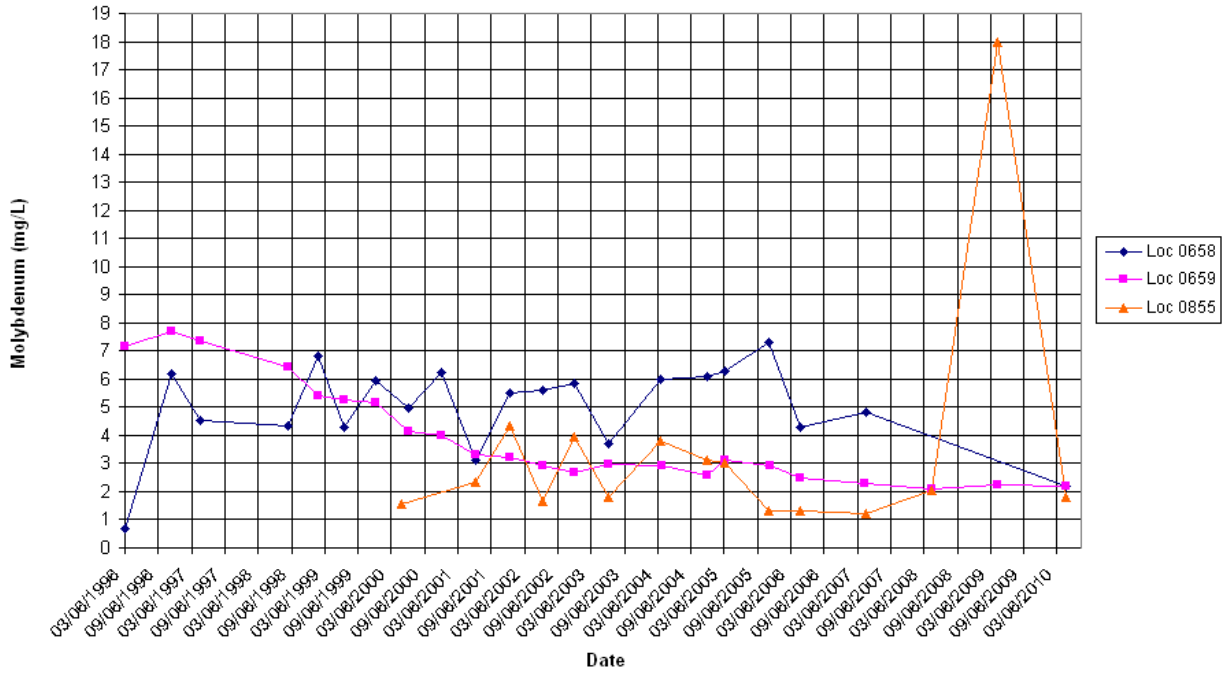
Rifle New Processing Site (RFN01)

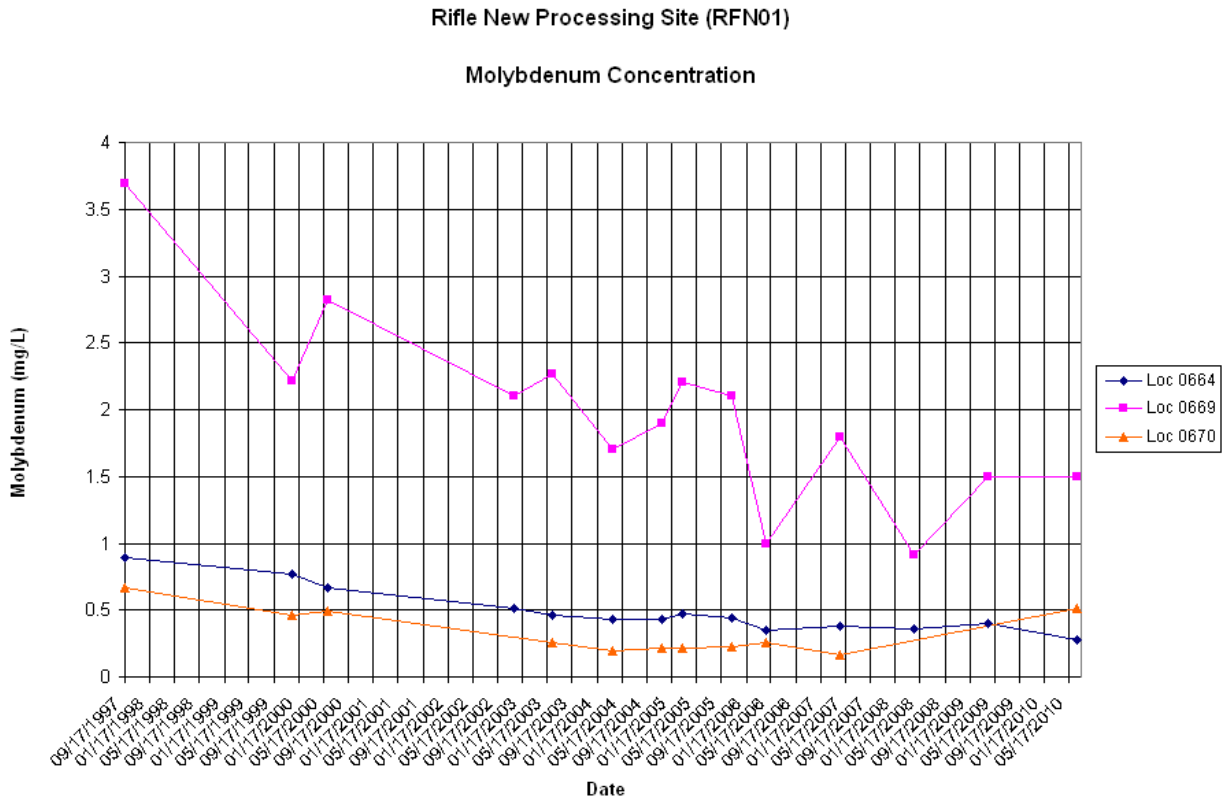
Molybdenum Concentration

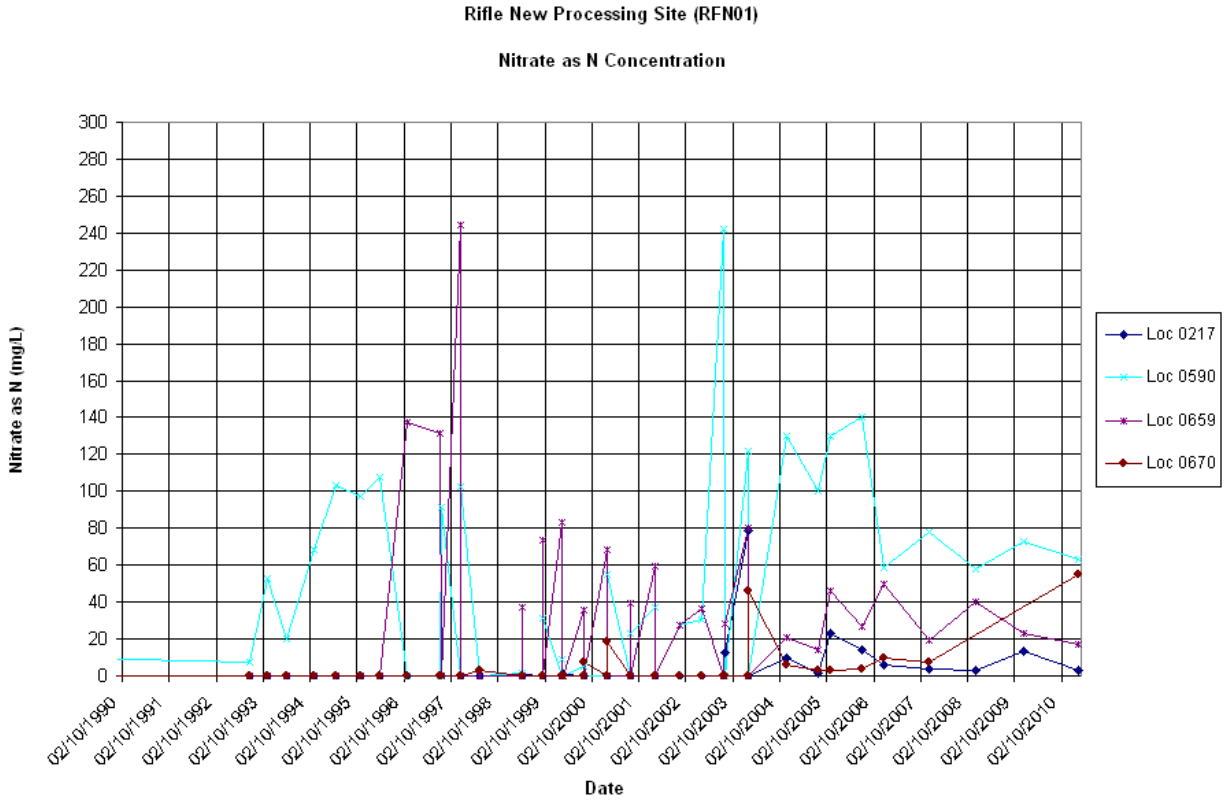


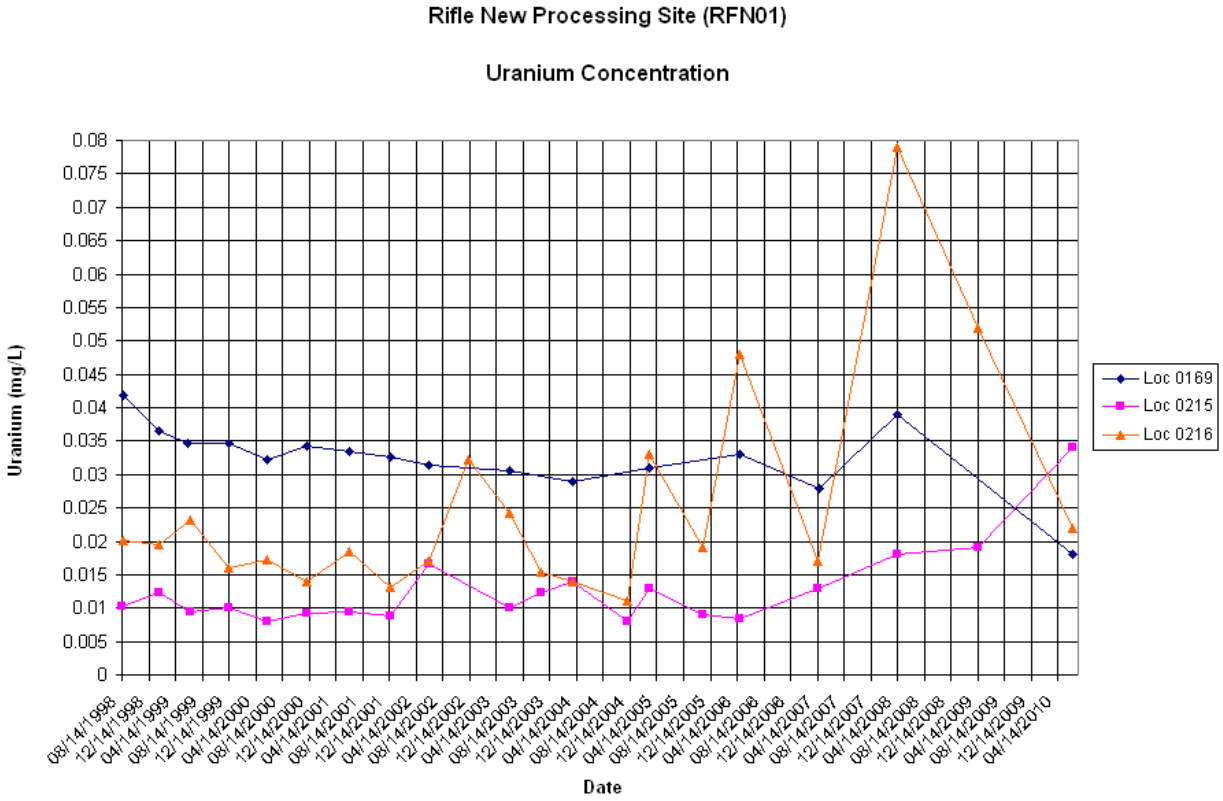
Rifle New Processing Site (RFN01)

Molybdenum Concentration




Rifle New Processing Site (RFN01)
Molybdenum Concentration
Molybdenum (mg/L)
Date
Loc 0664
Loc 0669
Loc 0670


Rifle New Processing Site (RFN01)
Nitrate as N Concentration
Nitrate as N (mg/L)
Date
Loc 0217
Loc 0590
Loc 0659
Loc 0670


Rifle New Processing Site (RFN01)
Uranium Concentration
Uranium (mg/L)
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
08/14/1998
12/14/1998
04/14/1999
08/14/1999
12/14/1999
04/14/2000
08/14/2000
12/14/2000
04/14/2001
08/14/2001
12/14/2001
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08/14/2007
12/14/2007
04/14/2008
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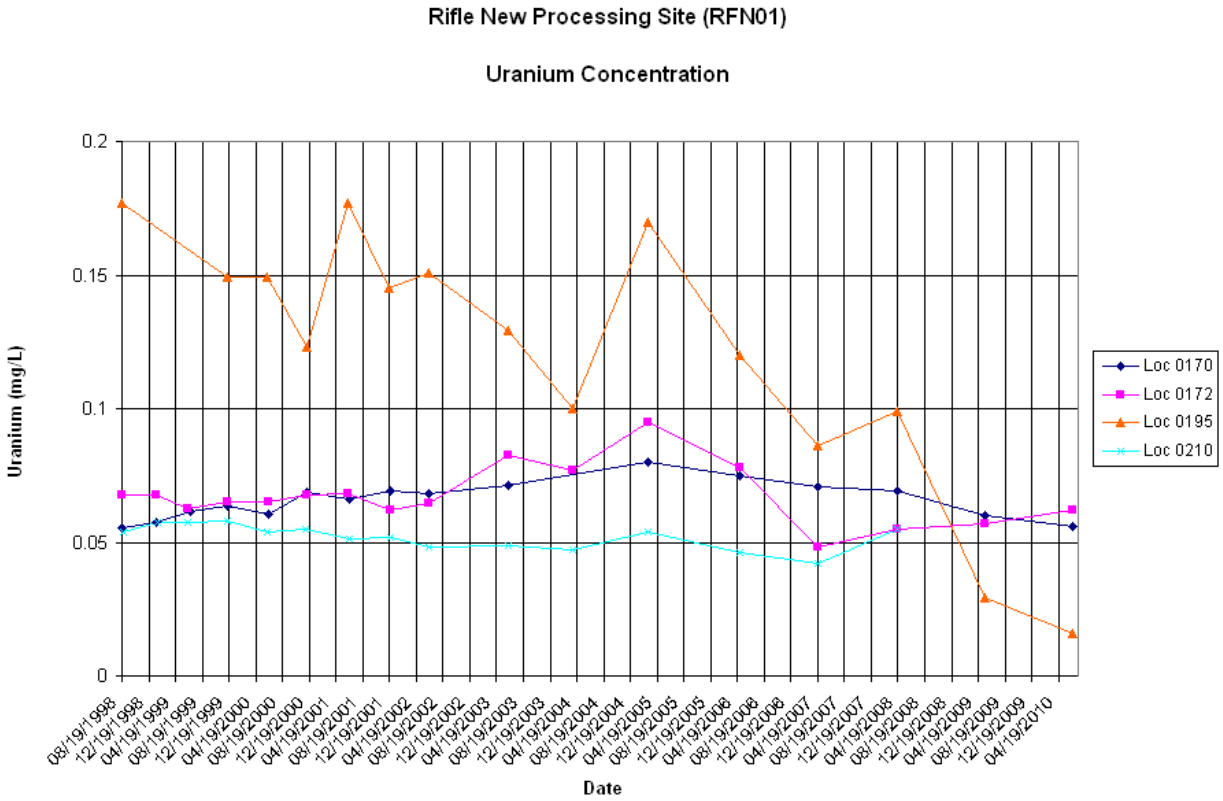
12/14/2009
04/14/2010
Date
Loc 0169
Loc 0215
Loc 0216


Rifle New Processing Site (RFN01)
Uranium Concentration
Uranium (mg/L)
0.2
0.15
0.1
0.05
0
08/19/1998
12/19/1998
04/19/1999
08/19/1999
12/19/1999
04/19/2000
08/19/2000
12/19/2000
04/19/2001
08/19/2001
12/19/2001
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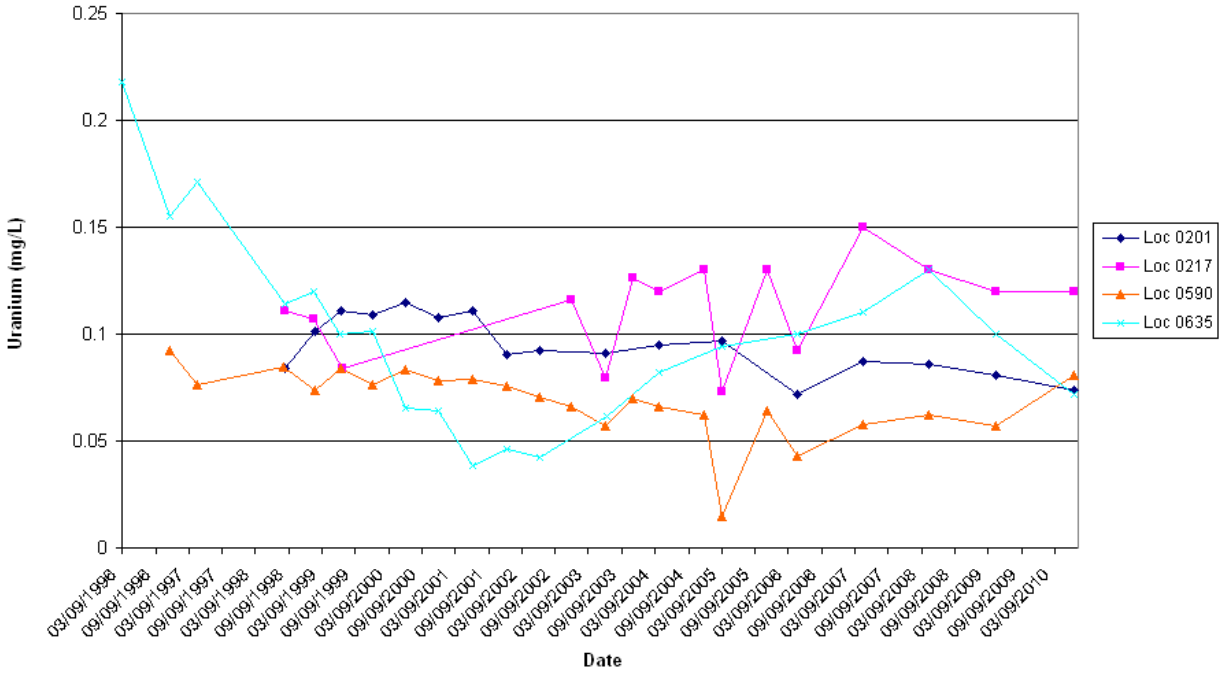
12/19/2006
04/19/2007
08/19/2007
12/19/2007
04/19/2008
08/19/2008
12/19/2008
04/19/2009
08/19/2009
12/19/2009
04/19/2010
Date
Loc 0170
Loc 0172
Loc 0195
Loc 0210

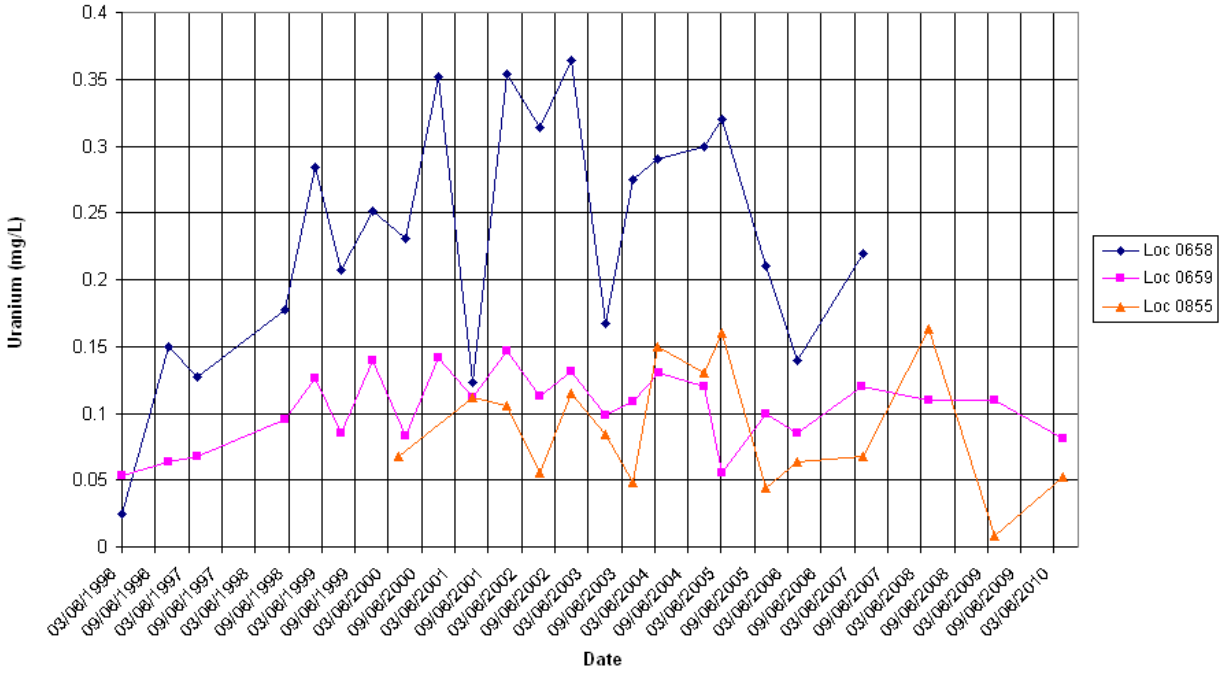
Rifle New Processing Site (RFN01)

Uranium Concentration



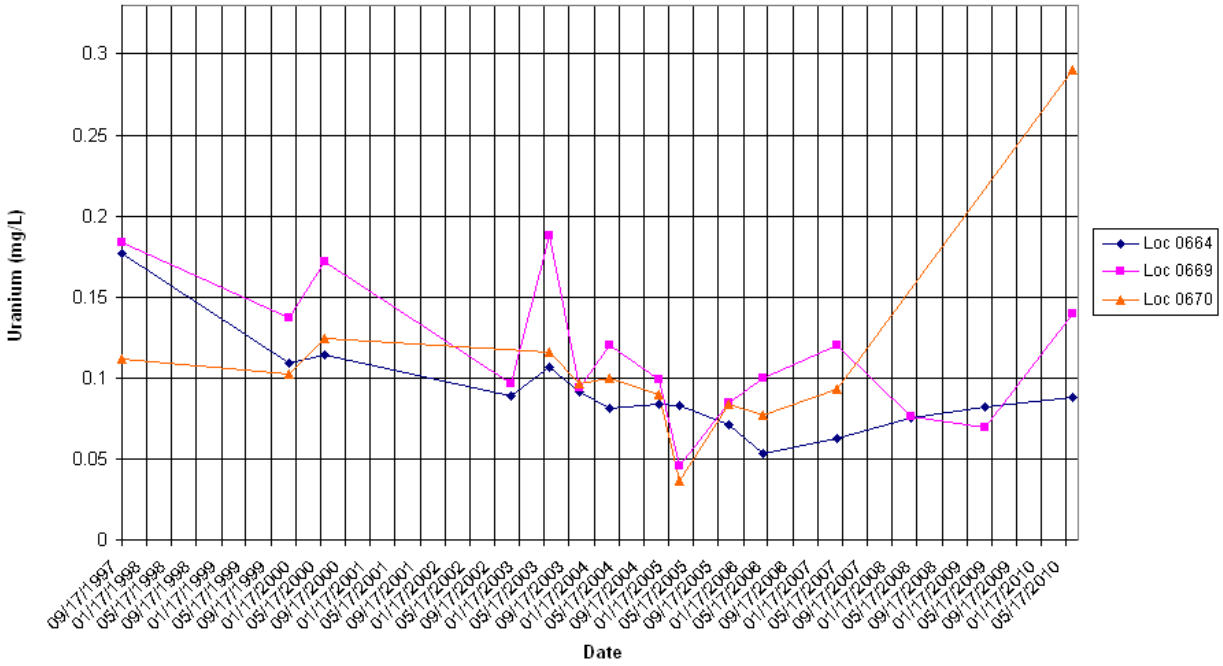
Rifle New Processing Site (RFN01)

Uranium Concentration



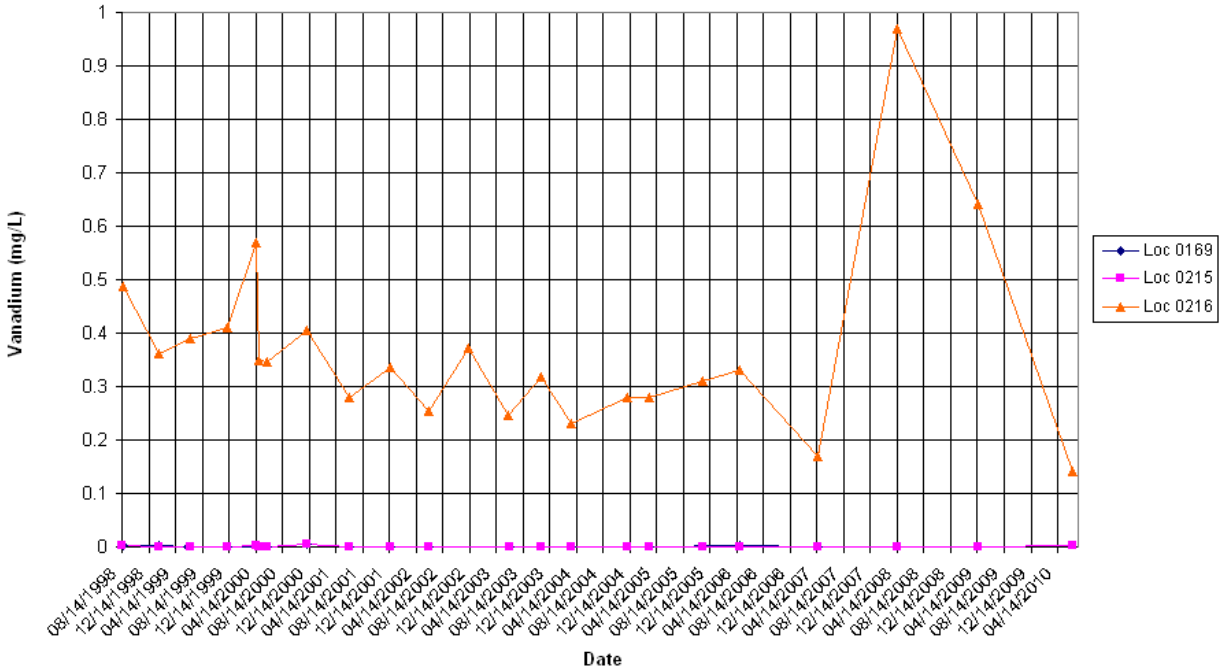
Rifle New Processing Site (RFN01)

Uranium Concentration



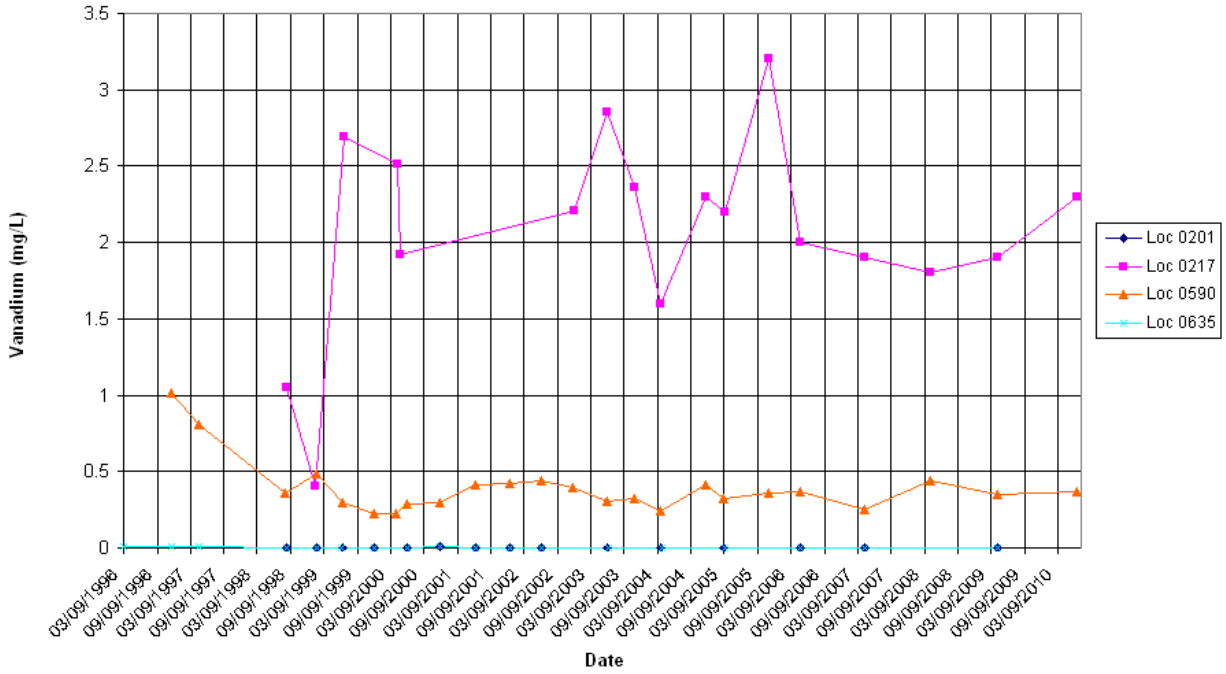
Rifle New Processing Site (RFN01)

Vanadium Concentration



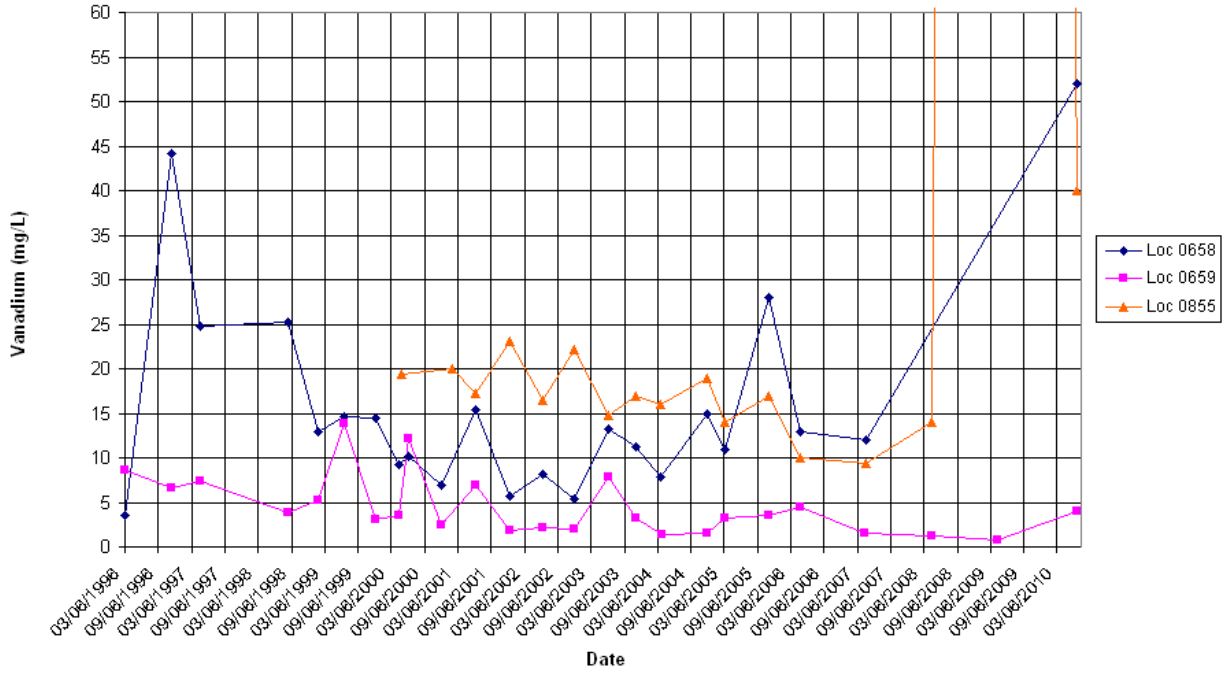
Rifle New Processing Site (RFN01)

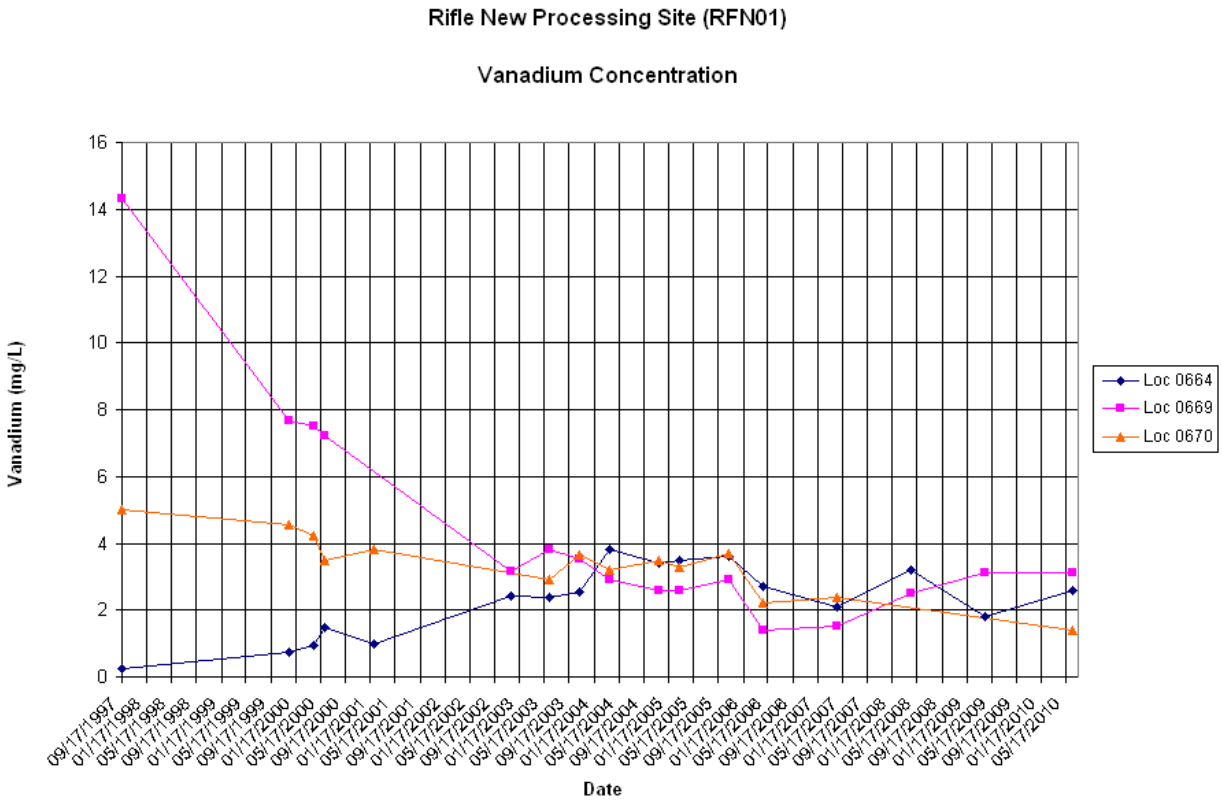
Vanadium Concentration



Rifle New Processing Site (RFN01)

Vanadium Concentration




Rifle New Processing Site (RFN01)
Vanadium Concentration
Vanadium (mg/L)
Date
Loc 0664
Loc 0669
Loc 0670

Appendix B

Application of the Mann-Kendall Test to the New Rifle Monitoring Data

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The Visual Sample Plan (VSP) computer module used for the trend analysis is the nonparametric Mann-Kendall test for trend (Gilbert 1987). In this procedure, missing values are allowed, and the data need not conform to any particular distribution. In this Mann-Kendall test, only the relative magnitudes of the data, rather than the measured values, are used.

A one-tailed test is used because it is desired to test the null hypothesis, H_O, of no trend against the alternative hypothesis, H_A, of a downward trend. If no trend is detected, then it is desired to test the null hypothesis, H_O, of no trend against the alternative hypothesis, H_A, of an upward trend.

Alpha (α) is often called the level of significance. It is also referred to as a Type I error. For α = .05, this would be a 5 percent probability of rejecting the null hypothesis when the null hypothesis is true (i.e., there is a 5 percent probability of concluding there is a trend when no trend is present). In table format, the Type I and Type II errors can be expressed as shown in Table B−1.

Table B−1. Type I and Type II Errors

	Hypothesis is correct	**Hypothesis is incorrect**
Hypothesis is accepted	Correct decision	Type II error (β)
Hypothesis is rejected	Type I error (α)	Correct decision

Table A18 (Gilbert 1987) gives probability values only for *n* less than or equal to 10. An extension of this table up to *n* = 40 is given in Table A.21 in Hollander and Wolfe (1973) and has been incorporated into the VSP.

The VSP module was used to analyze monitoring data collected from four wells at the New Rifle site. Results are based on data collected since surface remediation was completed in 1998. Data for both uranium and molybdenum were used in the analysis. Table B−2 summarizes the results. Molybdenum did not show a trend, either downward or upward, and any of the alpha significance levels.

Table B−2. Summary of Mann-Kendall Test Results for Selected Wells at the New Rifle Site

Location	**Uranium Trend**	**Alpha**	**Molybdenum Trend**	**Alpha**
RFN-0195	Down	5%	None	5%, 10%, or 15%
RFN-0201	Down	5%	Down	5%
RFN-0664	Down	5%	Down	5%
RFN-0669	Down	5%	Down	5%

References:

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

Hollander, M., and D.A. Wolfe, 1973. *Nonparametric Statistical Methods*, Wiley, New York.

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Appendix C

Groundwater and Surface Water Monitoring Results for 2010

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SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:40 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potential	mV	0294	11/23/2009	N001	175.3			#	-	-
	mV	0396	11/23/2009	N001	54.6			#	-	-
	mV	0398	11/23/2009	N001	95.3			#	-	-
	mV	0741	11/23/2009	N001	95.2			#	-	-
pH	s.u.	0294	11/23/2009	N001	8.30			#	-	-
	s.u.	0396	11/23/2009	N001	8.65			#	-	-
	s.u.	0398	11/23/2009	N001	8.19			#	-	-
	s.u.	0741	11/23/2009	N001	8.45			#	-	-
Selenium	mg/L	0294	11/23/2009	N001	0.0005			#	2.7E-05	-
	mg/L	0396	11/23/2009	N001	0.0005			#	2.7E-05	-
	mg/L	0398	11/23/2009	N001	0.0045			#	2.7E-05	-
	mg/L	0741	11/23/2009	N001	0.0005			#	2.7E-05	-
Specific Conductance	umhos/cm	0294	11/23/2009	N001	1060			#	-	-
	umhos/cm	0396	11/23/2009	N001	1083			#	-	-
	umhos/cm	0398	11/23/2009	N001	1688			#	-	-
	umhos/cm	0741	11/23/2009	N001	1053			#	-	-
Temperature	C	0294	11/23/2009	N001	3.35			#	-	-
	C	0396	11/23/2009	N001	3.42			#	-	-
	C	0398	11/23/2009	N001	8.23			#	-	-
	C	0741	11/23/2009	N001	3.12			#	-	-
Turbidity	NTU	0294	11/23/2009	N001	3.31			#	-	-
	NTU	0396	11/23/2009	N001	4.81			#	-	-
	NTU	0398	11/23/2009	N001	5.21			#	-	-
	NTU	0741	11/23/2009	N001	4.25			#	-	-
Uranium	mg/L	0294	11/23/2009	N001	0.0027			#	2.4E-06	-
	mg/L	0396	11/23/2009	N001	0.0026			#	2.4E-06	-
	mg/L	0398	11/23/2009	N001	0.023			#	2.4E-06	-
	mg/L	0741	11/23/2009	N001	0.0025			#	2.4E-06	-
Vanadium	mg/L	0294	11/23/2009	N001	0.0006			#	7.5E-05	-
	mg/L	0396	11/23/2009	N001	0.001			#	7.5E-05	-
	mg/L	0398	11/23/2009	N001	0.0045			#	7.5E-05	-
	mg/L	0741	11/23/2009	N001	0.0006			#	7.5E-05	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:40 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE800 WHERE site_code='RFO01' AND location_code in('0294','0395','0396','0398','0741') AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND cas in('ALKALINITY','ORP','PH','07782-49-2','EC','TMP','TURBIDITY','07440-61-1','07440-62-2') AND DATE_SAMPLED between #11/1/2009# and #11/30/2009#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

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

DATA QUALIFIERS:

F	Low flow sampling method used.
J	Estimated value.
N	Presumptive evidence that analyte is present. The analyte is "tentatively identified".
R	Unusable result.
X	Location is undefined.
G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.
Q	Qualitative result due to sampling technique
U	Parameter analyzed for but was not detected.

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

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:37 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3)	mg/L	0294	06/21/2010	0001	115			#	-	-
	mg/L	0395	06/23/2010	N001	355			#	-	-
	mg/L	0396	06/22/2010	0001	92			#	-	-
	mg/L	0398	06/22/2010	N001	235			#	-	-
	mg/L	0741	06/22/2010	0001	94			#	-	-
Oxidation Reduction Potential	mV	0294	06/21/2010	N001	116.1			#	-	-
	mV	0395	06/23/2010	N001	45.8			#	-	-
	mV	0396	06/22/2010	N001	-92.3			#	-	-
	mV	0398	06/22/2010	N001	138.0			#	-	-
	mV	0741	06/22/2010	N001	-91.0			#	-	-
pH	s.u.	0294	06/21/2010	N001	8.11			#	-	-
	s.u.	0395	06/23/2010	N001	8.26			#	-	-
	s.u.	0396	06/22/2010	N001	8.16			#	-	-
	s.u.	0398	06/22/2010	N001	8.19			#	-	-
	s.u.	0741	06/22/2010	N001	8.20			#	-	-
Selenium	mg/L	0294	06/21/2010	0001	0.0002			#	3.2E-05	-
	mg/L	0395	06/23/2010	N001	0.0032			#	3.2E-05	-
	mg/L	0396	06/22/2010	0001	0.0002			#	3.2E-05	-
	mg/L	0398	06/22/2010	N001	0.0024			#	3.2E-05	-
	mg/L	0741	06/22/2010	0001	0.0002			#	3.2E-05	-
Specific Conductance	umhos/cm	0294	06/21/2010	N001	349			#	-	-
	umhos/cm	0395	06/23/2010	N001	26			#	-	-
	umhos/cm	0396	06/22/2010	N001	362			#	-	-
	umhos/cm	0398	06/22/2010	N001	1435			#	-	-
	umhos/cm	0741	06/22/2010	N001	358			#	-	-
Temperature	C	0294	06/21/2010	N001	14.67			#	-	-
	C	0395	06/23/2010	N001	27.40			#	-	-
	C	0396	06/22/2010	N001	16.99			#	-	-
	C	0398	06/22/2010	N001	15.91			#	-	-
	C	0741	06/22/2010	N001	14.63			#	-	-
Turbidity	NTU	0294	06/21/2010	N001	18.9			#	-	-
	NTU	0395	06/23/2010	N001	4.91			#	-	-
	NTU	0396	06/22/2010	N001	17			#	-	-
	NTU	0398	06/22/2010	N001	4.37			#	-	-
	NTU	0741	06/22/2010	N001	17.0			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:37 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0294	06/21/2010	0001	0.0011			#	2.9E-06	-
	mg/L	0395	06/23/2010	N001	0.028			#	2.9E-06	-
	mg/L	0396	06/22/2010	0001	0.001			#	2.9E-06	-
	mg/L	0398	06/22/2010	N001	0.014			#	2.9E-06	-
	mg/L	0741	06/22/2010	0001	0.0009			#	2.9E-06	-
Vanadium	mg/L	0294	06/21/2010	0001	0.0005		J	#	1.5E-05	-
	mg/L	0395	06/23/2010	N001	0.0016			#	1.5E-05	-
	mg/L	0396	06/22/2010	0001	0.0006		J	#	1.5E-05	-
	mg/L	0398	06/22/2010	N001	0.0037			#	1.5E-05	-
	mg/L	0741	06/22/2010	0001	0.0005		J	#	1.5E-05	-

RECORDS: SELECTED FROM USEE800 WHERE site_code='RFO01' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND cas in('ALKALINITY','ORP','PH','07782-49-2','EC','TMP','TURBIDITY','07440-61-1','07440-62-2') AND DATE_SAMPLED >= #6/1/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

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

DATA QUALIFIERS:

- F Low flow sampling method used.
- G Possible grout contamination, pH > 9.
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- N Presumptive evidence that analyte is present. The analyte is "tentatively identified".
- Q Qualitative result due to sampling technique
- R Unusable result.
- U Parameter analyzed for but was not detected.
- X Location is undefined.

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

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:31 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	SAMPLE: ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potential	mV	0292A	WL	11/23/2009	N001	10.50 - 20.50	59.7		F	#	-	-
	mV	0304	WL	11/23/2009	N001	13.20 - 18.20	10.2		F	#	-	-
	mV	0305	WL	11/24/2009	N001	13.76 - 18.76	213.3		F	#	-	-
	mV	0309	WL	11/24/2009	N001	16.93 - 21.93	-17.4		F	#	-	-
	mV	0655	WL	11/24/2009	N001	13.60 - 23.60	61.9		F	#	-	-
	mV	0656	WL	11/23/2009	N001	6.35 - 21.35	123.8		F	#	-	-
	mV	0658	WL	11/23/2009	N001	2.30 - 17.30	161.9		F	#	-	-
pH	s.u.	0292A	WL	11/23/2009	N001	10.50 - 20.50	7.07		F	#	-	-
	s.u.	0304	WL	11/23/2009	N001	13.20 - 18.20	7.28		F	#	-	-
	s.u.	0305	WL	11/24/2009	N001	13.76 - 18.76	7.29		F	#	-	-
	s.u.	0309	WL	11/24/2009	N001	16.93 - 21.93	7.09		F	#	-	-
	s.u.	0310	WL	11/24/2009	N001	17.93 - 22.93	7.17		F	#	-	-
	s.u.	0655	WL	11/24/2009	N001	13.60 - 23.60	7.00		F	#	-	-
	s.u.	0656	WL	11/23/2009	N001	6.35 - 21.35	7.12		F	#	-	-
	s.u.	0658	WL	11/23/2009	N001	2.30 - 17.30	6.99		F	#	-	-
Selenium	mg/L	0292A	WL	11/23/2009	N001	10.50 - 20.50	0.00024		F	#	2.7E-05	-
	mg/L	0304	WL	11/23/2009	N001	13.20 - 18.20	0.0025		F	#	2.7E-05	-
	mg/L	0305	WL	11/24/2009	N001	13.76 - 18.76	0.026		F	#	0.00013	-
	mg/L	0309	WL	11/24/2009	N001	16.93 - 21.93	0.00011		UF	#	2.7E-05	-
	mg/L	0310	WL	11/24/2009	N001	17.93 - 22.93	0.00037		F	#	2.7E-05	-
	mg/L	0655	WL	11/24/2009	N001	13.60 - 23.60	0.027		F	#	0.00013	-
	mg/L	0656	WL	11/23/2009	N001	6.35 - 21.35	0.0014		F	#	2.7E-05	-
	mg/L	0656	WL	11/23/2009	N002	6.35 - 21.35	0.0014		F	#	2.7E-05	-
	mg/L	0658	WL	11/23/2009	N001	2.30 - 17.30	0.0019		F	#	2.7E-05	-
Specific Conductance	umhos/cm	0292A	WL	11/23/2009	N001	10.50 - 20.50	2356		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:31 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	SAMPLE: ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0304	WL	11/23/2009	N001	13.20 - 18.20	1877		F	#	-	-
	umhos/cm	0305	WL	11/24/2009	N001	13.76 - 18.76	1902		F	#	-	-
	umhos/cm	0309	WL	11/24/2009	N001	16.93 - 21.93	2297		F	#	-	-
	umhos/cm	0310	WL	11/24/2009	N001	17.93 - 22.93	2895		F	#	-	-
	umhos/cm	0655	WL	11/24/2009	N001	13.60 - 23.60	2479		F	#	-	-
	umhos/cm	0656	WL	11/23/2009	N001	6.35 - 21.35	1908		F	#	-	-
	umhos/cm	0658	WL	11/23/2009	N001	2.30 - 17.30	1682		F	#	-	-
Temperature	C	0292A	WL	11/23/2009	N001	10.50 - 20.50	13.27		F	#	-	-
	C	0304	WL	11/23/2009	N001	13.20 - 18.20	12.98		F	#	-	-
	C	0305	WL	11/24/2009	N001	13.76 - 18.76	13.23		F	#	-	-
	C	0309	WL	11/24/2009	N001	16.93 - 21.93	14.39		F	#	-	-
	C	0310	WL	11/24/2009	N001	17.93 - 22.93	13.67		F	#	-	-
	C	0655	WL	11/24/2009	N001	13.60 - 23.60	13.63		F	#	-	-
	C	0656	WL	11/23/2009	N001	6.35 - 21.35	15.38		F	#	-	-
	C	0658	WL	11/23/2009	N001	2.30 - 17.30	9.65		F	#	-	-
Turbidity	NTU	0292A	WL	11/23/2009	N001	10.50 - 20.50	8.81		F	#	-	-
	NTU	0304	WL	11/23/2009	N001	13.20 - 18.20	9.72		F	#	-	-
	NTU	0305	WL	11/24/2009	N001	13.76 - 18.76	7.24		F	#	-	-
	NTU	0309	WL	11/24/2009	N001	16.93 - 21.93	5.58		F	#	-	-
	NTU	0310	WL	11/24/2009	N001	17.93 - 22.93	7.35		F	#	-	-
	NTU	0655	WL	11/24/2009	N001	13.60 - 23.60	2.40		F	#	-	-
	NTU	0656	WL	11/23/2009	N001	6.35 - 21.35	2.80		F	#	-	-
	NTU	0658	WL	11/23/2009	N001	2.30 - 17.30	4.61		F	#	-	-
Uranium	mg/L	0292A	WL	11/23/2009	N001	10.50 - 20.50	0.030		F	#	2.4E-06	-
	mg/L	0304	WL	11/23/2009	N001	13.20 - 18.20	0.052		F	#	2.4E-06	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:31 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	SAMPLE: ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0305	WL	11/24/2009	N001	13.76 - 18.76	0.088		F	#	1.2E-05	-
	mg/L	0309	WL	11/24/2009	N001	16.93 - 21.93	0.017		F	#	2.4E-06	-
	mg/L	0310	WL	11/24/2009	N001	17.93 - 22.93	0.200		F	#	1.2E-05	-
	mg/L	0655	WL	11/24/2009	N001	13.60 - 23.60	0.110		F	#	1.2E-05	-
	mg/L	0656	WL	11/23/2009	N001	6.35 - 21.35	0.140		F	#	1.2E-05	-
	mg/L	0656	WL	11/23/2009	N002	6.35 - 21.35	0.140		F	#	1.2E-05	-
	mg/L	0658	WL	11/23/2009	N001	2.30 - 17.30	0.018		F	#	2.4E-06	-
Vanadium	mg/L	0292A	WL	11/23/2009	N001	10.50 - 20.50	0.00054		F	#	7.5E-05	-
	mg/L	0304	WL	11/23/2009	N001	13.20 - 18.20	0.037		F	#	0.00025	-
	mg/L	0305	WL	11/24/2009	N001	13.76 - 18.76	0.580		F	#	0.0025	-
	mg/L	0309	WL	11/24/2009	N001	16.93 - 21.93	0.00019	B	F	#	7.5E-05	-
	mg/L	0310	WL	11/24/2009	N001	17.93 - 22.93	0.012		F	#	7.5E-05	-
	mg/L	0655	WL	11/24/2009	N001	13.60 - 23.60	0.340		F	#	0.0025	-
	mg/L	0656	WL	11/23/2009	N001	6.35 - 21.35	0.031		F	#	0.00025	-
	mg/L	0656	WL	11/23/2009	N002	6.35 - 21.35	0.031		F	#	0.00025	-
	mg/L	0658	WL	11/23/2009	N001	2.30 - 17.30	0.00098		F	#	7.5E-05	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:31 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE200 WHERE site_code='RFO01' AND location_code in('0292A','0304','0305','0309','0310','0655','0656','0658') AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED between #11/1/2009# and #12/1/2009#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LAB QUALIFIERS:

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

DATA QUALIFIERS:

F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	N	Presumptive evidence that analyte is present. The analyte is "tentatively identified".	Q	Qualitative result due to sampling technique
R	Unusable result.	U	Parameter analyzed for but was not detected.	X	Location is undefined.

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

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:36 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3)	mg/L	0292A	WL	06/21/2010	N001	10.50 - 20.50	503		F	#	-	-
	mg/L	0304	WL	06/23/2010	N001	13.20 - 18.20	261		F	#	-	-
	mg/L	0305	WL	06/23/2010	N001	13.76 - 18.76	338		F	#	-	-
	mg/L	0309	WL	06/22/2010	N001	16.93 - 21.93	384		F	#	-	-
	mg/L	0310	WL	06/22/2010	N001	17.93 - 22.93	467		F	#	-	-
	mg/L	0655	WL	06/23/2010	N001	13.60 - 23.60	421		F	#	-	-
	mg/L	0656	WL	06/22/2010	N001	6.35 - 21.35	360		F	#	-	-
	mg/L	0658	WL	06/21/2010	N001	2.30 - 17.30	420		F	#	-	-
Oxidation Reduction Potential	mV	0292A	WL	06/21/2010	N001	10.50 - 20.50	126.8		F	#	-	-
	mV	0304	WL	06/23/2010	N001	13.20 - 18.20	108.6		F	#	-	-
	mV	0305	WL	06/23/2010	N001	13.76 - 18.76	92.6		F	#	-	-
	mV	0309	WL	06/22/2010	N001	16.93 - 21.93	-17.2		F	#	-	-
	mV	0310	WL	06/22/2010	N001	17.93 - 22.93	-14.5		F	#	-	-
	mV	0655	WL	06/23/2010	N001	13.60 - 23.60	73.0		F	#	-	-
	mV	0656	WL	06/22/2010	N001	6.35 - 21.35	176.7		F	#	-	-
	mV	0658	WL	06/21/2010	N001	2.30 - 17.30	122.4		F	#	-	-
pH	s.u.	0292A	WL	06/21/2010	N001	10.50 - 20.50	7.02		F	#	-	-
	s.u.	0304	WL	06/23/2010	N001	13.20 - 18.20	7.20		F	#	-	-
	s.u.	0305	WL	06/23/2010	N001	13.76 - 18.76	7.32		F	#	-	-
	s.u.	0309	WL	06/22/2010	N001	16.93 - 21.93	7.40		F	#	-	-
	s.u.	0310	WL	06/22/2010	N001	17.93 - 22.93	7.26		F	#	-	-
	s.u.	0655	WL	06/23/2010	N001	13.60 - 23.60	7.13		F	#	-	-
	s.u.	0656	WL	06/22/2010	N001	6.35 - 21.35	7.10		F	#	-	-
	s.u.	0658	WL	06/21/2010	N001	2.30 - 17.30	7.05		F	#	-	-
Selenium	mg/L	0292A	WL	06/21/2010	N001	10.50 - 20.50	0.00038		F	#	3.2E-05	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:36 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Selenium	mg/L	0304	WL	06/23/2010	N001	13.20 - 18.20	0.0021		F	#	3.2E-05	-
	mg/L	0305	WL	06/23/2010	N001	13.76 - 18.76	0.025		F	#	3.2E-05	-
	mg/L	0309	WL	06/22/2010	N001	16.93 - 21.93	0.00021		F	#	3.2E-05	-
	mg/L	0310	WL	06/22/2010	N001	17.93 - 22.93	0.00054		F	#	3.2E-05	-
	mg/L	0655	WL	06/23/2010	N001	13.60 - 23.60	0.064		F	#	0.00032	-
	mg/L	0656	WL	06/22/2010	N001	6.35 - 21.35	0.0036		F	#	3.2E-05	-
	mg/L	0658	WL	06/21/2010	N001	2.30 - 17.30	0.0062		F	#	3.2E-05	-
Specific Conductance	umhos/cm	0292A	WL	06/21/2010	N001	10.50 - 20.50	2322		F	#	-	-
	umhos/cm	0304	WL	06/23/2010	N001	13.20 - 18.20	2131		F	#	-	-
	umhos/cm	0305	WL	06/23/2010	N001	13.76 - 18.76	2577		F	#	-	-
	umhos/cm	0309	WL	06/22/2010	N001	16.93 - 21.93	2405		F	#	-	-
	umhos/cm	0310	WL	06/22/2010	N001	17.93 - 22.93	2947		F	#	-	-
	umhos/cm	0655	WL	06/23/2010	N001	13.60 - 23.60	2741		F	#	-	-
	umhos/cm	0656	WL	06/22/2010	N001	6.35 - 21.35	2029		F	#	-	-
	umhos/cm	0658	WL	06/21/2010	N001	2.30 - 17.30	1668		F	#	-	-
Temperature	C	0292A	WL	06/21/2010	N001	10.50 - 20.50	12.96		F	#	-	-
	C	0304	WL	06/23/2010	N001	13.20 - 18.20	12.59		F	#	-	-
	C	0305	WL	06/23/2010	N001	13.76 - 18.76	12.01		F	#	-	-
	C	0309	WL	06/22/2010	N001	16.93 - 21.93	19.11		F	#	-	-
	C	0310	WL	06/22/2010	N001	17.93 - 22.93	14.79		F	#	-	-
	C	0655	WL	06/23/2010	N001	13.60 - 23.60	12.94		F	#	-	-
	C	0656	WL	06/22/2010	N001	6.35 - 21.35	14.85		F	#	-	-
	C	0658	WL	06/21/2010	N001	2.30 - 17.30	11.43		F	#	-	-
Turbidity	NTU	0292A	WL	06/21/2010	N001	10.50 - 20.50	3.07		F	#	-	-
	NTU	0304	WL	06/23/2010	N001	13.20 - 18.20	1.92		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:36 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0305	WL	06/23/2010	N001	13.76 - 18.76	1.21		F	#	-	-
	NTU	0309	WL	06/22/2010	N001	16.93 - 21.93	3.27		F	#	-	-
	NTU	0310	WL	06/22/2010	N001	17.93 - 22.93	3.24		F	#	-	-
	NTU	0655	WL	06/23/2010	N001	13.60 - 23.60	0.79		F	#	-	-
	NTU	0656	WL	06/22/2010	N001	6.35 - 21.35	1.0		F	#	-	-
	NTU	0658	WL	06/21/2010	N001	2.30 - 17.30	1.79		F	#	-	-
Uranium	mg/L	0292A	WL	06/21/2010	N001	10.50 - 20.50	0.029		F	#	2.9E-06	-
	mg/L	0304	WL	06/23/2010	N001	13.20 - 18.20	0.046		F	#	2.9E-06	-
	mg/L	0305	WL	06/23/2010	N001	13.76 - 18.76	0.080		F	#	2.9E-06	-
	mg/L	0309	WL	06/22/2010	N001	16.93 - 21.93	0.020		F	#	2.9E-06	-
	mg/L	0310	WL	06/22/2010	N001	17.93 - 22.93	0.180		F	#	2.9E-05	-
	mg/L	0655	WL	06/23/2010	N001	13.60 - 23.60	0.130		F	#	2.9E-05	-
	mg/L	0656	WL	06/22/2010	N001	6.35 - 21.35	0.170		F	#	2.9E-06	-
	mg/L	0658	WL	06/21/2010	N001	2.30 - 17.30	0.018		F	#	2.9E-06	-
Vanadium	mg/L	0292A	WL	06/21/2010	N001	10.50 - 20.50	0.00039		F	#	1.5E-05	-
	mg/L	0304	WL	06/23/2010	N001	13.20 - 18.20	0.025		F	#	1.5E-05	-
	mg/L	0305	WL	06/23/2010	N001	13.76 - 18.76	0.340		F	#	1.5E-05	-
	mg/L	0309	WL	06/22/2010	N001	16.93 - 21.93	0.00059		F	#	1.5E-05	-
	mg/L	0310	WL	06/22/2010	N001	17.93 - 22.93	0.012		F	#	0.00015	-
	mg/L	0655	WL	06/23/2010	N001	13.60 - 23.60	0.400		F	#	0.00015	-
	mg/L	0656	WL	06/22/2010	N001	6.35 - 21.35	0.032		F	#	1.5E-05	-
	mg/L	0658	WL	06/21/2010	N001	2.30 - 17.30	0.0013		F	#	1.5E-05	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFO01, Rifle Old Processing Site
REPORT DATE: 9/13/2010 11:36 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE200 WHERE site_code='RFO01' AND location_code in('0292A','0304','0305','0309','0310','0655','0656','0658') AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND cas in('ALKALINITY','ORP','PH','07782-49-2','EC','TMP','TURBIDITY','07440-61-1','07440-62-2') AND DATE_SAMPLED >= #6/1/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LAB QUALIFIERS:

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

DATA QUALIFIERS:

F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	N	Presumptive evidence that analyte is present. The analyte is "tentatively identified".	Q	Qualitative result due to sampling technique
R	Unusable result.	U	Parameter analyzed for but was not detected.	X	Location is undefined.

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

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:24 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3)	mg/L	0320	06/22/2010	N001	303			#	-	-
	mg/L	0322	06/22/2010	N001	70			#	-	-
	mg/L	0323	06/22/2010	N001	145			#	-	-
	mg/L	0324	06/24/2010	0001	120			#	-	-
	mg/L	0452	06/22/2010	N001	265			#	-	-
	mg/L	0453	06/22/2010	0001	160			#	-	-
	mg/L	0575	06/22/2010	N001	132			#	-	-
Ammonia Total as N	mg/L	0320	06/22/2010	N001	10		J	#	0.5	-
	mg/L	0322	06/22/2010	0001	0.1	U	J	#	0.1	-
	mg/L	0323	06/22/2010	N001	26		J	#	1	-
	mg/L	0324	06/24/2010	0001	0.1	U	J	#	0.1	-
	mg/L	0452	06/22/2010	N001	21		J	#	1	-
	mg/L	0453	06/22/2010	0001	30		J	#	2	-
	mg/L	0575	06/22/2010	N001	0.1	U	J	#	0.1	-
Molybdenum	mg/L	0320	06/22/2010	N001	1.900			#	0.0016	-
	mg/L	0322	06/22/2010	0001	0.0031			#	9.6E-05	-
	mg/L	0323	06/22/2010	N001	2.500			#	0.0016	-
	mg/L	0324	06/24/2010	0001	0.0032			#	9.6E-05	-
	mg/L	0452	06/22/2010	N001	2.800			#	0.0032	-
	mg/L	0453	06/22/2010	0001	2.700			#	0.00032	-
	mg/L	0575	06/22/2010	N001	0.035			#	9.6E-05	-
Nitrate + Nitrite as Nitrogen	mg/L	0320	06/22/2010	N001	36			#	0.2	-
	mg/L	0322	06/22/2010	0001	0.13			#	0.01	-
	mg/L	0323	06/22/2010	N001	91			#	0.5	-
	mg/L	0324	06/24/2010	0001	0.1			#	0.01	-
	mg/L	0452	06/22/2010	N001	30			#	0.2	-
	mg/L	0453	06/22/2010	0001	28			#	0.2	-
	mg/L	0575	06/22/2010	N001	0.011			#	0.01	-
Oxidation Reduction Potential	mV	0320	06/22/2010	N001	225.1			#	-	-
	mV	0322	06/22/2010	N001	-103.1			#	-	-
	mV	0323	06/22/2010	N001	130.3			#	-	-
	mV	0324	06/24/2010	N001	-8.2			#	-	-
	mV	0452	06/22/2010	N001	220.3			#	-	-
	mV	0453	06/22/2010	N001	230.0			#	-	-
	mV	0575	06/22/2010	N001	113.6			#	-	-
pH	s.u.	0320	06/22/2010	N001	8.09			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:24 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
pH	s.u.	0322	06/22/2010	N001	8.04			#	-	-
	s.u.	0323	06/22/2010	N001	7.99			#	-	-
	s.u.	0324	06/24/2010	N001	8.21			#	-	-
	s.u.	0452	06/22/2010	N001	7.80			#	-	-
	s.u.	0453	06/22/2010	N001	7.54			#	-	-
	s.u.	0575	06/22/2010	N001	8.58			#	-	-
Specific Conductance	umhos/cm	0320	06/22/2010	N001	6969			#	-	-
	umhos/cm	0322	06/22/2010	N001	418			#	-	-
	umhos/cm	0323	06/22/2010	N001	8981			#	-	-
	umhos/cm	0324	06/24/2010	N001	406			#	-	-
	umhos/cm	0452	06/22/2010	N001	5679			#	-	-
	umhos/cm	0453	06/22/2010	N001	5164			#	-	-
	umhos/cm	0575	06/22/2010	N001	1575			#	-	-
Temperature	C	0320	06/22/2010	N001	23.10			#	-	-
	C	0322	06/22/2010	N001	18.96			#	-	-
	C	0323	06/22/2010	N001	21.72			#	-	-
	C	0324	06/24/2010	N001	17.41			#	-	-
	C	0452	06/22/2010	N001	24.41			#	-	-
	C	0453	06/22/2010	N001	23.26			#	-	-
	C	0575	06/22/2010	N001	22.16			#	-	-
Turbidity	NTU	0320	06/22/2010	N001	3.97			#	-	-
	NTU	0322	06/22/2010	N001	15.7			#	-	-
	NTU	0323	06/22/2010	N001	2.76			#	-	-
	NTU	0324	06/24/2010	N001	13.7			#	-	-
	NTU	0452	06/22/2010	N001	7.71			#	-	-
	NTU	0453	06/22/2010	N001	10.2			#	-	-
	NTU	0575	06/22/2010	N001	5.01			#	-	-
Uranium	mg/L	0320	06/22/2010	N001	0.210			#	0.00015	-
	mg/L	0322	06/22/2010	0001	0.0009			#	8.8E-06	-
	mg/L	0323	06/22/2010	N001	0.290			#	0.00015	-
	mg/L	0324	06/24/2010	0001	0.001			#	8.8E-06	-
	mg/L	0452	06/22/2010	N001	0.200			#	0.00029	-
	mg/L	0453	06/22/2010	0001	0.210			#	2.9E-05	-
	mg/L	0575	06/22/2010	N001	0.017			#	8.8E-06	-
Vanadium	mg/L	0320	06/22/2010	N001	0.220			#	0.00076	-
	mg/L	0322	06/22/2010	0001	0.0008		J	#	4.6E-05	-
	mg/L	0323	06/22/2010	N001	0.0043			#	4.6E-05	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:24 am

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Vanadium	mg/L	0324	06/24/2010	0001	0.0007		J	#	4.6E-05	-
	mg/L	0452	06/22/2010	N001	1.300			#	0.0015	-
	mg/L	0453	06/22/2010	0001	1.400			#	0.00015	-
	mg/L	0575	06/22/2010	N001	0.0032			#	4.6E-05	-

RECORDS: SELECTED FROM USEE800 WHERE site_code='RFN01' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED >= #1/1/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

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

DATA QUALIFIERS:

- F Low flow sampling method used.
- G Possible grout contamination, pH > 9.
- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- N Presumptive evidence that analyte is present. The analyte is "tentatively identified".
- Q Qualitative result due to sampling technique
- R Unusable result.
- U Parameter analyzed for but was not detected.
- X Location is undefined.

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

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GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3)	mg/L	0169	WL	06/24/2010	N001	3.13 - 18.13	540		F	#	-	-
	mg/L	0170	WL	06/24/2010	N001	92.23 - 112.23	502		F	#	-	-
	mg/L	0172	WL	06/24/2010	N001	6.98 - 31.98	768		F	#	-	-
	mg/L	0195	WL	06/22/2010	N001	5.29 - 25.29	407		F	#	-	-
	mg/L	0201	WL	06/22/2010	N001	7.35 - 22.35	248		F	#	-	-
	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	260		F	#	-	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	200		F	#	-	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	189		F	#	-	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	287		F	#	-	-
	mg/L	0620	WL	06/24/2010	N001	6.70 - 10.70	517		F	#	-	-
	mg/L	0635	WL	06/24/2010	N001	12.00 - 17.00	297		F	#	-	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	308		F	#	-	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	182		F	#	-	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	489		F	#	-	-
	mg/L	0669	WL	06/23/2010	N001	4.00 - 10.60	327		FQ	#	-	-
	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	421		FQ	#	-	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	230		F	#	-	-
Ammonia Total as N	mg/L	0169	WL	06/24/2010	N001	3.13 - 18.13	0.1	UN	FJ	#	0.1	-
	mg/L	0170	WL	06/24/2010	N001	92.23 - 112.23	0.1	U	FJ	#	0.1	-
	mg/L	0172	WL	06/24/2010	N001	6.98 - 31.98	0.1	U	FJ	#	0.1	-
	mg/L	0195	WL	06/22/2010	N001	5.29 - 25.29	0.97		FJ	#	0.1	-
	mg/L	0201	WL	06/22/2010	N001	7.35 - 22.35	110		FJ	#	5	-
	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	3.4		FJ	#	0.1	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	7		FJ	#	0.2	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	53		FJ	#	2	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	190		FJ	#	20	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	0620	WL	06/24/2010	N001	6.70 - 10.70	0.1	U	FJ	#	0.1	-
	mg/L	0635	WL	06/24/2010	N001	12.00 - 17.00	99		FJ	#	5	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	48		FJ	#	5	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	35		FJ	#	1	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	38		FJ	#	1	-
	mg/L	0664	WL	06/23/2010	N002	7.70 - 14.70	37		FJ	#	1	-
	mg/L	0669	WL	06/23/2010	0001	4.00 - 10.60	110		FQJ	#	5	-
	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	1.9		FQJ	#	0.1	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	40		FJ	#	1	-
Dissolved Oxygen	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	0.00		FQ	#	-	-
Molybdenum	mg/L	0169	WL	06/24/2010	N001	3.13 - 18.13	0.004		F	#	0.00032	-
	mg/L	0170	WL	06/24/2010	N001	92.23 - 112.23	0.0033		F	#	0.00032	-
	mg/L	0172	WL	06/24/2010	N001	6.98 - 31.98	0.0052		F	#	0.00032	-
	mg/L	0195	WL	06/22/2010	N001	5.29 - 25.29	0.035		F	#	0.00032	-
	mg/L	0201	WL	06/22/2010	N001	7.35 - 22.35	1.800		F	#	0.0032	-
	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	0.013		F	#	9.6E-05	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	0.055		F	#	0.00032	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	1.600		F	#	0.0032	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	1.000		F	#	0.00032	-
	mg/L	0620	WL	06/24/2010	N001	6.70 - 10.70	0.010		F	#	0.00032	-
	mg/L	0635	WL	06/24/2010	N001	12.00 - 17.00	0.400		F	#	0.00032	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	2.200		F	#	0.0064	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	2.200		F	#	0.0032	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	0.280		F	#	0.0032	-
	mg/L	0664	WL	06/23/2010	N002	7.70 - 14.70	0.270		F	#	0.0032	-
	mg/L	0669	WL	06/23/2010	0001	4.00 - 10.60	1.500		FQ	#	0.0032	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Molybdenum	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	0.510		FQ	#	0.0032	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	1.800		F	#	0.032	-
Nitrate + Nitrite as Nitrogen	mg/L	0169	WL	06/24/2010	N001	3.13 - 18.13	0.01	U	F	#	0.01	-
	mg/L	0170	WL	06/24/2010	N001	92.23 - 112.23	17		F	#	0.1	-
	mg/L	0172	WL	06/24/2010	N001	6.98 - 31.98	0.012		F	#	0.01	-
	mg/L	0195	WL	06/22/2010	N001	5.29 - 25.29	0.01	U	F	#	0.01	-
	mg/L	0201	WL	06/22/2010	N001	7.35 - 22.35	52		F	#	0.5	-
	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	0.027		F	#	0.01	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	0.01	U	F	#	0.01	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	2.9		F	#	0.05	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	63		F	#	0.5	-
	mg/L	0620	WL	06/24/2010	N001	6.70 - 10.70	28		F	#	0.2	-
	mg/L	0635	WL	06/24/2010	N001	12.00 - 17.00	10		F	#	0.1	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	23		F	#	0.2	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	17		F	#	0.1	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	15		F	#	0.1	-
	mg/L	0664	WL	06/23/2010	N002	7.70 - 14.70	15		F	#	0.1	-
	mg/L	0669	WL	06/23/2010	0001	4.00 - 10.60	8.9		FQ	#	0.05	-
	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	55		FQ	#	0.5	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	15		F	#	0.1	-
Oxidation Reduction Potential	mV	0169	WL	06/24/2010	N001	3.13 - 18.13	-19.8		F	#	-	-
	mV	0170	WL	06/24/2010	N001	92.23 - 112.23	14.5		F	#	-	-
	mV	0172	WL	06/24/2010	N001	6.98 - 31.98	-44.5		F	#	-	-
	mV	0195	WL	06/22/2010	N001	5.29 - 25.29	-36.5		F	#	-	-
	mV	0201	WL	06/22/2010	N001	7.35 - 22.35	232.7		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potential	mV	0215	WL	06/24/2010	N001	6.84 - 21.84	-64.5		F	#	-	-
	mV	0216	WL	06/24/2010	N001	5.50 - 20.50	-49.8		F	#	-	-
	mV	0217	WL	06/22/2010	N001	7.40 - 22.40	220.2		F	#	-	-
	mV	0590	WL	06/22/2010	N001	5.21 - 19.21	238.4		F	#	-	-
	mV	0620	WL	06/24/2010	N001	6.70 - 10.70	28.0		F	#	-	-
	mV	0635	WL	06/24/2010	N001	12.00 - 17.00	124.9		F	#	-	-
	mV	0658	WL	06/23/2010	N001	0.50 - 5.50	154.5		F	#	-	-
	mV	0659	WL	06/23/2010	N001	0.50 - 10.50	153.9		F	#	-	-
	mV	0664	WL	06/23/2010	N001	7.70 - 14.70	142.9		F	#	-	-
	mV	0669	WL	06/23/2010	N001	4.00 - 10.60	166.4		FQ	#	-	-
	mV	0670	WL	06/23/2010	N001	5.20 - 12.20	115.8		FQ	#	-	-
	mV	0855	WL	06/23/2010	N001	6.00 - 11.00	152.9		F	#	-	-
pH	s.u.	0169	WL	06/24/2010	N001	3.13 - 18.13	7.13		F	#	-	-
	s.u.	0170	WL	06/24/2010	N001	92.23 - 112.23	7.12		F	#	-	-
	s.u.	0172	WL	06/24/2010	N001	6.98 - 31.98	7.05		F	#	-	-
	s.u.	0195	WL	06/22/2010	N001	5.29 - 25.29	6.91		F	#	-	-
	s.u.	0201	WL	06/22/2010	N001	7.35 - 22.35	6.78		F	#	-	-
	s.u.	0215	WL	06/24/2010	N001	6.84 - 21.84	7.31		F	#	-	-
	s.u.	0216	WL	06/24/2010	N001	5.50 - 20.50	7.57		F	#	-	-
	s.u.	0217	WL	06/22/2010	N001	7.40 - 22.40	6.75		F	#	-	-
	s.u.	0590	WL	06/22/2010	N001	5.21 - 19.21	6.61		F	#	-	-
	s.u.	0620	WL	06/24/2010	N001	6.70 - 10.70	7.21		F	#	-	-
	s.u.	0635	WL	06/24/2010	N001	12.00 - 17.00	6.98		F	#	-	-
	s.u.	0658	WL	06/23/2010	N001	0.50 - 5.50	6.82		F	#	-	-
	s.u.	0659	WL	06/23/2010	N001	0.50 - 10.50	7.11		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
pH	s.u.	0664	WL	06/23/2010	N001	7.70 - 14.70	7.01		F	#	-	-
	s.u.	0669	WL	06/23/2010	N001	4.00 - 10.60	6.86		FQ	#	-	-
	s.u.	0670	WL	06/23/2010	N001	5.20 - 12.20	7.01		FQ	#	-	-
	s.u.	0855	WL	06/23/2010	N001	6.00 - 11.00	6.68		F	#	-	-
Specific Conductance	umhos/cm	0169	WL	06/24/2010	N001	3.13 - 18.13	2006		F	#	-	-
	umhos/cm	0170	WL	06/24/2010	N001	92.23 - 112.23	3571		F	#	-	-
	umhos/cm	0172	WL	06/24/2010	N001	6.98 - 31.98	18443		F	#	-	-
	umhos/cm	0195	WL	06/22/2010	N001	5.29 - 25.29	1251		F	#	-	-
	umhos/cm	0201	WL	06/22/2010	N001	7.35 - 22.35	4554		F	#	-	-
	umhos/cm	0215	WL	06/24/2010	N001	6.84 - 21.84	2046		F	#	-	-
	umhos/cm	0216	WL	06/24/2010	N001	5.50 - 20.50	1160		F	#	-	-
	umhos/cm	0217	WL	06/22/2010	N001	7.40 - 22.40	3431		F	#	-	-
	umhos/cm	0590	WL	06/22/2010	N001	5.21 - 19.21	6616		F	#	-	-
	umhos/cm	0620	WL	06/24/2010	N001	6.70 - 10.70	6839		F	#	-	-
	umhos/cm	0635	WL	06/24/2010	N001	12.00 - 17.00	3503		F	#	-	-
	umhos/cm	0658	WL	06/23/2010	N001	0.50 - 5.50	3072		F	#	-	-
	umhos/cm	0659	WL	06/23/2010	N001	0.50 - 10.50	3355		F	#	-	-
	umhos/cm	0664	WL	06/23/2010	N001	7.70 - 14.70	2747		F	#	-	-
	umhos/cm	0669	WL	06/23/2010	N001	4.00 - 10.60	4164		FQ	#	-	-
	umhos/cm	0670	WL	06/23/2010	N001	5.20 - 12.20	2986		FQ	#	-	-
	umhos/cm	0855	WL	06/23/2010	N001	6.00 - 11.00	2971		F	#	-	-
Temperature	C	0169	WL	06/24/2010	N001	3.13 - 18.13	14.96		F	#	-	-
	C	0170	WL	06/24/2010	N001	92.23 - 112.23	17.76		F	#	-	-
	C	0172	WL	06/24/2010	N001	6.98 - 31.98	14.39		F	#	-	-
	C	0195	WL	06/22/2010	N001	5.29 - 25.29	12.66		F	#	-	-
	C	0201	WL	06/22/2010	N001	7.35 - 22.35	15.59		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Temperature	C	0215	WL	06/24/2010	N001	6.84 - 21.84	14.65		F	#	-	-
	C	0216	WL	06/24/2010	N001	5.50 - 20.50	14.59		F	#	-	-
	C	0217	WL	06/22/2010	N001	7.40 - 22.40	13.66		F	#	-	-
	C	0590	WL	06/22/2010	N001	5.21 - 19.21	13.01		F	#	-	-
	C	0620	WL	06/24/2010	N001	6.70 - 10.70	14.82		F	#	-	-
	C	0635	WL	06/24/2010	N001	12.00 - 17.00	12.98		F	#	-	-
	C	0658	WL	06/23/2010	N001	0.50 - 5.50	15.99		F	#	-	-
	C	0659	WL	06/23/2010	N001	0.50 - 10.50	16.29		F	#	-	-
	C	0664	WL	06/23/2010	N001	7.70 - 14.70	14.99		F	#	-	-
	C	0669	WL	06/23/2010	N001	4.00 - 10.60	16.95		FQ	#	-	-
	C	0670	WL	06/23/2010	N001	5.20 - 12.20	13.65		FQ	#	-	-
	C	0855	WL	06/23/2010	N001	6.00 - 11.00	16.24		F	#	-	-
Turbidity	NTU	0169	WL	06/24/2010	N001	3.13 - 18.13	1.30		F	#	-	-
	NTU	0170	WL	06/24/2010	N001	92.23 - 112.23	1.58		F	#	-	-
	NTU	0172	WL	06/24/2010	N001	6.98 - 31.98	1.91		F	#	-	-
	NTU	0195	WL	06/22/2010	N001	5.29 - 25.29	3.95		F	#	-	-
	NTU	0201	WL	06/22/2010	N001	7.35 - 22.35	1.07		F	#	-	-
	NTU	0215	WL	06/24/2010	N001	6.84 - 21.84	0.6		F	#	-	-
	NTU	0216	WL	06/24/2010	N001	5.50 - 20.50	1.98		F	#	-	-
	NTU	0217	WL	06/22/2010	N001	7.40 - 22.40	2.15		F	#	-	-
	NTU	0590	WL	06/22/2010	N001	5.21 - 19.21	2.46		F	#	-	-
	NTU	0620	WL	06/24/2010	N001	6.70 - 10.70	1.88		F	#	-	-
	NTU	0635	WL	06/24/2010	N001	12.00 - 17.00	9.23		F	#	-	-
	NTU	0658	WL	06/23/2010	N001	0.50 - 5.50	5.51		F	#	-	-
	NTU	0659	WL	06/23/2010	N001	0.50 - 10.50	4.26		F	#	-	-
	NTU	0664	WL	06/23/2010	N001	7.70 - 14.70	4.80		F	#	-	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0669	WL	06/23/2010	N001	4.00 - 10.60	21.4		FQ	#	-	-
	NTU	0670	WL	06/23/2010	N001	5.20 - 12.20	3.38		FQ	#	-	-
	NTU	0855	WL	06/23/2010	N001	6.00 - 11.00	2.48		F	#	-	-
Uranium	mg/L	0169	WL	06/24/2010	N001	3.13 - 18.13	0.018		F	#	2.9E-05	-
	mg/L	0170	WL	06/24/2010	N001	92.23 - 112.23	0.056		F	#	2.9E-05	-
	mg/L	0172	WL	06/24/2010	N001	6.98 - 31.98	0.062		F	#	2.9E-05	-
	mg/L	0195	WL	06/22/2010	N001	5.29 - 25.29	0.016		F	#	2.9E-05	-
	mg/L	0201	WL	06/22/2010	N001	7.35 - 22.35	0.074		F	#	0.00029	-
	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	0.034		F	#	8.8E-06	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	0.022		F	#	2.9E-05	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	0.120		F	#	0.00029	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	0.081		F	#	2.9E-05	-
	mg/L	0620	WL	06/24/2010	N001	6.70 - 10.70	0.065		F	#	2.9E-05	-
	mg/L	0635	WL	06/24/2010	N001	12.00 - 17.00	0.072		F	#	2.9E-05	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	0.069		F	#	0.00058	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	0.081		F	#	0.00029	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	0.088		F	#	0.00029	-
	mg/L	0664	WL	06/23/2010	N002	7.70 - 14.70	0.082		F	#	0.00029	-
	mg/L	0669	WL	06/23/2010	0001	4.00 - 10.60	0.140		FQ	#	0.00029	-
	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	0.290		FQ	#	0.00029	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	0.052		F	#	0.0029	-
	mg/L	0857	WL	01/04/2010	N001	19.00 - 23.00	0.110			#	1.2E-05	-
	mg/L	0857	WL	01/11/2010	N001	19.00 - 23.00	0.110			#	1.2E-05	-
	mg/L	0857	WL	01/18/2010	N001	19.00 - 23.00	0.110			#	1.2E-05	-
	mg/L	0857	WL	01/25/2010	N001	19.00 - 23.00	0.120			#	0.00029	-
	mg/L	0857	WL	02/01/2010	N001	19.00 - 23.00	0.110			#	0.00029	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0857	WL	02/15/2010	N001	19.00 - 23.00	0.110			#	0.00029	-
	mg/L	0857	WL	03/01/2010	N001	19.00 - 23.00	0.110			#	0.00029	-
	mg/L	0857	WL	03/14/2010	N001	19.00 - 23.00	0.100			#	0.00029	-
	mg/L	0857	WL	03/28/2010	N001	19.00 - 23.00	0.087			#	0.00029	-
	mg/L	0857	WL	04/04/2010	N001	19.00 - 23.00	0.086			#	0.00029	-
	mg/L	0857	WL	04/18/2010	N001	19.00 - 23.00	0.068			#	0.00029	-
Vanadium	mg/L	0215	WL	06/24/2010	N001	6.84 - 21.84	0.0026		F	#	4.6E-05	-
	mg/L	0216	WL	06/24/2010	N001	5.50 - 20.50	0.140		F	#	0.00015	-
	mg/L	0217	WL	06/22/2010	N001	7.40 - 22.40	2.300		F	#	0.0015	-
	mg/L	0590	WL	06/22/2010	N001	5.21 - 19.21	0.370		F	#	0.00015	-
	mg/L	0658	WL	06/23/2010	N001	0.50 - 5.50	52.000		F	#	0.03	-
	mg/L	0659	WL	06/23/2010	N001	0.50 - 10.50	4.000		F	#	0.0015	-
	mg/L	0664	WL	06/23/2010	N001	7.70 - 14.70	2.600		F	#	0.0015	-
	mg/L	0664	WL	06/23/2010	N002	7.70 - 14.70	2.600		F	#	0.0015	-
	mg/L	0669	WL	06/23/2010	0001	4.00 - 10.60	3.100		FQ	#	0.0015	-
	mg/L	0670	WL	06/23/2010	N001	5.20 - 12.20	1.400		FQ	#	0.0015	-
	mg/L	0855	WL	06/23/2010	N001	6.00 - 11.00	40.000		F	#	0.015	-
	mg/L	0857	WL	01/04/2010	N001	19.00 - 23.00	21.000			#	0.13	-
	mg/L	0857	WL	01/11/2010	N001	19.00 - 23.00	20.000			#	0.13	-
	mg/L	0857	WL	01/18/2010	N001	19.00 - 23.00	20.000			#	0.13	-
	mg/L	0857	WL	01/25/2010	N001	19.00 - 23.00	19.000			#	0.0015	-
	mg/L	0857	WL	02/01/2010	N001	19.00 - 23.00	19.000			#	0.0015	-
	mg/L	0857	WL	02/15/2010	N001	19.00 - 23.00	19.000			#	0.0015	-
	mg/L	0857	WL	03/01/2010	N001	19.00 - 23.00	19.000			#	0.0015	-
	mg/L	0857	WL	03/14/2010	N001	19.00 - 23.00	20.000			#	0.0015	-
	mg/L	0857	WL	03/28/2010	N001	19.00 - 23.00	17.000			#	0.0015	-

GROUNDWATER QUALITY DATA BY PARAMETER WITH DEPTH (USEE200) FOR SITE RFN01, Rifle New Processing Site
REPORT DATE: 9/13/2010 11:25 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Vanadium	mg/L	0857	WL	04/04/2010	N001	19.00 - 23.00	17.000			#	0.0015	-
	mg/L	0857	WL	04/18/2010	N001	19.00 - 23.00	14.000			#	0.0015	-

RECORDS: SELECTED FROM USEE200 WHERE site_code='RFN01' AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED >= #1/1/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LAB QUALIFIERS:

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

DATA QUALIFIERS:

F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.	J	Estimated value.
L	Less than 3 bore volumes purged prior to sampling.	N	Presumptive evidence that analyte is present. The analyte is "tentatively identified".	Q	Qualitative result due to sampling technique
R	Unusable result.	U	Parameter analyzed for but was not detected.	X	Location is undefined.

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